



Lindum Vale PSP 1202: Biodiversity Assessment

DRAFT REPORT

Prepared for Metropolitan Planning Authority

27 April 2015

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Summary

Biosis Pty Ltd was commissioned by the Metropolitan Planning Authority (MPA) to undertake a flora and fauna assessment for land proposed to be included within Precinct Structure Plan 1202 otherwise known as Lindum Vale. The roughly 145 hectare site is approximately 9 kilometres north of Craigieburn and 25 kilometres north of the Melbourne Central Business District.

Ecological values

Key ecological values identified within the study area are as follows:

- 16.959 ha of native vegetation with four patches (HZ1-4) based on the presence of a relatively intact cover of understorey species rather than the presence of canopy trees alone.
- All remnants are of Plains Grassy Woodland (EVC 55) which is considered endangered
- One area (HZ1) which is classified as Grassy Eucalypt Woodland of the Victorian Volcanic Plain Community (EPBC Act listed).
- 61 scattered trees many of which are large hollow bearing trees.
- Populations of Golden Sun Moth *Synemon plana* (critically endangered in Australia) and Austral Crane's-bill (vulnerable in Victoria)
- Contribution to surrounding ecological values by providing a degree of habitat continuity for more mobile fauna such as birds and bats.

Government legislation and policy

An assessment of the project in relation to key biodiversity legislation and policy is provided and summarised below.

Legislation / policy	Relevant ecological feature on site	Permit / approval required	Notes
EPBC Act	GSM habitat on site	Referral recommended	A population of GSM exist on site
FFG Act		Protected Flora Permit not required for private property	Sections of the site which become public land (i.e. land to be zones for the expansion of Mt Ridley road) would require an FFG permit.
Planning & Environment Act	Areas of indigenous vegetation to be cleared.	Planning permit required, including permission to lop or remove native vegetation.	The need for a permit to clear vegetation approved for clearing by a Native Vegetation Precinct Plan would not require a planning permit
CaLP Act	11 Noxious weeds 1 pest animal	Not Applicable	Comply with requirements to control/eradicate

Note: Guidance provided in this report does not constitute legal advice.

Permitted clearing of native vegetation - Biodiversity assessment guidelines (the Guidelines)

Based on the current design, the proposed development will require the removal of [XXX] hectares of native vegetation and [XXX] scattered trees from within location risk A. Therefore the planning permit application will be assessed on the [low/moderate/high] risk-based pathway.

An assessment of the project against the Guidelines is provided below*:

Guidelines	Outcome	Notes
Location risk	Location A	Entire site is Location A
Native vegetation removal extent	X.XXX ha	habitat zones and X scattered trees
Risk-based pathway	Moderate	Based on clearing >1 ha and X scattered trees
Habitat hectares to be removed	X.XXX*	X.XXX of Plains Grassy Woodland and X.XXX of scattered trees
Strategic Biodiversity Score	0.350	All vegetation has the same score
Modelled habitat for rare or threatened species	Important habitat modelled for 9 species	Black Falcon, Chestnut-rumped Heathwren, Painted Honeyeater, Lace Monitor, Brown Toadlet, Golden Sun Moth, Clover Glycine, Pale Swamp Everlasting and Austral Crane's-bill
Specific-general offset test result	General	No habitat loss exceeds the specific offset threshold for any rare or threatened species
General Biodiversity Equivalence Scores	0.002 – 1.792	The largest patch (HZ2) has the highest Specific Biodiversity Equivalence Score (SBES)
Offset type	General	External offsets required
Offset risk factor	1.5	
Offset amount: General Biodiversity Equivalence Units (GBEU)	4.117	Loss of all native vegetation. External offsets required
Offset habitat for species	Not Applicable	No specific offsets required if all vegetation is cleared
Offset Vicinity	Port Phillip and Western Port CMA	Within the CMA or the City of Hume
Offset minimum Strategic Biodiversity Score (SBS)	0.280	

* outputs provided by DELWP native vegetation support team use rounded number for each polygon of vegetation and therefore totals can vary slightly.

If a permit is granted, the offset requirements would be 4.117 general biodiversity equivalence units (complete loss).

The general offset must be within the Port Phillip and Westernport catchment management authority area or the Hume municipal district, and must have a minimum strategic biodiversity score of 0.280.

It is likely that some of the required general offsets could be generated through management of retained native vegetation within the study area. This would be a 'first party' offset and would require the appropriate vegetation security agreements and a 10 year offset management plan. Alternatively, the applicant may seek to purchase 'third party' specific offset credits via an accredited trading scheme. This offset process would also be required for any offsets not obtained as part of a first party offset process.

Recommendations

The results of this assessment should be incorporated into the project design, by adding the flora and fauna mapping information into the planning maps and investigating options to retain as much of the mapped vegetation/habitats as possible.

1. Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by the Metropolitan Planning Authority (MPA) to undertake a biodiversity assessment of land proposed to be included within Precinct Structure Plan 1202 otherwise known as Lindum Vale. This area includes two main parcels of land 1920 and 2040 Mickleham Road, Mickleham as well as three other small parcels with frontage to Mickleham Road (Figure 1). This land has been included within Melbourne's expanded Urban Growth Boundary (UGB) to be developed for urban subdivision. However this area is not covered by Victoria's Biodiversity Conservation Strategy (BCS – DEPI 2013a).

1.2 Scope of assessment

The objectives of this investigation are to:

- Review databases relating to flora and terrestrial fauna issues for areas within a 5 km radius of the study area, including the Victorian Biodiversity Atlas (VBA), Victorian Flora Information System (FIS), and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool
- Conduct a field assessment of the flora and fauna values present within the study area
- Identify and map any patches of native vegetation or scattered trees within the study area as defined by the DEPI (2013b) Permitted Clearing of Native Vegetation Biodiversity Assessment Guidelines (the Guidelines)
- Classify these patches of native vegetation into the appropriate Ecological Vegetation Classes and conduct a Vegetation Quality Assessment as prescribed by the relevant DELWP guidelines (i.e. DSE 2004 Vegetation Quality Assessment Manual - guidelines for applying the habitat hectare scoring method - version 1.3)
- Document any rare or threatened flora and fauna species observed or the potential for such species to occur based on the habitat present and records for rare or threatened species identified by the database searches.
- Identify the implications of state and federal biodiversity legislation, the Hume Planning Scheme (including local policies) relevant to the project including the EPBC Act, *Flora and Fauna Guarantee Act 1988* (FFG Act), Hume Planning Scheme and particularly the objectives and decision guidelines of the Environmental Significance Overlay schedule 5 and 11 (ESO5 and ESO11)
- Assess the potential impacts of the proposed subdivision in the context of the loss of native vegetation, fauna habitat and broader habitat connectivity and discuss mitigation options relevant to the proposal. Habitat connectivity should be assessed in relation to local networks of native vegetation and habitat, and in particular nearby reserves identified by the BCS.
- Provide DELWP with the relevant information, as specified in the Guidelines, to produce a Biodiversity Impact and Offset Requirements Report (BIOR)
- Provide a draft report outlining the findings of the investigations, the impact of the proposed development design and the offset prescription identified by DELWP for that impact.
- Provide a final report after receipt of comments on the draft compiled by the MPA.

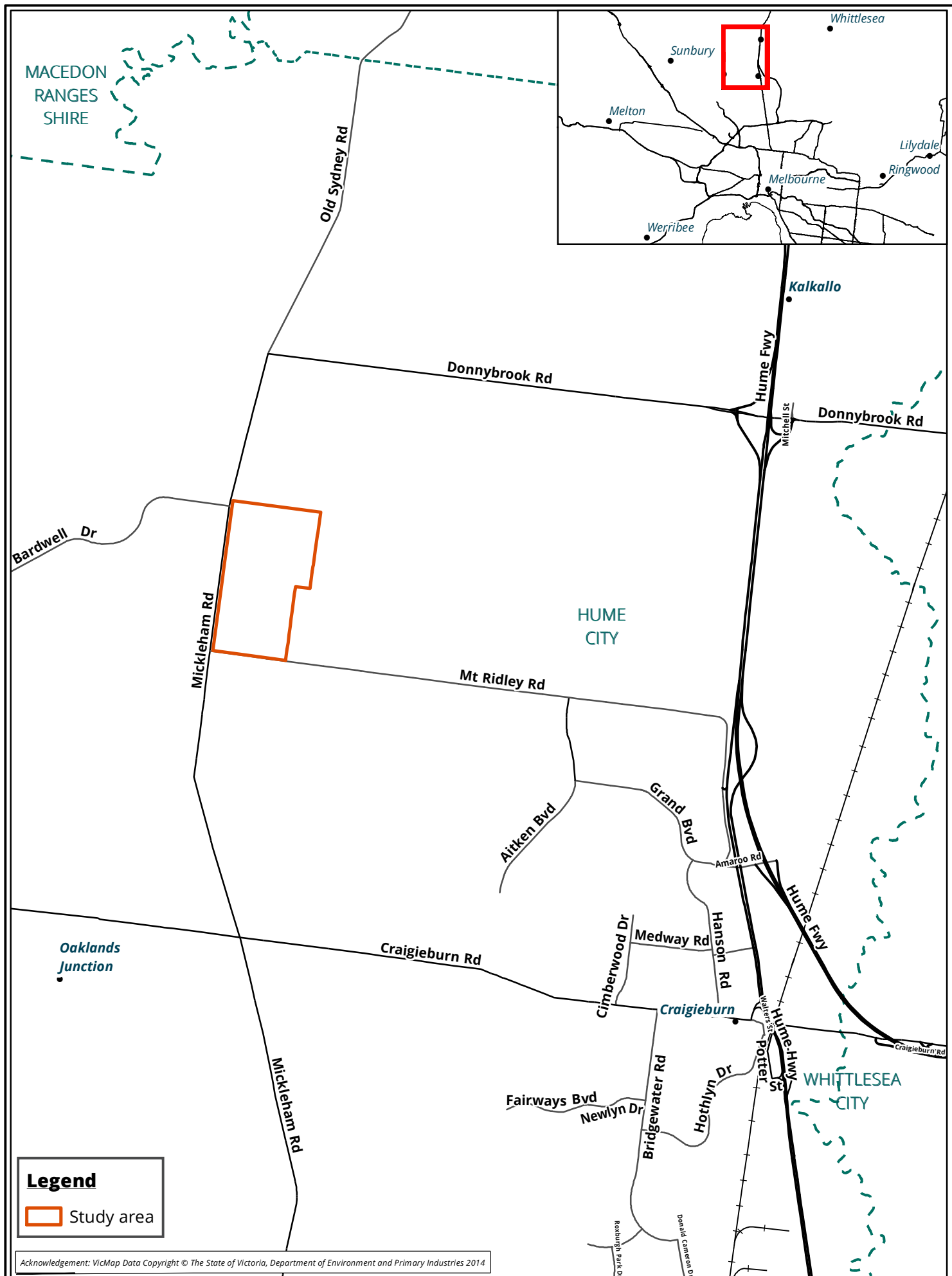
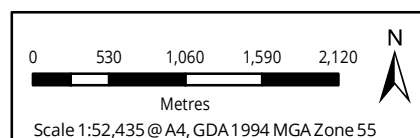


Figure 1: Location of the Study Area - 1969-2040
Mickleham Road, Mickleham, Victoria



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Ballarat, Brisbane, Canberra, Melbourne,
Sydney, Wangaratta & Wollongong

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1.3 Location of the study area

The roughly 145 hectare site is approximately 9 kilometres north of Craigieburn and 25 kilometres north of the Melbourne Central Business District (Figure 1). It is bounded to the west by Mickleham Road, to the south by Mount Ridley Road, to the north by high tension power-lines on private property and to the east by private rural residential lots. It is currently zoned Green-Wedge A Zone and is also covered in part by Environmental Significance Overlays (ESO) ESO 5 and ESO 11.

The study area is within the:

- Victorian Volcanic Plain Bioregion
- Yarra River Basin (Malcolm and Merri Creek catchments)
- Management area of Melbourne Water and the Port Phillip and Westernport Catchment Management Authority (CMA)
- City of Hume.

2. Methods

2.1 Literature and database review

In order to provide a context for the study site, information about flora and fauna from within 5 km of the study area (the 'local area') was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- Flora Information System which includes records from the Victorian Biodiversity Atlas 'VBA_FLORA25, FLORA100 & FLORA Restricted' August 2014 © The State of Victoria, Department of Environment, Land, Water and Planning (DELWP). The contribution of the Royal Botanical Gardens Melbourne to the database is acknowledged.
- Victorian Biodiversity Atlas 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' August 2014 © The State of Victoria
- DELWP Biodiversity Interactive Map (BIM)
- BirdLife Australia, the New Atlas of Australian Birds 1998-2012 (BA)
- Protected Matters Search Tool of the Australian Government Department of the Environment for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

Other sources of biodiversity information:

- DELWP Native Vegetation Information Management (NVIM) system and Biodiversity Interactive Mapper (BIM)
- DELWP NaturePrint; accessed through the Biodiversity Interactive Map
- Biosis records that have been submitted to DELWP (but do not yet appear on the VBA or FIS)

The following reports were also reviewed:

- Biosis Research 2009. Survey of the Golden Sun Moth at Lindum Vale, Mickleham, Victoria. Report for MAB Corporation. Authors Venosta, M. Biosis Research, Melbourne. Project No. 7564.
- Biosis Research 2010. Targeted Striped Legless Lizard survey – Lindum Vale Property, Mickleham. Report for MAB Corporation. Authors Venosta, M. Gilmore, D. and Garvey, N. Biosis Research, Melbourne. Project No. 7559.
- Biosis Research 2012. 'Lindum Vale' Property, 1920 and 2040 Mickleham Road, Mickleham, Victoria: Flora and fauna assessment. Report for MAB Corporation. Authors Mueck, S. and Gilmore, D. Biosis Research, Melbourne. Project No. 13869.
- Biosis 2013. Systematic search for Matted Flax-lily in areas of native vegetation at "Lindum Vale" 1920 and 2040 Mickleham Road, Mickleham. Report for MAB Corporation. Author Mueck, S. Biosis Research, Melbourne. Project No. 16178.
- Biosis 2014. Tree Assessment and Arboricultural Report: Lindum Vale, Mickleham. Report for MAB Corporation. Authors Callow, D. Biosis, Melbourne. Project No. 17916.
- Biosis 2015. Lindum Vale: Golden Sun Moth survey and habitat assessment. Report for MAB Corporation. Author: Venosta, M. and Mueck, S. Biosis Pty Ltd, Melbourne. Project no. 19308.

2.2 Definitions of significance

2.2.1 Species and ecological communities

The significance of a species or community is determined by its listing as rare or threatened under Commonwealth or State legislation / policy. The sources used to categorise significance of species and communities in this report are summarised below in Table 1.

Table 1: Criteria for determining significance of species & ecological communities

Significance	
National	Listed as threatened (critically endangered, endangered, vulnerable or conservation dependent) under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>
State	Listed as threatened (critically endangered, endangered, vulnerable) or rare for flora species, in Victoria on a DELWP Advisory List (DEPI 2013c; DEPI 2014) Listed as threatened under the <i>Flora and Fauna Guarantee Act 1988</i>

In accordance with advice from DELWP fauna species listed as near threatened or data deficient are not considered to be at the same level of risk as higher categories of threat. These species are generally not discussed in this report.

2.3 Likelihood of occurrence

The likelihood of occurrence is a broad categorisation used by Biosis to indicate the potential for a species to occur within the study area. It is based on expert opinion and implies the relative value of a site for a particular species.

Only those species listed under the EPBC Act or listed as threatened under the FFG Act (hereafter referred to as 'listed species') are assessed to determine their likelihood of occurrence. The habitat value for species listed on the DELWP Advisory Lists is calculated by the Habitat Importance Modelling produced by DELWP (DEPI 2013b). Where DELWP Advisory List species are recorded in the study area this is noted in Appendix 1 (flora) and Appendix 2 (fauna).

The likelihood of listed species occurring within the study area is ranked as negligible, low, medium or high. The rationale for the rank assigned is provided for each species in Appendix 1 (flora) and Appendix 2 (fauna).

Species which have at least medium likelihood of occurrence are given further consideration in this report. The need for targeted survey for these species is also considered.

2.4 Site investigation

2.4.1 Flora assessment

The flora assessment was undertaken on 5 March 2015 and a list of flora species was collected. Species which had not been previously recorded by Biosis were added to a cumulative list of species recorded from the property since 2005 (# T25309). This list will be submitted to DELWP for incorporation into the Victorian Biodiversity Atlas. Planted species have not been recorded unless they are naturalised.

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses' (Clause 72).

The Guidelines classify native vegetation into two categories (DEPI 2013b):

- A **remnant patch** of native vegetation (measured in hectares) is either:
 - An area of native vegetation, with or without trees, where at least 25 percent of the total perennial understorey cover is native plants.
 - An area with three or more indigenous canopy trees where the tree canopy cover is at least 20 percent.

Remnant patch vegetation is classified into ecological vegetation classes (EVCs). An EVC contains one or more floristic (plant) communities, and represents a grouping of broadly similar environments. Definitions of EVCs and benchmarks (condition against which vegetation quality at the site can be compared) are determined by DELWP.

- A **scattered tree** is defined as (extent measured by number of trees):
 - An indigenous canopy tree that does not form part of a remnant patch of native vegetation.

A canopy tree is a mature tree that is greater than three metres in height and is normally found in the upper layer of a vegetation type. Ecological vegetation class descriptions provide a list of the typical canopy species. A condition score and extent is applied to each scattered tree based on information provided by DELWP's NVIM. The planning scheme also identifies a requirement for a permit to clear dead trees with a diameter at breast height (dbh) of >40cm. Therefore dead trees with a diameter at breast height (dbh) of >40cm and greater than 3 m in height were also identified as scattered trees.

A Vegetation Quality Assessment was undertaken for all remnant patch native vegetation identified in the study area. This assessment is consistent with DELWP's Habitat hectare method (DSE 2004) and the Guidelines (DEPI 2013b). For the purposes of this assessment the limit of the resolution for the Habitat hectare assessment process is taken to be 0.001 Habitat hectares (Hha). That is, if native vegetation is present with sufficient cover but its condition and extent would not result in the identification of at least 0.001 Habitat hectares then that vegetation will not be mapped or assessed as a separate habitat zone.

Where relevant, notes were made on specific issues such as noxious weed infestations, evidence of management works, current grazing impacts and the regeneration capacity of the vegetation.

Species nomenclature for flora follows the Flora Information System (FIS 2014).

2.4.2 Fauna assessment

Fauna data collected by Biosis within the study area during 2009, 2010, 2012 and 2015 have been incorporated into the report.

Targeted surveys have been undertaken for Striped Legless Lizard *Delma impar* and Golden Sun Moth *Synemon plana* (Biosis Research 2009 & 2010 and Biosis 2015). Biosis Standard Operating Procedures provide a comprehensive outline of methods used for fauna survey and are available on request.

2.4.3 Permits

Biosis undertakes flora and fauna assessments under the following permits and approvals:

- Research Permit/Management Authorisation and Permit to Take Protected Flora & Protected Fish issued by the Department of Environment and Primary Industries under the *Wildlife Act 1975*, *Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975* (Permit number 10006240, expiry date 9 May 2015)
- Approvals 04.12 and 14.12 from the Wildlife and Small Institutions Animal Ethics Committee

2.5 Qualifications

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as low abundance, patchy distribution, species dormancy, seasonal conditions, and migration and breeding behaviours. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The current flora and fauna assessment was conducted in summer, which is not an optimal time for survey. However, where relevant, data has been included from previous surveys conducted by Biosis within the study area. As a result there are no seasonal or other external factors which limit the results of this assessment.

Biodiversity Assessment Reports (BAR) and Biodiversity Impact Offset Requirement (BIOR) reports are prepared through DELWP's NVIM system or requested through DELWP's Native Vegetation Transitional Guidance team. Biosis supplies relevant site-based spatial information as inputs to DELWP and we are entirely reliant on DELWP's output reports for moderate and high risk pathway applications. Biosis makes every effort to ensure site and spatial information entered into the NVIM, or supplied to DELWP, is an accurate reflection of proposed native vegetation removal.

2.6 Legislation and policy

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- Matters listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), associated policy statements, significant impacts guidelines, listing advice and key threatening processes
- Threatened taxa, communities and threatening processes listed under Section 10 of the *Flora & Fauna Guarantee Act 1988* (FFG Act); associated action statements and listing advice
- Permitted Clearing of native vegetation: Biodiversity assessment guidelines (DEPI 2013b)
- Native Vegetation Management Plans prepared by Catchment Management Authorities
- *Planning and Environment Act 1987* – specifically Clauses 12.01-2, 52.17 and 66.02 and Overlays in the Hume Planning Scheme
- Noxious weeds and pest animals lists under the *Catchment and Land Protection Act 1994* (CaLP Act)
- *Fisheries Act 1995*
- *Water Act 1989*
- *Environment Protection Act 1971*: State Environmental Protection Policy (Waters of Victoria) 2003.

2.7 Mapping

Current aerial photography was extracted from NearMap while the study area was defined using the publicly available cadastre.

Mapping was conducted using hand-held (uncorrected) GPS units (WGS84) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files which contain our flora and fauna spatial data are available to incorporate into design concept plans. However this mapping may not be sufficiently precise for detailed design purposes.

3. Results

The ecological features of the study area are described below and mapped in Figure 2.

Species recorded during the flora and fauna assessment are listed in Appendix 1 (flora) and Appendix 2 (fauna). Unless of particular note, these species are not discussed further.

Those species recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area.

3.1 Vegetation & fauna habitat

The majority of the study area has been highly modified due to the prolonged use of the site for grazing domestic stock and cropping. Most of the study area has been significantly degraded and supports predominantly introduced vegetation that is of limited value for native fauna.

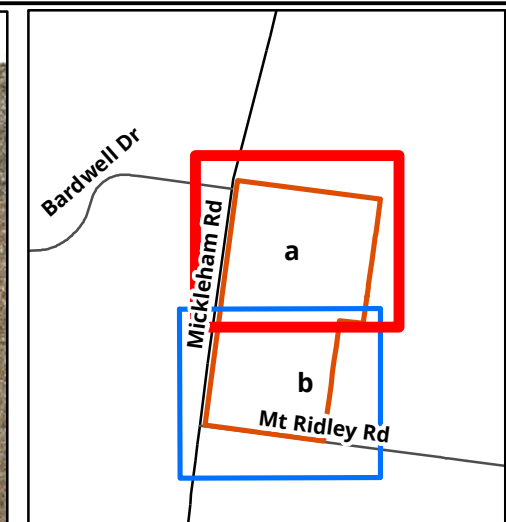
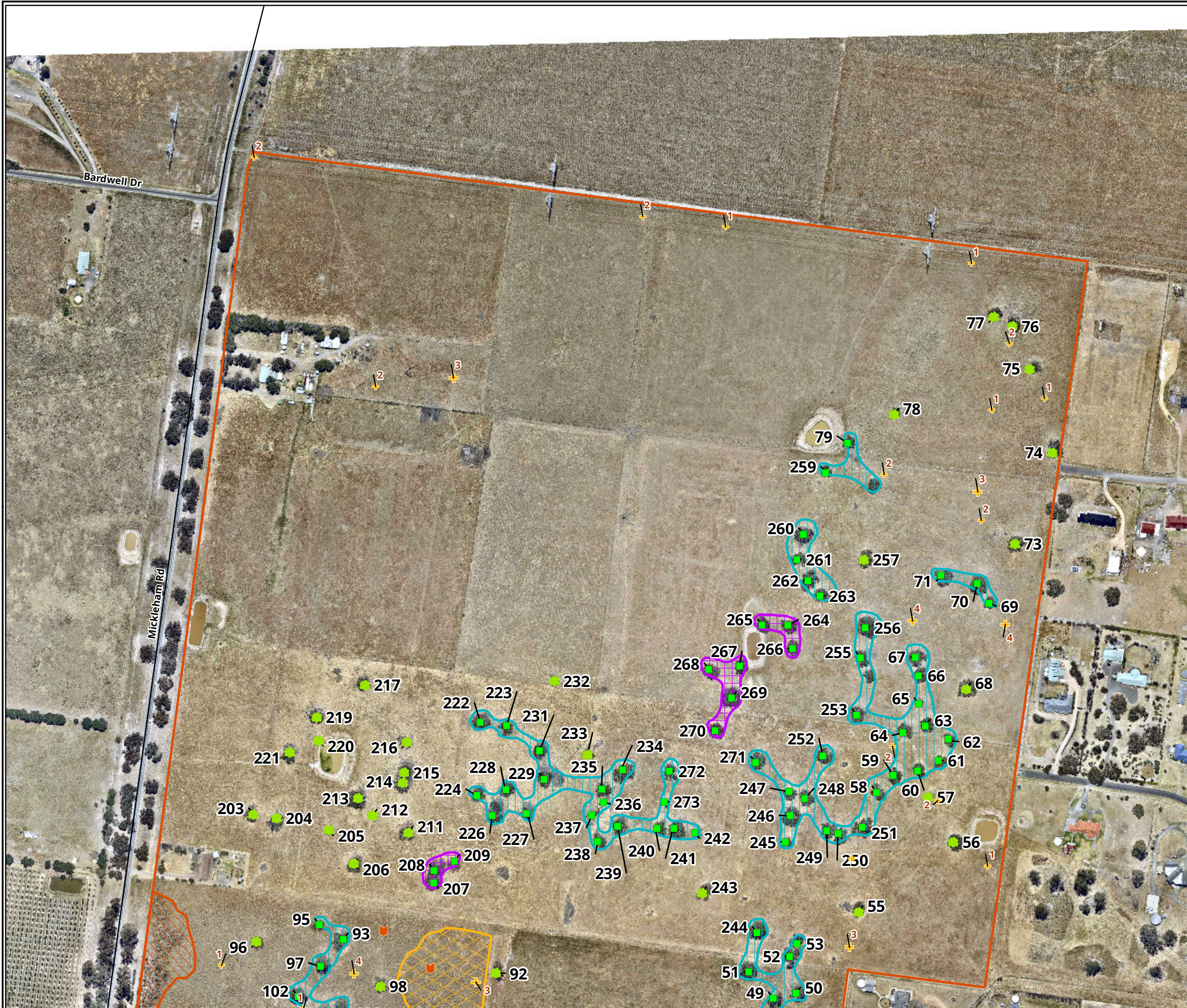
Notwithstanding the above, the study area supports a range of ecological features including areas (patches) of native vegetation, scattered trees, constructed dams and dry stone walls. These features are described further in Table 2 and mapped in Figure 2.

Photos are provided in Appendix 3.

3.2 Landscape context

The study area is on the north eastern margin of the Victorian Volcanic Plain bioregion in close proximity to a boundary with the Central Victorian Uplands. No permanent creeks traverse the property. It is less than two kilometres from the Mount Ridley Grasslands Nature Conservation Reserve and is connected to the reserve by other areas of agricultural land much of which is zoned for future residential development. The site is not included in any Biosite (DSE 2005) however Biosite 5195 is about 1 km to the east on the southern side of Mount Ridley Road.

Patches of trees within the study area contribute to a broader area of open woodland which is relatively unusual within the local landscape. These trees can serve as stepping stones for more mobile species such as birds and bats and provide some level of habitat continuity for other reserves in the local area such as the reserve system proposed under the BCS (DEPI 2013a). However the "on ground" continuity of grassland and woodland habitat between this site and other local reserves such as Mount Ridley Woodland to the north (BCS Conservation Area 26), Mount Ridley Nature Conservation Reserve to the east, BCS Conservation Area 29 to the south and other remnant native vegetation to the west, has already been or is planned to be compromised. Existing barriers include Mount Ridley Road, Mickleham Road, various roads and associated fences and housing to the east of the site and proposed housing currently under construction to the north. Regardless of the configuration of development within Lindum Vale, any retained remnants of native vegetation within this PSP will only maintain habitat continuity as stepping stone habitat for more mobile species.



Legend

- Study area
- GSM Survey A 2009
- GPS_Results_Wpt
- Golden Sun Moth 2015 (No. seen)
 - 1 - 2
 - 3 - 4
- Trees
 - 2015 Significant trees
 - Large Old Tree in patch
 - Scattered Tree
- Ecological Vegetation Class
 - Plains Grassy Woodland
 - HZ3
 - HZ4
 - HZ5
 - HZ6

Figure 2. 1: Ecological features of the study area

0 40 80 120 160 200

Metres

Scale: 1:4,000 @ A3

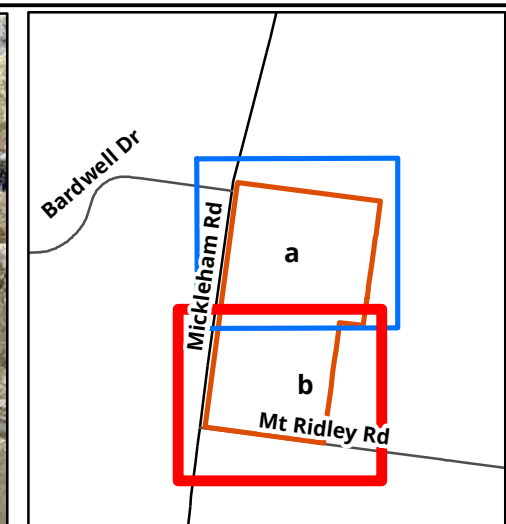
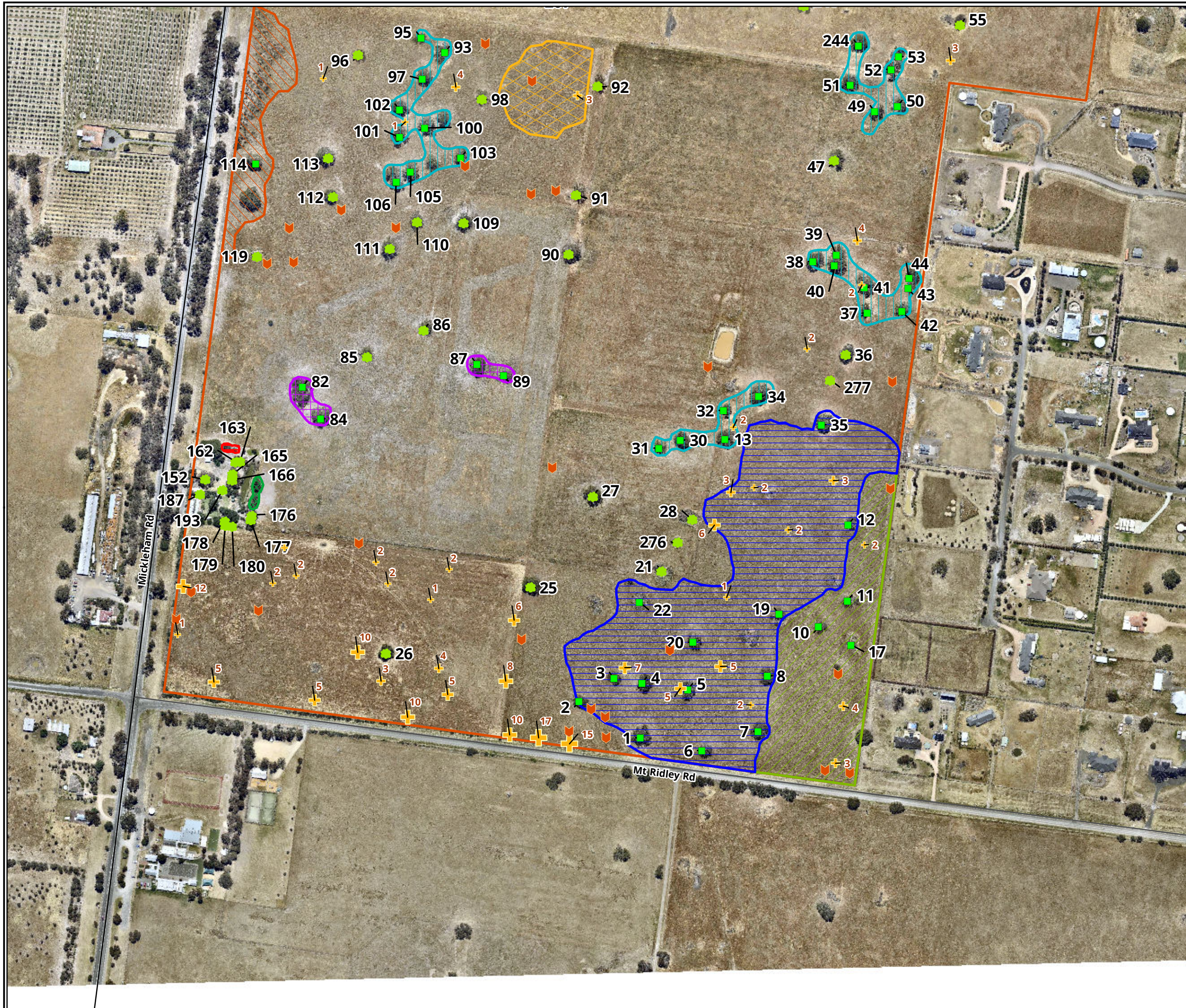
Coordinate System: GDA 1994 MGA Zone 55

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Legend

Study area

GSM Survey A 2009

GPS_Results_Wpt

Golden Sun Moth 2015 (No. seen)

- 1 - 2
- 3 - 4
- 5 - 7
- 8 - 12
- 13 - 17

Trees

2015 Significant trees

- Large Old Tree in patch
- Scattered Tree

Ecological Vegetation Class

Plains Grassy Woodland

- HZ1
- HZ2
- HZ3
- HZ4
- HZ5
- HZ6
- HZ7
- HZ8

Figure 2. 2: Ecological features of the study area

0 40 80 120 160 200

Metres

Scale: 1:4,000 @ A3

Coordinate System: GDA 1994 MGA Zone 55

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Date: 30 March 2015,
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Location: P:\19600s\19679\Mapping\19679_F2_EcoFeatures

Table 2: Summary of vegetation and habitat types within the study area

Vegetation or habitat type	Description	Location	Significant values
Plains Grassy Woodland EVC 55	<p>Supports an open canopy of River Red-gum <i>Eucalyptus camaldulensis</i> and occasionally Grey Box <i>Eucalyptus microcarpa</i> (Plates 1, 4 & 6). Typically there would be an open shrub layer of various wattles but with the exception of Habitat Zone 3 near the western boundary of the site, shrubs are largely absent from the study area due to long-term cattle grazing. In some cases Tree Violet <i>Melicytus dentatus</i> survives along dry stone walls. The ground layer supports grasses such as Common Wheat-grass <i>Anthosachne scabra</i>, Slender Wallaby-grass <i>Rytidosperma racemosum</i>, Brown-back Wallaby grass <i>Rytidosperma duttonianum</i> and Common Tussock-grass <i>Poa labillardierei</i>. In more degraded areas, herbs usually found within this EVC are poorly represented because of grazing pressure. The intact areas of the EVC support a range of herbs including Grassland Wood-sorrel <i>Oxalis perennans</i>, Slender Dock <i>Rumex brownii</i>, Kidney-weed <i>Dichondra repens</i>, Blue Devil <i>Eryngium ovinum</i> and Slender Speedwell <i>Veronica gracilis</i>.</p> <p>Degraded remnants have a high cover of weeds such as Brown-top Bent <i>Agrostis capillaris</i>, Spear Thistle <i>Cirsium vulgare</i> and introduced annual grasses. Relatively intact zones are represented by Habitat Zones 1, 2 and 3 while more degraded zones are represented by Habitat Zones 4 - 8.</p>	Throughout the study area	Includes some areas of potential habitat for Matted Flax lily, Golden Sun Moth and Striped Legless Lizard.
Scattered trees	<p>Scattered remnant trees (Plates 2, 3 & 8) provide a foraging resource for mobile fauna species. The majority of these scattered trees contain hollows. Note that the definition of a scattered tree only requires a canopy species to be "mature" and greater than 3 m tall. Dead trees greater than 3 m tall and with a diameter at breast height (dbh) can also be classified as a scattered tree. Some trees previously identified as scattered large old trees which were burnt in the 2013 wildfire which impacted this region. Where these trees have coppiced and include material, alive or dead, which exceeds 3 m in height those individuals are still classified as scattered trees.</p>	Throughout the study area.	Eucalypts in these areas offer potential foraging habitat for Swift Parrot.

Vegetation or habitat type	Description	Location	Significant values
Predominantly introduced vegetation	The majority of the study area supports degraded paddocks that have been cleared, are subject to cropping and pasture improvement and are otherwise used for grazing domestic stock. Native vegetation in these areas consists of scattered grasses and herbs. Many paddocks are heavily infested with introduced species such as annual grasses, Cocksfoot <i>Dactylis glomerata</i> , Toowoomba Canary-grass <i>Phalaris aquatica</i> and Brown-top Bent and also support scattered infestations of noxious weeds such as SpearThistle, African Box-thorn <i>Lycium ferocissimum</i> , Serrated Tussock <i>Nassella trichotoma</i> and Chilean Needle-grass <i>Nassella neesiana</i> .	Majority of the study area.	Areas of grassland infested with, or dominated by Chilean Needle-grass, are potential habitat for Golden Sun Moth. Tussock-forming grasses, such as Serrated Tussock are potential habitat for Striped Legless Lizard. Flowering eucalypts that are not indigenous to the local area offer possible foraging habitat for Swift Parrot and Grey-headed Flying-fox.
Rocky outcrops and dry stone walls	Natural rock outcrops on escarpments and agricultural dry stone walls. Latter are often now in disrepair (Plate 3).	Dry stone walls scattered throughout.	Surface rocks associated with natural outcrops and intact or remnant dry stone walls provide potential microhabitat for species such as Fat-tailed Dunnart and Striped Legless Lizard.
Farm dams	The dams within the study area are in a degraded state owing to the absence of woody vegetation, trampling by livestock and nitrification. Nonetheless, the dams do provide habitat for waterbirds and amphibian species.	Small dams are in various locations across entire study area.	Dams are generally of low habitat value for significant fauna. All will be used occasionally by significant waterbirds but none offer important or limiting resources to any such. Edges of dams provide potential habitat for River Swamp Wallaby-grass despite their heavily degraded condition.
Planted vegetation	Planted vegetation most commonly occurs in gardens in the vicinity of houses. These generally contain few habitat values as most indigenous fauna species in the area are adapted to open grassland environments. However, these gardens may support a range of common native and introduced bird species, particularly when in flower.	Houses along Mickleham Road	These gardens may support a range of common native and introduced bird species, particularly when in flower

3.3 Significant species and ecological communities

3.3.1 EPBC Act and FFG Act listed species

Lists of EPBC Act and FFG Act listed species recorded or predicted to occur within 5 km of the study area or from the relevant catchment (aquatic species) are provided in Appendix 1 (flora) and Appendix 2 (fauna). An assessment of the likelihood of these species occurring in the study area and an indication of where within the site (i.e. which habitats or features of relevance to the species) is included. A summary of those species recorded or with a medium or higher likelihood of occurring in the study area is provided in Table 3.

Table 3: Summary of EPBC and FFG Act listed species most likely to occur in the study area

Species name	Listing status	Area of value within the study area
Flora		
River Swamp Wallaby-grass	Vulnerable under the EPBC Act	May occur within seasonally wet areas of the site or along the edges of constructed dams
Austral Crane's-bill	Vulnerable in Victoria	Recorded during the previous assessment. Recorded within the road reserve for Mount Ridley Road with a few individual occurring within 2-3 m north of the road reserve within Habitat Zones 1 and 2.
Fauna		
Golden Sun Moth	Critically endangered under EPBC Act, listed under FFG Act	The majority of the site supports an open Grasslands structure and larval food plants that is favoured by GSM; the location records of this species are provided in Figure 2.

3.3.2 DELWP advisory list of rare and threatened species

To support decision making under the Guidelines, DELWP has produced models for Victoria describing the extent of habitat for most listed rare or threatened species. These models are called 'habitat importance models' and they assign a 'habitat importance score' to a location based on the importance of that location in the landscape as habitat for a particular rare or threatened species, in relation to other suitable habitat for that species (DEPI 2013b).

Under the Guidelines, these models form the basis for determining the impact of potential native vegetation clearing on rare and threatened species. The models only apply where a clearing proposal is considered on the moderate or high risk-based application pathways. The habitat importance scores are used to calculate the type and extent of biodiversity offsets required for native vegetation removal that impacts on individual rare or threatened species habitat for moderate or high risk application pathways.

A summary of those species for which habitat is modelled in the study area is provided in Table 4. These data were provided by DELWP Native Vegetation Transitional Support team and a full output report from DELWP is provided in Appendix 4. Four of these species, Black Falcon, Brown Toadlet, Golden Sun Moth and Austral Crane's-bill have database records within the local area (refer relevant Appendix for species records). Two of the species, Golden Sun Moth and Austral Crane's-bill have been recorded within the study area.

Determination of the requirement for a specific offset based on the extent of impact to one or more rare or threatened species is addressed in Section 5.

Table 4: Summary of rare or threatened species' habitats modelled in the study area

Species number	Species scientific name	Species common name	Recorded on site during Biosis assessment?
10238	<i>Falco subniger</i>	Black Falcon	No
10498	<i>Calamanthus pyrrhopygius</i>	Chestnut-rumped Heathwren	No
10598	<i>Grantiella picta</i>	Painted Honeyeater	No
12283	<i>Varanus varius</i>	Lace Monitor	No
13117	<i>Pseudophryne bibronii</i>	Brown Toadlet	No
15021	<i>Synemon plana</i>	Golden Sun Moth	Yes
501456	<i>Glycine latrobeana</i>	Clover Glycine	No
504655	<i>Coronidium gunianum</i>	Pale Swamp Everlasting	No
505337	<i>Geranium solanderi</i>	Austral Crane's-bill	Yes

3.3.3 Significant ecological communities

Areas of Plains Grassy Woodland (EVC 55) within the study area represent the remnants of a vegetation community rated as endangered within the Victorian Volcanic Plain bioregion (DELWP website). This vegetation also corresponds to remnants of Western Basalt Plains (River Red Gum) Grassy Woodland Floristic Community 55-04 which is listed under the *Flora and Fauna Guarantee Act 1988*.

Habitat Zone 1 (Figure 2) also satisfies the definition of Grassy Eucalypt Woodland of the Victorian Volcanic Plain Community which is listed as critically endangered under the EPBC Act.

3.4 Other ecological values

The DELWP biodiversity interactive mapper (BIM) identifies the study area as providing a moderate to high contribution to natural values.

The study area is not included as part of a Biosite (DSE 2005).

The study area provides isolated areas of Plains Grassy Woodland between two reserves identified by the BCS. The remnant native vegetation within the study area therefore provides some level of habitat connectivity between these reserves for more mobile species such as birds and bats.

3.5 Further survey recommendations

The site has been subjected to a number of targeted assessments by Biosis including surveys for Golden Sun Moth in 2009 and 2014, surveys for Striped Legless Lizard (Biosis Research 2010, Biosis 2015) and targeted survey for Matted Flax-lily (Biosis 2013). These surveys are considered adequate to cover all the relevant significant species likely to require formal assessment under the EPBC Act.

The Biodiversity Assessment Guidelines do not require any formal searches for threatened species as this policy only considered the rare and threatened species models prepared by DELWP.

4. Biodiversity legislation and government policy

This section provides an assessment of the project in relation to key biodiversity legislation and government policy. Where available, links to further information are provided. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the Act.

Link for further information including a guide to the referral process is available at: <http://www.environment.gov.au/epbc/index.html>.

MNES relevant to the project are summarised in Table 5. It includes an assessment against the EPBC Act policy statements published by the Australian Government which provide guidance on the practical application of EPBC Act.

Table 5: Assessment of project in relation to the EPBC Act

Matter of NES	Project specifics	Assessment against significant impact guidelines
Threatened species and ecological communities	<p>4 listed threatened ecological communities are identified as potentially occurring in the local area.</p> <p>21 species have been recorded or predicted to occur in the project search area. The likelihood of these species occurring in the study area is assessed in Appendix 1 (flora) and Appendix 2 (fauna).</p>	<p>Survey confirms the presence of Grassy Eucalypt Woodland of the Victorian Volcanic Plain (DSEWPac 2011).</p> <p>Golden Sun Moth has been recorded in relatively large numbers within the study area and development is likely to have a significant impact on this species (DEWHA 2009).</p> <p>Surveys provide evidence that Matted Flax-lily and Striped Legless Lizard are not present.</p>
Migratory species	<p>11 migratory species have been recorded or predicted to occur in the project search area (Appendix 2).</p>	<p>While some of these species would be expected to use the study area on occasions, and some of them may do so regularly or may be resident, it does not provide important habitat for an ecologically significant proportion of any of these species.</p>
Wetlands of international importance (Ramsar sites).	<p>No Ramsar Wetlands occur on site or within the vicinity of the study area</p>	<p>No impact likely on any significant wetland.</p>

On the basis of potential for significant impacts on two MNES, the EPBC Act is likely to be triggered and referral of the proposed action to the Australian Government Minister for the Environment is recommended.

4.2 State

4.2.1 Flora and Fauna Guarantee Act 1988 (FFG Act)

The FFG Act is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. Under the FFG Act a permit is required from DSE to 'take' protected flora species from public land. A permit is generally not required for removal of protected flora from private land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish.

Link for further information: <http://www.dse.vic.gov.au/plants-and-animals/native-plants-and-animals/threatened-species-and-communities/flora-and-fauna-guarantee-act>.

Native vegetation on site is a listed community, contains a number of protected flora species (Appendix 1), and one listed threatened species (Golden Sun Moth) and associated habitat (Appendix 2).

The land is privately owned, is not declared 'critical habitat' for the purposes of the FFG Act and the flora species are not being taken for the purpose of commercial sale. Therefore a protected flora permit is not required, however the presence of rare or threatened flora and habitat for threatened fauna will be considered by the Responsible Authority in determining its response to an application for vegetation clearance under Clause 52.17 (see below).

However the area impacted by the expansion of Mt Ridley Road will become public land and the development of that area would require an FFG permit unless the proponent (which may be VicRoads) has an exemption or an existing permit to cover the works.

4.2.2 Catchment and Land Protection Act 1994 (CaLP Act)

The CaLP Act identifies and classifies certain species as noxious weeds or pest animals, and provides a system of controls on noxious species.

Declared noxious weeds identified in the study area are listed in Appendix 1 and established pest animals are listed in Appendix 2.

The proponent/land owner must take all reasonable steps to 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. The State is responsible for eradicating State prohibited weeds from all land in Victoria.

Link for further information: <http://www.dpi.vic.gov.au/agriculture/pests-diseases-and-weeds/protecting-victoria-pest-animals-weeds/legislation,-policy-and-permits/legislation>

4.2.3 Planning and Environment Act 1987 (incl. Planning Schemes)

The *Planning and Environment Act 1987* controls the planning and development of land in Victoria, and provides for the development of planning schemes for all municipalities.

Reforms to the native vegetation permitted clearing regulations were gazetted on 20 December 2013 through planning scheme amendment VC105. The reforms made changes to the Victoria Planning Provisions including the State Planning Policy Framework (SPPF), Clause 52.16 and 52.17 of all planning scheme within Victoria and introduced the Permitted clearing of native vegetation: Biodiversity Assessment Guidelines (DEPI 2013b).

Of particular relevance to the development proposal are controls relating to the removal, destruction or lopping of native vegetation contained within the Hume Planning Scheme (the Scheme), including permit requirements. The Scheme (Clause 72) defines 'native vegetation' as 'Plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. It is an objective of Clause 12.01-2 of the SPPF (Native Vegetation Management) that permitted clearing of native vegetation results in no net loss in the contribution made by native vegetation to Victoria's biodiversity. For more information on these reforms refer to <http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/native-vegetation>.

Clause 52.17 (Native Vegetation) requires a planning permit to remove, destroy or lop native vegetation including some dead native vegetation. Decision guidelines are contained in Clause 52.17-5. Clause 52.17 does not apply if a Native Vegetation Precinct Plan (NVPP) corresponding to the land is incorporated in the Scheme. It should be noted that where native vegetation does not meet the definition of a remnant patch or scattered trees, as described in Section 3.1, the Guidelines do not apply. However, a permit may still be required to remove, destroy or lop native vegetation under the provisions of the Scheme.

Clause 65.02 requires consideration of native vegetation retention in a subdivision application and siting of open space areas.

Under Clause 66.02 a permit application to remove, destroy or lop native vegetation is required to be referred to DELWP as a recommending referral authority if any of the following apply:

- the area of native vegetation to be removed is greater than 0.5 hectares
- the class of application is on the high risk-based pathway
- a property vegetation precinct plan applies to the site or
- the native vegetation is on Crown land occupied or managed by the Responsible Authority.

The need for a permit to remove native vegetation may also be triggered by various overlays within the Scheme. The location of the overlays in relation to the study area can be determined via the following link: <http://planningschemes.dpcd.vic.gov.au/index.html>. The provisions of the following overlays apply to the study area:

Environmental Significance Overlay 5 and 11 (ESO5 and ESO11) cover a significant proportion of the study area. ESO 11 covers all of the southern parcel while ESO 5 & 11 cover much of the southern and eastern half of the northern parcel. Additional permit requirements relating to these overlays are as follows:

ESO5

A permit is required to remove native vegetation and an application to remove native vegetation must indicate:

- The total extent of vegetation on the property and the extent of native vegetation proposed to be cleared.
- The purpose of the proposed clearing and any proposals for revegetation, including proposed species, and ground stabilisation.
- A report by a suitable qualified person which describes the vegetation and habitat significance of the site, to the satisfaction of the responsible authority.

Before deciding on an application, the responsible authority must consider:

- The effect of the proposed removal of native vegetation on the habitat value and long term viability of remnant grasses in the vicinity.
- The significance of the native vegetation area.

- The reason for removing the vegetation and the practicality of alternative options which do not require removal of the native vegetation.
- The requirements of the Native Woodland Protection Area Guidelines as they apply to land within the Mount Ridley Local Structure Plan.

ESO 11

The objectives of this overlay are to:

- Protect and improve the viability of habitats, ecological communities, flora and fauna and genetic diversity of key areas within the Urban Growth Boundary.
- Enhance the environmental and landscape values of the area.
- Protect the unique geological features of the area.
- Ensure that any use, development or management of land within and adjacent to areas of biological significance are compatible with their long-term maintenance and conservation and will not have detrimental impacts on biodiversity values.
- Encourage ecological restoration, regeneration and revegetation with indigenous species within the area.
- Maintain and enhance habitat connectivity for listed threatened species.
- Prevent a decline in the extent and quality of native vegetation and native fauna habitat.
- Ensure that the siting and design of any buildings and works maintains the environmental integrity of the area.
- Maintain and enhance the integrity of sites of environmental significance.
- Provide for the long term preservation of the flora and fauna and associated habitat of environmentally significant areas.

A permit is not required to:

- Remove non native vegetation (including where it is dead)
- Remove vegetation where it has been planted or grown for amenity or aesthetic purposes
- For the purposes of maintenance where no more than one third of the foliage is removed from any individual plant. This exemption does not apply to the pruning or lopping of the trunk of a tree or shrub or to native vegetation within a road or railway reservation.

An application must be accompanied by:

- A description of any proposed disturbance of surface soil or rocks associated with the proposal.
- The total extent of vegetation on the property and the extent of native vegetation proposed to be cleared.
- A description of the steps that have been taken to avoid and minimise the removal of native vegetation including the practicality of alternative options which do not require removal of the native vegetation.

An application must also be accompanied by, as appropriate:

- A flora and fauna assessment of the land prepared by a suitably qualified and experienced person to the satisfaction of the responsible authority. The assessment must include:
 - A flora and fauna survey.

- A habitat hectare assessment.
- Identification of the vegetation and habitat significance of the property.
- A description of the effect of the proposed development in relation to other areas of native vegetation or native fauna habitat, including any proposed reserves, strategic reserves, conservation reserves, streams and waterways.
- A land and environmental management plan prepared by a suitably qualified person identifying, as appropriate:
 - Any proposals for revegetation, including proposed species, and ground stabilisation.
 - How any vegetation removal will be offset (an offset plan), in accordance with Victoria's Native Vegetation Management: A Framework for Action (NRE 2002).
 - Weed management, including species to be targeted and proposed management techniques.
 - Pest animal management, including species to be targeted and proposed management techniques.

If in the opinion of the responsible authority a flora and fauna assessment of the land or a land and environmental management plan is not relevant to the assessment of an application, the responsible authority may waive or reduce the requirement.

Specific ESO requirements / objectives

ESO 5

The focus of ESO5 appears to be the conservation of significant species, communities and habitats in the Mount Ridley locality, with this area identified as of State significance due to the high diversity of flora species and relatively intact examples of Red Gum woodland and their natural grassy understorey. The best examples of this are conserved in the Mt. Ridley Woodland Reserve which is contiguous with the Mount Ridley Grasslands conservation area.

Lindum Vale does support two areas of Red Gum woodland with at least some natural grassy understorey, with the most intact and species rich area being HZ 1 (Figure 2) and to a lesser extent HZs 2, 3 & 4. Habitat Zones 5 & 6 are typically dominated by mature trees with high habitat values. However these areas exist as patches because of the presence of three or more canopy trees providing more than 20% projected foliage cover while the ground cover typically supports a low abundance of a small number of otherwise common indigenous grasses and herbs.

The clearing of native vegetation within the study area, including patches of native vegetation and scattered trees would have a localised impact on populations of common and threatened species, specifically Austral Crane's-bill and Golden Sun Moth. This is unlikely to have an impact on the viability or conservation status of other native vegetation within the general locality or broader bioregion, including the area of ESO5 within Lindum Vale.

The impact on Austral Crane's-bill will largely result from the upgrade of Mount Ridley Road (outside ESO5) as all individuals of this species were recorded within the area to be impacted by this upgrade. No other threatened flora were recorded within the broader area of Lindum Vale.

In terms of habitat connectivity for vertebrate fauna, the majority of species within the local area are widespread and common. While the site may be utilised on occasion by rare or threatened fauna (i.e. Swift Parrot, Grey headed Flying-fox) these species are highly mobile and the foraging habitat present does not represent a significant proportion of the broader habitat resources for these species.

The critically endangered Golden Sun Moth has been recorded within the study area and this population is considered part of a broader population that extends south, north and east of the study area. The proposal will likely have a significant impact on the local population of this species through loss of habitat and habitat fragmentation.

More mobile examples of the resident fauna include woodland and open country birds and microbats. These species will suffer a loss of habitat from any clearing associated with residential development (e.g. loss of pasture foraging areas and loss of trees as foraging, perching, nesting and roosting sites). Many of these species are dependant on large old hollow bearing trees for nesting and/or shelter. Large old trees also provide an abundance of food resources for birds that forage in the foliage and flowers. Many of the birds and microbats are highly mobile and are able to move around the local landscape despite the exiting barriers such as roads, residential developments and clearing associated with agriculture. The proposed residential development will likely present less of a barrier to movement for these species.

The removal of large old trees within Lindum Vale would reduce the hollow/foraging resource for the existing vertebrate fauna, but given the mobile nature of these local inhabitants, connectivity to and between Mt Ridley Woodland and BCS Conservation Area 29 is unlikely to be significantly influenced by such clearing. For these reasons, the loss of some of this habitat is not considered to be a significant impact on local habitat connectivity. Therefore, while the retention of large old trees should be encouraged, the optimum arrangement would be to retain consolidated patches of habitat rather than scattered individual trees.

Mammals that move across the ground such as Eastern Grey Kangaroo and Common Brushtail Possum will also suffer a loss of habitat as well as a loss of habitat connectivity as the environment will present additional physical barriers (e.g. roads, housing) as well as behavioural barriers such that deter movement such as dogs and humans. For these species, losses in or restrictions in habitat connectivity is plausible.

In summary the clearing of native vegetation associate with the urban development of PSP1202 will have a negative impact on the species richness, habitat values and overall intactness within areas covered by ESO5. As this vegetation contributes to the broader Mount Ridley woodlands which have regional and state conservation significance any clearing within Lindum Vale could be viewed as inconsistent with the objectives of ESO5. However, given the condition of the vegetation in comparison to the broader Mount Ridley woodland, the impact of limited clearing is not expected to be significant at the regional or state level. It also important to note that the current land use, if continued, would also result in an ongoing decline the values ESO5 attempts to protect.

ESO5 Requirements

ESO 5 requires that the total extent of vegetation on the property, its condition and significance is described. This report satisfies that requirement although it is required to be accepted by Hume.

ESO 5 also requires the extent to which that native vegetation is proposed to be cleared is defined. An NVPP to be prepared by the MPA (in consultation with Hume Council) would define the extent of proposed clearing.

Once the proposed clearing is defined, there is an expectation that some areas of native vegetation would be retained as part of the PSP, specifically some or all of the area of Plains Grassy Woodland in the south eastern corner adjacent to Mount Ridley Road. This area would then have an environmental management plan prepared to identify any revegetation and rehabilitation works (as required by ESO 5).

ESO 11

The first objective for ESO 11, relates to key areas within the UGB. Based on past discussions with DELWP, and their recent attempts to conserve HZ 1 & 2 (Figure 2), they would consider these two habitat zones to be defined as such a key area. This, by default suggests that DELWP would not consider other areas of native

vegetation within the study area as key areas within the UGB. Given the critically endangered nature of this vegetation community, this remnant is considered to be of conservation significance in the local area.

The generic objectives of ESO 11, such as the enhancement of the environmental and landscape values, would be difficult to achieve if any clearing was proposed in association with the broader residential development of this land. However, the current land use, if continued, would also result in an ongoing decline in both of these values. While the current land owner may be encouraged to conduct ecological restoration activities, these have not occurred to date.

ESO 11's objective to maintain and enhance habitat connectivity for listed threatened species suggests that the site either provides important habitat or is an essential movement corridor for such species. As discussed above, the site does provide potential habitat for a small number threatened vertebrate fauna species (Swift Parrot and Grey-headed Flying-fox). While the proposal would likely result in the removal of habitat for these species, in terms of habitat connectivity, these species are highly mobile and it is not expected that a loss of habitat connectivity would result from the proposed subdivision. Given the context of the site, it is fair to say that virtually all other threatened vertebrate fauna recorded or predicted to occur in the local area are either uncommon or vagrant visitors or are locally extinct.

Golden Sun Moth has been recorded and is widely distributed on site. Urban development will lead to a loss of habitat for this species in the local area and is also likely to result in the fragmentation of the broader population that extends beyond the study area into smaller, discrete populations. However, existing approvals associated with the expanded urban growth boundary will already largely result in the isolation of Lindum Vale's Golden Sun Moth habitat.

ESO 11's objective to prevent a decline in the extent and quality of the native vegetation and fauna habitat identified in this report is impossible under current land use conditions and under any development scenario.

Maintenance of native vegetation condition would require a significant conservation management effort. No resources are available for such works and even if there were, the site is private property and any such works would require the participation of the land owner.

ESO 11 Requirements

This report provides for the information requirements of ESO 11, including a flora and fauna survey, a habitat hectare assessment, identification of the vegetation and habitat significance of the property and a description of the effect of the proposed development in relation to other areas of native vegetation and fauna habitat, including any proposed reserves, strategic reserves, conservation reserves, streams and waterways.

ESO 11 requires any development application to describe the steps taken to avoid and minimise the clearing of native vegetation. In this context, avoidance of clearing could be demonstrated through the exclusion of one or more patches of native vegetation from development. Minimising the impact on native vegetation can be identified through the design process avoiding higher quality areas of native vegetation and protecting groups of large old trees, while identifying lower quality areas of native vegetation and/or scattered trees to be cleared in favour of development. Identifying the design process for all such choices would document the "avoid and minimise" process conducted by a developer.

ESO 11 requires a land and management plan identifying how any vegetation removal will be offset (an offset plan), in accordance with Victoria's Native Vegetation Management: A Framework for Action (NRE 2002) (the Framework). Permitted clearing in Victoria is currently governed by the Biodiversity Assessment Guidelines which have superseded the Framework. Any offsets associated with the development of PSP 1202 would result in the requirement to provide offsets as General Biodiversity Equivalence Units which must be provided either within the City of Hume or within the administrative boundary of the Port Phillip and Westernport Catchment Management Authority (PPWPCMA). Under the Framework, offsets would be prescribed in terms of habitat hectares and large old tree protection requirements. These would need to be provided within the

Victorian Volcanic Plain bioregion. Given the actions of the Melbourne Strategic Assessment (DSE 2009) and associate Biodiversity Conservation Strategy (DEPI 2013) to protect significant tracts of native grassland and woodland surrounding Melbourne, it is highly unlikely that both these offset prescriptions could be provided concurrently. If both offset policies were applied then it is likely that any offsets would need to be provided separately.

Identifying a requirement to produce a management plan for any native vegetation retained as a conservation reserve would be a reasonable permit condition to ensure consistency with the requirements of ESO 11 to identify pest plant and animal management procedures for such a reserve.

The potential effect of native vegetation removal on local habitat values and the long term viability of remnant grasses in the vicinity have been discussed above. It is likely that the proposed duplication of Mount Ridley Road would result in a significant impact on Austral Crane's-bill due to the highly localised distribution of this species. However individuals of this species could be propagated and established within a reserve to be established in this vicinity. Otherwise, it is considered unlikely that the loss of some trees and scattered areas of remnant understorey species would have any measurable impact on the viability of other native vegetation in the local area.

Victoria's Biodiversity Assessment Guidelines

The Guidelines are incorporated into the Victoria Planning Provisions and all planning schemes in Victoria (DEPI 2013b). The Guidelines replace Victoria's Native Vegetation Management – A Framework for Action.

The purpose of the Guidelines is to guide how impacts to biodiversity should be considered when assessing a permit application to remove, destroy or lop native vegetation. The objective for permitted clearing of native vegetation in Victoria is 'No net loss in the contribution made by native vegetation to Victoria's biodiversity'.

A detailed assessment of the implications for the project under the Guidelines is provided in Section 5 of this report. Under the Guidelines, there are three risk-based pathways for assessing an application for a permit to remove native vegetation: low, moderate and high.

A detailed determination of the risk-based pathway for the planning application relevant to the proposed development is provided in Section 5.2. In summary, the planning application for removal of native vegetation must meet the requirements of, and be assessed in, the **low/moderate/high** risk-based pathway. These requirements are outlined in Section 5.

4.2.4 Water Act 1989

The primary purpose of the *Water Act 1989* is to provide a framework for the allocation and management of surface water and groundwater throughout Victoria. It provides a principal mechanism for maintenance of ecosystem functions including those of aquatic ecosystems. Under By-Laws created by the relevant Authority under the Act, the authorities regulate the works within and in the vicinity of waterways. In Melbourne Water's management area this applies to all waterways with a catchment area of 60 ha or more. These waterways are deemed to be Melbourne Water assets, while all smaller watercourses are deemed the responsibility of the local government.

The proposed development will involve construction or maintenance activities that may affect waterways through increased or decreased surface run off. Development within the study area will require a permit from Melbourne Water. Guidelines and application forms can be obtained from Melbourne Water's Asset Service team.

For developments within Melbourne Water's management area that entail the provision of new drainage infrastructure, approval for works on waterways is covered under the Agreement process set out in the Land Development Manual: <http://ldm.melbournewater.com.au/content/introduction/introduction.asp>.

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

The Environment Protection Act underpins the State Environmental Protection Policy (SEPP) - Waters of Victoria which provides a legal framework for the protection and rehabilitation of Victoria's surface water environments.

The project may directly and/or indirectly impact upon Malcolm Creek and its aquatic ecosystems. The SEPP (Schedule 7 – Waters of the Yarra Catchment) requires that aquatic ecosystem values be protected. Environmental quality objectives and indicators are defined to protect beneficial uses (i.e. the uses and values of the water environment) and an attainment program provides guidance on protection of the beneficial uses.

Impacts to surface water quality must not result in changes that exceed background levels and/or the water quality objectives specified for the Rural Western Waterways segment to protect surface water uses and values. The proponent needs to ensure that direct and indirect (e.g. runoff) impacts to surface water quality do not exceed the background levels and/or water quality objectives.

Link to further information: <http://www.epa.vic.gov.au/water/epa/wov.asp>.

5. Victoria's biodiversity assessment guidelines

The Guidelines were introduced in December 2013, and they describe the following objective for permitted clearing of native vegetation in Victoria:

"No net loss in the contribution made by native vegetation to Victoria's biodiversity"

This objective is to be achieved through Victoria's planning system using a risk-based approach that relies on strategic planning and the permit and offset system. The key strategies for achieving no net loss at the permit level are:

- avoiding the removal of native vegetation that makes a significant contribution to Victoria's biodiversity
- minimising impacts to Victoria's biodiversity from the removal of native vegetation
- where native vegetation is permitted to be removed, ensuring it is offset in a manner that makes a contribution to Victoria's biodiversity that is equivalent to the contribution made by the native vegetation to be removed.

The steps that have been taken during the design of the development to ensure that impacts on biodiversity from the removal of native vegetation have been minimised include:

- Locating the proposed building in existing disturbed land
- Designing the access road to avoid scattered trees

DELWP has provided biodiversity information tools to assist with determining the risk associated with permitted clearing and the contribution that native vegetation within the study area makes to Victoria's biodiversity.

All planning permit applications to remove native vegetation are assigned to a risk-based pathway determined by the extent and location of proposed clearing. The risk-based pathway will dictate the information to be provided in a planning permit application and the decisions guidelines the responsible authority (e.g. Council) and/or DELWP as a referral authority will use to assess the permit application.

The biodiversity information tools have two components:

Site-based information

The site-based information is observable at a particular site. Biosis has collected the requisite site-based information for the assessment against the Guidelines.

Landscape scale information

Landscape scale information requires consideration of information beyond the site. This information is managed by DELWP and can be accessed via the NVIM. Biosis has submitted the site-based data and location information to DELWP and a Biodiversity Information and Offset Requirements (BIOR) report has been prepared to accompany the planning application.

The following section summarises the results of the site-based assessment and the outputs generated by the BIOR report. The BIOR report identifies the risk-based pathway on which the planning application will be assessed. The full BIOR report can be viewed in Appendix 5.

Note: a glossary of terms used in relation to the Guidelines and Habitat hectares assessment is provided in Appendix 5.

5.1 Proposed removal of native vegetation

The extent of native vegetation patches and the number of scattered trees were mapped within the study area (Figure 2) and the condition was assessed in relation to standard methods provided by DSE (2004). The condition of native vegetation was assessed using the DSE Vegetation Quality Assessment Sheet (DSE 2004) and pre-determined EVC benchmarks: <http://www.dse.vic.gov.au/conservation-and-environment/ecological-vegetation-class-evc-benchmarks-by-bioregion>.

The proposed removal of native vegetation was assessed in accordance with the **concept design provided**. It is proposed to remove **[Number]** Habitat hectares as shown in Table 6. Spatial data (shapefiles) of proposed vegetation removal were submitted to DELWP's native vegetation support team, who provided a BIOR report for the project. This is provided in **Appendix X** and summarised in the following sections.

5.1.1 Habitat hectares

Areas of uniform quality for each EVC within the patches are termed 'habitat zones' and are assessed separately. The condition score of the habitat zone is multiplied by the extent of the zone to give a value in Habitat hectares.

Eight habitat zones are identified (Table 6). The results of the condition assessment are provided in Table 6, with the number of Habitat hectares in each habitat zone.

5.1.2 Scattered Trees

There are 61 scattered remnant trees within the study area. These trees equate to 0.866 Habitat hectares (Table 7).

5.1.3 Summary of Habitat hectares within the study area

In summary, the study area supports 6.999 Habitat hectares

5.2 Determining the risk-based pathway

To determine the risk based pathway for the permit application, two factors are considered: **location risk** and **extent risk**.

Location risk has been pre-determined by DELWP for all locations in Victoria. The location of a particular site is determined using the *Native vegetation location risk map* available in the Native Vegetation Information Management (NVIM) system (<http://nvim.depi.vic.gov.au>).

The extent risk is based on the extent of native vegetation proposed to be removed. Extent risk is determined with reference to the:

- area of any remnant patches of native vegetation proposed to be removed; and
- number of any scattered trees proposed to be removed.

Table 6: Habitat hectares of native vegetation within the study area

Site ID		1	2	3	4	5	6	7	8	Total
Habitat Zone ID		A	A	A	A	A	A	A	A	
EVC #: Name		PGW*	PGW	PGW	PGW	PGW	PGW	PGW	PGW	
EVC No.		55	55	55	55	55	55	55	55	
		Max Score	Score	Score	Score	Score	Score	Score	Score	Total
Site Condition	Large Old Trees	10	3	4	3	0	10	10	0	0
	Canopy Cover	5	3	3	3	0	5	5	0	5
	Lack of Weeds	15	4	4	4	4	0	0	0	0
	Understorey	25	15	5	15	5	5	5	5	0
	Recruitment	10	5	5	5	5	5	5	0	0
	Organic Matter	5	3	3	3	4	2	2	2	2
	Logs	5	2	2	0	0	4	0	0	0
	Total Site Score		35	26	33	18	31	27	7	7
Landscape Value	Patch Size	10	6	6	1	1	1	1	1	1
	Neighbourhood	10	1	1	0	0	0	0	0	0
	Distance to Core	5	3	3	3	3	3	3	3	3
	Total Landscape Score		10	10	4	4	4	4	4	4
HABITAT SCORE		100	45	36	37	22	35	31	11	11
Habitat points = #/100		1	0.45	0.36	0.37	0.22	0.35	0.31	0.11	0.11
Habitat Zone area (ha)			2.812	7.000	1.027	0.87	4.421	0.691	0.105	0.033
Habitat hectares (Hha)			1.265	2.520	0.380	0.191	1.547	0.214	0.012	0.004
										16.959
										6.133

Table 7: Habitat hectare conversion for scattered remnant canopy trees within the study area

Number of scattered trees	Weighted average condition multiplier*	Standard extent (ha)	Habitat hectares (Hha)
61	0.2	0.071	0.866

*From DELWP NVIM, PGW = Plains Grassy Woodland

OPTION 4: FOR REMOVAL OF REMNANT PATCH VEGETATION AND SCATTERED TREES

For applications that propose to remove both remnant patch vegetation and scattered trees, the extent of scattered trees is calculated using the standard extent multiplier and added to the extent of remnant patch vegetation, to determine the overall extent to be considered when determining the risk-based pathway.

It is proposed to remove [< 0.5 hectares; ≥ 0.5 hectares and < 1 hectare; ≥ 1 hectare] of native vegetation from within location [A/B/C], therefore the application for removal of this native vegetation must meet the requirements of, and be assessed in, the [low/moderate/high] risk-based pathway. These requirements are provided in Appendix X.

5.3 Offset requirements

In order to ensure a gain to Victoria's biodiversity that is equivalent to the loss resulting from permitted clearing of native vegetation, compensatory offsets are required. Losses and gains are measured in biodiversity equivalence scores or units.

For a [moderate/high] risk-based pathway application, the specific-general offset test will determine if a general offset, specific offset or combination of both is required.

The results of the specific-general offset test are provided in Appendix X and summarized in Table 8.

5.4 Proposed offset strategy

OPTION 1 FIRST PARTY OFFSET

[CLIENT] intends to retain and manage [XX] ha of native vegetation as a [general/specific] first party offset site.

The offset site is on freehold land located in the [XXXX] catchment management area and the [XXXX] municipality. The offset site has a strategic biodiversity score of XX.

Based on the offset site security standards detailed in page 6 of DEPI 2013b, the offset owner will be required to enter into a security agreement that meets the following security standards:

- Contains a legally enforceable provision
- Has no termination date
- Is implemented by a statutory body on the list of statutory bodies that have agreed to the *Agreement with the Secretary to the Department of Environment and Primary Industries (DEPI) for implementing offsets on freehold land*. DELWP maintains an up to date list of the statutory bodies who have provided written confirmation to the agreement. The list is available on the DELWP website.

For specific offset sites, the security agreement must be registered on the land title.

An offset management plan will need to be developed and this area will need to be actively managed for a nominated 10 year period and then maintained as an offset in perpetuity.

OPTION 2 THIRD PARTY OFFSET CREDIT PURCHASE

[CLIENT] intends to purchase the offset credits from the Victorian native vegetation credit register.

A quote has been obtained to purchase credits that satisfy the offset requirements as specified in Section 5.3. The offset site is located in the [XXXX] catchment management area and the [XXXX] municipality. The offset site has a strategic biodiversity score of XX.

Table 8: Summary of DELWP Biodiversity Impacts and Offset Requirements report

Attribute	Outcome	Notes
Location risk	A	Entire site is Location Risk A
Native vegetation removal extent		Yet to be defined
Risk-based pathway	Moderate	
Habitat hectares to be removed		Yet to be defined
Strategic Biodiversity Score	0.350	
Modelled habitat for rare or threatened species	Yes	Black Falcon, Chestnut-rumped Heathwren, Painted Honeyeater, Lace Monitor, Brown Toadlet, Golden Sun Moth, Clover Glycine, Pale Swamp Everlasting and Austral Crane's-bill
Specific-general offset test result	No specific offset required	
General Biodiversity Equivalence Scores	0.002 – 1.792	To be defined based on clearing approved
Offset type	General	Complete loss of all vegetation only requires a general offset
Offset risk factor	1.5	
Offset amount: General Biodiversity Equivalence Units	4.117	For loss of all vegetation
Offset habitat for species	NA	Not Applicable
Offset Vicinity	PPWPCMA	Within the CMA or the City of Hume
Offset minimum Strategic Biodiversity Score	0.280	

6. Key ecological values and recommendations

This section identifies the key ecological features of the study area, provides an outline of potential implications of proposed development on those values and includes recommendations to assist the Metropolitan Planning Authority to design a development to minimise impacts on biodiversity.

The primary measure to reduce impacts to biodiversity values within the study area is to minimise removal of native vegetation and terrestrial habitat. It is critical that this be considered during the design phase of the project, when key decisions are made about the location of major roads and services, parks and housing areas. The results of this assessment should therefore be incorporated into the project design, by adding the flora and fauna mapping information into the planning maps and investigating options to retain as much of the mapped vegetation/habitats as possible. Priority should be given to highest value areas and retaining larger areas in preference to numerous smaller ones.

The design phase is also the time during which future requirements for infrastructure and services must be forecast and allowance made outside any nominated reserves for all construction works, such as road batters, footpaths, drainage and services (including optic fibre). All areas of vegetation/habitat nominated in the design plan as 'retained' are to be treated as no-go zones and are not to be encroached upon as development progresses.

A summary of potential implications of development of the study area and recommendations to minimise impacts during the **design phase** of the project is provided in Table 9.

Table 9: Summary of key ecological values, potential implications of developing the study area and recommendations to minimise ecological impacts during the design phase.

Ecological feature (Figure 2)	Implications of development	Recommendations
Native vegetation	<p>The permanent removal of up to XX Habitat hectares of vegetation</p> <p>Removal of habitat for Golden Sun Moth and potential impacts to areas of Plains Grassy Woodland.</p> <p>The application will be assessed on the low/moderate risk-based pathway. Impacts to native vegetation are all below the specific offset threshold for the threatened species habitat modelled within the study area.</p>	<p>Avoid and minimise removal of native vegetation, in accordance with the Guidelines (no net loss). Refer to Section 5.</p> <p>Avoid and minimise removal of terrestrial habitat to retain habitat linkages within the development. Retained native vegetation will provide stepping stone links to other areas of native vegetation within the broader area.</p> <p>Identify and implement appropriate general offsets for vegetation losses as outlined in Section 5.3.</p> <p>There is an opportunity to provide first party offsets within the PSP.</p> <p>If native vegetation is to be retained within the proposed development area, development of an offset management plan will be required.</p>
Other habitat features	Removal of known habitat for Golden Sun Moth.	Avoid/minimise impacts on higher quality GSM habitat.
Habitat connectivity	Removal of vegetation / habitat that forms part of a broader array of remnant habitat.	Retain patches and scattered trees within the development area to function as habitat islands. Existing and proposed developments have/will continue to isolate the existing remnants from all but the more mobile fauna. Any retained remnants of native vegetation within this PSP will only maintain habitat continuity as stepping stone habitat for more mobile species.

Construction and post-construction management

Specific detail relating to preventing impacts to retained native vegetation and terrestrial habitat should be addressed in a site-specific Construction Environmental Management Plan. This will include issues relating to contractors such as environmental inductions, installation of temporary fencing/signage, drainage and sediment control.

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An Ecological Management Plan should be prepared by an ecological consultant to provide detailed advice on the ongoing protection and long-term management of retained vegetation/ habitat, creation of linkages and other habitat features such as wetlands, if proposed.

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Appendices

Appendix 1: Flora

Notes to tables:

EPBC Act: CR - Critically Endangered EN - Endangered VU - Vulnerable PMST – Protected Matters Search Tool	DEPI 2014: e - endangered v - vulnerable r - rare
FFG Act: L - listed as threatened under FFG Act P - protected under the FFG Act (public land only)	Noxious weed status: SP- State prohibited species RP - Regionally prohibited species RC - Regionally controlled species RR - Regionally restricted species
	# - Native species outside natural range

A1.1 Flora species recorded from the study area

Table A3.1. Flora species (56 native and 59 weeds) recorded from the study area.

Status	Scientific Name	Common Name
Rare or Threatened Species		
v	<i>Geranium solanderi</i> var. <i>solanderi</i> s.s.	Austral Crane's-bill
Native Species		
	<i>Acacia paradoxa</i>	Hedge Wattle
	<i>Allocasuarina verticillata</i>	Drooping Sheoak
	<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass
	<i>Anthosachne scabra</i>	Common Wheat-grass
	<i>Arthropodium strictum</i>	Chocolate Lily
	<i>Atriplex semibaccata</i>	Berry Saltbush
	<i>Austrostipa bigeniculata</i>	Kneed Spear-grass
	<i>Austrostipa mollis</i>	Supple Spear-grass
	<i>Austrostipa scabra</i> subsp. <i>falcata</i>	Rough Spear-grass
	<i>Austrostipa semibarbata</i>	Fibrous Spear-grass
	<i>Austrostipa</i> spp.	Spear Grass
	<i>Bothriochloa macra</i>	Red-leg Grass

Status	Scientific Name	Common Name
	<i>Burchardia umbellata</i>	Milkmaids
	<i>Carex inversa</i>	Knob Sedge
	<i>Chloris truncata</i>	Windmill Grass
	<i>Crassula decumbens</i> var. <i>decumbens</i>	Spreading Crassula
	<i>Dianella revoluta</i> s.l.	Black-anther Flax-lily
	<i>Dichelachne crinita</i>	Long-hair Plume-grass
	<i>Dichondra repens</i>	Kidney-weed
	<i>Dysphania pumilio</i>	Clammy Goosefoot
	<i>Eleocharis acuta</i>	Common Spike-sedge
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush
	<i>Epilobium billardierianum</i>	Variable Willow-herb
	<i>Epilobium hirtigerum</i>	Hairy Willow-herb
	<i>Eryngium ovium</i>	Blue Devil
	<i>Eucalyptus camaldulensis</i>	River Red-gum
	<i>Eucalyptus microcarpa</i>	Grey Box
	<i>Euchiton involucratus</i>	Star Cudweed
P	<i>Euchiton sphaericus</i>	Annual Cudweed
	<i>Geranium retrorsum</i> s.s.	Grassland Crane's-bill
P	<i>Helichrysum luteoalbum</i>	Jersey Cudweed
	<i>Hypericum gramineum</i> spp. agg.	Small St John's Wort
	<i>Isolepis hookeriana</i>	Grassy Club-sedge
	<i>Juncus bufonius</i>	Toad Rush
	<i>Juncus gregiflorus</i>	Green Rush
	<i>Juncus subsecundus</i>	Finger Rush
	<i>Lachnagrostis filiformis</i>	Common Blown-grass
	<i>Lobelia</i> spp.	Lobelia
	<i>Lomandra filiformis</i>	Wattle Mat-rush
	<i>Lythrum hyssopifolia</i>	Small Loosestrife
	<i>Melicytus dentatus</i>	Tree Violet
	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass

Status	Scientific Name	Common Name
	<i>Oxalis perennans</i>	Grassland Wood-sorrel
	<i>Phragmites australis</i>	Common Reed
	<i>Poa labillardierei</i>	Common Tussock-grass
	<i>Poa morrisii</i>	Soft Tussock-grass
	<i>Rumex brownii</i>	Slender Dock
	<i>Rytidosperma duttonianum</i>	Brown-back Wallaby-grass
	<i>Rytidosperma geniculatum</i>	Kneed Wallaby-grass
	<i>Rytidosperma racemosum</i> var. <i>racemosum</i>	Slender Wallaby-grass
	<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass
	<i>Rytidosperma</i> spp.	Wallaby Grass
	<i>Schoenus apogon</i>	Common Bog-sedge
P	<i>Senecio quadridentatus</i>	Cotton Fireweed
P	<i>Solenogyne dominii</i>	Smooth Solenogyne
	<i>Themeda triandra</i>	Kangaroo Grass
	<i>Veronica gracilis</i>	Slender Speedwell
Introduced Species		
	<i>Acetosella vulgaris</i>	Sheep Sorrel
	<i>Agrostis capillaris</i>	Brown-top Bent
	<i>Arctotheca calendula</i>	Cape Weed
	<i>Bromus catharticus</i>	Prairie Grass
	<i>Bromus diandrus</i>	Great Brome
	<i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>	Soft Brome
RC	<i>Carthamus lanatus</i>	Saffron Thistle
	<i>Cerastium glomeratum</i>	Sticky Mouse-ear Chickweed
	<i>Chenopodium album</i>	Fat Hen
	<i>Chenopodium murale</i>	Sowbane
RC	<i>Cirsium vulgare</i>	Spear Thistle
	<i>Conyza bonariensis</i>	Flaxleaf Fleabane
RC	<i>Crataegus monogyna</i>	Hawthorn
	<i>Cynara cardunculus</i> subsp. <i>flavescens</i>	Artichoke Thistle

Status	Scientific Name	Common Name
	<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch
	<i>Dactylis glomerata</i>	Cocksfoot
	<i>Ehrharta erecta</i> var. <i>erecta</i>	Panic Veldt-grass
	<i>Ehrharta longiflora</i>	Annual Veldt-grass
	<i>Festuca arundinacea</i>	Tall Fescue
	<i>Gamochaeta purpurea</i>	Spiked Cudweed
RC	<i>Genista monspessulana</i>	Montpellier Broom
	<i>Helminthotheca echioides</i>	Ox-tongue
	<i>Hirschfeldia incana</i>	Buchan Weed
	<i>Holcus lanatus</i>	Yorkshire Fog
	<i>Hordeum leporinum</i>	Barley-grass
	<i>Hypochaeris radicata</i>	Flatweed
	<i>Leontodon taraxacoides</i> subsp. <i>taraxacoides</i>	Hairy Hawkbit
	<i>Lepidium africanum</i>	Common Peppergrass
	<i>Lolium rigidum</i>	Wimmera Rye-grass
RC	<i>Lycium ferocissimum</i>	African Box-thorn
	<i>Malva nicaeensis</i>	Mallow of Nice
	<i>Molineriella minuta</i>	Small Hair-grass
	<i>Nassella hyalina</i>	Cane Needle-grass
	<i>Nassella leucotricha</i>	Texas Needle-grass
RR	<i>Nassella neesiana</i>	Chilean Needle-grass
RC	<i>Nassella trichotoma</i>	Serrated Tussock
RR	<i>Oxalis pes-caprae</i>	Soursob
	<i>Paspalum dilatatum</i>	Paspalum
	<i>Phalaris aquatica</i>	Toowoomba Canary-grass
	<i>Plantago lanceolata</i>	Ribwort
	<i>Poa annua</i>	Annual Meadow-grass
	<i>Polygonum aviculare</i>	Hogweed
	<i>Prunus cerasifera</i>	Cherry Plum
	<i>Romulea rosea</i>	Onion Grass

Status	Scientific Name	Common Name
RC	<i>Rosa rubiginosa</i>	Sweet Briar
RC	<i>Rubus fruticosus</i> spp. agg.	Blackberry
	<i>Rumex crispus</i>	Curled Dock
RC	<i>Silybum marianum</i>	Variegated Thistle
	<i>Solanum nigrum</i>	Black Nightshade
	<i>Sonchus asper</i>	Rough Sow-thistle
	<i>Sonchus oleraceus</i>	Common Sow-thistle
	<i>Stellaria media</i>	Chickweed
	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Narrow-leaf Clover
	<i>Trifolium campestre</i> var. <i>campestre</i>	Hop Clover
	<i>Trifolium glomeratum</i>	Cluster Clover
	<i>Trifolium subterraneum</i>	Subterranean Clover
	<i>Triticum aestivum</i>	Wheat
	<i>Ulmus</i> spp.	Elm
	<i>Urtica urens</i>	Small Nettle

A1.2 Listed flora species

The following table includes the listed flora species that have potential to occur within the study area. The list of species is sourced from the Victorian Flora Information System and the Protected Matters Search Tool (DoE; accessed on 23.02.15).

Table A3.2. Listed flora species recorded / predicted to occur within 5 km of the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DE LWP	FFG					
National Significance									
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	V			2008	PMST	Swampy areas, mainly along the Murray River between Wodonga and Echuca with scattered records from southern Victoria.	Low	Areas that are seasonally inundated with water may provide suitable habitat
<i>Carex tasmanica</i>	Curly Sedge	VU	v	L	-	PMST	Seasonally wet areas, such as around drainage lines and freshwater swamps, on fertile, clay soils derived from basalt.	Low	No suitable habitat
<i>Dianella amoena</i>	Matted Flax-lily	E	e	f	2011	PMST	Lowland grassland and grassy woodland, on well-drained to seasonally waterlogged fertile sandy loam soils to heavy cracking clays.	Low	Suitable habitat present but targeted searches failed to locate
<i>Glycine latrobeana</i>	Clover Glycine	VU	v	L	-	PMST	Grasslands and grassy woodlands, particularly those dominated by <i>Themeda triandra</i> .	Low	Considered very rare in the Melbourne area
<i>Lachnagrostis adamsonii</i>	Adamson's Blown-grass	EN	v	L	-	PMST	Low-lying, seasonally wet or swampy areas of plains communities, often in slightly saline conditions.	Low	No suitable habitat

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DE LWP	FFG					
<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Spiny Rice-flower	CR	e	L	-	PMST	Primarily grasslands featuring a moderate diversity of other native species and inter-tussock spaces, although also recorded in grassland dominated by introduced perennial grasses.	Negligible	Suitable habitat but species not recorded from northern Melbourne
<i>Prasophyllum frenchii</i>	Maroon Leek-orchid	EN	e	L	-	PMST	Grassland and grassy woodland environments on sandy or black clay loam soils, that are generally damp but well drained.	Negligible	Heavily disturbed habitat
<i>Senecio macrocarpus</i>	Large-headed Fireweed	VU	e	L	-	PMST	Grassland, shrubland and woodland habitats on heavy soils subject to waterlogging and/or drought conditions in summer.	Negligible	No local records. Perennial species which would have been recorded
<i>Thelymitra matthewsii</i>	Spiral Sun-orchid	VU	v	L	-	PMST	Typically on well-drained soils on slightly elevated sites, but also on coastal sandy flats. Often in open situations following disturbance.	Negligible	Heavily disturbed habitat. No members of this genus recorded
State Significance									
<i>Amphibromus pithogastrus</i>	Plump Swamp Wallaby-grass		e	f	1992		Seasonally damp depressions in grassland or grassy wetland.	Medium	Has been recorded in the local area. Only other members of this genus observed.
<i>Callitriche umbonata</i>	Winged Water-starwort		r		2012		Damp, periodically waterlogged sites; swamps and shallow freshwater ponds.	Low	Recorded from relatively undisturbed wetland in Mt Ridley Woodland

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DE LWP	FFG					
<i>Cullen tenax</i>	Tough Scurf-pea		e	f	2008		Lowland grasslands, including pastures and occasionally in otherwise disturbed grassy areas.	Low	Perennial species which would have been recorded since 2005
<i>Geranium solanderi</i> var. <i>solanderi</i> s.s.	Austral Crane's-bill		v		2012		Grasslands or grassy woodlands where hydrology is not a limiting factor.	Recorded	Recorded from Mt Ridley Rd and area proposed for expansion of this road
<i>Geranium</i> sp. 3	Pale-flower Crane's-bill		r		2012		Grasslands and woodlands. Seasonally wet areas within these environments	Low	Perennial species which would have been observed

Appendix 2: Fauna

Notes to tables:

EPBC Act: EX - Extinct CR - Critically Endangered EN - Endangered VU - Vulnerable CD - Conservation dependent	DSE 2013: ex - extinct cr - critically endangered en - endangered vu - vulnerable nt - near threatened dd - data deficient rx - regionally extinct
FFG Act: L - listed as threatened under FFG Act N - nominated for listing as threatened I - determined ineligible for listing	# – Protected Matters Search Tool BA – Birds Australia
PS - pest species listed under the CaLP Act	* - introduced species

Most recent database records are from the Victorian Biodiversity Atlas unless otherwise specified as follows
Fauna species in these tables are listed in alphabetical order within their taxonomic group.

A2.1 Fauna species recorded from the study area

Table A4.1. Vertebrate fauna recorded from the study area (Biosis 2012)

Status	Scientific name	Common name
	Birds	
	Masked Lapwing	<i>Vanellus miles</i>
	White-faced Heron	<i>Egretta novaehollandiae</i>
	Brown Falcon	<i>Falco berigora</i>
	Nankeen Kestrel	<i>Falco cenchroides</i>
	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>
	Long-billed Corella	<i>Cacatua tenuirostris</i>
	Galah	<i>Cacatua roseicapilla</i>
	Eastern Rosella	<i>Platycercus eximius</i>
	Red-rumped Parrot	<i>Psephotus haematonotus</i>
	Pallid Cuckoo	<i>Cuculus pallidus</i>
	Horsfield's Bronze-Cuckoo	<i>Chrysococcyx basalis</i>
	Welcome Swallow	<i>Hirundo neoxena</i>
	Tree Martin	<i>Hirundo nigricans</i>

Status	Scientific name	Common name
	Willie Wagtail	<i>Rhipidura leucophrys</i>
	Flame Robin	<i>Petroica phoenicea</i>
	Magpie-lark	<i>Grallina cyanoleuca</i>
	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>
	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>
	Spotted Pardalote	<i>Pardalotus punctatus</i>
	White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>
	Noisy Miner	<i>Manorina melanocephala</i>
	Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>
	Australasian Pipit	<i>Anthus novaeseelandiae</i>
	Australian Magpie	<i>Gymnorhina tibicen</i>
	Australian Raven	<i>Corvus coronoides</i>
	Little Raven	<i>Corvus mellori</i>
*	Rock Dove	<i>Columba livia</i>
*	Striated Pardalote	<i>Pardalotus striatus</i>
*	Common Blackbird	<i>Turdus merula</i>
*	Skylark	<i>Alauda arvensis</i>
*	House Sparrow	<i>Passer domesticus</i>
*	Common Myna	<i>Acridotheres tristis</i>
*	Common Starling	<i>Sturnus vulgaris</i>
	Mammals	
	Common Brushtail Possum	<i>Trichosurus vulpecula</i>
	Eastern Grey Kangaroo	<i>Macropus giganteus</i>
*	Brown Hare	<i>Lepus capensis</i>
*	Red Fox	<i>Canis vulpes</i>
	Reptiles	
	Marbled Gecko	<i>Phyllodactylus marmoratus</i>
	Common Blue-tongued Lizard	<i>Tiliqua scincoides</i>
	Amphibians	
	Southern Bullfrog (northern)	<i>Limnodynastes dumerilii dumerilii</i>
	Spotted Marsh Frog SCR	<i>Limnodynastes tasmaniensis SCR</i>

A4.2 Listed fauna species

The following table includes a list of the listed fauna species that have potential to occur within the study area. The list of species is sourced from the Victorian Biodiversity Atlas and the Protected Matters Search Tool (DoE; accessed on 23.02.15).

Table A4.3. Listed fauna species recorded, or predicted to occur, within 5 km of the study area.

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEL WP	FFG					
Mammals									
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	vu	L	-	PMST	Utilises a wide range of habitats from lowland rainforest in East Gippsland and coastal Stringybark forests to agricultural land and suburban gardens, with permanently established colonies in Melbourne, Geelong and Mallacoota.	Medium	May forage in eucalypts when flowering
Birds									
<i>Actitis hypoleucos</i>	Common Sandpiper		vu		1981		Migrates to Australia from Eurasia in August where it inhabits a wide variety of coastal and inland wetlands with muddy margins before departing north in March.	Negligible	No suitable habitat
<i>Anas rhynchotis</i>	Australasian Shoveler		vu		2012		Prefers large, permanent lakes and swamps with deep water, stable conditions and abundant aquatic vegetation. Less commonly recorded in small or shallow waters, such as billabongs, sewage ponds, freshwater rivers and densely vegetated farm dams.	Negligible	No suitable habitat

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEL WP	FFG					
<i>Anthochaera phrygia</i>	Regent Honeyeater	EN	cr	L	-	PMST	Inhabits dry woodlands and forests dominated by Box Ironbark eucalypts. Distribution currently restricted to the Chiltern - Mt Pilot National Park in north-eastern Victoria following severe range contraction and population decline.	Low	Extinct in southern Victoria
<i>Ardea intermedia</i>	Intermediate Egret		en	L	1980		Breeds in flooded or fringing trees alongside wetlands.	Medium	May forage in open farmland and local farm dams
<i>Ardea modesta</i>	Eastern Great Egret		vu	L	2012	PMST	Usually found in terrestrial wetland, estuarine and wet grassland habitats particularly permanent well-vegetated water bodies but also use freshwater meadows, channels and larger dams. Forages by wading on shallow open water, generally avoiding dry or deeply flooded areas preferring moist, low-lying, poorly drained pasture, especially near hollows and ditches and where tussocks of long grass are present. Uses estuarine mudflats as summer-autumn or drought refuges.	Medium	May forage in open farmland and local farm dams

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEL WP	FFG					
<i>Aythya australis</i>	Hardhead		vu		2013		A mainly aquatic species preferring large, deep freshwater environments with abundant aquatic vegetation, including slow moving areas of rivers. Also occurs in brackish wetlands and can be found in deep dams and water storage ponds. Occasionally in estuarine and littoral habitats such as salt pans, coastal lagoons and sheltered inshore waters. Avoids main streams or rivers, except in calm reaches where aquatic flora is developed.	Negligible	No suitable habitat
<i>Biziura lobata</i>	Musk Duck		vu		1981		A largely aquatic species preferring deep water on large, permanent swamps, lakes and estuaries with abundant aquatic vegetation. Often occurs in areas of dense vegetated cover within a wetland. Less commonly recorded in small or shallow waters, such as billabongs, sewage ponds, freshwater rivers and densely vegetated farm dams.	Negligible	No suitable habitat
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	en	L	-	PMST	Occurs in wetlands with tall, dense vegetation where it forages in shallow water at the edges of pools or waterways. Prefers permanent freshwater habitats, particularly when dominated by macrophytes.	Negligible	No suitable habitat

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEL WP	FFG					
<i>Chthonicola sagittata</i>	Speckled Warbler		vu	L	1978		Occurs in open forest and Box Ironbark Woodlands, usually with scattered shrubs and a cover of acacias. Seldom seen far from dense patches of shrubs.	Low	Poor habitat
<i>Egretta garzetta</i>	Little Egret		en	L	1980		Occupies a wide range of wetlands and typically prefers the shallows of wetlands for foraging activities. Occasionally they will forage in small waterways or wet grassland areas.	Medium	May forage in open farmland and local farm dams
<i>Falco subniger</i>	Black Falcon		vu		2005		Primarily occurs in arid and semi-arid zones in the north, north-west and west of Victoria, though can be forced into more coastal areas by droughts and subsequent food shortages. Occurs in woodlands, open country and around terrestrial wetlands areas, including rivers and creeks. Hunts mostly over open plains and undulating land with large tracts of low vegetation.	Medium	May forage in airspace over the study area

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEL WP	FFG					
<i>Gallinago hardwickii</i>	Latham's Snipe		nt		2004	PMST	A migrant to Australia from July to April occurring in a wide variety of permanent and ephemeral wetlands. Prefers open freshwater wetlands with nearby cover, but also recorded on the edges of creeks and rivers, river-pools and floodplains. Forages in soft mud at edge of wetlands and roosts in a variety of vegetation around wetlands including tussock grasslands, reeds and rushes, tea-tree scrub, woodlands and forests.	Medium	May forage in areas of damp pasture
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		vu	L	-	PMST	Occurs in marine habitats and terrestrial wetlands along or near coastal areas in eastern Victoria, particularly around large open wetlands such as deep freshwater swamps, lakes, reservoirs and billabongs. Uses tall trees in or near water for breeding.	Low	No suitable habitat
<i>Hirundapus caudacutus</i>	White-throated Needletail		vu		1981		An almost exclusively aerial species within Australia, occurring over most types of habitat, particularly wooded areas.	Medium	May forage in airspace over the study area

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEL WP	FFG					
<i>Lathamus discolor</i>	Swift Parrot	EN	en	L	1990	PMST	Migrates to south-east mainland Australia during the winter months where it prefers dry, open eucalypt forests and woodlands, especially Box Ironbark Forest in north-central Victoria. Has also been recorded in urban parks, gardens, street trees and golf courses with flowering ornamental trees and shrubs.	Low	River Red Gum not considered to be a valuable food tree. Small numbers of Grey Box trees present
<i>Pedionomus torquatus</i>	Plains-wanderer	VU	cr	L	1989		The Plains-wanderer is a small ground-dwelling bird that occupies high quality native grassland with a sparse, open structure. Due to a range of threatening processes, the species has declined markedly across most of its range. Populations are now patchily distributed throughout south-west Queensland, the Riverina district of NSW and north-central Victoria.	Low	Vagrant in southern Victoria
<i>Rostratula australis</i>	Australian Painted Snipe	EN	cr	L	-	PMST	Generally found in shallow, terrestrial freshwater wetlands with rank, emergent tussocks of grass, sedges and rushes. Australian Painted Snipe can occur in well vegetated lakes, swamps, inundated pasture, saltmarsh and dams.	Negligible	No suitable habitat

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEL WP	FFG					
Reptiles									
<i>Aprasia parapulchella</i>	Pink-tailed Worm-Lizard	VU	en	L	-	PMST	Isolated population near Bendigo. Favours areas with native grasses and partially buried rocks, sheltering beneath rock and in ant tunnels.	Negligible	No suitable habitat
<i>Delma impar</i>	Striped Legless Lizard	VU	en	L	-	PMST	Inhabits native and modified grasslands, where sufficient cover is available to provide protection from predators. Often associated with soils of cracking clays with embedded and surface rocks. Occasionally recorded from grassy woodlands.	Low	Past targeted surveys failed to detect this species
<i>Pseudemoia pagenstecheri</i>	Tussock Skink		vu		2009		On the ground in a range of grasslands or sparse grassy woodlands from alps to coast.	High	Suitable habitat present
Amphibians									
<i>Litoria raniformis</i>	Growling Grass Frog	VU	en	L	2006	PMST	Occupies a variety of permanent and semi-permanent water bodies generally containing abundant submerged and emergent vegetation, within lowland grasslands, woodlands and open forests.	Negligible	No suitable habitat

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEL WP	FFG					
<i>Pseudophryne bibronii</i>	Brown Toadlet		en	L	1990		Occurs in a variety of damp and occasionally inundated habitats at lower elevations, including watercourses and gullies in forest and woodland habitat, roadside ditches and table drains, wetlands, permanent ponds, and heaths and grasslands with abundant damp leaf litter required for shelter.	Negligible	No suitable habitat
<i>Pseudophryne semimarmorata</i>	Southern Toadlet		vu		1960		Occupies a variety of habitats in south-eastern Australia, such as open forests, lowland woodlands and heathlands where adults shelter beneath leaf litter and other debris in moist soaks and depressions.	Negligible	No suitable habitat
Fishes									
<i>Galaxiella pusilla</i>	Dwarf Galaxias	VU	vu	L	-	PMST	Occurs in relatively shallow still or slow flowing water bodies including streams, wetlands, drains, that in many instances are ephemeral and partially dry up over summer. Typically requires abundant marginal and aquatic vegetation.	Negligible	No suitable habitat
<i>Maccullochella peelii peelii</i>	Murray Cod	VU	en	L	-	PMST	Found within the Murray River catchment usually in sluggish turbid rivers, in deep holes or amongst fallen timber and other debris. Also occurs in upper reaches of rivers where water is clear and there is little fallen timber.	Negligible	No suitable habitat

Scientific name	Common name	Conservation status			Most recent database record	Other records	Habitat description	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	DEL WP	FFG					
<i>Prototroctes maraena</i>	Australian Grayling	VU	vu	L	-	PMST	A diadromous species which spends most of its life in freshwater within rivers and large creeks. Juveniles inhabit estuaries and coastal seas. Adults occur in freshwater habitats, typically rivers and streams with cool, clear waters and gravel substrates, but occasionally also in turbid waters.	Negligible	No suitable habitat
Invertebrates									
<i>Synemon plana</i>	Golden Sun Moth	CR	cr	L	2011	PMST	This medium-sized diurnal moth inhabits grassy woodlands and grasslands. Once thought to be a specialised species inhabiting grasslands dominated by Wallaby-grasses, it is now recognised that this species can occur in exotic grasslands dominated by Chilean Needle Grass <i>Nassella neesiana</i> .	Recorded	Large resident population recorded over a number of years

A2.3 Migratory species (EPBC Act listed)

Table A2.4. Migratory fauna species recorded or predicted to occur within 5 km of the study area.

Scientific name	Common name	Most recent record
<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	2013
<i>Actitis hypoleucos</i>	Common Sandpiper	1981
<i>Apus pacificus</i>	Fork-tailed Swift	-
<i>Apus pacificus</i>	Fork-tailed Swift	2005
<i>Ardea modesta</i>	Eastern Great Egret	-
<i>Ardea modesta</i>	Eastern Great Egret	2012
<i>Bubulcus ibis</i>	Cattle Egret	-
<i>Bubulcus ibis</i>	Cattle Egret	1990
<i>Gallinago hardwickii</i>	Latham's Snipe	-
<i>Gallinago hardwickii</i>	Latham's Snipe	2004
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	-
<i>Hirundapus caudacutus</i>	White-throated Needletail	-
<i>Hirundapus caudacutus</i>	White-throated Needletail	1981
<i>Hydroprogne caspia</i>	Caspian Tern	1981
<i>Merops ornatus</i>	Rainbow Bee-eater	-
<i>Merops ornatus</i>	Rainbow Bee-eater	1981
<i>Monarcha melanopsis</i>	Black-faced Monarch	-
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	1978
<i>Rhipidura rufifrons</i>	Rufous Fantail	-
<i>Rhipidura rufifrons</i>	Rufous Fantail	1981
<i>Rostratula australis</i>	Australian Painted Snipe	-
<i>Rostratula australis</i>	Australian Painted Snipe	-

Appendix 3: Photos of the study area



Plate 1: Scattered River Red Gum with patches of Plains Grassy Woodland in background



Plate 2: Scattered River Red Gum with epicormic growth.



Plate 3: Tree Violet along a dry stone wall with scattered River Red-Gum in background



Plate 4: Plains Grassy Woodland patch with logs.



Plate 5: Fire killed River Red Gum which has completely collapsed.



Plate 6: Plains Grassy Woodland understory patch with Hedge Wattle and Weeping Grass.



Plate 7: Hedge Wattle recruitment



Plate 8: Scattered tree.

Appendix 4: Biodiversity impact and offset requirement report

Appendix 5: Glossary

Items marked with 'A' are cited from DEPI (2013a) ; items marked with 'B' are cited from DSE (2007b) and items marked with a 'C' are cited from DEPI (2014).

Avoid ^A

Avoiding removing any native vegetation when undertaking a use or development. This can be either by not permitting or not going ahead with the use or development, or locating it elsewhere so that removing native vegetation is not required.

Benchmark ^B

A standard vegetation –quality reference point, dependent on vegetation type, which is applied in Habitat hectare assessments. Represents the average characteristics of a mature and apparently long undisturbed state of the same vegetation type.

Biodiversity ^A

The variety of all life forms, the different plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part.

Biodiversity Interactive Map (BIM)

Web based interactive map available on the DSE website that provides information on the biodiversity of Victoria and displays flora and fauna data from the Victorian Biodiversity Atlas.

Bioregion ^B

Biogeographic areas that capture the patterns of ecological characteristics in the landscape or seascape, providing a natural framework for recognising and responding to biodiversity values. A landscape based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology and vegetation.

BushBroker ^A

A program coordinated by DELWP to match parties that require native vegetation offsets with third party suppliers of native vegetation offsets.

Canopy Tree ^C

Is a mature tree greater than 3 m in height and is normally found in the upper layer of a vegetation type. Immature trees that are not yet able to flower and are less than three metres in height are considered part of the understorey (see definition of understorey).

Condition score

The score assigned to a habitat zone that indicates the quality of the vegetation relative to the ecological vegetation class benchmark, usually expressed as a percentage or on a scale of 0 to 1.

Degraded treeless vegetation ^B

Vegetation that is neither a wetland, a remnant patch nor scattered tree(s).

DBH (Diameter at Breast Height) ^B

The diameter of the main trunk of a tree measured 1.3 m above ground level.

Dispersed habitat ^A

Habitat for a rare or threatened species whose habitat is spread over a relatively broad geographic area.

Ecological vegetation class (EVC) ^A

A native vegetation type classified on the basis of a combination of its floristic, life form, environmental and ecological characteristics.

EVC (see Ecological vegetation class) ^B

Extent risk ^A

The level of risk to biodiversity from the removal of native vegetation based on the area and/or number of scattered trees to be removed.

Forb

A herbaceous flowering plant that is not a graminoid (grass, sedge or rush).

Gain^A

Predicted improvement in the contribution to Victoria's biodiversity achieved from an offset, calculated by combining site gain with the strategic biodiversity score or habitat importance score of the site. Gain is measured with biodiversity equivalence scores or units.

Gain Target^B

The amount of gain that needs to be achieved to offset a loss measured in Habitat hectares.

General biodiversity equivalence score / units^A

Score or units used to quantify the relative overall contribution of a site to Victoria's biodiversity.

General offset^A

An offset that is required when a proposal to remove native vegetation is not deemed, by application of the specific-general offset test, to have a significant impact on habitat for any rare or threatened species.

General provisions^A

Operational requirements in planning schemes which are consistent across the state, relating to matters such as administrative provisions, ancillary activities and referral of applications.

Habitat hectares^A

Combined measure of condition and extent of native vegetation. This measure is obtained by multiplying the site's condition score (measured between 0 and 1) with the area of the site (in hectares).

Habitat hectares benchmark^A

A reference point for each vegetation type that represents the average condition of mature stands that are likely to reflect pre-settlement circumstances.

Habitat hectares site assessment^A

A site-based measure of the condition of native vegetation with reference to the benchmark for the same type of native vegetation. The assessment generates a condition score of between 0 and 1.

Habitat importance map^A

A map that indicates the importance of locations as habitat for a particular rare or threatened species. This map is based on modelled data.

Habitat importance score^A

Measure of the importance of the habitat located on a site for a particular rare or threatened species.

Habitat zone^B

A discrete area of native vegetation consisting of a single vegetation type (EVC) within an assumed similar quality. This is the base spatial unit for conducting a Habitat hectare assessment. Separate *Vegetation Quality Assessments* (or Habitat hectare assessments) are conducted for each habitat zone within the designated assessment area.

Highly localised habitat^A

Habitat for rare or threatened species whose habitat is spread over a very restricted area (i.e. less than 2,000 ha). This can also be applied to a similarly limited sub-habitat that is disproportionately important for a wide-ranging rare or threatened species.

Improvement gain^B

This is gain resulting from management commitments beyond existing obligations under legislation to improve the current vegetation quality. Achieving improvement gain is predicated on maintenance commitments being already in place. For example, control of any threats such as grazing that could otherwise damage the native vegetation must already be agreed. Typical actions leading to an improvement gain include reducing or eliminating environmental weeds, enhancement planting or revegetation over a 10-year management period. If the vegetation is to be used as an offset, a commitment to maintain the improvement gain (i.e. no subsequent decline in quality) will be required in perpetuity.

Incorporated document^A

A document that is included in the list of incorporated documents in a planning scheme. These documents affect the operation of the planning scheme.

Indigenous vegetation^B

The type of native vegetation that would have normally been expected to occur on the site prior to European settlement.

Landholder^A

An owner, occupier, proprietor or holder of land.

Landowner^A

Owner of land.

Landscape scale information^A

Mapped or modelled information based on data collected across the landscape rather than just on a particular site.

Large Old Tree (LOT)^B

A tree with a DBH equal to or greater than the large tree diameter as specified in the relevant EVC benchmark.

Listed species

A flora or fauna species listed under the Commonwealth *Environment Protection and Biodiversity Act 1999* or listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988*.

Local Planning Policy Framework^A

Framework outlining a Municipal Strategic Statement and the Local Planning Policies that apply to the local government area.

Location risk^A

The risk that removing native vegetation in a particular location will have an impact on the persistence of a rare or threatened species.

Loss^A

Loss in the contribution to Victoria's biodiversity when native vegetation is fully or partially removed, as measured in biodiversity equivalence scores or units.

Maintenance Gain^B

This is gain from commitments that contribute to the maintenance of the current vegetation quality over time (i.e. avoiding any decline). Includes foregoing certain entitled activities that could otherwise damage or remove native vegetation, such as grazing or firewood collection. Also typically requires a commitment to ensure no further spread of environmental weeds that may otherwise result in the loss of vegetation quality over time. If the vegetation is to be used as an offset, a commitment to maintain the vegetation quality will be required in perpetuity.

Minimise^A

Locating, designing or managing a use or development to reduce the impacts on biodiversity from the removal of native vegetation.

Native (indigenous) vegetation^B

Native vegetation is plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses (as defined in Clause 72 of the planning scheme).

Native vegetation credit^A

Gains in the contribution that native vegetation makes to Victoria's biodiversity that are registered on the native vegetation credit register. Native vegetation credits are offered for sale to parties who are required to offset the removal of native vegetation.

Native vegetation credit register^A

A statewide register of native vegetation credits that meet minimum standards for security and management of sites. The register is administered by the Department of Environment and Primary Industries, and records the creation, trade and allocation of credits to meet specific offset requirements.

Native vegetation extent^A

Area of land covered by native vegetation or the number of scattered trees.

Native Vegetation Information Management (NVIM) system^A

An online tool used to access information about Victoria's native vegetation.

Native vegetation particular provision^A

Clause 52.17 in the Victoria Planning Provisions that relates to the removing, destroying or lopping of native vegetation.

No net loss^A

An outcome where a particular gain in the contribution to Victoria's biodiversity is equivalent to an associated loss in the contribution to Victoria's biodiversity from permitted clearing.

Offset^A

Protection and management (including revegetation) of native vegetation at a site to generate a gain in the contribution that native vegetation makes to Victoria's biodiversity. An offset is used to compensate for the loss to Victoria's biodiversity from the removal of native vegetation.

Offset Management Plan (OMP)

A document which sets out the requirements for establishment, protection and management of an offset site.

Offset market^A

A system which facilitates trade of native vegetation credits between parties requiring offsets and third party suppliers of offsets.

Old tree^B

A tree with a DBH equal to or greater than 0.75 of the large tree diameter as specified in the relevant EVC benchmark. Includes medium old trees and large old trees (see separate definitions). Some Regional Native Vegetation Plans additionally define very large old trees (1.5 times large tree diameter).

On-site offset^B

An offset located on the same property as the clearing.

Particular Provisions^A

Provisions in the Victoria Planning Provisions that relate to specific activities (for example, native vegetation is a Particular Provision).

Patch (see Remnant Patch)

Permit^A

A legal document that gives permission for a use or development on a particular piece of land.

Perennial^A

A plant that lives for more than two years. Perennials include species that are always visible e.g. shrubs and trees, but also include species that are not always visible above ground.

Permitted clearing^A

Removal of native vegetation for which a planning permit has been granted to remove native vegetation.

Permitted clearing regulations^A

The rules in the planning system that regulate permits for the removal of native vegetation.

Planning provisions – See Victoria Planning Provisions.

Prior management gain

This gain acknowledges actions to manage vegetation since State-wide planning permit controls for native vegetation removal were introduced in 1989.

Planning scheme^A

Policies and provisions for the use, development and protection of land in a local government area.

Planning system^A

Victoria's land-use planning system that includes the Victoria Planning Provisions and each local government's planning scheme.

Property Vegetation Plan^B

A plan which relates to the management of native vegetation within a property, and which is contained within an agreement made pursuant to section 69 of the Conservation, Forests and Lands Act 1987.

Protected species

A flora species protected under the *Victorian Flora and Fauna Guarantee Act 1988*.

Protection (of a tree)^B

An area with twice the canopy diameter of the tree(s) fenced and protected from adverse impacts: grazing, burning and soil disturbance not permitted, fallen timber retained, weeds controlled, and other intervention and/or management if necessary to ensure adequate natural regeneration or planting can occur.

Rare or threatened species^A

A species that is listed in:

- DELWP's Advisory List of Rare or Threatened Plants in Victoria as 'endangered', 'vulnerable', or 'rare', but does not include the 'poorly known' category
- DELWP's Advisory List of Threatened Vertebrate Fauna in Victoria as 'critically endangered', 'endangered' or 'vulnerable', but does not include 'near threatened' or 'data deficient' categories
- DELWP's Advisory List of Threatened Invertebrate Fauna in Victoria as 'critically endangered', 'endangered' or 'vulnerable', but does not include 'near threatened' or 'data deficient' categories.

Recruitment^B

The production of new generations of plants, either by allowing natural ecological processes to occur (regeneration etc), by facilitating such processes such as regeneration to occur, or by actively revegetating (replanting, reseeding). See Revegetation.

Referral authority^A

An authority that a permit application is referred to for decision under Section 55 of the Planning and Environment Act 1987. All referral requirements are specified in Clause 66 of planning schemes.

Remnant patch of native vegetation^A

Either:

- an area of native vegetation, with or without trees, where at least 25 per cent of the total perennial understorey plant cover is native plants
- an area with three or more indigenous canopy trees where the tree canopy cover is at least 20 per cent.

Remnant vegetation^B

Native vegetation that is established or has regenerated on a largely natural landform. The species present are those normally expected in that vegetation community. Largely natural landforms may have been subject to some past surface disturbance such as some clearing or cultivation (or even the activities of the nineteenth century gold rushes) but do not include man-made structures such as dam walls and quarry floors.

Responsible authority^A

The authority charged with the responsibility for administering and enforcing particular aspects of a planning scheme.

Revegetation^B

Establishment of native vegetation to a minimum standard in formerly cleared areas, outside of a remnant patch.

Scattered tree^C

An indigenous canopy tree that does not form part of a remnant patch of native vegetation (see definition of remnant patch of native vegetation).

Section 173 agreements^B

A management agreement primarily between a landowner and the responsible authority according to section 173 of the Planning and Environment Act 1987.

Security Gain

This is gain from actions to enhance security of the on-going management and protection of native vegetation at the offset site, either by entering into an on-title agreement (for example under Section 173 of the *Planning and Environment Act 1987*), or by locating the offset on land that has greater security than the clearing site, or by transferring private land to a secure public conservation reserve.

Site ^A

An area of land that contains contiguous patches of native vegetation or scattered trees, within the same ownership.

Site-based information ^A

Information that is collected at a site.

Site gain ^A

Predicted improvement in the condition, or the condition and extent, of native vegetation at a site (measured in Habitat hectares) generated by the landowner committing to active management and increased security.

Site loss ^A

Loss in the condition, or condition and extent, of native vegetation when native vegetation is fully or partially removed, measured in Habitat hectares.

sp.

Species (one species).

spp.

Species (more than one species).

Species persistence ^A

The continued existence of a species into the future.

Specific biodiversity equivalence score / units ^A

With reference to a specific species, a score or units used to quantify the relative contribution of a site to Victoria's biodiversity.

Specific-general offset test ^A

A test used to determine whether a general or specific offset is required based on the impact of native vegetation removal on the habitat for rare or threatened species.

Specific offset ^A

An offset that is targeted to a particular species (or multiple species) impacted by the removal of native vegetation.

State Planning Policy Framework ^A

A collection of clauses in the Victoria Planning Provisions that inform planning authorities and responsible authorities of those aspects of state planning policy which they are to take into account and give effect to in planning and administering their respective areas.

Strategic biodiversity map ^A

A map that shows the relative value of a location in the landscape with regard to its condition, extent, connectivity and the support function it plays for species. The map is based on modelled data.

Strategic biodiversity score ^A

A score that quantifies the relative value of a location in the landscape with regard to its condition, extent, connectivity and the support function it plays for species.

Strategic planning ^A

A coordinated approach to planning where areas for conservation and areas which can be cleared are strategically identified.

Supplementary planting

Establishment of overstorey and/or understorey plants within a remnant patch. Typically includes the planting or direct-seeding of understorey life forms.

Taxon (plural taxa)

A term used to describe any taxonomic unit. This term is typically used when referring broadly to any scientifically recognised species, subspecies or variety.

Third-party offset ^B

An offset located on a property owned by a person other than the landowner who incurs the native vegetation loss being offset.

Understorey

Understorey is all vegetation other than mature canopy trees – includes immature trees, shrubs, grasses, herbs, mosses, lichens and soil crust. It does not include dead plant material that is not attached to a living plant. More information on understorey life forms is set out in the Vegetation Quality Assessment Manual (DSE 2004).

Vegetation Quality Assessment

The standard DELWP method for assessing remnant patches of vegetation. Details of the method are outlined in the Vegetation Quality Assessment Method (DSE 2004). The results of the assessment are expressed in Habitat hectares. Also referred to as a 'Habitat hectare assessment'

Victoria Planning Provisions ^A

A list of planning provisions that provides a standard template for individual planning schemes.

Zone ^A

A zone in the Victoria Planning Provisions is a set of permitted uses of land which are defined spatially.