ecology & heritage partners

Final Report

Biodiversity Assessment, 892-990 Barwon Heads Road, Armstrong Creek

Prepared for

CGM Land Pty Ltd

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Ecology and Heritage Partners Pty Ltd

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GLOSSARY

Acronym	Description
AVW	Atlas of Victorian Wildlife
CaLP	*Catchment and Land Protection Act 1994*
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CMA	Catchment Management Authority
CMP	Conservation Management Plan
DBH	Diameter at Breast Height
DELWP	Victorian Department of Environment, Land, Water and Planning (formerly the Department of Environment and Primary Industries)
DoE	Federal Department of the Environment (former Department of Sustainability, Environment, Water, Population and Communities)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
FIS	Flora Information System
HabHa	Habitat Hectare
NES	National Environmental Significance
NVIM Tool	Native Vegetation Information Management Tool (DELWP)
PMST	Protected Matters Search Tool (DoE)
TRZ	Tree Retention Zone
VBA	Victorian Biodiversity Atlas (DELWP)

SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was commissioned by CGM Land Pty Ltd to conduct a Biodiversity Assessment at 892-990 Barwon Heads Road, Armstrong Creek (Keirl and Clancy properties). This assessment was undertaken to identify and characterise the vegetation on-site, determine the presence (or likelihood thereof) of any significant flora and fauna species and/or ecological communities and address any implications under Commonwealth and State environmental legislation.

Methods

A field assessment was undertaken on 27 January 2015 to obtain information on terrestrial flora and fauna values within the study area. A habitat hectare assessment was undertaken in conjunction with the flora survey. Vegetation within the study area was assessed according to the habitat hectare methodology, which is described in the Vegetation Quality Assessment Manual.

Results

Flora and Fauna

Based on habitat present within the study area, landscape context and the proximity of previous records, significant flora and fauna species are considered unlikely to occur within the study area.

Communities

Vegetation within the study area was consistent with the condition thresholds for one ecological community of State conservation significance (Western [Basalt] Plains Grasslands Community).

Permitted Clearing Assessment (the Guidelines)

The study area is within Location A, with 0.928 hectares of native vegetation proposed to be removed. As such, the permit application falls under the Low Risk-based pathway. The offset requirement for native vegetation removal is 0.203 General Biodiversity Equivalence Units (BEU).

Legislative and Policy Implications

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act - Federal)

The proposed action is unlikely to have a significant impact on any matter of National Environmental Significance (NES). As such, a referral to the Commonwealth Environment Minister is not recommended regarding biodiversity matters listed under the EPBC Act.

Flora and Fauna Guarantee Act 1988 (FFG Act - Victoria)

There is suitable habitat within the study area for several species listed or protected under the FFG Act and one listed ecological community is present. However the study area is privately owned, as such a permit under the FFG Act is not required.

Planning and Environment Act 1987

A Planning Permit from City of Greater Geelong is required to remove, destroy or lop any native vegetation. Areas of remnant native vegetation, Scattered Trees and habitat for rare or threatened species must be offset if they are proposed to be disturbed as part of the project.

In this instance, The Victorian Department of Environment, Land, Water and Planning (DELWP) is likely to be a mandatory referral authority as greater than 0.5 hectares of vegetation is likely to be removed within the study area.

Wildlife Act 1975 and Wildlife Regulations 2002 (Victoria)

Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*.

Catchment and Land Protection Act 1994

A number of weeds listed as noxious under the *Catchment and Land Protection Act 1994* were recorded during the assessment. Similarly, there is evidence that the study area is currently occupied by several pest fauna species listed under the *Catchment and Land Protection Act 1994*. Landowners are responsible for controlling any infestation of noxious weeds and pest fauna species to meet *Catchment and Land Protection Act 1994* requirements. A Weed Management Plan and pest fauna eradication plan may be required to fulfil these obligations as a condition of the planning permit for the project.

Water Act 1989

A 'works on waterways' permit from the Corangamite Catchment Management Authority may be required as a precautionary approach where an action has the potential to impact waterways adjoining the study area (Armstrong Creek).

Table S1. Application requirements for a permit to remove native vegetation (*Victoria Planning Provisions* Clause 52.17 -3; DEPI 2013a)

No.	Application Requirement	Response
Application requirements for all applications:		
1	The location of the site of native vegetation to be removed.	892-990 Barwon Heads Road, Armstrong Creek
2	A description of the native vegetation to be removed, including the area of the patch of native vegetation and/or the number of any scattered trees to be removed.	0.718 hectares of remnant vegetation and three scattered trees. Refer to Section 3.
3	Maps or plans containing information set out in the Guidelines, (Department of Environment and Primary Industries, September 2013)	Refer to Figures and BIOR report (Appendix 4.1).
4	Recent dated photographs of the native vegetation to be removed.	Refer to Section 3.
-	Topographic information, highlighting ridges, crests and hilltops, streams and waterways, slopes of more than 20 percent, drainage lines, low lying areas, saline discharge areas, and areas of existing erosion.	Refer to Section 1.3.
5	The risk-based pathway of the application to remove native vegetation.	Low risk-based pathway. Refer to Section 4.1.
6	Where the purpose of removal, destruction or lopping of native vegetation is to create defendable space, a statement is required that explains why removal, destruction or lopping of native vegetation is necessary. The statement must have regard to other available bushfire risk mitigation measures. This requirement does not apply to the creation of defendable space in conjunction with an application under the Bushfire Management Overlay.	The purpose of removal, destruction or lopping of native vegetation is not to create defendable space in conjunction with an application under the Bushfire Management Overlay.
7	A copy of any property vegetation plan that applies to the site.	A PVP does not apply to the study area.
8	Details of any other native vegetation that was permitted to be removed on the same property with the same ownership as the native vegetation to be removed, where the removal occurred in the five year period before the application to remove native vegetation is lodged.	No other native vegetation removal has been permitted within the same contiguous parcel of land during the last five years.
9	The strategic biodiversity score of the native vegetation to be removed.	0.656. Refer to Section 4.1 and BIOR report (Appendix 4).
10	The offset requirements should a permit be granted to remove native vegetation.	0.203 general BEU's. Refer to Section 4.2 and BIOR report (Appendix 4).

CONTENTS

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by CGM Land Pty Ltd to conduct a Biodiversity Assessment at 892-990 Barwon Heads Road, Armstrong Creek (Keirl and Clancy properties). The site is being considered for rezoning into the Urban Growth Zone (UGZ) for potential subdivision and residential development. This assessment was undertaken to inform ecological implications associated with the proposed action.

The purpose of the assessment was to identify the extent and type of remnant native vegetation present within the study area and to determine the presence of significant flora and fauna species and/or ecological communities. This report presents the results of the assessment and discusses the potential ecological and legislative implications associated with the proposed action. The report also provides recommendations to address or reduce impacts and, where necessary, highlights components that require further investigation, such as targeted surveys.

1.2 Scope and Objectives

The objectives of the flora and fauna assessment were to:

- Review the relevant flora and fauna databases and available literature;
- Conduct a site assessment to identify flora and fauna values within the study area;
- Provide maps showing any areas of remnant native vegetation and locations of any significant flora and fauna species, and/or fauna habitat (if present);
- Classify any flora and fauna species and vegetation communities identified or considered likely to occur within the study area in accordance with Commonwealth and State legislation;
- Document relevant environmental legislation and policy;
- Document any opportunities and constraints associated with the proposed works; and,
- Advise whether any additional flora and/or fauna surveys are required prior to works commencing (e.g. targeted surveys for significant flora and fauna species).

Where areas of remnant vegetation were present, the following tasks were completed to address requirements under the 'Permitted clearing of native vegetation - Biodiversity assessment guidelines' (the Guidelines) (DEPI 2013a):

- A habitat hectare assessment of any areas of remnant native vegetation within the study area; and,
- Recommendations to address requirements under the Guidelines (DEPI 2013a) to avoid and/or minimise impacts to remnant vegetation.

1.3 Study Area

The study area is located at 892-990 Barwon Heads Road in Armstrong Creek, approximately 10 kilometres south of Geelong (Figure 1). The site covers approximately 52 hectares consisting of two properties and is bound by Lake Road road reserve to the north, private land to the south and west and Barwon Heads Road to the east.

The study area comprises farming/grazing land, which is relatively flat, although the terrain does descend gently from slightly higher ground to the south and south west towards the Armstrong Creek channel. Several small drainage lines (a tributary of Armstrong Creek) occur in the north western corner of the study area.

According to the Victorian Department of Environment, Land, Water and Planning (DELWP) Biodiversity Interactive Map (DELWP 2015a), the study area occurs within the Victorian Volcanic Plain Bioregion. It is located within the jurisdiction of the Corangamite Catchment Management Authority (CMA) and the City of Greater Geelong municipality. Section 6.3.1 discusses zoning and overlays relevant to the study area.

2 METHODS

2.1 Nomenclature

Common and scientific names of vascular plants follow the Victorian Biodiversity Atlas (VBA) (DEPI 2014b) and the Census of Vascular Plants of Victoria (Walsh and Stajsic 2007). Vegetation community names follow DELWP's Ecological Vegetation Classes (EVC) benchmarks (DEWLP 2015d). The names of aquatic and terrestrial vertebrate and invertebrate fauna follow the VBA (DEPI 2011).

2.2 Desktop Assessment

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

- The DELWP Biodiversity Interactive Map (DELWP 2015a) for:
    - modelled data for location risk, remnant vegetation patches, scattered trees and habitat for rare or threatened species; and,
    - the extent of historic and current EVCs.
- The VBA (DEPI 2014b), Flora Information System (FIS) (Viridans 2013a) and Atlas of Victorian Wildlife (AVW) (Viridans 2013b) for previously documented flora and fauna records within the project locality;
- The Federal Department of Environment (DoE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DoE 2015);
- The DELWP Planning Maps Online to ascertain current zoning and environmental overlays (DEWLP 2015b);
- Aerial photography of the study area;
- Relevant environmental legislation and policies; and,
- Previous ecological assessments within the study area.

2.3 Flora Assessment

A flora assessment was undertaken on 27 January 2015 to obtain information on flora values within the study area. The study area was walked, with all observed flora species recorded, any significant records mapped and the overall condition of vegetation noted. Remnant vegetation in the local area was also investigated to assist in determining the pre-European vegetation within the study area.

EVCs were determined with reference to DELWP pre-1750 and extant EVC mapping (DELWP 2015a) and their published descriptions (DELWP 2015d). The significance assessment criteria of taxa and vegetation communities are presented in Appendix 1.

2.4 Fauna Assessment

A fauna assessment was undertaken on 27 January 2015 to obtain information on terrestrial fauna values within the study area. The study area was visually assessed and active searching under and around ground debris for reptiles, frogs and small mammals was undertaken. Binoculars were also used to scan the area for birds, and observers listened for calls and searched for other signs of fauna such as nests, remains of dead animals, droppings and footprints. Potential habitat for fauna was assessed, with a particular emphasis on habitats that may provide shelter, food or other resources for significant species.

2.5 Permitted Clearing Assessment (the Guidelines)

2.5.1 Risk-based Pathway

The planning system manages the impacts on biodiversity from native vegetation removal using a risk-based approach. Two factors – extent risk and location risk – are used to determine the risk associated with an application for a permit to remove native vegetation (Table 1). The extent risk is determined by the extent of native vegetation (in hectares) or the number of scattered trees that are proposed to be removed. The location risk (A, B or C) has been determined for all areas in Victoria and is available on DELWP's Native Vegetation Information Management (NVIM) Tool (DELWP 2015c). The risk-based pathway is determined by combining the extent risk and the location risk of the vegetation to be removed (Table 1). If the risk-based pathway for vegetation differs to that for scattered trees, the higher of the two must be applied.

Table 1. Risk-based pathways for applications to remove native vegetation (DEPI 2013a)

Extent*		Location		
		A	B	C
Native Vegetation	< 0.5 hectares	Low	Low	High
	≥ 0.5 hectares and < 1 hectare	Low	Moderate	High
	≥ 1 hectare	Moderate	High	High
Scattered Trees	< 15 scattered trees	Low	Moderate	High
	≥ 15 scattered trees	Moderate	High	High

* For the purpose of determining the risk-based pathway of an application to remove native vegetation the extent includes any other native vegetation that was permitted to be removed on the same contiguous parcel of land with the same ownership as the native vegetation to be removed, where the removal occurred in the five year period before an application to remove native vegetation is lodged.

2.5.2 Vegetation Assessment

The 'habitat hectare' is a unit of measurement which combines the condition and extent of native vegetation. The methodology for undertaking a habitat hectare assessment is described in the Vegetation Quality Assessment Manual (DSE 2004) and summarised in Table 2.

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. Under the Biodiversity Assessment Guidelines, native vegetation is classified into two categories, remnant patches of native vegetation and scattered trees (Table 2).

For Low Risk-based pathways:

- The extent (in hectares) of native vegetation is determined by a site assessment; and,
- The condition of native vegetation is based on modelled data (although a proponent may commission on-ground assessments), available on DELWP's NVIM Tool (DELWP 2015c).

For Moderate and High Risk-based pathways:

- Extent (in hectares) and condition score are calculated based on a detailed habitat hectare assessment conducted by a qualified ecologist.

Table 2. Assessment of remnant native vegetation under Moderate and High Risk-based pathways (DEPI 2013a)

Category	Definition	Extent	Condition
Remnant patch of native vegetation	An area of native vegetation where at least 25 per cent of the total perennial understorey plant cover is native plants. OR An area with three or more native canopy trees where the canopy foliage cover is at least 20 per cent of the area.	Measured in hectares. Based on hectare area of the remnant patch.	Vegetation Quality Assessment Manual (DSE 2004).
Scattered tree	A native canopy tree that does not form part of a patch.	Measured in hectares. Each scattered tree is assigned an extent of 0.071 hectares (30m diameter).	Scattered trees are assigned a default condition score of 0.2.

2.5.3 Avoid and Minimise

Avoid and minimise requirements are summarised in Table 3. The impact avoidance and minimisation measures are discussed in Section 7.

Table 3. Avoid, minimise and offset requirements

Risk-based Pathway	Avoid	Minimise	Offset
Low	X	X	✓
Moderate	X	✓	✓
High	✓*	✓	✓

*Where native vegetation makes a significant contribution to Victoria's biodiversity

2.5.4 Offset

When the removal of native vegetation has a significant impact on habitat for a rare or threatened species[1], the offset must compensate for the removal of that species' habitat. Offsets are divided into two categories: General and Specific. General offsets are based on the contribution a site makes to biodiversity overall, while Specific offsets consider the contribution a site makes to the persistence of rare or threatened species.

[1] Only species listed as 'critically endangered', 'endangered', 'vulnerable' or 'rare' on DEPI's advisory lists (DSE 2005; DSE 2013) for flora and fauna are considered a rare or threatened species.

General offsets require an offset multiplier (Risk Factor) of 1.5 with restrictions on location (same CMA boundary or municipal district) and biodiversity value (strategic biodiversity score at least 80% that of the vegetation to be removed). A Specific offset requires an offset multiplier of 2, with no location or biodiversity value restrictions, and must support habitat for each rare or threatened species for which an offset is required (currently designated by DELWP).

The tools used to determine offset obligations are summarised in Appendix 1.5.1, and offset site criteria are summarised in Appendix 1.5.2.

2.5.5 Biodiversity Impact and Offset Requirements (BIOR) Report

The offset requirements for native vegetation removal are calculated by DELWP, based on the vegetation condition scores determined during the biodiversity assessment (Appendix 2.3). The resulting Biodiversity Impact and Offset Requirements report (BIOR) produced by DELWP is presented in Appendix 4.

2.6 Assessment Qualifications and Limitations

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

The 'snap shot' nature of a standard flora and fauna assessment reduces the likelihood of mobile, migratory, seasonal, cryptic, nocturnal or uncommon species being detected. Generally, targeted or repeated surveys, at specific times of the year, are required to detect such species.

Notwithstanding the above, terrestrial flora and fauna data collected during the field assessment, and information obtained from relevant sources (e.g. biological databases and relevant literature) are considered adequate to provide an accurate assessment of the ecological values within the study area.

Flora and fauna surveys were conducted under the Ecology and Heritage Partners Pty Ltd Research Permit (#10006893) issued by DELWP under the *Wildlife Act 1975*.

3 RESULTS

3.1 Vegetation

DELWP modelled (pre-1750) EVC mapping for the region shows that the study area would have predominantly been dominated by Plains Grassland (EVC 132) with a small band of Plains Sedgy Wetland (EVC 647) in the south east corner. Extant (2005) DELWP mapping shows the study area to be largely devoid of remnant vegetation, with only scattered patches of Plains Grassland present (DELWP 2015a).

The field assessment recorded one EVC, Plains Grassland (EVC 132) in a highly modified condition within the study area (Figure 2). Two small patches of Plains Grassy Woodland (EVC 55) were recorded outside the study area on the southern and northern boundaries (Figure 2). Both EVCs are listed as Endangered in the Victoria Volcanic Plain bioregion.

The study area supports four broad vegetation and habitat types: native grassland, introduced grassland, scattered trees and farm dams. These are discussed in further detail below.

3.2 Native Grassland

3.2.1.1 Vegetation Condition

Based on the field assessment, native grassland within the study area is consistent with the Plains Grassland EVC. Plains Grassland is described as treeless vegetation mostly less than one metre tall, and dominated by graminoid (grass-like) and herb life-forms (DELWP 2015d).

Remnant vegetation was restricted to the north east of the study area adjacent to the Lake Road road reserve. The vegetation consisted of two small and highly modified patches of Plains Grassland persisting within the open paddock (Figure 2). The patches were highly simplified consisting of only wallaby-grasses including Bristly Wallaby-grass *Rytidosperma setacea* and Slender Wallaby-grass *R. racemosa* (Plate 1 and 2).

3.2.1.2 Fauna Habitat

Native grassland within the study area provides low quality habitat to the majority of native fauna species. Given the modified nature of this habitat, it is likely to support common bird species which are adapted to modified landscapes including Australian Magpie *Gymnorhina tibicen*, Little Raven *Corvus mellori*, Red-rumped Parrot *Psephotus haematonotus*, Crested Pigeon *Ocyphaps lophotes*, Magpie-lark *Grallina cyanoleuca* and Masked Lapwing *Vanellus miles* which were all observed within the study area during the assessment.

Native grassland can also support locally common ground-dwelling mammals, frogs and reptile species and may provide suitable dispersal habitat for more mobile fauna moving through the study area, enhancing landscape connectivity in the local area between preferred habitats.

Plate 1. Plains Grassland within the study area (Photo: EHP 27/01/2015)

Plate 2. Plains Grassland within the study area (Photo: EHP 27/01/2015)

3.2.2 Introduced Grassland

3.2.2.1 Vegetation Condition

The majority of the study area was dominated by introduced pasture grasses and other exotic weed species including Cocksfoot *Dactylis glomerata*, Perennial Rye-grass *Lolium perenne*, Barley Grass *Hordeum leporinum* and Toowoomba Canary-grass *Phalaris aquatica* (Plate 3 & 4). Areas of introduced grassland are considered to be in poor condition as they support a high number of introduced species, many of which are highly invasive (Gorse *Ulex europaeus*, Spear Thistle *Cirsium vulgare*, African Box-thorn *Lycium ferocissimum*).

Plate 3. Introduced pasture grass and exotic weed species (Photo: EHP 27/01/2015)

Plate 4. Introduced pasture grass and exotic weed species (Photo: EHP 27/01/2015)

3.2.2.2 Fauna Habitat

Introduced grassland is considered to be of low value for fauna, however may be utilised by birds adapted to open areas, such as Australian Magpie, Little Raven and Willie Wagtail *Rhipidura leucophrys*. Australian White Ibis *Threskiornis moluccus* are also likely to forage within this habitat after extended rainfall.

Diurnal and nocturnal raptors including Brown Falcon *Falco berigora*, Black-shouldered Kite *Elanus axillaris* and Nankeen Kestrel *Falco cenchroides* will commonly forage over open areas given the high degree of visibility on prey items.

Introduced mammal; European Rabbit *Oryctolagus cuniculus*, European Hare *Lepus europaeus*, Red Fox Vulpes Vulpes and, bird species; Common Starling *Sturnus vulgaris* and Common Myna *Acridotheres tristis* are likely to utilise this habitat for dispersal and foraging purposes on a regular basis.

3.2.3 Scattered Trees

3.2.3.1 Vegetation Condition

Two scattered River Red-gum *Eucalyptus camaldulensis* trees were recorded within the study area (Plate 5 & 6) (Figure 2). An additional six scattered trees were recorded within the Barwon Heads Road reserve and an additional two scattered trees were recorded just outside the property boundary (northern and southern boundary fence) (Appendix 2.4). Several planted tree species were also present around the existing dwellings and along fence line including Sugar Gums *Eucalyptus cladocalyx* and Monterey Cypress *Cupressus macrocarpa*

Plate 5. Scattered River Red-gum within the study area (Photo: EHP 27/01/2015)

Plate 6. Scattered River Red-gum within the study area (Photo: EHP 27/01/2015)

3.2.3.1 Fauna Habitat

Scattered remnant trees provide moderate quality habitat for native fauna. This habitat provides an important resource for more mobile tree-dependent fauna, especially local bird species. Many of the scattered eucalypts are relatively mature, with larger trees providing several small hollows, bark fissures and crevices. Hollow-bearing trees are likely to be used for shelter and nesting by a range of hollow-dependent fauna including birds, microbats and possums. Scattered trees also provide foraging habitat for insectivorous and nectivorous birds as well as vantage points and nesting areas for diurnal and nocturnal raptors. While the understorey layer was highly modified, fallen debris and leaf litter may provide temporary refuge and dispersal habitat for local reptiles (i.e. snakes and skinks) and frog species.

Species observed utilising scattered trees within the study area included; Australian Magpie, Little Raven, Magpie-lark, Galah *Eolophus roseicapilla*, Grey-Shrike-thrush *Colluricincla harmonica,* White-plumed Honeyeater *Lichenostomus penicillatus* and New Holland Honeyeater *Phylidonyris novaehollandiae.*

3.2.4 Farm Dams

3.2.4.1 Vegetation Condition

Two farms dams were identified within the study area. The dams were both dry at the time of the assessment and were largely void of vegetation (Plate 7 & 8; Figure 2). The introduced matt-forming grass Kikuyu *Pennisetum clandestinum* was identified recolonising the floor of the dam adjacent to the dwelling in the centre of the property, while the dam adjacent to Barwon Heads Road consisted mostly of bare ground and scattered rocks.

Plate 7. Farm dam adjacent to the dwelling (Photo: EHP 27/01/2015)

Plate 8. Farm dam adjacent to Barwon Heads Road (Photo: EHP 27/01/2015)

3.2.4.2 *Fauna Habitat*

Farm dams within the study area provide low quality habitat to native fauna. Given the majority of farm dams had been heavily grazed (i.e. showing visual signs of pugging) and were dry at the time of the survey, they are unlikely to support suitable habitat for any threatened frog species (i.e. Growling Grass Frog *Litoria raniformis*), as there is a lack of preferred habitat characteristics including permanent water levels, a sufficient level of cover for emergent, submergent and floating aquatic vegetation, and the availability of refuge sites.

However, after extended rainfall these dams may act as stepping stone habitat or may provide adequate breeding and foraging habitat for locally common frog species, including Common Froglet *Crinia signifera*, Southern Brown Tree Frog *Litoria ewingii*, Striped Marsh Frog *Limnodynastes peronii*, Spotted Marsh Frog *Limnodynastes tasmaniensis* and Common Spadefoot Toad *Neobatrachus sudelli*.

Similarly, locally common bird species which are adapted to wetland habitats and likely to forage within these farm dams during suitable conditions include Australian White Ibis, Straw-necked Ibis *Threskiornis spinicollis*, Pacific Black Duck *Anas superciliosa* and Australian Wood Duck *Chenonetta jubata*.

3.3 National Significance Assessment

National significance for flora and fauna is defined in Appendix 1.2.

3.3.1 Flora

The VBA and FIS contain records of six nationally listed flora species previously recorded within 10 kilometres of the study area (DEPI 2014b; Viridans 2013a) (Appendix 2.2; Figure 3). The PMST nominated an additional seven nationally significant species which have not been recorded in the locality but have the potential to occur (DoE 2015).

Based on habitat present within the study area, landscape context and the proximity of previous records, nationally significant flora species are considered unlikely to occur within the study area (Appendix 2.2).

3.3.2 Fauna

The VBA and AVW contain records of 20 nationally listed fauna species previously recorded within 10 kilometres of the study area (DEPI 2014b; Viridans 2013b) (Appendix 3.1; Figure 4). The PMST nominated an additional eight nationally significant species which have not been recorded in the locality but have the potential to occur (DoE 2015).

Grey-headed Flying-fox *Pteropus poliocephalus* may occasionally use River Red-gums within the study area as a potential foraging resource; however, it is unlikely that this species would reside within the study area for extended periods or on an annual basis. Swift Parrot *Lathamus discolor* may fly over the study area on an occasional basis for feeding or roosting purposes (Appendix 3.2).

Detailed targeted surveys for Growling Grass Frog *Litoria raniformis* have previously been undertaken throughout the local area as part of the Horseshoe Bend, Western Employment Precinct and Marshall Precinct Structure Plans associated with the Armstrong Creek Growth Area (Ecology Partners Pty Ltd 2011a; 2011b and Ecology and Heritage Partners Pty Ltd 2012). However, based on the results of the field assessment, lack of connectivity to known sites and the paucity of records within the local area, there is a low likelihood of occurrence for this species within the study area for breeding or foraging purposes.

Based on habitat present within the study area, landscape context and the proximity of previous records, additional nationally significant fauna species are considered unlikely to occur within the study area (Appendix 3.1).

3.3.3 Communities

No nationally listed ecological communities were recorded within the study area.

Five nationally listed ecological communities are predicted to occur within 10 kilometres of the study area (DoE 2015):

- Giant Kelp Marine Forests of South East Australia;
- Grassy Eucalypt Woodland of the Victorian Volcanic Plain;
- Natural Temperate Grassland of the Victorian Volcanic Plain;
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains; and,
- White Box-Yellow Box-Blakely's red Gum Grassy Woodland and Derived Native Grassland.

Vegetation within the study area did not meet the condition thresholds that define these communities.

3.4 State Significance Assessment

State significance for flora and fauna is defined in Appendix 1.2.

3.4.1 Flora

The VBA and FIS contain records of 24 State-significant flora species within 10 kilometres of the study area (DEPI 2014b; Viridans 2013a) (Appendix 2.2; Figure 3).

Based on habitat present within the study area, landscape context and the proximity of previous records, State-significant flora species are considered unlikely to occur within the study area (Appendix 2.2).

3.4.2 Fauna

No State-significant fauna species were recorded within the study area during the field assessment. The VBA and AVW contain records of 48 State-significant fauna species within 10 kilometres of the study area (DEPI 2014b; Viridans 2013b) (Appendix 3.1; Figure 4).

Given the landscape context and the proximity of previous records to the study area, State-significant fauna species are considered unlikely to occur within the study area on a permanent basis as no suitable habitat is present (Appendix 3.1).

3.4.3 Communities

Vegetation within the study area was consistent with the condition thresholds for Western (Basalt) Plains Grasslands Community as it corresponds to the Plains Grassland EVC which was recorded within the study area (Figure 2).

3.5 Regional Significance Assessment

Regional significance for fauna is defined in Appendix 1.2.

No regionally significant fauna species were recorded within the study area during the field assessment. The VBA and AVW contain records of 19 regionally significant fauna species within 10 kilometres of the study area (DEPI 2014b; Viridans 2013b) (Appendix 3.1; Figure 4).

Given the landscape context and the proximity of previous records to the study area, regionally significant fauna species are considered unlikely to occur within the study area on a permanent basis as no suitable habitat is present (Appendix 3.1).

4 PERMITTED CLEARING ASSESSMENT

4.1 Risk-based Pathway

A broad development plan has been prepared for this site including the approximate location of an intersection with Barwon Heads Road. At this stage, scattered trees within the property can be avoided through detailed design, however, the remnant patches identified within the study area are likely to be removed. Three scattered trees within the road reserve are also likely to be removed based on the location of the proposed Barwon Heads Road intersection. A permitted clearance assessment has been undertaken based on these proposed removals.

The study area is within Location A, with 0.928 hectares of native vegetation proposed to be removed. As such, the permit application falls under the Low Risk-based pathway. A summary of proposed vegetation losses is presented in Table 4.

4.2 Offset Targets

The offset requirement for native vegetation removal is 0.203 General Biodiversity Equivalence Units (BEU). The *Biodiversity Impact and Offset Requirements* (BIOR) report containing details of the offset requirements and other relevant information is presented in Appendix 4. A summary of offsets for proposed vegetation losses is presented in Table 4.

Table 4. Permitted Clearing Assessment (the Guidelines)

Risk	Risk-based pathway	Low
Vegetation to be removed	Total Extent	0.928
	Remnant Patch (ha)	0.718
	Scattered Trees (no.)	3
	Location Risk	A
	Strategic Biodiversity Score	0.656
Offset requirements	General Offsets Required (BEU)	0.203
	Specific Offsets Required (BEU)	NA
	Vicinity (catchment / LGA)	Corangamite CMA / City of Greater Geelong
	Minimum Strategic Biodiversity Score*	0.525

Note: BEU = Biodiversity Equivalence Units

5 POTENTIAL IMPACTS

The proposed action is likely to directly impact on several indigenous flora and fauna species, and communities recorded within the study area. These impacts may include:

- The removal of one endangered EVC (Plains Grassland);
- Loss of habitat and potential mortality for locally common fauna species associated with remnant scattered trees (e.g. Common Brush-tailed Possum *Trichosurus vulpecula*, Red-rumped Parrot, Rainbow Lorikeet *Trichoglossus haematodus*), and leaf litter and other ground debris (e.g. lizards, snakes, frogs and invertebrates) for foraging, shelter, roosting or nesting;
- Loss of habitat and potential mortality for locally common fauna species dependent on wetlands or inundated areas for foraging, shelter or nesting (e.g. frogs and wetland associated birds);
- Potential for the spread of weeds and soil pathogens due to on-site activities;
- Disturbance to wildlife from increased human activity and noise during construction; and,
- Indirect impacts on adjacent areas if construction activities and drainage are not appropriately managed.

Measures to avoid, mitigate and offset the above noted impacts are provided in Section 7.

6 LEGISLATIVE AND POLICY IMPLICATIONS

This section identifies biodiversity policy and legislation relevant to the proposed development, principally:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth);
- *Flora and Fauna Guarantee Act 1988* (FFG Act) (Victoria);
- *Planning and Environment Act 1987* (Victoria);
    - Local Planning Schemes;
    - Victoria's Native Vegetation Permitted Clearing Regulations.
- *Wildlife Act 1975* and Wildlife Regulations 2002 (Victoria); and,
- *Catchment and Land Protection Act 1994* (CALP Act) (Victoria).

6.1 *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)

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

- World Heritage properties;
- National heritage places;
- Ramsar wetlands of international significance;
- Threatened species and ecological communities;
- Migratory and marine species;
- Commonwealth marine area;
- Nuclear actions (including uranium mining);
- Great Barrier Reef Marine Park; or,
- Water resources impacted by coal seam gas or mining development.

6.1.1 Ramsar wetlands of international significance

The study area occurs approximately 1.7 kilometres upstream of the Port Phillip Bay (western shoreline) and Bellarine Ramsar wetland (DoE 2015). This Ramsar wetland is unlikely to be impacted as the nearest components (Reedy Lake, Salt Swamp and Lake Connewarre) are situated a considerable distance (i.e. greater than 1.5 kilometres) from the proposed action; however, there is a potential for sedimentation run-off via Armstrong Creek to impact this Ramsar wetland system if not managed appropriately.

Provided management practices and construction techniques are consistent with the current on-site practices within the Waralilly Estate and inclusive of measures outlined within the Construction Techniques for Sediment Pollution Control (EPA 1991) and Environmental Guidelines for Major Construction Sites (EPA 1996), the project is unlikely to affect the ecological character of this Ramsar wetland.

6.1.2 Threatened species and ecological communities

Flora: No flora species listed under the EPBC Act were recorded within the study area during the field assessment and there is no suitable habitat within the study area (Section 3.3.1).

Fauna: No fauna species listed under the EPBC Act were recorded within the study area during the field assessment. There is potentially suitable foraging habitat within the study area for two fauna species listed under the EPBC Act (Grey-headed Flying-fox and Swift Parrot) (Section 3.3.2). The study area forms a very small part of a significantly large foraging range for both species and is not considered significant in the context of the surrounding landscape and broader locality.

Communities: No ecological communities listed under the EPBC Act were recorded within the study area (Section 3.3.3).

6.1.3 Migratory and marine species

A total of 115 Migratory and/or Marine species have been recorded within 10 kilometres of the study area (DEPI 2014b). However, the study area would not be classed as an 'important habitat' as defined under the EPBC Act Policy Statement 1.1 Principal Significant Impact Guidelines (DoE 2015).

6.1.4 Implications

The proposed action is unlikely to have a significant impact on any matter of NES. As such, a referral to the Commonwealth Environment Minister is not recommended regarding biodiversity matters listed under the EPBC Act.

6.2 *Flora and Fauna Guarantee Act 1988* (Victoria)

The FFG Act is the primary Victorian legislation providing for the conservation of threatened species and ecological communities, and for the management of processes that are threatening to Victoria's native flora and fauna. The FFG Act contains protection procedures such as the listing of threatened species and/or communities, and the preparation of action statements to protect the long-term viability of these values.

Proponents are required to apply for an FFG Act Permit to 'take' listed and/or protected[2] flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

Flora: Several 'protected' flora species (Indigenous species representative of the Plains Grassland EVC) were recorded within the study area during the field assessment (Section 3.3.1 and 3.4.1).

Fauna: No fauna species listed under the FFG Act were recorded within the study area during the field assessment. There is potentially suitable foraging habitat within the study area for two fauna species listed under the FFG Act (Grey-headed Flying-fox and Swift Parrot) (Section 3.3.2 and 3.4.2).

Communities: One ecological community listed under the FFG Act (Western (Basalt) Plains Grasslands Community) was recorded within the study area (Section 3.4.3).

Threatening processes: The following threatening processes listed under the FFG Act should be considered in relation to the proposed development:

- Alteration to the natural flow regimes of rivers and streams;
- Degradation of native riparian vegetation along Victorian rivers and streams;
- Increase in sediment input into Victorian rivers and streams due to human activities;
- Invasion of native vegetation by 'environmental weeds'.
- Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing.
- Input of toxic substances into Victorian rivers and streams; and,
- Reduction in biodiversity resulting from Noisy Miner (*Manorina melanocephala*) populations in Victoria.

6.2.1 Implications

The local planning authority may consider flora, fauna and communities listed under the FFG Act when making decisions regarding the use and development of land.

There is suitable habitat within the study area for several species listed or protected under the FFG Act and one listed ecological community is present. However the study area is privately owned, as such a permit under the FFG Act is not required.

[2] In addition to 'listed' flora species, the FFG Act identifies 'protected' flora species. This includes any of the Asteraceae (Daisies), all orchids, ferns (excluding *Pteridium esculentum*) and Acacia species (excluding *Acacia dealbata*, *Acacia decurrens*, *Acacia implexa*, *Acacia melanoxylon* and *Acacia paradoxa*), as well as any taxa that may be a component of a listed ecological community. A species may be both listed and protected.

6.3 *Planning and Environment Act 1987* (Victoria)

The *Planning and Environment Act 1987* outlines the legislative framework for planning in Victoria and for the development and administration of planning schemes.

All planning schemes contain native vegetation provisions at Clause 52.17 which require a planning permit from the relevant local Council to remove, destroy or lop native vegetation on a site of more than 0.4 hectares, unless an exemption under clause 52.17-7 of the Victorian Planning Schemes applies (Appendix 1.5.3) or a subdivision is proposed with lots less than 0.4 hectares[3]. Local planning schemes may contain other provisions in relation to the removal of native vegetation (Section 6.3.1).

Where the clearing of native vegetation is permitted, the quantity and type of vegetation to be offset is determined using methodology specified in the Guidelines (DEPI 2013a).

6.3.1 Local Planning Schemes

The study area is located within the City of Greater Geelong municipality and is currently zoned Farming Zone (FZ). No environmental overlays currently apply to the site (DELWP 2015b).

6.3.1.1 Implications

A Planning Permit from City of Greater Geelong is required to remove, destroy or lop any native vegetation.

6.3.2 The Guidelines

In December 2013 the Victorian Government integrated the 'Permitted clearing of native vegetation - Biodiversity assessment guidelines' (the Guidelines) (DEPI 2013a) into the Victorian Planning Provisions, replacing the *Victoria's Native Vegetation Management – A Framework for Action* (The Framework) (NRE 2002). The primary objective of the regulations is "no net loss in the contribution made by native vegetation to Victoria's biodiversity". The State Planning Policy Framework and the decision guidelines at Clause 52.17 (Native Vegetation) of Particular Provisions and Clause 12.01 require Planning and Responsible Authorities to have regard for the Biodiversity Assessment Guidelines.

In addition, a permit must be referred to DELWP if vegetation removal meets one or more of the below thresholds (Table 5).

Table 5. Permit to remove native vegetation – application referral triggers (Clause 66, Referral and Notice Provisions)

Native Vegetation	• Remove, destroy or lop native vegetation where the area to be cleared is 0.5 hectares or more
	• Remove, destroy or lop native vegetation which is to be considered under the High Risk-based pathway
Other Circumstances	• Remove, destroy or lop native vegetation if a property vegetation plan applies to the site
	• Remove, destroy or lop native vegetation on Crown land which is occupied or managed by the responsible authority (DELWP)

[3] In accordance with the Victorian Civil and Administrative Tribunal's (VCAT) decision Villawood v Greater Bendigo CC (2005) VCAT 2703 (20 December 2005) all native vegetation is considered lost where proposed lots are less than 0.4 hectares in area and must be offset at the time of subdivision.

6.3.2.1 Implications

Areas of remnant native vegetation, Scattered Trees and habitat for rare or threatened species must be offset if they are proposed to be disturbed as part of the project. The results of the permitted clearing assessment under the Guidelines are presented in Section 4.

In this instance, DELWP is likely to be a mandatory referral authority as greater than 0.5 hectares of vegetation is likely to be removed within the study area.

6.4 *Wildlife Act 1975* and Wildlife Regulations 2002 (Victoria)

The *Wildlife Act 1975* (and associated Wildlife Regulations 2002) is the primary legislation in Victoria providing for protection and management of wildlife. The Act requires people engaged in wildlife research (e.g. fauna surveys, salvage and translocation activities) to obtain a permit under the Act to ensure that these activities are undertaken in a manner consistent with the appropriate controls.

The *Wildlife Act 1975* has the following objectives:

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

6.4.1 Implications

Authorisation for habitat removal may be obtained under the *Wildlife Act 1975* through a licence granted under the *Forests Act 1958*, or under any other Act such as the *Planning and Environment Act 1987*. Any persons engaged to remove, salvage, hold or relocate native fauna during construction must hold a current Management Authorisation under the *Wildlife Act 1975*.

6.5 *Catchment and Land Protection Act 1994* (Victoria)

The *Catchment and Land Protection Act 1994* (CaLP Act) contains provisions relating to catchment planning, land management, noxious weeds and pest animals. The Act also provides a legislative framework for the management of private and public land and sets out the responsibilities of land managers, stating that they must take all reasonable steps to:

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

6.5.1 Implications

A number of weeds listed as noxious under the CaLP Act were recorded during the assessment (Gorse *Ulex europaeus*, Spear Thistle *Cirsium vulgare*, African Box-thorn *Lycium ferocissimum*) (Appendix 2.1). Similarly, there is evidence that the study area is currently occupied by several pest fauna species listed under the CaLP Act (European Rabbit, European Hare and Red Fox). Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species. To meet CaLP Act requirements listed noxious weeds should be appropriately controlled throughout the study area to minimise their spread and impact on ecological values, and a Weed Management Plan may be required. A pest fauna eradication plan may also be required.

6.6 *Water Act 1989* (Victoria)

The purposes of the *Water Act 1989* are manifold but (in part) relate to the orderly, equitable, efficient and sustainable use of water resources within Victoria. This includes the provision of a formal means of protecting and enhancing environmental qualities of waterways and their in-stream uses as well as catchment conditions that may affect water quality and the ecological environments within them.

6.6.1 Implications

Given the study area is in proximity to Armstrong Creek and subsequently Ramsar wetlands of significance downstream, a 'works on waterways' permit from the Corangamite CMA may be required as a precautionary approach where an action has the potential to impact a waterway within or adjoining the study area.

7 MITIGATION MEASURES

Any loss of ecological values should be viewed in the overall context of on-going loss, fragmentation, and deterioration in the quality of remnant vegetation throughout the greater Victorian Volcanic Plain bioregion.

The current proposal falls under the Low Risk-based pathway. As such, the application is not required to demonstrate measures to avoid or minimise impacts (although these should be considered, where possible), however an offset must be identified that satisfies requirements outlined in Section 4.2.

7.1 Avoid Impacts

Under the High Risk-based pathway the Guidelines require the relevant authorities to consider whether reasonable steps have been taken to avoid impacts to 'native vegetation that makes a significant contribution to Victoria's biodiversity'. Although this is not a requirement for Low and Moderate Risk-based pathway applications, impact avoidance should regardless be considered, where possible. This includes considering:

- Impacts on important habitat for rare or threatened species, particularly highly localised habitat;
- Proportional impacts on remaining habitat for rare or threatened species;
- If the removal of the native vegetation will contribute to a cumulative impact that is a significant threat to the persistence of a rare or threatened species; and,
- The availability of, and potential for, gain from offsets.

7.2 Minimise Impacts

For the removal of vegetation that falls under the Moderate and High Risk-based pathways, the Guidelines require the relevant authorities to consider whether reasonable steps have been taken to ensure that impacts of the proposed removal of native vegetation on biodiversity have been minimised. Reasonable steps are considered to have been taken when one of the following applies:

- The site has been the subject of a comprehensive DELWP supported regional or landscape scale strategic planning process that has resulted in minimising adverse impacts on biodiversity from the removal of native vegetation; or,
- Opportunities have been taken to locate, design and manage the proposed use or development to minimise impacts on biodiversity from the removal of native vegetation, and there is sufficient evidence that any further actions to minimise impacts on biodiversity from the removal of native vegetation will undermine the key objectives of the proposal or materially increase the cost of the proposal.

Recommended measures to minimise impacts upon terrestrial and aquatic values present within the study area may include:

- Appropriate consideration in planning processes and expert input into project design or management. Project planning should include consideration of Water Sensitive Urban Design techniques such as stormwater treatment wetlands, bio-retention systems, porous paving or swales;
- Minimise impacts to native vegetation and habitats through construction and micro-siting techniques, including fencing retained areas of native vegetation. If indeed necessary, trees should be lopped or trimmed rather than removed. Similarly, soil disturbance and sedimentation within wetlands should be avoided or kept to a minimum, to avoid, or minimise impacts to fauna habitats;
- All contractors should be aware of ecologically sensitive areas to minimise the likelihood of inadvertent disturbance to areas marked for retention. Habitat Zones (areas of sensitivity) should be included as a mapping overlay on any construction plans;
- Tree Retention Zones (TRZs) should be implemented to prevent indirect losses of native vegetation during construction activities (DSE 2010). See Appendix 1.6;
- Removal of any habitat trees or shrubs (particularly hollow-bearing trees) should be undertaken between February and September to avoid the breeding season for the majority of fauna species. If any habitat trees or shrubs are proposed to be removed, this should be undertaken under the supervision of an appropriately qualified zoologist to salvage and translocate any displaced fauna. A Fauna Management Plan may be required to guide the salvage and translocation process;
- Where possible, construction stockpiles, machinery, roads, and other infrastructure should be placed away from areas supporting native vegetation, LOTs and/or wetlands;
- Ensure that best practice sedimentation and pollution control measures are undertaken at all times, in accordance with Environment Protection Agency guidelines (EPA 1991; EPA 1996; Victorian Stormwater Committee 1999) to prevent offsite impacts to waterways and wetlands; and,
- As indigenous flora provides valuable habitat for indigenous fauna, it is recommended that any landscape plantings that are undertaken as part of the proposed works are conducted using indigenous species sourced from a local provenance, rather than exotic deciduous trees and shrubs.

In addition to these measures, the following documents should be prepared and implemented prior to any construction activities:

- Construction Environmental Management Plan (CEMP). The CEMP should include specific species/vegetation conservation strategies, daily monitoring, sedimentation management, site specific rehabilitation plans, weed and pathogen management measures, etc. and,
- Weed Management Plan. This plan should follow the guidelines set out in the CaLP Act, and clearly outline any obligations of the project team in relation to minimising the spread of weeds as a result of this project. This may include a pre-clearance weed survey undertaken prior to any construction activities to record and map the locations of all noxious and environmental weeds.

7.3 Offset Impacts

7.3.1 State (The Guidelines)

7.3.1.1 Offset Criteria

The Guidelines require offsetting as the final step in considering the impacts of development on native vegetation. Emphasis is placed on avoiding (High Risk) and minimising impacts, and only after these steps have been taken should offsets (actions undertaken to achieve commensurate gains) be considered.

Offset targets must be met, as specified in Section 4.2. In determining the appropriate offset responses for permitted vegetation clearance, the Guidelines set out several criteria which must be considered for any offset site. These criteria are presented in Appendix 1.5.

7.3.1.2 Offset Management Strategy

Potential offsets may be sourced using the following mechanisms:

- Over-the-Counter Offsets Scheme: The Guidelines include the expansion of the "Over-the-Counter" (OTC) Offsets Scheme, allowing non-government agencies to establish themselves as OTC Facilities. OTC Facilities will broker native vegetation offsets (credits) between landholders (with offset sites) and permit holders (with offset requirements). The OTC Offsets Scheme differs from other third party offsets (Bushbroker, Trust for Nature) as permit holders will not be required to negotiate directly with landholders. Instead, they can review available credits and relevant sale prices at each private OTC Facility, and purchase their required credits through them. Following payment, the permit holder will receive a Credit Extract as proof that they have satisfied their offset requirements. Ecology and Heritage Partners is an accredited OTC Facility.
- BushBroker: BushBroker maintains a register of landowners who are willing to sell offset credits. Offsets secured by Bushbroker are done so via a Section 69 Agreement under the *Conservation, Forest and Lands Act 1987*.
- Trust for Nature: Trust for Nature holds a list of landowners who are willing to sell vegetation offsets. Offsets secured by Trust for Nature are done so under the Victorian *Conservation Trust Act 1972*.
- Local Councils: The proponent may contact local councils to seek availability of offsets.

8 FURTHER REQUIREMENTS

Further requirements associated with development of the study area, as well as additional studies or reporting that may be required, are provided in Table 6, below.

Table 6. Further requirements associated with development of the study area

Relevant Legislation	Implications	Further Action
Environment Protection and Biodiversity Conservation Act 1999	The proposed action is unlikely to have a significant impact on any matter of NES. As such, a referral to the Commonwealth Environment Minister is not recommended regarding biodiversity matters listed under the EPBC Act.	No further action required.
Flora and Fauna Guarantee Act 1988	There is suitable habitat within the study area for several species listed or protected under the FFG Act and one listed ecological community is present. However the study area is privately owned, as such a permit under the FFG Act is not required.	No further action required.
Planning and Environment Act 1987	The study area is within Location A, with 0.928 hectares of native vegetation proposed to be removed. As such, the permit application falls under the Low Risk-based pathway. The offset requirement for native vegetation removal is 0.203 General Biodiversity Equivalence Units (BEU). A Planning Permit from City of Greater Geelong is required to remove, destroy or lop any native vegetation. In this instance, DELWP is likely to be a mandatory referral authority as greater than 0.5 hectares of vegetation is likely to be removed within the study area.	Prepare and submit a Planning Permit application. Planning Permit conditions are likely to include a requirement for: • Vegetation offsets, as detailed in Section 4.2.
Catchment and Land Protection Act 1994	Several weed species listed under the CaLP Act were recorded within the study area. To meet requirements under the CaLP Act, listed noxious weeds should be appropriately controlled throughout the study area.	Planning Permit conditions are likely to include a requirement for a Weed Management Plan.
Wildlife Act 1975	Any persons engaged to conduct salvage and translocation or general handling of terrestrial fauna species must hold a current Management Authorisation.	Ensure wildlife specialists hold a current Management Authorisation.
Water Act 1989	A 'works on waterways' permit from the Corangamite CMA may be required as a precautionary approach where an action has the potential to impact a waterways within or adjoining the study area, specifically relating to off-site impacts to Ramsar wetlands via Armstrong Creek.	Recommended that discussions with the Corangamite CMA should be undertaken.

REFERENCES

Christidis, L. & Boles, W.E 2008. Systematics and Taxonomy of Australian Birds. CSIRO Publishing, Collingwood, Victoria.

Cogger, H. G (Ed). 1996. Reptiles and Amphibians of Australia. 5th Edition. Reed Books Australia, Victoria.

Cogger, H.G., Cameron, E.E., Sadlier, R.A. and Eggler P., 1993. The Action Plan for Australian Reptiles. Australian Nature conservation Agency, Canberra, ACT.

DELWP 2015a. Biodiversity Interactive Map [WWW Document]. URL http://mapshare2.dse.vic.gov.au/MapShare2EXT/imf.jsp?site=bim. Victorian Department of Environment, Land, Water and Planning.

DELWP 2015b. Planning Maps Online [www Document]. URL http://services.land.vic.gov.au/landchannel/jsp/map/PlanningMapsIntro.jsp. Victorian Department of Environment, Land, Water and Planning.

DELWP 2015c. Native Vegetation Information Management Tool [WWW Document] URL http://nvim.depi.vic.gov.au/. Victorian Department of Environment, Land, Water and Planning.

DELWP 2015d. Ecological Vegetation Class (EVC) Benchmarks for each Bioregion [WWW Document]. URL http://www.dse.vic.gov.au/conservation-and-environment/native-vegetation-groups-for-victoria/ecological-vegetation-class-evc-benchmarks-by-bioregion. Victorian Department of Environment, Land, Water and Planning.

DEPI 2013a. Permitted clearing of native vegetation - Biodiversity assessment guidelines (the Guidelines). Victorian Department of Environment and Primary Industries.

DEPI 2014b. Victorian Biodiversity Atlas. Sourced from: "VBA_FLORA25" and "VBA_FLORA100", February 2014. Victorian Department of Environment and Primary Industries.

DoE 2013. Significant Impact Guidelines 1.1. Matters of National Environmental Significance. Federal Department of the Environment, Canberra.

DoE 2015. Protected Matters Search Tool: Interactive Map [WWW Document]. URL http://www.environment.gov.au/arcgis-framework/apps/pmst/pmst.jsf (accessed 1.4.12). Federal Department of Sustainability, Environment, Water, Population and Communities, Canberra.

DSE 2004. Vegetation quality assessment manual: Guidelines for applying the habitat hectares scoring method. Version 1.3. Victorian Department of Sustainability and Environment.

DSE 2005. Advisory List of Rare or Threatened Plants in Victoria. Victorian Department of Sustainability and Environment.

DSE 2009. Advisory list of Threatened Invertebrate Fauna in Victoria – 2009. Victorian Department of Sustainability and Environment.

DSE 2013. Advisory List of Rare or Threatened Fauna in Victoria. Victorian Department of Sustainability and Environment.

Duncan, A., Baker, G.B. and Montgomery, N. (Eds) 1999. The Action Plan for Australian Bats. Environment Australia. Canberra, ACT.

Ecology Partners Pty Ltd 2011a. Flora and Fauna Assessment and Net Gain Analysis, Western Employment Precinct: Armstrong Creek Growth Area. Report prepared for The Carter Group c/o Spade Consulting.

Ecology Partners Pty Ltd 2011b. Flora and Fauna Survey, and Net Gain Assessment Marshall Precinct: Armstrong Creek Urban Growth Area. Report prepared for City of Greater Geelong.

Ecology and Heritage Partners Pty Ltd 2012. Flora and Fauna Assessment and Net Gain Analysis, Horseshoe Bend Precinct, Armstrong Creek Growth Area, Victoria. Report prepared for St Quentin Consulting Pty Ltd.

EPA 1991. Construction Techniques for Sediment Pollution Control. Published document prepared by the Victorian Environment Protection Authority, Victoria.

EPA 1996. Environmental Guidelines for Major Construction Sites. Published document prepared by the Victorian Environmental Protection Authority (EPA).

Garnett, S.T. and Crowley, G. M. 2000. The Action Plan for Australian Birds 2000. Environment Australia.

Lee, A. K. 1995. Action Plan for Australian Rodents. Australian Nature Conservation Agency, Canberra.

Maxwell, S., Burbidge, A A. and Morris, K (Eds) 1996. The 1996 Action Plan for Australian Marsupials and Monotremes. Wildlife Australia for Australasian Marsupial and Monotreme Specialist Group and the IUCN Species Survival commission, Switzerland.

Menkhorst, P. and Knight, F. 2004. A Field Guide to the Mammals of Australia . 2nd Edition. Oxford University Press, Victoria.

Nelson, J. S. 1994. Fishes of the World, 3rd Edition. John Wiley & Sons, New York.

NRE 2002. Native Vegetation Management: A Framework for Action. Department of Natural Resources and Environment, Victoria.

Sands, D.P.A. and New, T.R. 2002. The Action Plan for Australian Butterflies, Environment Australia, Canberra.

Strahan, R. (Ed) 1995. The Mammals of Australia. Reed Books, Sydney.

Tyler, M.J. 1997. The Action Plan for Australian Frogs. Wildlife Australia: Canberra.

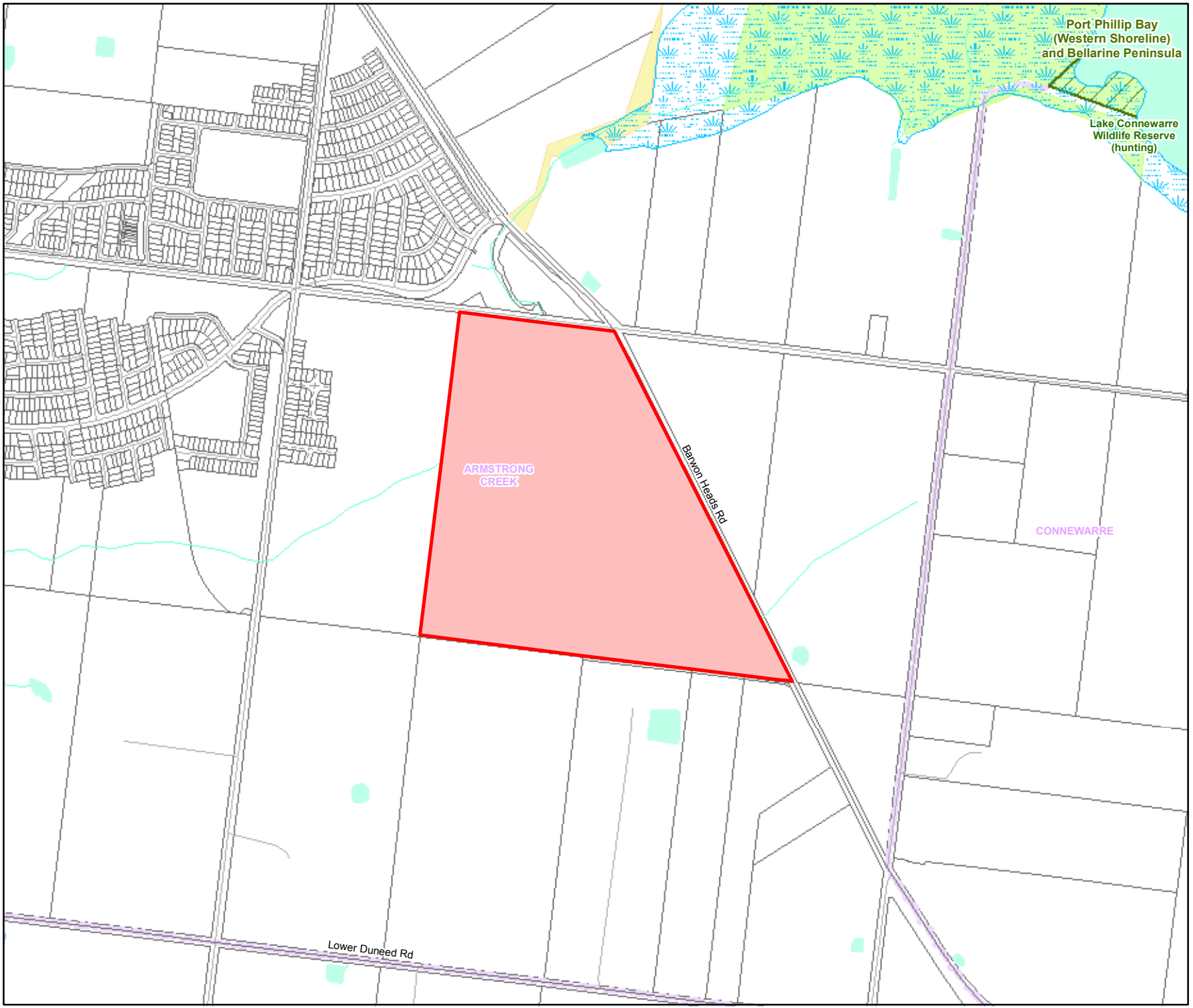
Victorian Urban Stormwater Committee 1999. Urban Stormwater: Best Practice Environmental Management Guidelines. CSIRO.

Viridans 2013a. Flora Information System. Viridans Biological Databases.

Viridans 2013b. Victorian Fauna Database. Viridans Biological Databases.

Walsh, N.G., Stajsic, V. 2007. A census of the vascular plants of Victoria, 8th ed. ed. Royal Botanic Gardens Melbourne.

FIGURES



Legend

- Study Area
- Collector Road
- Minor Road
- Proposed Road
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp
- Parks and Reserves
- RAMSAR site
- Crown Land
- Localities

Figure 1

Location of the study area

Clancy and Keirl Properties, Barwon Heads Road, Armstrong Creek

N

0 125 250

Metres

ecology & heritage partners

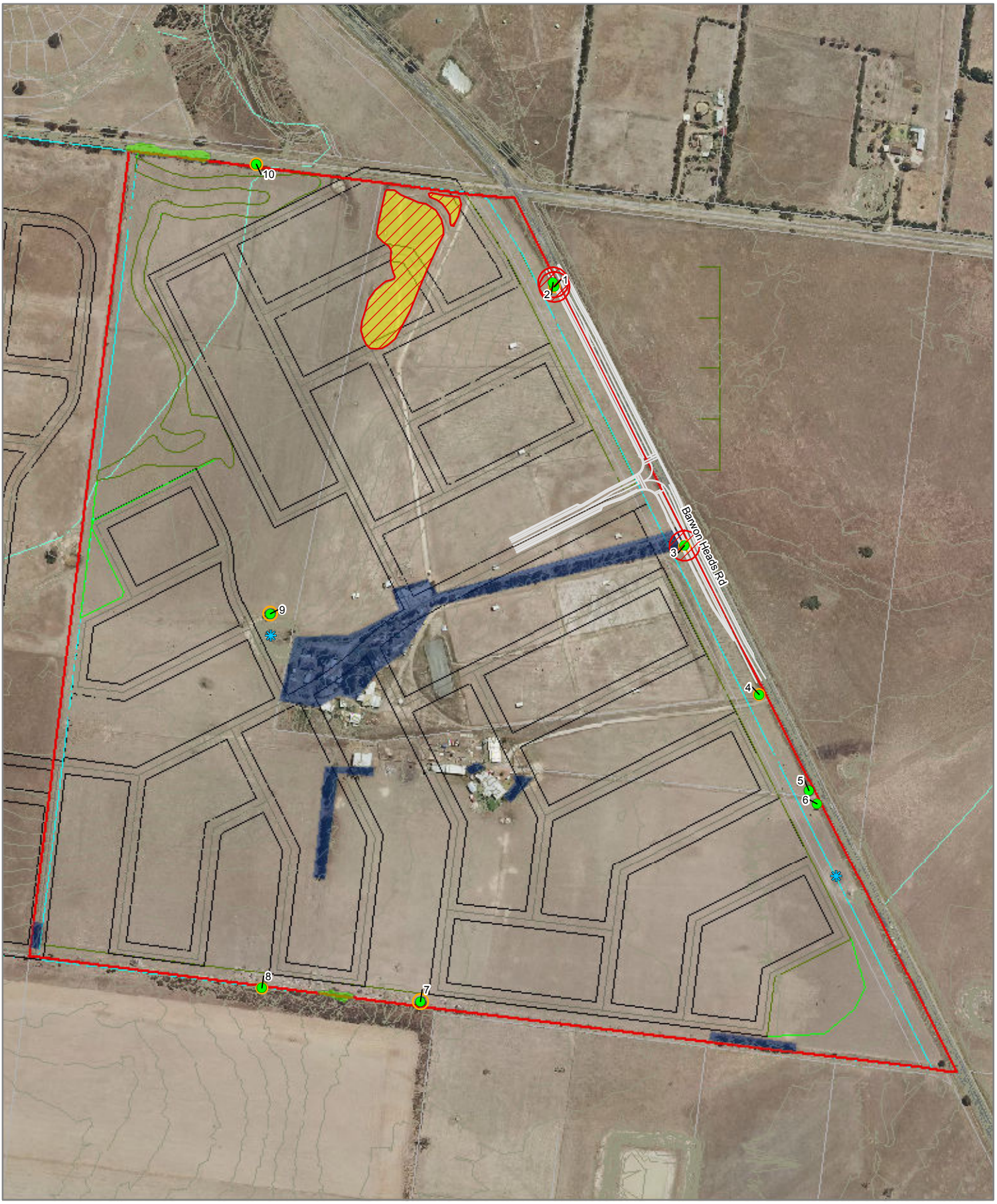


Figure 2
Ecological features within the study area
Keirl and Clancy Properties, Barwon Heads Road, Armstrong Creek

Legend

- Study Area

Vegetation

- Plains Grassland
- Plains Grassy Woodland
- Planted Trees
- Vegetation proposed to be removed
- Scattered Trees
- Tree Retention Zone
- Waterbodies
- Barwon Heads Road Intersection

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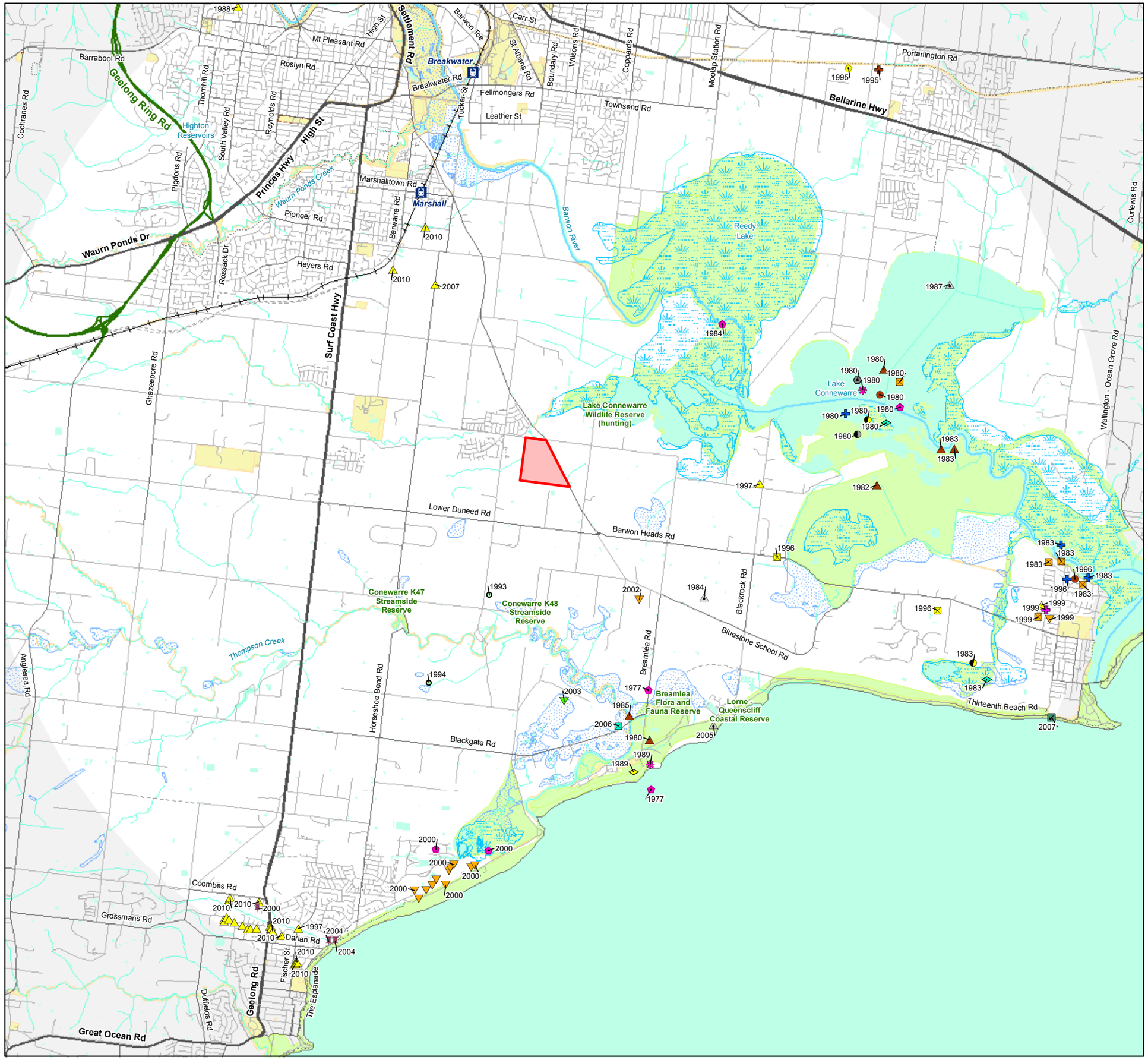
N

0 50 100
Metres



Legend

- Adamson's Blown-grass
- Austral Trefoil
- Bellarine Yellow-gum
- Coast Bitter-bush
- Coast Fescue
- Coast Twin-leaf
- Coast Wirilda
- Creeping Rush
- Cup Wattle
- Dune Poa
- Glenelg Pomaderris
- Grey Mangrove
- Ivy-leaf Duckweed
- Leafy Greenhood
- Marsh Saltbush
- Pale Swamp Everlasting
- Prickly Arrowgrass
- Salt Blown-grass
- Salt Lawrencia
- Spiny Peppercress
- Swamp Everlasting
- Tiny Arrowgrass
- Yellow Sea-lavender
- Study Area

Figure 3

Previously documented significant flora within 10km of the study area

Clancy and Keirl Properties, Barwon Heads Road, Armstrong Creek

N

0 1.5 3

Kilometres

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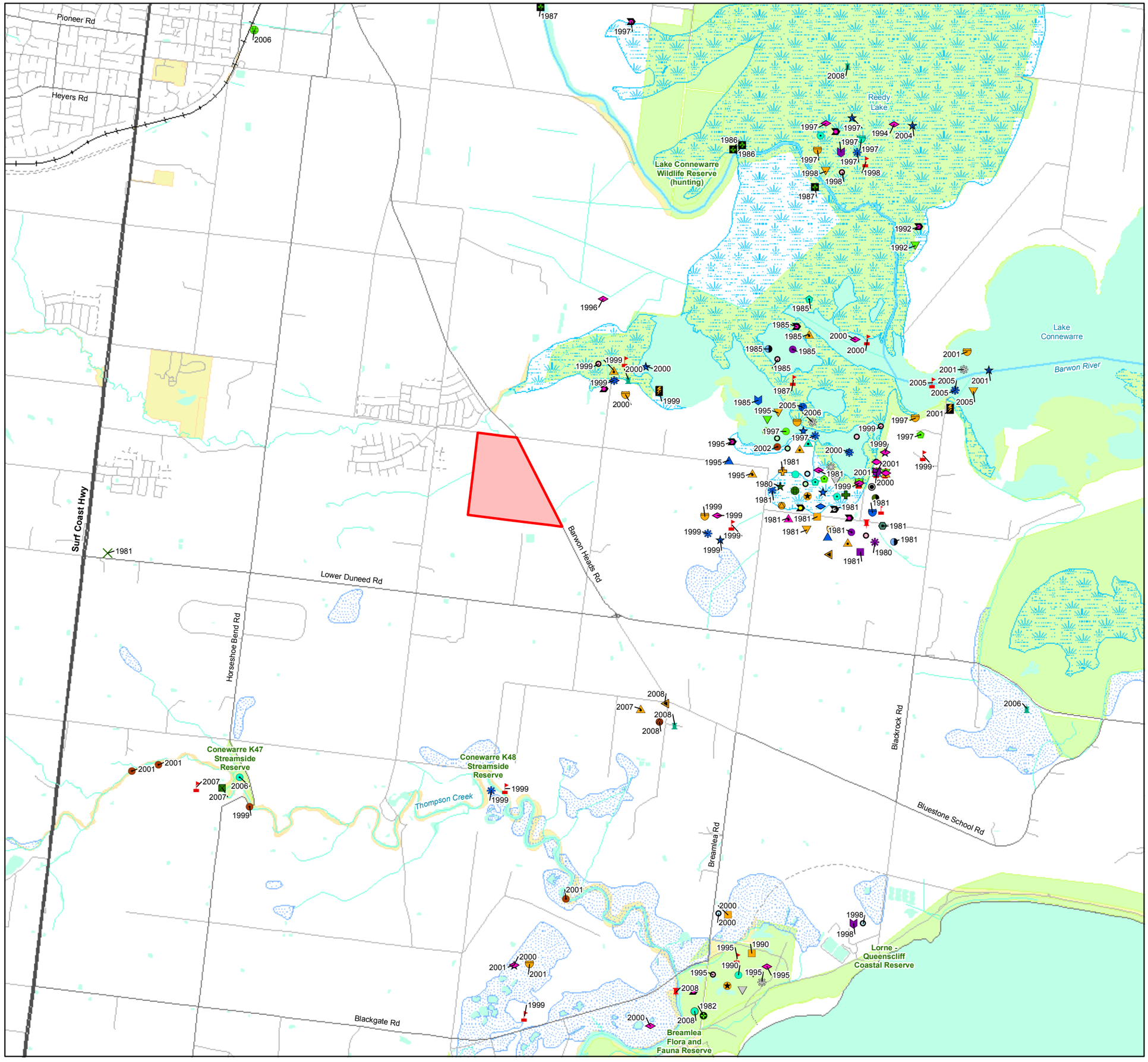

Legend

- Australasian Bittern
- Australasian Shoveler
- Australian Grayling
- Australian Painted Snipe
- Baillon's Crake
- Black Falcon
- Black-browed Albatross
- Black-tailed Godwit
- Blue Petrel
- Brolga
- Caspian Tern
- Common Diving-Petrel
- Common Greenshank
- Common Sandpiper
- Eastern Great Egret
- Fairy Prion
- Fairy Tern
- Freckled Duck
- Glossy Ibis
- Great Knot
- Growling Grass Frog
- Gull-billed Tern
- Hardhead
- Hooded Plover
- Intermediate Egret
- Latham's Snipe
- Little Egret
- Little Tern
- Long-toed Stint
- Magpie Goose
- Marsh Sandpiper
- Musk Duck
- Nankeen Night Heron
- Northern Giant-Petrel
- Pacific Golden Plover
- Pacific Gull
- Pectoral Sandpiper
- Pied Cormorant
- Powerful Owl
- Royal Spoonbill
- Ruddy Turnstone
- Sanderling
- Shy Albatross
- Southern Brown Bandicoot
- Southern Giant-Petrel
- Spotted Harrier
- Swift Parrot
- Terek Sandpiper
- Whimbrel
- Whiskered Tern
- White-bellied Sea-Eagle
- White-faced Storm-Petrel
- White-throated Needletail
- White-winged Black Tern
- Wood Sandpiper
- Yarra Pygmy Perch
- Study Area

Figure 4

Previously documented significant fauna within 5km of the study area

Clancy and Keirl Properties, Barwon Heads Road, Armstrong Creek

N

0 0.75 1.5

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APPENDICES

APPENDIX 1

Appendix 1.1 – Rare or Threatened Categories for Listed Victorian Taxa

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

Rare or Threatened Categories
Conservation Status in Australia (Based on the EPBC Act 1999)
EX - Extinct: Extinct is when there is no reasonable doubt that the last individual of the species has died.
CR - Critically Endangered: A species is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
EN - Endangered: A species is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.
VU - Vulnerable: A species is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.
R* - Rare: A species is rare but overall is not currently considered critically endangered, endangered or vulnerable.
K* - Poorly Known: A species is suspected, but not definitely known, to belong to any of the categories extinct, critically endangered, endangered, vulnerable or rare.
Conservation Status in Victoria (Based on DSE 2005, DSE 2009, DSE 2013)
x - Presumed Extinct in Victoria: not recorded from Victoria during the past 50 years despite field searches specifically for the plant, or, alternatively, intensive field searches (since 1950) at all previously known sites have failed to record the plant.
e - Endangered in Victoria: at risk of disappearing from the wild state if present land use and other causal factors continue to operate.
v - Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.
r - Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.
k - Poorly Known in Victoria: poorly known and suspected, but not definitely known, to belong to one of the above categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate.

Appendix 1.2 – Defining Ecological Significance

Table A1.2. Criteria for defining Ecological Significance ratings for significant flora, fauna and communities.

National Significance
Flora: National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
Fauna: National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. Extinct, Critically Endangered, Endangered, Vulnerable). Fauna listed as Extinct, Critically Endangered, Endangered, Vulnerable, or Rare under National Action Plans for terrestrial taxon prepared for DoE: threatened marsupials and monotremes (Maxwell et al. 1996), rodents (Lee 1995), bats (Duncan et al. 1999), birds (Garnett and Crowley 2000), reptiles (Cogger et al. 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).
Communities: Vegetation communities considered critically endangered, endangered or vulnerable under the EPBC Act and considering vegetation condition.
State Significance
Flora: Threatened taxa listed under the provisions of the FFG Act. Flora listed in the State Government's Advisory List of Rare or Threatened Plants in Victoria (DSE 2005).
Fauna: Threatened taxon listed under Schedule 2 of the FFG Act. Fauna listed as Extinct, Critically Endangered, Endangered and Vulnerable on the State Government's Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013). Listed as Lower Risk (Near Threatened, Conservation Dependent or Least concern) or Data Deficient under National Action Plans for terrestrial species prepared for the DoE: threatened marsupials and monotremes (Maxwell et al. 1996), rodents (Lee 1995), bats (Duncan et al. 1999), birds (Garnett and Crowley 2000), reptiles (Cogger et al. 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).
Communities: Ecological communities listed as threatened under the FFG Act. EVC listed as threatened (i.e. endangered, vulnerable) or rare in a Native Vegetation Plan for a particular bioregion (DSE 2013c) and considering vegetation condition.
Regional Significance
Fauna: Fauna with a disjunct distribution, or a small number of documented recorded or naturally rare in the particular Bioregion in which the study area is located. A particular taxon that is has an unusual ecological or biogeographical occurrence or listed as Lower Risk – Near Threatened, Data Deficient or Insufficiently Known on the State Government's Advisory List of Threatened Vertebrate Fauna in Victoria (DSE 2013).
Communities: EVC listed as depleted or least concern in a Native Vegetation Plan for a particular bioregion (DSE 2013c) and considering vegetation condition. EVC considered rare by the author for a particular bioregion.
Local Significance
Local significance is defined as flora, fauna and ecological communities indigenous to a particular area, which are not considered rare or threatened on a national, state or regional level.

Appendix 1.3 – Defining Site Significance

Table A1.3. Criteria for defining Site Significance ratings.

National Significance
A site is of National significance if: • It regularly supports, or has a high probability of regularly supporting individuals of a taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans for terrestrial taxon prepared for the DoE. • It regularly supports, or has a high probability of supporting, an 'important population' as defined under the EPBC Act of one or more nationally 'vulnerable' flora and fauna taxon. • It is known to support, or has a high probability of supporting taxon listed as 'Vulnerable' under National Action Plans. • It is known to regularly support a large proportion (i.e. greater than 1%) of a population of a taxon listed as 'Conservation Dependent' under the EPBC Act and/or listed as Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans. • It contains an area, or part thereof designated as 'critical habitat' under the EPBC Act, or if the site is listed under the Register of National Estate compiled by the Australian Heritage Commission. • It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of national conservation significance such as most National Park, and/or a Ramsar Wetland(s).
State Significance
A site is of State significance if: • It occasionally (i.e. every 1 to 5 years) supports, or has suitable habitat to support taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans. • It regularly supports, or has a high probability of regularly supporting (i.e. high habitat quality) taxon listed as 'Vulnerable', 'Near threatened', 'Data Deficient' or 'Insufficiently Known' in Victoria (DSE 2005, 2013), or species listed as 'Data Deficient' or 'Insufficiently Known' under National Action Plans. • It contains an area, or part thereof designated as 'critical habitat' under the FFG Act. • It supports, or likely to support a high proportion of any Victorian flora and fauna taxa. • It contains high quality, intact vegetation/habitat supporting a high species richness and diversity in a particular bioregion. • It is a site which forms part of, or connected to a larger area(s) of remnant native vegetation or habitat of state conservation significance such as most State Parks and/or Flora and Fauna Reserves.
Regional Significance
A site is of Regional significance if: • It regularly supports, or has a high probability of regularly supporting regionally significant fauna as defined in Table 1.2. • Is contains a large population (i.e. greater than 1% or 5%) of flora considered rare in any regional native vegetation plan for a particular bioregion. • It supports a fauna population with a disjunct distribution, or a particular taxon that has an unusual ecological or biogeographical occurrence. • It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of regional conservation significance such as most Regional Parks and/or Flora and Fauna Reserves.
Local Significance
Most sites are considered to be of at least local significant for conservation, and in general a site of local significance can be defined as: • An area which supports indigenous flora species and/or a remnant EVC, and habitats used by locally significant fauna species. • An area which currently acts, or has the potential to act as a wildlife corridor linking other areas of higher conservation significance and facilitating fauna movement throughout the landscape.

Appendix 1.4 – Vegetation Condition and Habitat Quality

Table A1.4.1 Defining Vegetation Condition ratings.

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

Table A1.4.2 Defining Habitat Quality.

Criteria for defining Habitat Quality
High Quality: • High degree of intactness (i.e. floristically and structurally diverse), containing several important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component. • High species richness and diversity (i.e. represented by a large number of species from a range of fauna groups). • High level of foraging and breeding activity, with the site regularly used by native fauna for refuge and cover. • Habitat that has experienced, or is experiencing low levels of disturbance and/or threatening processes (i.e. weed invasion, introduced animals, soil erosion, salinity). • High contribution to a wildlife corridor, and/or connected to a larger area(s) of high quality habitat. • Provides known, or likely habitat for one or more rare or threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2005; 2009 or 2013.
Moderate Quality: - Moderate degree of intactness, containing one or more important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component. - Moderate species richness and diversity - represented by a moderate number of species from a range of fauna groups. - Moderate levels of foraging and breeding activity, with the site used by native fauna for refuge and cover. - Habitat that has experienced, or is experiencing moderate levels of disturbance and/or threatening processes. - Moderate contribution to a wildlife corridor, or is connected to area(s) of moderate quality habitat. - Provides potential habitat for a small number of threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2005; 2009 or 2013.
Low Quality: • Low degree of intactness, containing few important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component. • Low species richness and diversity (i.e. represented by a small number of species from a range of fauna groups). • Low levels of foraging and breeding activity, with the site used by native fauna for refuge and cover. • Habitat that has experienced, or is experiencing high levels of disturbance and/or threatening processes. • Unlikely to form part of a wildlife corridor, and is not connected to another area(s) of habitat. • Unlikely to provide habitat for rare or threatened species listed under the EPBC Act, FFG Act, or considered rare or threatened according to DSE 2005; 2009 or 2013.

Appendix 1.5 – Offsets and Exemptions

Table A1.5.1. Calculation of Biodiversity Equivalence Scores and General or Specific Offsets (DEPI 2013a)

Pathway	Biodiversity Assessment Tools	Information Source
Low Risk-based pathway	Condition Score	Modelled data, NVIM Tool (DELWP 2015c)
	Habitat Hectares	= Condition Score x Extent (ha)
	Strategic Biodiversity Score	Modelled data, NVIM Tool (DELWP 2015c)
	General Biodiversity Equivalence Score	= Habitat Hectares x Strategic Biodiversity Score
Moderate or High Risk-based pathway	Condition Score	Habitat hectare assessment
	Habitat Hectares	= Condition Score x Extent (ha)
	Strategic Biodiversity Score and Habitat Importance Score	Modelled data, determined by DELWP
	Specific Biodiversity Equivalence Score **(A)**	= Habitat Hectares x Habitat Importance Score
	Sum of Specific Biodiversity Equivalence Scores of remaining habitat **(B)**	Data gathered during the site assessment is provided to DELWP for analysis and a resulting assessment offset report is provided by the Department.
	Specific Offset Threshold **(C)**	
	General/Specific Threshold Test: If **A ÷ B > C** a **Specific** offset is required If **A ÷ B < C** a **General** offset required	

Table A1.5.2. Summary of offset requirements (DEPI 2013a)

Risk –based Pathway	Offset Type	Offset Amount (Risk adjusted biodiversity equivalence score)	Offset Attributes		
			Habitat for Species	Vicinity	Strategic Biodiversity Score
Low Risk	General offset	1.5 times the general biodiversity equivalence score of the native vegetation to be removed.	No restrictions	In the same Catchment Management Authority or Local Government Area boundary as the native vegetation to be removed.	At least 80 per cent of the strategic biodiversity score of the native vegetation to be removed.
Moderate or High Risk	General offset	1.5 times the general biodiversity equivalence score of the native vegetation to be removed.	No restrictions	In the same Catchment Management Authority or Local Government Area boundary as the native vegetation to be removed.	At least 80 per cent of the strategic biodiversity score of the native vegetation to be removed.
Moderate or High Risk	Specific offset	For each species impacted, 2 times the specific biodiversity equivalence score of the native vegetation to be removed.	Likely habitat for each rare or threatened species that a specific offset is required for, according to the specific-general offset test.	No restrictions	No restrictions

Appendix 1.6 – Tree Retention Zones

Tree Retention Zones (TRZs) should be implemented to prevent indirect losses of native vegetation during construction activities (DSE 2010). A TRZ applies to a tree and is a specific area above and below the ground, with a radius 12 x the DBH. At a minimum standard a TRZ should consider the following:

- A TRZ of trees should be a radius no less than two metres or greater than 15 metres;
- Construction, related activities and encroachment (i.e. earthworks such as trenching that disturb the root zone) should be excluded from the TRZ;
- Where encroachment exceeds 10% of the total area of the TRZ, the tree should be considered as lost and offset accordingly;
- Directional drilling may be used for works within the TRZ without being considered encroachment. The directional bore should be at least 600 millimetres deep;
- The above guidelines may be varied if a qualified arborist confirms the works will not significantly damage the tree (including stags / dead trees). In this case the tree would be retained and no offset would be required; and,
- Where the minimum standard for a TRZ has not been met an offset may be required.

APPENDIX 2 - FLORA

Appendix 2.1 – Flora Results

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

INDIGENOUS SPECIES	
Acacia paradoxa	Hedge Wattle
Einadia nutans subsp. nutans	Nodding Saltbush
Eryngium vesiculosum	Prickfoot
Eucalyptus camaldulensis	River Red-gum
Lachnagrostis filiformis s.s.	Common Blown-grass
Oxalis perennans	Grassland Wood-sorrel
Rytidosperma racemosum	Slender Wallaby-grass
Rytidosperma setaceum	Bristly Wallaby-grass
INTRODUCED SPECIES	
Chenopodium album	Fat Hen
Cirsium vulgare	Spear Thistle
Dactylis glomerata	Cocksfoot
Galenia pubescens var. pubescens	Galenia
Helminthotheca echioides	Ox-tongue
Leontodon taraxacoides subsp. taraxacoides	Hairy Hawkbit
Lepidium africanum	Common Peppercress
Lolium perenne	Perennial Rye-grass
Lycium ferocissimum	African Box-thorn
Phalaris aquatica	Toowoomba Canary-grass
Plantago coronopus subsp. coronopus	Buck's-horn Plantain
Ulex europaeus	Gorse

Appendix 2.2 – Significant Flora Species

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

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DSE	Likely occurrence in study area
NATIONAL SIGNIFICANCE							
Glycine latrobeana	Clover Glycine	1	1881	VU	L	v	5
Lachnagrostis adamsonii	Adamson's Blown-grass	1	2003	EN	L	v	5
Lepidium aschersonii	Spiny Peppercress	1	2006	VU	L	e	4
Pterostylis cucullata	Leafy Greenhood	1	1999	VU	L	P	5
Senecio macrocarpus	Large-headed Fireweed	1	1853	VU	L	e	4
Xerochrysum palustre	Swamp Everlasting	1	1995	VU	L	v	4
Caladenia pumila	Dwarf Spider-orchid	-	#	CR	L	e	5
Carex tasmanica	Curly Sedge	-	#	VU	L	v	5
Ixodia achillaeoides subsp. *arenicola*	Coast Ixodia	-	#	VU	-	v	5
Pimelea spinescens subsp. *spinescens*	Spiny Rice-flower	-	#	CR	L	e	5
Prasophyllum frenchii	Maroon Leek-orchid	-	#	EN	L	e	5
Thelymitra epipactoides	Metallic Sun-orchid	-	#	EN	L	e	5
Thelymitra matthewsii	Spiral Sun-orchid	-	#	VU	L	v	5
STATE SIGNIFICANCE							
Acacia cupularis	Cup Wattle	3	2004	-	-	r	5
Acacia uncifolia	Coast Wirilda	17	2004	-	-	r	5
Adriana quadripartita	Coast Bitter-bush	5	2005	-	-	v	5
Atriplex paludosa subsp. *paludosa*	Marsh Saltbush	6	1985	-	-	r	5

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DSE	Likely occurrence in study area
Avicennia marina subsp. *australasica*	Grey Mangrove	5	1996	-	-	r	5
Callitriche umbonata	Winged Water-starwort	1	1770	-	-	r	5
*Clematis decipens**	Slender Clematis	1	1982	-	-	k	5
Coronidium gunnianum	Pale Swamp Everlasting	1	1995	-	-	v	5
Eucalyptus leucoxylon subsp. *bellarinensis*	Bellarine Yellow-gum	51	2010	-	L	e	5
Eucalyptus leucoxylon subsp. *connata**	Melbourne Yellow-gum	5	2007	-	-	v	4
Euphrasia scabra	Rough Eyebright	1	1770	-	L	e	5
Galium compactum	Compact Bedstraw	1	1885	-	-	r	5
*Halophila australis**	Oval Sea-wrack	1	1906	-	-	k	5
Juncus revolutus	Creeping Rush	6	2000	-	-	r	5
Lachnagrostis robusta	Salt Blown-grass	2	1996	-	-	r	4
Lawrencia spicata	Salt Lawrencia	2	1983	-	-	r	4
Lemna trisulca	Ivy-leaf Duckweed	1	1980	-	-	k	5
Limonium australe var. *australe*	Yellow Sea-lavender	2	1996	-	-	r	5
Lotus australis var. australis	Austral Trefoil	1	1989	-	-	k	5
Pleurosorus subglandulosus	Glandular Blanket-fern	1	1770	-	-	k	5
Poa billardierei	Coast Fescue	3	1989	-	-	r	5
Poa poiformis var. *ramifer*	Dune Poa	1	2007	-	-	r	5
Pomaderris halmaturina subsp. *continentis*	Glenelg Pomaderris	2	1994	-	-	r	5
Prasophyllum lindleyanum	Green Leek-orchid	1	1893	-	-	v	5
Ruppia maritima s.s.*	Water Tassel	1	1982	-	-	k	5
Senecio cunninghamii var. *cunninghamii*	Branching Groundsel	1	1770	-	-	r	5
Triglochin minutissima	Tiny Arrowgrass	1	1980	-	-	r	5

Scientific name	Common name	Total # of documented records	Last documented record	EPBC	FFG	DSE	Likely occurrence in study area
Triglochin mucronata	Prickly Arrowgrass	2	1983	-	-	r	5
Zygophyllum billardierei	Coast Twin-leaf	6	2007	-	-	r	5

Notes: EPBC = Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), FFG = Flora and Fauna Guarantee Act 1988 (FFG Act), DSE = Advisory List of Threatened Flora in Victoria (DSE 2005), EX = Extinct, CR = Critically endangered, EN = Endangered, VU = Vulnerable, K = Poorly Known (Briggs and Leigh 1996), X = Extinct, e = Endangered, v = Vulnerable, r = Rare, k = Poorly Known, L = Listed, # Records identified from EPBC Act Protected Matters Search Tool, * = Records identified from the FIS, ^ = Records identified from Meredith et al (1992) .

Data source: Victorian Biodiversity Atlas (DEPI 2014); Protected Matters Search Tool (DoE 2015).

Order: Alphabetical.

Likelihood: Habitat characteristics of significant flora species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area were assessed to determine their likelihood of occurrence. The likelihood of occurrence rankings are defined below.

1 - Known occurrence

- Recorded within the study area recently (i.e. within ten years)

2 - High Likelihood

- Previous records of the species in the local vicinity; and/or,
- The study area contains areas of high quality habitat.

3 - Moderate Likelihood

- Limited previous records of the species in the local vicinity; and/or,
- The study area contains poor or limited habitat.

4 - Low Likelihood

- Poor or limited habitat for the species however other evidence (such as a lack of records or environmental factors) indicates there is a very low likelihood of presence.

5 – Unlikely

- No suitable habitat and/or outside the species range.

Appendix 2.3 – Habitat Hectare Assessment

Table A2.3. Habitat Hectares results for remnant vegetation recorded within the study area.

Vegetation Zone		PG1
Bioregion		Victorian Volcanic Plain
EVC / Tree		Plains Grassland
EVC Number		132_61
EVC Conservation Status		Endangered
Patch Condition	Large Old Trees /10	0
	Canopy Cover /5	0
	Under storey /25	5
	Lack of Weeds /15	2
	Recruitment /10	0
	Organic Matter /5	4
	Logs /5	0
	Treeless EVC Multiplier	1.36
	Subtotal =	14.96
Landscape Value /25		8
Habitat Points /100		22.96
Habitat Score		0.23
Total Area (ha)		0.72
Area (ha) to be removed		0.72
Area (ha) to be retained		0.00

Appendix 2.4 – Scattered Trees

Table A2.4. Remnant scattered trees recorded within the study area.

Tree Number	Tree Species	DBH (cm)	Tree Size	Tree Retention Zone (m)	Location	Status
1	River Red-gum *Eucalyptus camaldulensis*	45	ST	5	Barwon Heads Rd	Removed
2	River Red-gum *Eucalyptus camaldulensis*	20	ST	2	Barwon Heads Rd	Removed
3	River Red-gum *Eucalyptus camaldulensis*	48	ST	6	Barwon Heads Rd	Removed
4	Dead Drooping Sheoak *Allocasuarina verticillata*	45	LOT	5	Barwon Heads Rd	Retained
5	River Red-gum *Eucalyptus camaldulensis*	28	ST	3	Barwon Heads Rd	Retained
6	River Red-gum *Eucalyptus camaldulensis*	35	ST	4	Barwon Heads Rd	Retained
7	River Red-gum *Eucalyptus camaldulensis*	64	MOT	8	Keirl property	Retained
8	River Red-gum *Eucalyptus camaldulensis*	45	ST	5	Property to South of Keirl	Retained
9	River Red-gum *Eucalyptus camaldulensis*	58	ST	7	Keirl property	Retained
10	River Red-gum *Eucalyptus camaldulensis*	50	ST	6	Lake Road road reserve	Retained

Note: DBH = Diameter at Breast Height, LOT = Large Old Tree, MOT = Medium Old Tree, ST = Small Tree

APPENDIX 3 - FAUNA

Appendix 3.1 – Significant Fauna Species

Table A3.1. Significant fauna within 10 kilometres of the study area.

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
NATIONAL SIGNIFICANCE								
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	1981	4	EN	L	NT	NT	4
Long-nosed Potoroo	*Potorous tridactylus tridactylus*	#	-	VU	L	NT	EN	4
Grey-headed Flying-fox	*Pteropus poliocephalus*	2002	2	VU	L	VU	VU	2
New Holland Mouse	*Pseudomys novaehollandiae*	#	-	VU	L	VU	-	4
Australasian Bittern	*Botaurus poiciloptilus*	2008	41	EN	L	EN	VU	4
Hooded Plover	*Thinornis rubricollis rubricollis*	2013	66	-	L	VU	VU	4
Plains-wanderer	*Pedionomus torquatus*	1971	2	VU	L	CR	EN	4
Australian Painted Snipe	*Rostratula benghalensis australis*	#	-	EN	L	CR	VU	4
Swift Parrot	*Lathamus discolor*	2006	7	EN	L	EN	EN	3
Orange-bellied Parrot	*Neophema chrysogaster*	2007	74	CR	L	CR	CR	4
Ground Parrot	*Pezoporus wallicus wallicus*	1909	3	-	L	EN	VU	4
Regent Honeyeater	*Anthochaera phrygia*	#	-	EN	L	CR	EN	4
Striped Legless Lizard	*Delma impar*	#	-	VU	L	EN	VU	4
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	#	-	EN	L	CR	VU	4
Growling Grass Frog	*Litoria raniformis*	1997	9	VU	L	EN	VU	4

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
Dwarf Galaxias	*Galaxiella pusilla*	#	-	VU	L	EN	VU	4
Australian Grayling	*Prototroctes maraena*	1986	11	VU	L	VU	VU	4
Macquarie Perch	*Macquaria australasica*	1938	3	EN	L	EN	DD	4
Yarra Pygmy Perch	*Nannoperca obscura*	2009	16	VU	L	VU	VU	4
Golden Sun Moth	*Synemon plana*	#	-	CR	L	CR	-	4
STATE SIGNIFICANCE								
King Quail	*Coturnix chinensis victoriae*	1898	1	-	L	EN	-	4
Magpie Goose	*Anseranas semipalmata*	2006	37	-	L	NT	-	4
Musk Duck	*Biziura lobata*	2006	42	-	-	VU	-	4
Freckled Duck	*Stictonetta naevosa*	2005	6	-	L	EN	-	4
Australasian Shoveler	*Anas rhynchotis*	2006	77	-	-	VU	-	4
Hardhead	*Aythya australis*	2005	89	-	-	VU	-	4
Blue-billed Duck	*Oxyura australis*	2002	12	-	L	EN	-	4
White-throated Needletail	*Hirundapus caudacutus*	2007	20	-	-	VU	-	4
White-faced Storm-Petrel	*Pelagodroma marina*	1981	6	-	-	VU	-	4
Little Bittern	*Ixobrychus minutus dubius*	2001	2	-	L	EN	-	4
Eastern Great Egret	*Ardea modesta*	2007	193	-	L	VU	-	3
Intermediate Egret	*Ardea intermedia*	1999	14	-	L	EN	-	3
Little Egret	*Egretta garzetta nigripes*	2006	44	-	L	EN	-	4
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	2005	12	-	L	VU	-	4
Grey Goshawk	*Accipiter novaehollandiae novaehollandiae*	2007	11	-	L	VU	-	4
Black Falcon	*Falco subniger*	2008	14	-	-	VU	-	3

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
Brolga	*Grus rubicunda*	2008	15	-	L	VU	-	4
Lewin's Rail	*Lewinia pectoralis pectoralis*	1994	2	-	L	VU	NT	4
Baillon's Crake	*Porzana pusilla palustris*	2010	26	-	L	VU	-	4
Pacific Golden Plover	*Pluvialis fulva*	2007	15	-	-	VU	-	4
Grey Plover	*Pluvialis squatarola*	1980	1	-	-	EN	-	4
Black-tailed Godwit	*Limosa limosa*	2004	14	-	-	VU	-	4
Whimbrel	*Numenius phaeopus*	1980	2	-	-	VU	-	4
Eastern Curlew	*Numenius madagascariensis*	2008	34	-	-	VU	-	4
Terek Sandpiper	*Xenus cinereus*	2008	2	-	L	EN	-	4
Common Sandpiper	*Actitis hypoleucos*	2007	14	-	-	VU	-	4
Grey-tailed Tattler	*Tringa brevipes*	1988	3	-	L	CR	-	4
Common Greenshank	*Tringa nebularia*	2008	128	-	-	VU	-	4
Marsh Sandpiper	*Tringa stagnatilis*	2001	34	-	-	VU	-	4
Wood Sandpiper	*Tringa glareola*	1999	3	-	-	VU	-	4
Ruddy Turnstone	*Arenaria interpres*	2000	20	-	-	VU	-	4
Great Knot	*Calidris tenuirostris*	2001	6	-	L	EN	-	4
Red Knot	*Calidris canutus*	2001	12	-	-	EN	-	4
Red-chested Button-quail	*Turnix pyrrhothorax*	1898	1	-	L	VU	-	4
Little Tern	*Sternula albifrons sinensis*	1997	14	-	L	VU	-	4
Gull-billed Tern	*Gelochelidon nilotica macrotarsa*	2008	16	-	L	EN	-	4
Caspian Tern	*Hydroprogne caspia*	2006	100	-	L	NT	-	4
Powerful Owl	*Ninox strenua*	2007	2	-	L	VU	-	4

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
Barking Owl	*Ninox connivens connivens*	2000	2	-	L	EN	NT	4
Masked Owl	*Tyto novaehollandiae novaehollandiae*	1983	2	-	L	EN	NT	4
Brown Treecreeper (south-eastern ssp.)	*Climacteris picumnus victoriae*	1951	1	-	-	NT	NT	4
Speckled Warbler	*Chthonicola sagittatus*	1960	3	-	L	VU	NT	4
Grey-crowned Babbler	*Pomatostomus temporalis temporalis*	1898	2	-	L	EN	NT	4
Hooded Robin	*Melanodryas cucullata cucullata*	1978	3	-	L	NT	NT	4
Diamond Firetail	*Stagonopleura guttata*	2007	5	-	L	NT	NT	4
Southern Toadlet	*Pseudophryne semimarmorata*	2004	1	-	-	VU	-	4
Southern Pygmy Perch	*Nannoperca australis*	2011	9	-	-	VU	-	4
Yellow Sedge-skipper	*Hesperilla flavescens flavescens*	1988	6	-	L	VU	LC	4
REGIONAL SIGNIFICANCE								
Common Diving-Petrel	*Pelecanoides urinatrix*	2000	11	-	-	NT	-	4
Pied Cormorant	*Phalacrocorax varius*	2008	73	-	-	NT	-	4
Black-faced Cormorant	*Phalacrocorax fuscescens*	1999	4	-	-	NT	-	4
Nankeen Night Heron	*Nycticorax caledonicus hillii*	2010	38	-	-	NT	-	4
Glossy Ibis	*Plegadis falcinellus*	2007	29	-	-	NT	-	4
Royal Spoonbill	*Platalea regia*	2010	157	-	-	NT	-	4
Spotted Harrier	*Circus assimilis*	1982	2	-	-	NT	-	3
Sooty Oystercatcher	*Haematopus fuliginosus*	1988	2	-	-	NT	-	4
Latham's Snipe	*Gallinago hardwickii*	2006	84	-	-	NT	-	4
Sanderling	*Calidris alba*	2008	12	-	-	NT	-	4
Long-toed Stint	*Calidris subminuta*	1986	7	-	-	NT	-	4

Common Name	Scientific Name	Last Documented Record (VBA)	# Records (VBA)	EPBC Act	FFG ACT	DSE (2013)	National Action Plan	Likelihood
Pectoral Sandpiper	*Calidris melanotos*	2001	12	-	-	NT	-	4
Whiskered Tern	*Chlidonias hybridus javanicus*	2007	82	-	-	NT	-	4
White-winged Black Tern	*Chlidonias leucopterus*	1992	12	-	-	NT	-	4
White-fronted Tern	*Sterna striata*	1978	1	-	-	NT	-	4
Pacific Gull	*Larus pacificus pacificus*	2007	126	-	-	NT	-	4
Azure Kingfisher	*Alcedo azurea*	1999	3	-	-	NT	-	4
Spotted Quail-thrush	*Cinclosoma punctatum*	1978	1	-	-	NT	-	4
River Blackfish	*Gadopsis marmoratus*	1981	1	-	-	DD	-	4

Note #1: Marine dependent species have primarily been removed from this table as they are unlikely to be impacted by the proposed action.

Notes #2: EPBC = Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), FFG = Flora and Fauna Guarantee Act 1988 (FFG Act), DSE = Advisory List of Threatened Flora in Victoria (DSE 2014), # = Records identified from EPBC Act Protected Matters Search Tool, EX = Extinct, CR = Critically endangered, EN = Endangered, VU = Vulnerable, K = Poorly Known, X = Extinct, e = Endangered, v = Vulnerable, r = Rare, k = Poorly Known, L = Listed.

Data sources: Victorian Biodiversity Atlas (DEPI 2014b); Victorian Fauna Database (Viridans 2014b); Protected Matters Search Tool (DoE 2015).

Taxonomic order: Mammals (Strahan 1995 in Menkhorst & Knight 2004); Birds (Christidis & Boles, 2008); Reptiles and Amphibians (Cogger et al. 1983 in Cogger 1996); Fish (Nelson 1994); Mussels & Crustaceans (Alphabetical); Invertebrates (Alphabetical).

Likelihood: Habitat characteristics of significant fauna species previously recorded within 10 kilometres of the study area, or that may potentially occur within the study area were assessed to determine their likelihood of occurrence. The likelihood of occurrence rankings are defined below.

1 - High Likelihood
- Known resident in the study area based on site observations, database records, or expert advice; and/or,
- Recent records (i.e. within five years) of the species in the local area (DEPI 2011); and/or,
- The study area contains the species' preferred habitat.

2 - Moderate Likelihood
- The species is likely to visit the study area regularly (i.e. at least seasonally); and/or,
- Previous records of the species in the local area (DEPI 2011); and/or,
- The study area contains some characteristics of the species' preferred habitat.

3 - Low Likelihood
- The species is likely to visit the study area occasionally or opportunistically whilst en route to more suitable sites; and/or,
- There are only limited or historical records of the species in the local area (i.e. more than 20 years old); and/or,
- The study area contains few or no characteristics of the species' preferred habitat.

4 - Unlikely
- No previous records of the species in the local area; and/or,
- The species may fly over the study area when moving between areas of more suitable habitat; and/or,
- Out of the species' range; and/or,
- No suitable habitat present.

APPENDIX 4

Biodiversity Impact and Offset Report (BIOR), DELWP

Biodiversity impact and offset requirements report

This report **does not represent an assessment by DELWP** of the proposed native vegetation removal. It provides biodiversity information for low risk-based pathway applications for permits to remove native vegetation under clause 52.16 or 52.17 of the planning schemes in Victoria.

Date of issue: **12/05/2015** **DELWP ref: EHP_0211**
Time of issue: **09:50 AM**

Project ID	6577_EHP_KeirlClancy

Summary of marked native vegetation

Risk-based pathway	**Low**
Total extent	0.928 ha
Remnant patches	0.718 ha
Scattered trees	3 trees
Location risk	A

Strategic biodiversity score of all marked native vegetation	0.656

Offset requirements if a permit is granted

If a permit is granted to remove the marked native vegetation, a requirement to obtain a native vegetation offset will be included in the permit conditions. The offset must meet the following requirements:

Offset type	**General offset**
General offset amount (general biodiversity equivalence units)	0.203 general units
General offset attributes	
Vicinity	Corangamite Catchment Management Authority (CMA) **or** the Local Municipal District where clearing takes place
Minimum strategic biodiversity score	0.525[1]

See Appendices 1 and 2 for details in how offset requirements were determined.

NB: values presented in tables throughout this document may not add to totals due to rounding

[1] Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

Next steps

This proposal to remove native vegetation must meet the application requirements of the low risk-based pathway and it will be assessed under the low risk-based pathway.

If you wish to remove the marked native vegetation you are required to apply for a permit from your local council. Council will then refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

The biodiversity assessment report from NVIM and this biodiversity impact and offset report should be submitted with your application for a permit to remove native vegetation you plan to remove, lop or destroy.

This report provides the following information to meet application requirements for a permit to remove native vegetation:

- Confirmation of the risk-based pathway of the application for a permit to remove native vegetation
- The area of the patch of native vegetation and/or the number of any scattered trees to be removed
- The strategic biodiversity score of the native vegetation to be removed
- The offset requirements should a permit be granted to remove native vegetation.

Refer to the *Permitted clearing of native vegetation – Biodiversity assessment guidelines* and for a full list and details of application requirements.

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DELWP Customer Service Centre 136 186

Appendix 1 – Biodiversity impact of removal of native vegetation

Habitat hectares

Habitat hectares are calculated for each habitat zone within your proposal using the extent and condition scores in the GIS data you provided.

Habitat zone	Site assessed condition score	Extent (ha)	Habitat hectares
PG1_a	0.230	0.043	0.010
PG1_b	0.230	0.674	0.155
ST_1	0.200	0.070	0.014
ST_2	0.200	0.070	0.014
ST_3	0.200	0.070	0.014
TOTAL			**0.207**

Clearing site biodiversity equivalence score(s)

The general biodiversity equivalence score for the habitat zone(s) is calculated by multiplying the habitat hectares by the strategic biodiversity score.

Habitat zone	Habitat hectares	Strategic biodiversity score	General biodiversity equivalence score (GBES)
PG1_a	0.010	0.677	0.007
PG1_b	0.155	0.636	0.099
ST_1	0.014	0.673	0.009
ST_2	0.014	0.666	0.009
ST_3	0.014	0.810	0.011

Appendix 2 – Offset requirements detail

If a permit is granted to remove the marked native vegetation the permit condition will include the requirement to obtain a native vegetation offset.

To calculate the required offset amount required the biodiversity equivalence scores are aggregated to the proposal level and multiplied by the relevant risk multiplier.

Offsets also have required attributes:

- General offsets must be located in the same Catchment Management Authority (CMA) boundary or Local Municipal District (local council) as the clearing and must have a minimum strategic biodiversity score of 80 per cent of the clearing.[2]

The offset requirements for your proposal are as follows:

Offset type	Clearing site biodiversity equivalence score	Risk multiplier	Offset requirements	
			Offset amount (biodiversity equivalence units)	Offset attributes
General	0.136 GBES	1.5	0.203 general units	Offset must be within Corangamite CMA **or** the same Municipal District as the vegetation removal Offset must have a minimum strategic biodiversity score of 0.525

[2] Strategic biodiversity score is a weighted average across habitat zones where a general offset is required

Appendix 3 – Images of marked native vegetation

Image 1. Native vegetation location risk map

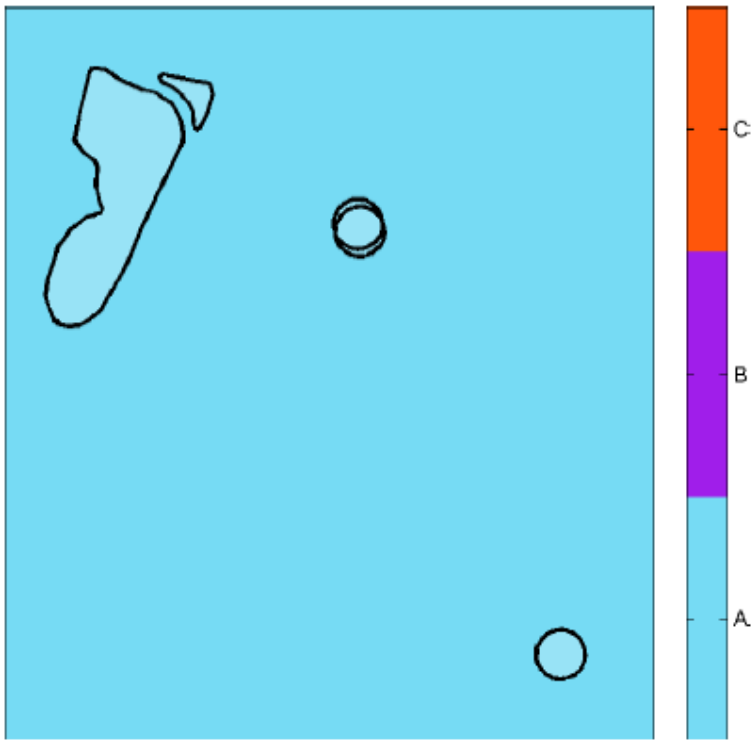


Image 2. Strategic biodiversity score map

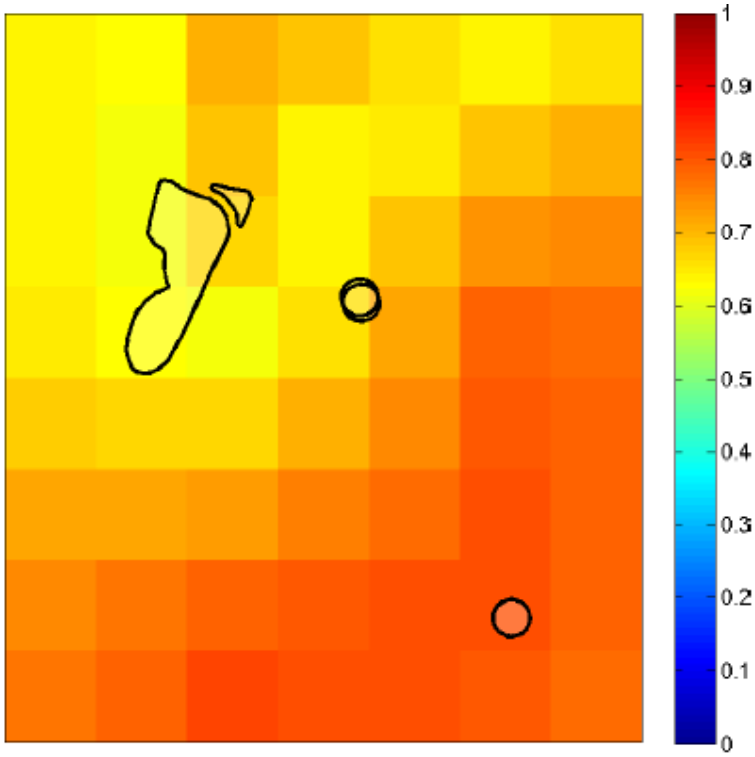
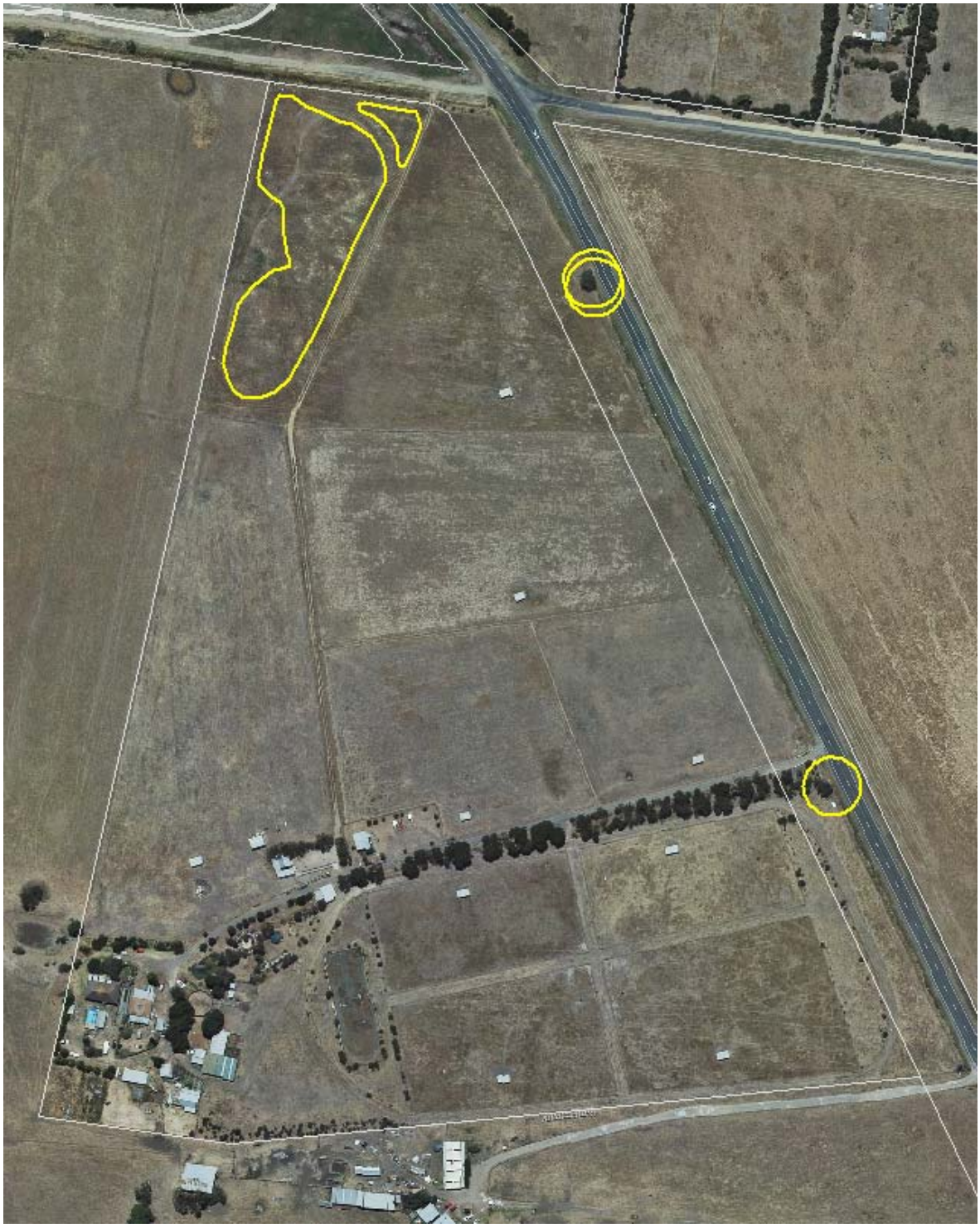


Image 3. Aerial photograph showing marked native vegetation



Glossary

Condition score

This is the site-assessed condition score for the native vegetation. Each habitat zone in the clearing proposal is assigned a condition score according to the habitat hectare assessment method. This information has been provided by or on behalf of the applicant in the GIS file.

Dispersed habitat

A dispersed species habitat is a habitat for a rare or threatened species whose habitat is spread over a relatively broad geographic area greater than 2,000 hectares.

General biodiversity equivalence score

The general biodiversity equivalence score quantifies the relative overall contribution that the native vegetation to be removed makes to Victoria's biodiversity. The general biodiversity equivalence score is calculated as follows:

$$\boldsymbol{General\ biodiversity\ equivalence\ score} = \boldsymbol{habitat\ hectares} \times \boldsymbol{strategic\ biodiversity\ score}$$

General offset amount

This is calculated by multiplying the general biodiversity equivalence score of the native vegetation to be removed by the risk factor for general offsets. This number is expressed in general biodiversity equivalence units and is the amount of offset that is required to be provided should the application be approved. This offset requirement will be a condition to the permit for the removal of native vegetation.

$$\boldsymbol{Risk\ adjusted\ general\ biodiversity\ equivalence\ score} = \boldsymbol{general\ biodiversity\ equivalence\ score\ clearing} \times \mathbf{1.5}$$

General offset attributes

Genenal offset must be locate din the same Cathcment Manamgnet Authority bounards or Muniipels DItricist (local council) as the clearing site. They msut alos have a strategritc biosdivsery coste that is at least 80 per cent of the clearing site.

Habitat hectares

Habitat hectares is a site-based measure that combines extent and condition of native vegetation. The habitat hectares of native vegetation is equal to the current condition of the vegetation (condition score) multiplied by the extent of native vegetation. Habitat hectares can be calculated for a remnant patch or for scattered trees or a combination of these two vegetation types. This value is calculated for each habitat zone using the following formula:

$$\boldsymbol{Habitat\ hectares} = \boldsymbol{total\ extent}\ (\boldsymbol{hectares}) \times \boldsymbol{condition\ score}$$

Habitat importance score

The habitat importance score is a measure of the importance of the habitat located on a site for a particular rare or threatened species. The habitat importance score for a species is a weighted average value calculated from the habitat importance map for that species. The habitat importance score is calculated for each habitat zone where the habitat importace map indicates that species habitat occurs.

Habitat zone

Habitat zone is a discrete contiguous area of native vegetation that:

- is of a single Ecological Vegetation Class
- has the same measured condition.

Highly localised habitat

A highly localised habitat is habitat for a rare or threatened species that is spread across a very restricted area (less than 2,000 hectares). This can also be applied to a similarly limited sub-habitat that is disproportionately important for a wide-ranging rare or threatened species. Highly localised habitats have the highest habitat importance score (1) for all locations where they are present.

Minimum strategic biodiversity score

The minimum strategic biodiversity score is an attribute for a general offset.

The strategic biodiversity score of the offset site must be at least 80 per cent of the strategic biodiversity score of the native vegetation to be removed. This is to ensure offsets are located in areas with a strategic value that is comparable to, or better than, the native vegetation to be removed. Where a specific and general offset is required, the minimum strategic biodiversity score relates only to the habitat zones that require the general offset.

Offset risk factor

There is a risk that the gain from undertaking the offset will not adequately compensate for the loss from the removal of native vegetation. If this were to occur, despite obtaining an offset, the overall impact from removing native vegetation would result in a loss in the contribution that native vegetation makes to Victoria's biodiversity.

To address the risk of offsets failing, an offset risk factor is applied to the calculated loss to biodiversity value from removing native vegetation.

$$\boldsymbol{Risk\ factor\ for\ general\ offsets = 1.5}$$

$$\boldsymbol{Risk\ factor\ for\ specific\ offset = 2}$$

Offset type

The specific-general offset test determines the offset type required.

When the specific-general offset test determines that the native vegetation removal will have an impact on one or more rare or threatened species habitat above the set threshold of 0.005 per cent, a specific offset is required. This test is done at the permit application level.

A general offset is required when a proposal to remove native vegetation is not deemed, by application of the specific-general offset test, to have an impact on any habitat for any rare or threatened species above the set threshold of 0.005 per cent. All habitat zones that do not require a specific offset will require a general offset.

Proportional impact on species

This is the outcome of the specific-general offset test. The specific-general offset test is calculated across the entire proposal for each species on the native vegetation permitted clearing species list. If the proportional impact on a species is above the set threshold of 0.005 per cent then a specific offset is required for that species.

Specific offset amount

The specific offset amount is calculated by multiplying the specific biodiversity equivalence score of the native vegetation to be removed by the risk factor for specific offsets. This number is expressed in specific biodiversity equivalence units and is the amount of offset that is required to be provided should the application be approved. This offset requirement will be a condition to the permit for the removal of native vegetation.

$$\boldsymbol{Risk\ adjusted\ specific\ biodiversity\ equivalence\ score} = \boldsymbol{specific\ biodiversity\ equivalence\ score\ clearing \times 2}$$

Specific offset attributes

Specific offsets must be located in the modelled habitat for the species that has triggered the specific offset requirement.

Specific biodiversity equivalence score

The specific biodiversity equivalence score quantifies the relative overall contribution that the native vegetation to be removed makes to the habitat of the relevant rare or threatened species. It is calculated for each habitat zone where one or more species habitats require a specific offset as a result of the specific-general offset test as follows:

$$\textbf{\textit{Specific biodiversity equivalence score}} = \textbf{\textit{habitat hectares}} \times \textbf{\textit{habitat importance score}}$$

Strategic biodiversity score

This is the weighted average strategic biodiversity score of the marked native vegetation. The strategic biodiversity score has been calculated from the *Strategic biodiversity map* for each habitat zone.

The strategic biodiversity score of native vegetation is a measure of the native vegetation's importance for Victoria's biodiversity, relative to other locations across the landscape. The *Strategic biodiversity map* is a modelled layer that prioritises locations on the basis of rarity and level of depletion of the types of vegetation, species habitats, and condition and connectivity of native vegetation.

Total extent (hectares) for calculating habitat hectares

This is the total area of the marked native vegetation in hectares.

The total extent of native vegetation is an input to calculating the habitat hectares of a site and in calculating the general biodiversity equivalence score. Where the marked native vegetation includes scattered trees, each tree is converted to hectares using a standard area calculation of 0.071 hectares per tree. This information has been provided by or on behalf of the applicant in the GIS file.

Vicinity

The vicinity is an attribute for a general offset.

The offset site must be located within the same Catchment Management Authority boundary or Local Municipal District as the native vegetation to be removed.