Draft Report

Draft Preliminary Documentation: Bacchus Marsh Development Project, Victoria (EPBC 2018/8271).

Prepared for

Bacchus Marsh Developments Pty Ltd

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Ecology and Heritage Partners Pty Ltd

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GLOSSARY

Acronym	Description
CaLP Act	(Victorian) *Catchment and Land Protection Act 1994*
CMA	Catchment Management Authority
DAWE	(former) Commonwealth Department of Agriculture, Water and the Environment
DEECA	Victorian Department of Energy, Environment and Climate Action
DCCEEW	Commonwealth Department of Climate Change, Environment, Energy and Water
DELWP	(former) Victorian Department of Environment, Land, Water and Planning
DEPI	(former) Victorian Department of Environment and Primary Industries
DoE	(former) Commonwealth Department of Environment
DoEE	(former) Commonwealth Department of Environment and Energy
DSEWPaC	(former) Commonwealth Department of Sustainability, Environment, Water, Populations and Communities.
EPBC Act	(Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	(Victorian) *Flora and Fauna Guarantee Act 1988*
FZ	Farming Zone
GGF	Growling Grass Frog *Litoria raniformis*
GSM	Golden Sun Moth *Synemon plana*
HabHa	Habitat Hectare
NES	National Environmental Significance
NTGVVP	Natural Temperate Grassland of the Victorian Volcanic Plain ecological community
NVIM Tool	Native Vegetation Information Management Tool (DEECA)
P&E Act	(Victorian) *Planning and Environment Act 1987*
PMST	Protected Matters Search Tool (Commonwealth)
PSP	Precinct Structure Plan
RCZ	Rural Conservation Zone
SLL	Striped Legless Lizard *Delma impar*
SRF	Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*
TfN	Trust for Nature
UGF	Urban Growth Framework (plan)
VBA	Victorian Biodiversity Atlas (DEECA)
VCT Act	(Victorian) *Victorian Conservation Trust Act 1972*
VGED	Victorian Grassland Earless Dragon *Tympanocryptis pinguicolla*
VPA	Victorian Planning Authority
WoNS	Weeds of National Significance

EXECUTIVE SUMMARY

Ecology and Heritage Partners Pty Ltd were commissioned by Bacchus Marsh Developments Pty Ltd to prepare a response to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) request for Preliminary Documentation for the proposed residential development located across several parcels of land in Merrimu, Victoria (the study area) (EPBC 2018/8271).

It has been determined the proposed action is a controlled action, and that the development of the study area will likely have a significant impact on 'listed threatened species and communities'. It has also been determined that the proposed action will be assessed by preliminary documentation.

The study area is approximately 460 hectares and is comprised of 16 properties bound by Gisborne Road to the west, and Bences Road to the east approximately 50 kilometres north-west of Melbourne's CBD. It should be noted that Property 16 is ultimately proposed to be secured and managed as an offset site and will not be subject to any proposed development.

Bacchus Marsh Developments Pty Ltd has acquired interests in the properties, which are currently used for agriculture. The properties are within an area identified for potential future urban development as part of the expansion of Bacchus Marsh, and Moorabool Council and the Victorian Planning Authority (VPA) have jointly prepared the draft Bacchus Marsh Urban Growth Framework (UGF) plan.

The UGF plan has been incorporated into the planning scheme (Amendment C81), and a Precinct Structure Plan will thereafter be prepared in relation to the land.

The ecological surveys undertaken recorded the nationally significant Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* (SRF) and a total of a total of 17.665 hectares of the Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) ecological community (Ecology and Heritage Partners 2018b).

The ecological surveys undertaken recorded 2,653 individuals of the nationally significant SRF, 17.665 hectares of the NTGVVP ecological community, and 58.598 hectares of confirmed habitat for Golden Sun Moth (GSM).

A total of 72.958 hectares of potential habitat for the nationally significant Victorian Grassland Earless Dragon *Tympanocryptis pinguicolla* (VGED) was recorded during a habitat assessment. Of this, it is proposed to remove 35.865 hectares of low quality habitat, and 2.966 hectares of moderate quality habitat, whilst 15.742 hectares of high quality habitat, 1.988 hectares of moderate quality habitat and 16.397 hectares of low quality habitat will be retained.

Despite the efforts of the targeted surveys, no VGED were detected. It is noted that VGED is highly cryptic, difficult to detect and may be missed during targeted surveys (if present), although a high number of reptile observations were made as part of the multi-method and multi-phased targeted survey effort, indicating a high reptile detection rate. Based on this, and the results of the targeted survey effort, the likelihood of a population of VGED being present within the study area is considered to be low.

No additional matters of National Environmental Significance (NES) were recorded during ecological investigations.

The proposed action will impact on a total of 1.783 hectares of the NTGVVP ecological community, 22.657 hectares of habitat for GSM. No SRF will be impacted.

Impacts to the 1.783 hectares of NTGVVP will be appropriately mitigated through the establishment of a high quality 4.3 hectare onsite offset site that provides a clear conservation benefit and increase in conservation values when compared to the condition and extent of the community at the proposed clearing site.

Impacts to the 22.657 hectares of GSM habitat will be appropriately mitigated through the establishment of a 38.6 hectare offsite offset, and a 6.4 hectare onsite offset that provides a clear conservation benefit and increase in conservation values when compared to the condition and extent of the community at the proposed clearing site.

The onsite offset site will be protected through a Section 69 Agreement under the *Conservation Forests and Lands Act 1987*, and the offsite offset will be protected through a Trust for Nature covenant under part Section 3A of the *Victorian Conservation Trust Act 1972*. Offset Management Plans have been prepared detailing the security and ongoing management actions required to secure the onsite offset (Appendix 3) and offsite offset sites (Appendix 4).

This report provides the Preliminary Documentation required by DCCEEW to assess the Bacchus Marsh Development Project (EPBC 2018/8271) as a controlled action. The document addresses all items raised by the DCCEEW in their request for additional information and has considered all relevant existing information, including assessment reports, species Recovery Plans, conservation advice and EPBC Act policy documents.

CONTENTS

1 INTRODUCTION

1.1 Project Background

Ecology and Heritage Partners Pty Ltd were commissioned by Bacchus Marsh Development Pty Ltd (BMD) to prepare a response to the Commonwealth Department of Climate Change, Environment, Energy and Water (DCCEEW) (formerly the Department of Agriculture, Water and the Environment) request for Preliminary Documentation for the proposed residential development located across several parcels of land in Merrimu, Victoria (the study area) (EPBC 2018/8271) (Figure 1).

On 5 October 2019, it was determined by a delegate for the Commonwealth Minister for the Environment that under Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the proposed action (to construct a residential development) is a controlled action, and that the development of the study area will likely have a significant impact on 'listed threatened species and communities (sections 18 and 18A)'. It has also been determined that the proposed action will be assessed by preliminary documentation.

Specifically, the matters of National Environmental Significance (NES) that DCCEEW has requested additional information for are:

- Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) ecological community;
- Golden Sun Moth (GSM) *Synemon plana*;
- Victorian Grassland Earless Dragon (VGED) *Tympanocryptis pinguicolla*; and,
- Spiny Rice Flower (SRF) *Pimelea spinescens subsp. spinescens*.

The following information includes that outlined in the EPBC Act referral, as well as additional information requested by DCCEEW regarding any other matters of NES outside of the study area that may be affected by the proposed action. The contents page of this report provides a reference table detailing where each of the requirements of the preliminary documentation request is addressed.

1.2 Site Context

The study area is located in Bacchus Marsh, approximately 50 kilometres north-west of Melbourne's CBD, and comprises 16 properties (Table 1) covering approximately 460 hectares. The site is bound by Gisborne Road to the west and Bences Road to the east. It should be noted that Property 16 is proposed to be secured and managed as an offset site and will not be subject to any proposed development.

Table 1. Proposed subdivision of the study area.

Property Number *	Address	Title details
1	2621 Gisborne Road	Lots 1 and 2 on PS724534Y
2	Gisborne Road	Lot 1 PS124024
3	146 Bences Road	Lot 2 PS124024
4a	2677 Gisborne Road	Lot 1 TP578035R

Property Number *	Address	Title details
4b	152 Bences Road	Lots 1 and 2 on PS823786S
5	Gisborne Road	Lots 1,2,3&4 TP567257J
6	Buckleys Road	Lot 1 on TP958042C
7	268 Bences Road	Lot 1 PS125141
8	139 O'Connell Road	Lots 1&2 TP408175C
9	332 Bences Road	Lot 2 PS125141
10	372 Bences Road	Lot 2 PS432900C
11	376A Bences Road	Lots 1 and 2 on PS724533B.
12	Lerderderg Park Road	Lot 1 TP97760S
13	Lerderderg Park Road	Lot 1 TP111405 (part)
14	345 Bences Road	Lot 2 PS139808
15	295 - 319 Bences Road	Lot 1 and 2 PS724532D
16^	289 Bences Road	Allot E, Sec 18\PP3095

Note: * Parcel numbers as shown in Figure 2; ^ Proposed to be managed for the purposes of conservation.

The land within and surrounding the study area predominantly supports agricultural activities in the form of grazing, cropping, market gardens, orchards and vineyards. Two operating quarries are located immediately opposite the study area on the west of Gisborne Road, while the Long Forest Flora and Fauna Reserve is located to the east of Bences Road in close proximity to the study area (Figure 1). The study area is generally flat, with several escarpments located to the west and south of the study area. The headwaters of several designated waterways commence within the study area and follow the escarpments into lower lying areas to the east and west.

Erosion is evident throughout all observed escarpments and has resulted in a shallow soil profile at both the top and mid-slope of these the escarpments. The location of waterways, escarpments, steep slopes and erosion within the study area is shown in Figure 1 and Figure 2.

According to the Department of Energy, Environment and Climate Action (DEECA) (formerly the Department of Environment, Land, Water and Planning [DELWP]) NatureKit Tool (DEECA 2025a), the study area occurs within the Victorian Volcanic Plain and Central Victorian Uplands bioregions. It is located within the jurisdiction of the Port Philip and Westernport Catchment Management Authority (CMA) and the Moorabool Shire Council municipality.

The ecological surveys undertaken within the study area recorded significant numbers of nationally significant GSM and SRF, and several hectares of the nationally significant NTGVVP ecological community (Ecology and Heritage Partners 2018a, 2018b).

Although potential habitat for nationally significant Striped Legless Lizard (SLL) and Victorian Grassland Earless Dragon (VGED) exists within the study area, no individuals were recorded during the targeted surveys undertaken within the study area (Ecology and Heritage Partners 2018b).

1.3 Amendment C81 – Bacchus Marsh Urban Growth Framework Plan

The properties are within an area identified for potential future urban development as part of the expansion of Bacchus Marsh, and Moorabool Shire Council and the Victorian Planning Authority (VPA) have jointly prepared the Bacchus Marsh Urban Growth Framework (UGF) plan (VPA and Moorabool Shire Council 2018).

With the population of Bacchus Marsh expected to double from 20,000 today to 40,000 residents by 2041, the UGF plan is crucial to guide growth. It is expected that the UGF plan will be incorporated into the planning scheme (Amendment C81), and that a Precinct Structure Plan (PSP) will thereafter be prepared in relation to the land.

Amendment C81 affects land in the urban and rural areas of Bacchus Marsh, Darley, Maddingley and Pentland Hills, together with the rural fringe areas of Merrimu, Parwan, Hopetoun Park, Coimadai (part), Long Forest (part) and Rowsley (part).

The subject land relevant to this project is located within the future Merrimu PSP area.

Amendment C81 promotes coordinated, master-planned development of identified areas in and around Bacchus Marsh, by identifying a need to:

- Contain short to medium term residential development within the existing settlement boundary (infill and greenfield);
- Prepare for medium to long term residential growth within the investigation areas at Merrimu, Parwan Station and Hopetoun Park;
- Require PSPs for any urban growth precincts at Merrimu and Parwan Station, and a development plan for any growth precinct at Hopetoun Park, and ensure that such plans provide for appropriate community and social infrastructure, activity centres, schools, integrated transport, reticulated services and local job opportunities;
- Prepare a PSP for Parwan Employment Precinct, to address key infrastructure and land use priorities that will deliver value-added and vertically or horizontally integrated agribusiness/industries; and
- Work with State Government and other relevant servicing authorities towards the servicing of Parwan Employment Precinct, with particular emphasis on the provision of reticulated water and gas.

It is important to note that Amendment C81 does not rezone any land. It provides a strategic framework for determining where future urban growth precincts and employment growth precincts will occur. A future, separate planning scheme amendment will be required, to identify exact boundaries for these precincts and to rezone land to facilitate master-planned urban development (VPA and Moorabool Shire Council 2018).

2 DESCRIPTION OF THE ACTION

The study area covers approximately 460 hectares and comprises 16 properties bound by Gisborne Road to the west and Bences Road to the east approximately 50 kilometres north- west of Melbourne's CBD. It should be noted that Property 16 is proposed to be secured and managed as an offset site and will not be subject to any proposed development.

The land within and surrounding the study area predominantly supports agricultural activities in the form of grazing, cropping, market gardens, orchards, and vineyards. Two operating quarries are located immediately opposite the study area on the west of Gisborne Road, while the Long Forest Flora and Fauna Reserve is located to the east of Bences Road in close proximity to the study area The proposed action will deliver a master planned community in accordance with the expectations of the Merrimu PSP and the Bacchus Marsh UGF plan. The precinct will enable the future expansion of Bacchus Marsh to the north-east and will ultimately result in the construction of approximately 5,500 dwellings and 16,000 people with associated community infrastructure and commercial development (i.e., commercial centre, upgraded access roads, open space).

2.1.1 Disturbance footprint (and areas adjoining areas which may be indirectly impacted)

The 16 properties of interest comprise an area of approximately 460 hectares. Within the disturbance footprint, the proposed development will impact on 22.657 hectares of GSM habitat and 1.783 hectares of NTGVVP. No impacts to SRF will occur due to the individuals recorded being located outside of the proposed impact area. No other impacts to MNES are expected to occur.

The action is expected to commence in 2026 and be completed within a 10-year period.

3 DESCRIPTION OF THE ENVIRONMENT AND MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

3.1 The Environment

A suite of detailed ecological assessments was undertaken between 15 August 5 April 2025 to obtain information on flora and fauna values within the study area. The entire study area was assessed with the overall condition of vegetation and habitats noted. Where native vegetation was identified a habitat hectare assessment was undertaken following methodology described in the Vegetation Quality Assessment Manual (Department of Sustainability and Environment [DSE] 2004).

Native vegetation in the study area is representative of four Ecological Vegetation Classes (EVCs): *Low Rainfall* Plains Grassland (EVC 132_63), Grassy Woodland (EVC 175), Rocky Chenopod Woodland (EVC 64) and Plains Grassy Wetland (EVC 125). The presence of these EVCs is generally consistent with the modelled extant (2005) native vegetation mapping (DEECA 2025b). Remnants of habitat zone PG4, and all of PG7, PG8 and PG9 met the thresholds that define the nationally significant NTGVVP ecological community.

The remainder of the study area comprises introduced and planted vegetation, present as crop, pasture, windrows and ornamental plantings. Specific details relating to observed EVCs are provided below.

3.1.1 Plains Grassland

Plains Grassland was recorded along the north-west boundary, and in scattered patches to the south and east of the study area (Figure 2). Dominant native grasses recorded throughout most patches included Spurred Spear-grass *Austrostipa gibbosa*, Rough Spear-grass *Austrostipa scabra* subsp. *falcata*, Common Wallaby-grass *Rytidosperma caespitosa*, Bristly Wallaby-grass *Rytidosperma setaceum*, and Kneed Wallaby-grass *Rytidosperma geniculatum* (Plate 1). Commonly observed shrubs and herbs within this vegetation type comprised Berry Saltbush *Atriplex semibaccata*, Sheep's Burr *Acaena echinata*, Wingless Bluebush *Maireana enchylaenoides*, Nodding Saltbush *Einadia nutans*, Ruby Saltbush *Enchylaena tomentosa* var. *tomentosa*, Native Flax *Linum marginale,* Lemon Beauty-heads *Calocephalus citreus*, Fuzzy New Holland Daisy *Vittadinia cuneata*, and Golden Billy-buttons *Pycnosorus chrysanthes* (Plate 2).

A total of 10 habitat zones comprising 34.453 hectares were recorded within the study area (PG1 – PG10) (Figure 2). A total of 15.095 hectares of Plains Grassland is located in Property 16 (Figure 2c).

Patches PG8 and PG9 were of the highest quality, were contiguous with each other and other larger remnants of vegetation in Property 16 and supported high native species diversity.

Plate 1. Patch of Plains Grassland within the study area (Ecology and Heritage Partners Pty Ltd).

Plate 2. Fuzzy New Holland Daisy-dominated Plains Grassland (PG8) within the study area (Ecology and Heritage Partners Pty Ltd).

3.1.1.1 Natural Temperate Grasslands of the Victorian Volcanic Plain (NTGVVP)

Some remnants of habitat zone PG4, and all of PG8 and PG9 met the thresholds that define the nationally significant NTGVVP ecological community. In total 17.665 hectares of the NTGVVP ecological community is present (Figure 2b-2c). A total of 1.783 hectares of NTGVVP is proposed to be impacted (Property 9).

3.1.2 Grassy Woodland

Within the study area, Grassy Woodland was recorded in several small, scattered remnants adjacent to Gisborne Road, along with one large remnant immediately north of O'Connell Road (Figure 2b).

The overstorey was predominantly comprised of Grey Box *Eucalyptus microcarpa*, with occasional specimens of Yellow Box *Eucalyptus melliodora* and Yellow Gum *Eucalyptus leucoxylon* subsp. *pruinosa* also present (Plate 3).

The understory was in poor condition in all habitat zones, with only occasional occurrences of native grasses and shrubs present. The State significant Fragrant Saltbush *Rhagodia parabolica* was relatively common within and adjacent to several patches of Grassy Woodland. However, the dominant understory species comprised African Box-thorn *Lycium ferocissimum*, Serrated Tussock *Nassella trichotoma* and Galenia *Galenia pubescens* (Plate 3; Plate 4).

Plate 3. Grassy Woodland (GW1) within the study area (Ecology and Heritage Partners Pty Ltd).

Plate 4. Grassy Woodland (GW4) within the study area (Ecology and Heritage Partners Pty Ltd).

3.1.3 Rocky Chenopod Woodland

Rocky Chenopod Woodland was recorded in small patches near north-west boundary adjacent to Gisborne Road, as well as in a large remnant to the east of the study area in Property 16 (Figure 2). The overstorey of this EVC was co-dominated by Grey Box and Bull Mallee *Eucalyptus behriana*, with the occasional Yellow Gum specimen also present. The understory was generally sparse, and comprised Fragrant Saltbush, Ruby Saltbush, Moonah *Melaleuca lanceolata*, Gold-dust Wattle *Acacia acinacea*, Variable Groundsel *Senecio pinnatifolius* and Saloop *Einadia hastata* (Plate 5; Plate 6).

Plate 5. Rocky Chenopod Woodland (RCW3) within the study area (Ecology and Heritage Partners Pty Ltd).

Plate 6. Rocky Chenopod Woodland (RCW3) within the study area (Ecology and Heritage Partners Pty Ltd).

3.1.4 Plains Grassy Wetland

One patch of Plans Grassy Wetland (PGWe1) was recorded around an artificial water body along a designated waterway within Property 5, and was comprised of Cumbungi *Typha* spp., Common Spike-sedge *Eleocharis acuta*, Joint-leaf Rush *Juncus holoschoenus* and Pale Rush *Juncus pallidus* (Plate 7; Plate 8).

The exotic species Drain Flat-sedge *Cyperus eragrostis*, Lesser Quaking-grass *Briza minor* and Yorkshire Fog *Holcus lanatus* were common in this habitat zone.

Plate 7. PGWe1 within the study area (Ecology and Heritage Partners Pty Ltd).

Plate 8. PGWe1 within the study area (Ecology and Heritage Partners Pty Ltd).

3.1.5 Scattered Trees

Sixty (60) scattered trees, the majority being Grey Box, with occasional specimens of River Red-gum *Eucalyptus camaldulensis,* Yellow Box, and Messmate *Eucalyptus obliqua* occur throughout the study area with the majority estimated to be at least 200 years old. These trees would once likely have been part of the Grassy Woodland EVC, however the understorey vegetation consists of predominantly introduced species (mainly exotic pasture grasses) and the trees no longer form a patch of native vegetation (Plate 9; Plate 10).

Plate 9. Two scattered Grey Box within the study area (Ecology and Heritage Partners Pty Ltd).

Plate 10. Scattered River Red-gum within the study area (Ecology and Heritage Partners Pty Ltd).

3.1.6 Introduced Vegetation

Areas not supporting remnant native vegetation have a high cover (>80%) of exotic grass species, many of which have been direct-seeded for use as pasture.

Large areas of the study area have no native vegetation present and are dominated by cereal crops (Plate 11). Disturbed areas (not mapped as native vegetation) were mostly dominated by the environmental weeds Rat's Tail Fescue, Wild Oat *Avena fatua,* Prairie Grass *Bromus catharticus*, Curled Dock *Rumex crispus*, Black Night-

shade *Solanum nigrum*, Sticky Ground-cherry *Physalis hederifolia*, and Onion-grass *Romulea rosea*. Non-grassy weeds present included Galenia and Ribwort *Plantago lanceolata*.

Noxious weeds, as defined under the Victorian *Catchment and Land Protection Act 1994* (CaLP Act) are present throughout the study area, with common occurrences of Artichoke Thistle *Cynara cardunculus*, Horehound *Marrubium vulgare* and Spear Thistle *Cirsium vulgare*, along with occurrences of African Boxthorn, Serrated Tussock, Prickly Pear *Opuntia* spp., Bridal Creeper *Asparagus asparagoides* and Blackberry *Rubus fruticosus* sp. agg. (Plate 12). The last five weeds are also Weeds of National Significance (WoNS).

Plate 11. Cropped paddock within the study area (Ecology and Heritage Partners Pty Ltd).

Plate 12. Artichoke Thistle within the study area (Ecology and Heritage Partners Pty Ltd).

3.2 Matters of National Environmental Significance

3.2.1 Natural Temperate Grassland of the Victorian Volcanic Plain

The nationally significant NTGVVP ecological community was identified within the study area during the ecological assessment undertaken by Ecology and Heritage Partners (2018a), as well as additional site visits undertaken in December 2021 and February 2022 and July 2023 and October 2023. This community was located in areas identified as Plains Grassland EVC, with a total of 17.665 hectares corresponding with the nationally significant NTGVVP ecological community (Figure 2). Some remnants of habitat zone PG4 and all of PG8 and PG9 met the thresholds that define the nationally significant NTGVVP ecological community (Figure 2b; 2c). Patches PG8 and PG9 were of the highest quality, were contiguous with each other and other larger remnants of vegetation in Property 16 and supported high native species diversity. This high quality vegetation in Property 16 did not continue further south into Property 15 (although there was still a suitable continuation of GSM habitat into Property 15) due to the vegetation not meeting the condition thresholds for NTGVVP (Table 2), which had resulted from ongoing land use practices such as regular slashing/mowing. Vegetation assessments undertaken in 2017 and 2018 were conducted by ecologists experienced in the identification of NTGVVP and the associated condition thresholds (Table 2).

In accordance with Commonwealth condition thresholds (Department of Sustainability, Environment, Water, Populations and Communities [DSEWPaC] 2011a), discrete patches of Plains Grassland recorded within the study area that met the following condition thresholds were mapped as the EPBC Act-listed NTGVVP ecological community (Table 2).

Table 2. Condition Thresholds for Natural Temperate Grassland of the Victorian Volcanic Plain (DSEWPaC 2011a)

Trigger	Criteria	NTGVVP Patches
EVC	The grassland is either Plains Grassland (EVC 132) or Creekline Tussock Grassland (EVC 654)	Criteria Met
Bioregion	Grassland is in the Victorian Volcanic Plain or near to the Victorian Volcanic Plain (Central Victorian Uplands, Dundas Tablelands and Otway Plain Bioregions)	Criteria Met
Size of Patch	If grassland remnant is ≤1 hectare, grassland patch needs to be at least 0.05 hectare in size with no more than 5% canopy cover of trees or shrubs.	Criteria Met
	If grassland remnant is >1 hectare, grassland patch needs to be at least 0.5 hectare in size with no more than 2 trees per hectare.	Criteria Met
Key Diagnostic Features	The grassland is associated with Quaternary basalt soils within the Victorian Volcanic Plain bioregion.	Criteria Met. Occurs on basalt soils within the Victorian Volcanic Plain
	At least one of the following grass genera is the dominant native species in the ground layer: Kangaroo Grass, Wallaby-grass., Spear-grass, or Tussock-grass.	Criteria Met, dominant cover of Spear Grasses and/or Wallaby Grasses.
Condition Thresholds	The native grasses Kangaroo-grass, Wallaby-grass, Spear-grass, or Tussock-grass account for 50% or more of the perennial tussock cover of the grassland patch. OR	Criteria met. Moderate cover of Spear-grass, Kangaroo Grass and Wallaby grass (PG4)
	Native wildflowers account for 50% or more of the total vegetation from September to February. OR	Criteria Met. Very high cover of native wildflowers (PG8; PG9).
	Non-grassy weeds account for less than 30% of the total vegetation cover at any time of the year.	Criteria met (for PG8 and PG9).
Additional Characteristics	The conservation value of a patch of the NTGVVP ecological community is enhanced if it shows any of the following features: • a high native plant species richness; • large patch size; • minimal weed invasion; • presence of threatened plant and/or animal species; • presence of natural exposed rock platforms and outcrops; or • presence of mosses, lichens or a soil crust on the soil surface.	- natural exposed rock platforms (most areas of NTGVVP have this component); - high native species plant richness (PG8); - presence of lichen and soil crusts on the soil surface; - supports a population of SRF and/or GSM.

3.2.2 Golden Sun Moth

The VBA contains 350 records of the GSM within 10 kilometres of the study area (DEECA 2025c), most of which were recorded by Ecology and Heritage Partners at a nearby property in 2013 (EPBC 2014/7251). This site was also used as a reference site prior to undertaking targeted surveys within the study area.

3.2.2.1 Golden Sun Moth Habitat Requirements

The GSM typically occurs in native grassland and grassy woodland habitats dominated by greater than 40% cover of Wallaby-grass *Rytidosperma* spp. (DSE 2004) but may also inhabit areas dominated by Kangaroo Grass *Themeda triandra* (Endersby and Koehler 2006) and introduced grassland dominated by Chilean Needle-grass

Nassella neesiana and other introduced species (A. Organ pers. obs.). Male flight is typically low, to about one metre above the ground, fast and can be prolonged, but they are generally not recorded flying more than 100 metres from suitable habitat (Clarke and O'Dwyer 1999). The male of this species generally flies between 11am and 3pm on calm, warm (over 20°C), sunny days.

The study area supports large expanses of the species preferred habitat (i.e. native and introduced grasslands) throughout the study area. The species' preferred host plants (i.e., Wallaby-grasses., Spear-grasses *Austrostipa* spp., and Kangaroo Grass) are scattered throughout much of the site and occur in highest densities within patches of Plains Grassland (EVC 132). In addition to this, there are scattered infestations throughout the site of the WoNS, Chilean Needle-grass, which is known to also provide suitable habitat for the threatened GSM.

Habitat for GSM was defined where a cover of at least 10% of the species' preferred food plants (i.e. Wallaby-grass, Kangaroo Grass, and/or Chilean Needle-grass) occurred. Where GSM was recorded within, or immediately adjacent to an area of habitat, this was noted as 'confirmed' GSM habitat.

3.2.2.2 Golden Sun Moth Targeted Surveys

Targeted surveys for the critically endangered GSM were undertaken in accordance with the recommended survey guidelines detailed in the significant impact guidelines for the species (DEWHA 2009a), and the *Biodiversity Precinct Planning Structure Kit* (DSE 2010a), with the following tasks undertaken:

- A habitat assessment was completed detailing information on habitat quality, biomass levels, presence of weeds and floristic diversity;
- Surveys were conducted by ecologists experienced in the detection and identification of GSM;
- The study area was surveyed on four separate occasions, with at least one week between surveys where possible;
- Surveys took place during the species' flight season (generally described as late October to early January). Moths were confirmed flying at known, nearby reference sites prior to undertaking each survey;
- Surveys were undertaken during weather conditions suitable for detecting the species (i.e., between 10am and 3pm on warm (over 20˚C by 10am) days with minimal cloud cover and still conditions); and
- Surveys were conducted by qualified zoologists walking (or driving, where access was permitted) 10 to 50-meter-wide parallel transects across all areas of suitable habitat.

Surveys were undertaken on 30 November, 12 December and 18 December 2017, and 4 January 2018 by ecologists experienced in the detection and identification of the species. The survey focused on areas of indigenous grassland, namely those areas dominated by Wallaby-grass, Kangaroo-grass, Spear-grass, as well as in areas of Chilean Needle-grass, which is a known food source for the species.

Targeted surveys recorded significant numbers of GSM within the site during the four surveys, particularly on the first survey day (Table 3), with the study area supporting suitable habitat characteristics. Due to the initial survey observing multiple hundreds of GSM within some properties, these properties were omitted from further assessment during subsequent surveys (Figure 3). Targeted surveys were only conducted in appropriate habitat (i.e., not in cropped areas, or areas dominated by the species non-preferred food plants).

A summary of the survey results is provided in Table 3.

Table 3. Golden Sun Moth survey results

Date	Survey times	Temperature (°C)	Wind (km/hr) Direction	Cloud cover (%)	Days since rain	Properties Surveyed	No. GSM
30/11/2017	10:00 – 15:00	34 - 39	31 N	60	2+	All	>250
12/12/2017	12:00 – 17:00	24 – 27	14 SW	5	2+	2*, 5, 6-13, 15	35
18/12/2017	10:00 – 17:00	22 – 29	11 SE	30	2+	2*, 5, 6-13, 15	0
04/01/2018	11:00 – 15:00	20 – 21	26 SSE	40	2+	2*, 5, 6-13, 15	0

Note: * surveyed area was in the road reserve in suitable habitat, directly adjacent to Property 2.

3.2.2.3 Habitat within the Study Area

In total, 58.298 hectares of confirmed habitat was recorded within the study area, with 42.106 hectares located in Properties 1-15, and a total of 16.193 hectares located in Property 6 (Figure 3; Table 4).

Table 4. Area of Confirmed Golden Sun Moth habitat

Confirmed GSM Habitat	Property 1-15	Property 16^	Total
Area (hectares)	42.106	16.193	58.298

Note: ^ Property 16 is proposed to be managed for the purposes of conservation.

The large majority of the GSM observations within the study area were made in the far eastern extent of the site (i.e., Property 15 and 16) and to the west (Property 5). Land immediately adjacent to this area consists of the Long Forest Flora and Fauna Nature Reserve, agricultural land and residential dwellings.

Land to the west, outside of the study area is not considered suitable habitat for GSM as the land mostly consists of a large mineral quarry (Boral Quarries) and does not support habitat or food sources suitable for GSM.

3.2.3 Spiny Rice-flower

There are seven (7) records of SRF recorded in the VBA within 10 kilometres of the study area, with the most recent from 1993, located immediately east of Bences Road and the development area in private property (Figure 6) (DEECA 2025c).

3.2.3.1 Spiny Rice-flower Habitat Requirements

SRF is endemic to Victoria and is found between the south-west and north-central parts of the State. It occurs in grassy EVCs such as Plains Grassland (EVC 132), Plains Grassy Woodland (EVC 55), Plains Woodland (EVC 803) and Plains Grassland/Grassy Woodland Mosaic (EVC 897) (DEWHA 2009b). SRF is typically found in small populations (<500 individuals).

The species is slow-growing and reaches up to 30 cm in height (Plate 13; Plate 14). Plants are mostly dioecious (male and female flowers on separate plants), but some plants are monoecious (male and female flower on same plant). It bears small yellow flowers between April and August (DEWHA 2009b).

3.2.3.2 Spiny Rice-flower Targeted Surveys

Targeted surveys for the nationally significant SRF were undertaken on 17, 21, 24 and 31 August, and 4 and 5 September 2017 (the species was still observed to be flowering in the reference site), and 3 July 2018 with the survey on each of the respective days undertaken by up to four qualified ecologists familiar with the target species. Areas identified as supporting suitable habitat (Properties 4b, 5, 9, 10, 11, 15 and 16) were traversed, with surveys conducted along transect lines approximately five metres apart, or as dictated by the density of existing grasses and weeds. The location of all plants was recorded during the survey with a handheld GPS (accuracy of +/- 3 metres) (Plate 13; Plate 14).

The survey methodology adhered to the survey guidelines for SRF outlined in the Biodiversity Precinct Structure Planning Kit (DSE 2010a) and in the Significant Impact Guidelines for the species (DEWHA 2009b). A summary of the survey effort compared with the survey guidelines is provided in Table 5.

Table 5. Survey effort compared with the Biodiversity Precinct Structure Planning Kit (DSE 2010a) and the Significant Impact Guidelines for the species (DEWHA 2009b).

Survey Guidelines	Comment
Targeted surveys should be done by people familiar with recognising the subspecies.	Yes. Surveys were completed by assessors familiar with the appearance and ecology of the subspecies.
Multiple surveys may be required to identify the species and provide adequate survey effort.	Given that the species was known to be flowering at the time of the assessments, and biomass was generally low across areas of suitable habitat, specimens were easily identifiable, a single survey effort across most of the properties was considered appropriate to accurately record the species. Multiple surveys were undertaken in Property 11 and 16 where large populations were identified.
Surveys should not be conducted for at least six months after fires and for at least three months after the cessation of grazing (DEWHA Survey Guidelines).	Yes. The assessors are not aware of any fires or grazing within the specified timeframes.
Survey SRF between April and August (easily overlooked when not in flower).	Yes. The assessments were conducted within the flowering period for the species by ecologists familiar with the species in and out of flower. Given the survey effort within areas of suitable habitat, there is reasonable assurance that individuals were not overlooked.
The targeted survey effort should be directed to all potential habitat areas i.e. remnant grassland including degraded grassland.	Yes. All potential habitat was visually surveyed and traversed in linear transects (i.e. targeted survey areas).
Walk through transects at less than 5m grid intervals are required for all potential habitat.	Yes. Transects of five metres apart were utilised throughout the entire targeted survey areas.
Record the number of plants per land parcel.	Yes. Any observed plants were recorded.

Plate 13. SRF within the study area (Ecology and Heritage Partners Pty Ltd).

Plate 14. SRF within the study area (Ecology and Heritage Partners Pty Ltd).

Targeted surveys conducted by qualified botanists recorded a large population of SRF (2,452 individuals) within Property 16. A further 201 individuals were recorded within Property 11 (Figure 4a; Figure 4b).

Although the targeted surveys were undertaken during the known flowering period when the species was known to be flowering within the locality, no other specimens were recorded on Properties 4b, 5, 9, 10, or 15 in areas considered to support suitable habitat.

3.2.4 Striped Legless Lizard

One record of SLL exists 4.2 kilometres north of the study area, being recorded in 2016 (Figure 7) (DEECA 2025c).

3.2.4.1 Striped Legless Lizard Habitat Requirements

The SLL is restricted to the lowland tussock grassland habitats (Coulson 1990) in temperate south-eastern Australia where the species has a limited and patchy distribution. Since European settlement the distribution of SLL is believed to have declined and the species is known to have disappeared from many sites. It has been estimated that 95% of Victoria's native lowland grasslands have been grossly altered since European settlement. The major type of grassland known to support SLL is the Western (Basalt) Plains Grassland community, and the majority of sites in Victoria occur on cracking clay soils with at least some surface rock which provides shelter (Cogger 1996; Coulson 1995).

A small percentage of the original habitat for SLL now exists, and therefore this species is thought to probably occur in small, isolated populations because remaining habitat is very limited in area and severely fragmented (Webster *et al.* 2003).

Suitable habitat for SLL is present in areas of native and introduced grassland throughout the study area, predominantly outside of areas that have been subject to ground disturbance as a result of cropping activities. Dominant exotic species within suitable habitat that may be used by SLL include Chilean Needle-grass and Serrated Tussock.

3.2.4.2 Striped Legless Lizard Surveys

Artificial refuges provide areas for ecologists to focus search attempts in which tiles are lifted to check for the presence of lizards. The adopted methodology is widely accepted as the primary survey technique for this species, particularly in areas supporting surface rock cover (DSEWPaC 2011a, 2011b).

Seventeen rectangular grids of terracotta roof tiles, 5 x 10 tiles (25 metres x 50 metres), were established in identified patches of suitable habitat (i.e. areas supporting a combination of preferred habitat features, including tussock-forming grasses, surface rocks and cracking soils) (Figure 5). Surveys were undertaken in accordance with the *Survey Guidelines for Australia's Threatened Reptiles* (DSEWPaC 2011b) and included:

- 850 grooved terracotta roof tiles (17 grids arranged in 5 x 10 rectangular grids) were placed in areas of suitable, contiguous habitat within the study area (Figure 5). Tiles were laid in areas that have the highest likelihood of supporting SLL;
- Tile grids were laid on 3 and 4 August 2017;
- Tiles were checked during cool weather conditions (i.e. less than 20 degrees Celsius where possible) between 7.00am and 10.00am; and
- Tile grids were checked on six occasions between 28 September and 24 November 2017.

Despite the presence of suitable habitat, 17 grids placed in areas representative of the best quality habitat (Figure 5; Plate 15), and targeted surveys undertaken at an appropriate time of year, no SLLs were detected within the study area during the six tile grid checks undertaken (Ecology and Heritage Partners 2018b).

The targeted survey recorded four reptile species: Bougainville's Skink *Lerista bougainvillii,* Delicate Skink *Lampropholis delicata* (Plate 16), Common Blue-tongue Lizard *Tiliqua scincoides*, and Eastern Tiger Snake *Notechis scutatus*. A summary of the survey results is provided in Table 6.

Plate 15. Tile grid setup within the study area (Ecology and Heritage Partners Pty Ltd).

Plate 16. Delicate Skink *Lampropholis delicata* (Ecology and Heritage Partners Pty Ltd).

Table 6. Summary of SLL survey results

Check/ Date	Weather Conditions *				SLL	Bougainville's Skink	Delicate Skink	Common Blue-tongue	Eastern Tiger Snake	Unidentified skink
	Temp (°C)	Relative Humidity (%)	Above Tile Temp C°	Under Tile Temp C°						
1 - 28/09/17	14	73	11.9	9.9	-	TG9 x 1	-	-	-	TG1 x 1 TG6 x 1 TG9 x 1
2 - 11/10/17	17.1	35	14.6	13.5	-	TG 16 x 1	TG9 x 2	-	-	TG14 x 1
3 - 20/10/17	12	66	12.7	11.4	-	TG16 x 2 TG1 x 1	-	-	-	TG9 x 1
4 - 6/11/17	10.7	75	11.1	9.8	-	TG17 x 3 TG3 x 1 TG7 x 1	-	TG14 x 1	TG8 x 1	-
5 -17/11/17	18	88	23.3	21.0	-	TG16 x 1	-	-	-	-
6 - 24/11/17	19	69	18.9	19.8	-	TG9 x 2 TG16 x 1	-	-	-	-

Based on targeted survey results, and the lack of records within the project locality despite several surveys being undertaken within the locality over the past 12 years, the species is likely to be locally extinct, and a population of SLLs are considered unlikely to be present in the study area, or if present, in very low numbers.

As such, there is a low likelihood that the species occurs within the study area or that it will be significantly impacted by the proposed action. SLL are therefore not considered further within this Preliminary Documentation.

3.2.5 Victorian Grassland Earless Dragon

There are currently no documented records of VGED within a 10-kilometre radius of the study area (Figure 7) (DEECA 2025b). However, the Habitat Distribution Model (HDM) for VGED partially covers the study area, and includes a maximum habitat suitability prediction score of 100, meaning parts of the study area are predicted to be highly suitable for the species (DEECA 2025a). Further, the study area is within the species' distribution map as shown on the VGED Species Profile and Threats Database (SPRAT) (DCCEEW 2025b).

Importantly, VGED was rediscovered in January 2023, marking the first confirmed sighting of the species in more than 50 years, and it is understood that the rediscovery site is located within a 10-kilometre radius of the study area.

3.2.5.1 Victorian Grassland Earless Dragon Habitat Requirements

The current distribution of VGED is unknown (DCCEEW 2023a). At the time of the Conservation Advice for the species, all confirmed and unconfirmed records of the species are from temperature grasslands within a 100-kilometre radius of the Melbourne CBD, excluding the recent rediscovery site (DCCEEW 2023a). This area, historically known as the Keilor Plains, is a subset of the Victorian Volcanic Plains.

VGED has been reported in open basalt stony plains and along riverbanks (McCoy 1889; Kershaw 1927) and may also occur in coastal grasslands adjoining saline habitats (DCCEEW 2023a). When threatened, VGED individuals retreat into small holes in the ground, like those created by Trap-door Spiders (a common name covering several spider Family) (McCoy 1889).

Research on related grassland earless dragons in Australian Capital Territory (ACT) and New South Wales (NSW) show a reliance on invertebrate burrows as a critical resource, using them for shelter, breeding, and overwintering (Stephens *et al.* 2010), and this behaviour is also believed to apply to VGED (DCCEEW 2023a). In the ACT and NSW, grassland earless dragon subspecies are found almost exclusively in grasslands that have experienced continuous low to moderate grazing (by sheep or kangaroo) or managed fire regimes, with no history of ploughing, rock removal, or pasture fertilisation, and minimal weed presence. However, grassland earless dragon populations in southern Queensland also occupy cropped land with deeply cracking clay soils (DCCEEW 2023). VGED recorded habitats include deeply cracking vertisol clay soils (TSSC 2008), suggesting possible occupation in habitats with these features (DCCEEW 2023a).

Overall, VGED populations have the greatest likelihood of persisting in Victorian volcanic and coastal grassland with (DCCEEW 2023a):

- Native vegetation cover with open patches of bare earth and/or naturally short open swards due to low-level disturbance (e.g. managed fire, grazing);
- Invertebrate burrows and/or rock cover and/or cracking vertisol soils;
- Adequate invertebrate prey;
- Minimal weed cover; and,
- Not been de-rocked, ploughed or fertilised to improve pasture quality.

Suitable habitat for VGED is present in areas of native and introduced grassland throughout the study area, in areas that have not been subject to ground disturbance as a result of previous cropping activities.

3.2.5.2 Victorian Grassland Earless Dragon Habitat Assessment

Given the rediscovery of the Victorian Grassland Earless Dragon west of Melbourne in early 2023, a detailed habitat assessment was undertaken to determine the presence and extent of potential Victorian Grassland Earless Dragon habitat.

A habitat assessment for VGED was undertaken by two experienced ecologists on 20-21 July 2023 using the habitat attributes summarised above (as detailed in DCCEEW 2023a), which suggests that grassland habitats that are considered to have the greatest likelihood of harbouring a remnant VGED population are most likely to contain:

- Native vegetation cover with open patches of bare earth and/or naturally short open swards due to low level disturbance (e.g. managed fire/grazing);
- Invertebrate burrow and/or rock cover and/or cracking vertisol soils;
- Adequate invertebrate prey;
- Minimal weed cover; and,
- Not been de-rocked, ploughed or fertilised to improve pasture quality.

The inspections sought primarily to identify the extent of potential habitat for VGED within the study area. Additional site inspections were undertaken on 18 October 2023 with Dr Steve Sinclair of the Arthur Rylah Institute and Peter Robinson (Wildlife Profiles) to review the type and extent of potential habitat present.

Habitat suitability was split into two categories based on the presence or absence of habitat attributes summarised above. Habitat type and habitat classifications are summarised in Table 7 using criteria detailed in the Victorian Grassland Earless Dragon Conservation Advice (DCCEEW 2023a) around grassland habitats that are considered to have the greatest likelihood of harbouring the species.

It should be noted that all habitat designated as High, Moderate or Low quality is considered as potential habitat as per discussions with Garry Peterson (Victorian Grassland Earless Dragon Recovery Team/Zoos Victoria) (Figure 9a).

Table 7. Classification of habitat suitability for Victorian Grassland Earless Dragon within the Assessment Area.

Habitat Type	Habitat Classification	Habitat Features
Potential Habitat	High	• Predominantly native vegetation (i.e. >50% cover); • Low biomass cover; • Some bare earth evident; • Rock cover present; • Cracking soils present; • Spider burrows present; • No evidence of ploughing/soil disturbance.
	Moderate	• Some native vegetation present (i.e. > 25% cover); • High weed cover; • Low biomass; • Some bare earth evident; • Rock cover present; • Cracking soils present; • Spider burrows present; • Little evidence of ground disturbance.
	Low	• Low cover of native vegetation (<25% cover); • Little to no surface rock evident; • High biomass; • Low cover (<5%) bare ground; • High non-grassy weed cover (i.e. Artichoke Thistle)
Unsuitable Habitat	Unsuitable (cropped/ploughed	• Currently/previously ploughed/cropped in the past 5-7 years;
	Unsuitable (Other)	• Non-grassland habitat (i.e. woodland with non-grassy understory); and/or, • Current agricultural use (i.e. vineyard/market garden); and/or, • Evidence of recent pasture improvement; and/or, • Non-native (i.e. no native vegetation); and/or, • Dominant non-grassy weed cover (i.e. Artichoke Thistle; Galenia).

Potential Habitat

Areas assessed as supporting high quality habitat for Victorian Grassland Earless Dragon within the Assessment Area contained high quality native grassland consistent with the condition thresholds that define the nationally significant NTGVVP ecological community. In total, 15.742 hectares of habitat was assessed as 'high' quality habitat (Table 8).

Native vegetation was generally comprised of native tussock species such as Spear Grass *Austrostipa* spp., and Wallaby-grass *Rytidosperma* spp., with several native herbs present (Plate 17; Plate 18). Biomass was generally low, and inter-tussock space and surface rock were evident. Some cracking spoils and spider burrows were also present.

It is noted that the Arthur Rylah Institute (ARI) produced a model that highlighted areas of land with similar histories of biomass fluctuation to the Victorian Grassland Earless Dragon rediscovery site. Some of these correspond to the exact areas of 'high quality' habitat identified as potential Victorian Grassland Earless Dragon habitat in the study area.

Plate 17. High Quality VGED habitat dominated by Wallaby-grass (Ecology and Heritage Partners Pty Ltd, October 2023).

Plate 18. High Quality VGED habitat dominated by Wallaby-grass and grassland herbs (Ecology and Heritage Partners Pty Ltd, December 2022).

A total of 4.954 hectares of habitat within the study area was assessed as supporting moderate quality habitat for VGED (Table 8), and supported a lower cover of native species and were generally located within areas mapped as Plains Grassland EVC. However, a higher cover of non-native species was observed in these locations, with Serrated Tussock being particularly prevalent (Plate 19; Plate 20). Biomass was generally low, and inter-tussock space and surface rock were evident. Occasional cracking soils and spider burrows were present.

A total of 52.262 hectares of low quality Victorian Grassland Earless Dragon habitat was recorded within the Assessment Area, and supported a low cover of native vegetation (generally less than 20% cover) and was generally dominated by non-native grasses such as Serrated Tussock, with a scattered cover of non-grassy weeds such as Artichoke Thistle and Galenia.

Biomass was high, and little to no inter-tussock space or surface rock was present in the ground layer, with the presence of rock piles near the perimeter of paddocks evidence of historical de-rocking activity (Plate 21; Plate 22).

Little evidence of soil cracking or spider burrows were evident in these areas.

Plate 19. Moderate Quality VGED habitat with a native cover of Spear-grass (Ecology and Heritage Partners Pty Ltd, July 2023).

Plate 20. Moderate Quality VGED habitat dominated by Serrated Tussock and Spear-grass, and some surface rock (Ecology and Heritage Partners Pty Ltd, July 2023).

Plate 21. Rock pile within low quality Victorian Grassland Earless Dragon habitat (Ecology and Heritage Partners Pty Ltd July 2023).

Plate 22. Low quality Victorian Grassland Earless Dragon habitat dominated by Serrated Tussock and Spear-grass. Surface rock absent (Ecology and Heritage Partners Pty Ltd July 2023).

Unsuitable Habitat

Much of the study area has been subject to historical, high intensity agricultural activity in the form of cereal cropping (Plate 23 – Plate 26). Although not currently under crop, previous site assessments have noted the presence of cropping activity (i.e. wheat cropping), and evidence of historical ploughing and cropping is currently evident in the form of rock piles along parcel boundaries, the disturbed condition of the ground-layer, and the dominance of non-native vegetation that has rapidly recruited in areas previously ploughed (Plate 27).

The remaining areas of the Assessment Area were assessed as supporting unsuitable habitat for the VGED due to one or more factors. These areas were generally highly modified, and comprised of improved pasture/cereal cropping and had been de-rocked (Plate 28), or contained non-grassy vegetation (i.e. understory of woodland habitat), were heavily disturbed and dominated by non-native vegetation (i.e. Serrated Tussock, Galenia and/or Artichoke Thistle), or were located in modified, residential land subject to

ongoing disturbance through slashing/ground disturbance/de-rocking etc. These areas did not support any of the preferred habitat features of the Victorian Grassland Earless Dragon summarised in Section 3.2.5.2.

A total of 387.260 hectares of habitat was recorded as unsuitable. A breakdown of habitat quality and extent is provided in Table 8.

Plate 23. Historical aerial photography showing evidence of cropping activity (Google Earth photo taken December 2018).

Plate 24. Historical aerial photography showing evidence of cropping activity (Google Earth photo taken January 2022).

Plate 25. Historical aerial photography showing evidence of cropping activity (Google Earth photo taken January 2022).

Plate 26. Historical aerial photography showing evidence of cropping activity (Google Earth photo taken January 2022).

Habitat Summary

Vast areas within the study area have been subject to previous agricultural disturbance that has resulted in the creation of unsuitable habitat for VGED. Based on the results of the habitat assessment, the location of potential and unsuitable habitat within the study area is shown in Figure 9a.

A breakdown of habitat quality and extent is provided in Table 8.

Plate 27. Harvested cropped paddock providing unsuitable habitat (Ecology and Heritage Partners Pty Ltd July 2023).

Plate 28. Non-native pasture subject to pasture improvement. Surface rock absent (Ecology and Heritage Partners Pty Ltd July 2023).

Table 8. VGED Habitat Classification Extent

Habitat Classification	Extent
High Quality Habitat	15.742
Low Quality Habitat	52.262
Moderate Quality Habitat	4.954
Unsuitable Habitat (Cropped/ploughed)	270.429
Unsuitable Habitat (Other)	116.831
Total	**460.218**

3.2.5.3 Victorian Grassland Earless Dragon Targeted Surveys

Targeted surveys for VGED were undertaken in areas of potential habitat within the eastern section of the study area in accordance with the *Survey Guidelines for Australia's threatened reptiles. EPBC Act survey guidelines 6.6* (DSEWPaC 2011), the *National Recovery Plan for the Grassland Earless Dragon Tympanocryptis pinguicolla* (Robertson and Evans 2009/2012), and the updated *Survey guidelines for four Grassland Earless Dragons (Tympanocryptis spp.) of Southeast Australia* (DCCEEW 2024).

Madani *et al.* (2023) found that multiple refugia types improve reptile detectability rates. As such, the survey method employed a multi-phase, multi-method approach, using a combination of tile grids, artificial arthropod burrows, endoscope inspections, and mini-pitfall traps.

Note that areas of potential VGED habitat that were not surveyed as part of this survey program are proposed to be retained, and will not be impacted as part of the proposed action (Figure 8; Figure 9a).

Tile Grids

Ten rectangular grids of terracotta roof tiles, with each grid comprising 50 tiles (5 x 10 formation at 10 metre spacing), were established in identified areas of potential habitat on 16 January 2025 in accordance with the *Survey guidelines for four Grassland Earless Dragons (Tympanocryptis spp.) of Southeast Australia* (DCCEEW 2024) (Figure 9a; Figure 9b).

Of these, three grids (grids #8-10) were placed in high quality habitat, one partially in moderate quality habitat (grid #1), with the remaining six grids in low quality habitat (grids #2-7) (Figure 9a).

Tile grids were checked on 33 occasions between 5 February and 28 May 2025, which is an average of one check every 3.4 days during this period. Grids were never checked on consecutive days to avoid unnecessary disturbance to the site.

- In total, 10 grids of 50 terracotta tiles each were placed in areas identified as supporting potential habitat for VGED (Figure 9a; Figure 9b).
- The four corners of each grid marked with a wooden stake;
- Tiles were checked for any damage during each visit and replaced (if required);
- Tile checks involved systematically inspecting each tile in the grid and observing and recording the species utilising/basking on or underneath the artificial habitat.

The following was recorded:

- Location and number of each tile grid;
- Date and weather conditions for each survey;
- A table of results including a breakdown of what tile grids were checked on which dates / intervals;
- Location and number of any VGED recorded; and,
- Any non-target species identified (the tile-grid method is suitable to identify other reptiles and small marsupials potentially present on site, including the nationally significant Striped Legless Lizard Delma impar (skins), State significant Tussock Skink Pseudemoia pagenstecheri and Fat-tailed Dunnart Sminthopsis *crassicaudata*).

Tiles were removed from the study area at the conclusion of the final tile check on 28 May 2025.

Results

Despite the presence of suitable habitat, and 10 grids placed in a combination of high, moderate and low quality habitat (Figure 9a; Plate 30), and targeted surveys undertaken at an appropriate time of year, VGED was not detected within the study area during the 33 tile grid checks undertaken.

The tile grid survey recorded eight reptile species: Common Blue-tongue Lizard, Common Garden Skink *Lampropholis guichenoti*, Eastern Striped Skink *Ctenotus robustus*, Eastern Three-lined Skink *Bassiana duperreyi*, Jacky Dragon *Amphibolurus muricatus*, Southern Grass Skink *Pseudemoia entrecasteauxii*, Southern Marbled Gecko *Christinus marmoratus*, and the State significant Tussock Skink *Pseudemoia pagenstecheri* (Plate 29).

The targeted survey also recorded two amphibian species: Southern Brown Tree Frog *Litoria ewingii*, and Spotted Marsh Frog *Limnodynastes tasmaniensis*.

A breakdown of the tile grid survey results is provided in Appendix 1.1.

Plate 29. Tussock Skink *Pseudemoia pagenstecheri* (Ecology and Heritage Partners Pty Ltd 02/05/2025).

Plate 30. Artificial burrow and flag pin in the foreground, roof tile in middle ground (Ecology and Heritage Partners Pty Ltd 28/02/2025).

Artificial Burrows and Endoscopic Inspections

Within each of the ten rectangular grids of roof tiles, two transects of artificial burrows were deployed at five metre intervals (Figure 9b). Within these transects, a burrow was deployed next to, and halfway between the tiles, totalling 19 burrows per transect (Figure 9a; Plate 31).

Of these, six burrow transects (grids #8-10) were placed in high quality habitat, one partially within moderate quality habitat (grid #, transect #1), with the remaining burrow transects in low quality habitat (grids #2-7) (Figure 9a).

In total, 380 burrows (19*2*10 = 380) were deployed between 18 and 21 February 2025. These burrows were each checked via endoscope on 27 calendar days between 28 February and 26 May 2025, exceeding the 3000 minimum number of trap/days in the National Recovery Plan (Robertson 2009/2012) with a total of 10,260 trap/days (380*27 = 10,260), and exceeding the minimum 8 week survey period (DCCEEW 2024).

Artificial burrows were never checked on consecutive days to avoid unnecessary disturbance to the site. The area within a 50-metre radius of the tile grids was also inspected for soil cracks and naturally occurring burrows. Where present, these habitats were also inspected via endoscope during each site visit.

- In total, 380 artificial burrows deployed in areas with the highest likelihood of supporting VGED;
- The 380 artificial burrows and surrounding habitats (i.e. soil cracks within a 50 metre radius of tile grids) were checked via endoscope on 27 calendar days, totalling 10,260 surveys;
- Artificial burrows were constructed using polyvinyl chloride (PVC) tubing, comprising an inner and outer length. The interior was lined with a soil substrate to provide individuals with the grip required to move freely in and out of the tubes and to mimic a natural invertebrate burrow;
- Artificial burrows were installed vertically into the ground with the upper part flush with the ground;
- Artificial burrows were checked for any damage and replaced accordingly (if required);
- Artificial burrows checks involve systematically inspecting each burrow via endoscope (Yateks Mechanical Endoscope M615FM), observing and recording the vertebrate species utilising the artificial habitat;

- Artificial burrows were deployed on 18 and 21 February 2025; and,
- Artificial burrows were checked on 27 occasions between 28 February and 26 May 2025, which is an average of one check every 3.3 days during this period.

Results

Despite the presence of suitable habitat, 380 artificial burrows placed in a combination of high, moderate and low quality habitat (Figure 9a), and targeted surveys undertaken at an appropriate time of year, VGED was not detected within the study area during the 27 artificial burrow checks undertaken.

The artificial burrow survey recorded multiple records of one reptile species: Tussock Skink (Plate 32; Plate 33), and one amphibian species: Spotted Marsh Frog Limnodynastes tasmaniensis (Plate 34).

A breakdown of the burrow survey results is provided in Appendix 1.2.

Plate 31. Staff inspecting artifical burrows (Ecology and Heritage Partners Pty Ltd 28/02/2025).

Plate 32. Tussock Skink as seen through endoscope (Ecology and Heritage Partners Pty Ltd 28/02/2025).

Plate 33. Tussock Skink as seen through endoscope (Ecology and Heritage Partners Pty Ltd 28/02/2025).

Plate 34. Spotted Marsh Frog *Limnodynastes tasmaniensis* as seen through endoscope (Ecology and Heritage Partners Pty Ltd 26/03/2025).

Mini-pitfall Traps

Mini-pitfall traps (MPTs) are particularly effective in areas that support cracking soils (DCCEEW 2024).

Due to the presence of cracking soils within discrete areas of potential habitat for VGED, particularly within a 50-metre radius of established tile grids, mini-pitfall traps (MPT) were deployed to enhance reptile detection probability. Ten transects were established, each comprising 10 MPTs, resulting in a total of 100 MPTs (Figure 9a; Plate 35; Plate 36). Of these, one was in moderate quality habitat, eight within low quality habitat, and one within an area of cracking soil extending into unsuitable habitat.

In accordance with DCCEEW (2024), MPTs were shaded to reduce exposure, thermal stress, and subsequent mortality risk of trapped individuals. MPTs were inspected daily over 13 consecutive days to limit duration of entrapment.

- Each transect included a 15 metre above-ground drift fence to encourage ground-active reptiles into the MPTs. Each MTP was spaced approximately one metre apart along the drift fence (i.e. 10 MPTs along a 15-metre drift fence);
- MPTs were constructed using a three-litre bucket with six holes drilled into the base for drainage. The bucket was dug into the ground so that the top of the bucket was flush with ground surface. A shade over was positioned above each MPT;
- In the event of extreme heat or heavy rain, MPTs were to be temporarily closed to minimise the risk of incidental mortality, however, such conditions did not occur during the survey period, and closure was not required;
- Checks involve systematically inspecting each MPT, observing and recording the vertebrate species within the MPT or fence and releasing any trapped individuals to the nearest suitable habitat;
- MPTs were deployed on 11 April 2025;
- MPTs were checked daily between 12 April and 26 April 2025, meaning that the MPTs were checked 13 times;
- MPTs (include shade and fence) were checked for any damage and replaced accordingly (where required); and,
- At the completion of surveys, the MPT areas were backfilled to mitigate against any accidental vertebrate mortality.

Plate 35. Mini-pitfall trap set-up with drift fence (Ecology and Heritage Partners Pty Ltd 11/04/2025).

Plate 36. Mini pitfall traps established within potential VGED habitat (Ecology and Heritage Partners 11/04/2025).

Results

Despite the presence of cracking soils, 100 MPTs placed in areas of potential habitat (Figure 9a), and targeted surveys undertaken at an appropriate time of year, VGED was not detected within the study area during the MPT checks.

The MPT survey recorded one reptile species - Tussock Skink, and one amphibian species - Spotted Marsh Frog.

A breakdown of the MPT survey results are provided in Appendix 1.3

Summary of Survey Results

Multi-phased, multi-method targeted survey for VGED were undertaken in areas supporting potential habitat for the species. Surveys were timed to minimise days with rainfall, or high cloud cover. However, the multi-phased, multi-method targeted survey methods utilised minimised the potential impact of poor weather on detection probability, as it is expected that VGED would have been recorded sheltering in artificial spider burrow, or under tiles on days with poor weather conditions inhibiting active movement (if present).

Despite the efforts of the targeted surveys, no VGED were detected. It is noted that VGED is highly cryptic, difficult to detect and may be missed during targeted surveys (if present).

A high number of reptile observations were made as part of the multi-method and multi-phased targeted survey effort, indicating a high reptile detection rate.

Conclusion

The study area is located within an area modelled to support VGED habitat (DEECA 2025a), with field surveys confirming the presence of 72.958 hectares of potential habitat. The remaining 387.260 hectares of the study area was assessed as containing unsuitable habitat (Table 8; Section 3.2.5.2).

The proposed action will result in the removal of 35.865 hectares of low quality habitat, and 2.966 hectares of moderate quality habitat, whilst 15.742 hectares of high quality habitat, 1.988 hectares of moderate quality habitat and 16.397 hectares of low quality habitat will be retained (Table 9).

Table 9. Proposed retention and removal of potential VGED habitat

Habitat Type	Retained	Removed	Total
High	15.742	0	**15.742**
Moderate	1.988	2.966	**4.954**
Low	16.397	35.865	**52.262**
Unsuitable	0	387.26	**387.26**
Total (potential habitat)	**34.127**	**38.831**	

Although the VGED rediscovery site is located within a 10-kilometre radius of the study area, given the small home range of the other grassland earless dragon species and poor dispersal ability (DCCEEW 2023b), as well as multiple physical barriers being located between the rediscovery site and study area, VGED would not be able to disperse between the two sites.

Despite the efforts of the targeted surveys, no VGED were detected. It is noted that VGED is highly cryptic, difficult to detect and may be missed during targeted surveys (if present), although a high number of reptile observations were made as part of the multi-method and multi-phased targeted survey effort, indicating a high reptile detection rate.

Based on this, and the results of the targeted survey effort, the likelihood of a population of VGED being present within the study area is considered to be low.

Despite the proposed removal of 38.831 hectares of moderate and low quality potential habitat, the proposed action will retain 34.127 hectares of high (15.742 hectares), moderate and low (18.385 hectares) potential habitat and as such, there is a very low likelihood that VGED will be significantly impacted by the proposed action. VGED are therefore not considered further within this Preliminary Documentation.

3.2.6 Other Matters of National Environmental Significance

The Protected Matters Search Tool (PMST) (DCCEEW 2025a) and the VBA (DEECA 2025c) identify several other nationally significant flora and fauna that have previously been recorded or have the potential to occur within the broader locality (Ecology and Heritage Partners 2018a; 2018b). These species are listed in Table 10, which outlines the potential for the species to occur within the study area.

Table 10. Nationally significant species with the potential to occur within the study area.

Common Name	Scientific Name	Habitat	Likelihood of Occurrence
Small Golden Moths	*Diuris basaltica*	There are five records of Small Golden Moths recorded in the VBA within the local area, with all located south of Werribee River and Bacchus Marsh township (DEECA 2025c). An additional record is located further east near Melton, with another record north-west in Toolern Vale (DEECA 2025c). Small Golden Moth orchids typically grow in herb-rich native grasslands, dominated by Kangaroo Grass on heavy basaltic soils, often embedded with basalt boulders, with the known distribution of the species highly restricted (DSE 2010b). Given the absence of Kangaroo Grass-dominated grassland within the study area, general poor condition of habitat (outside of Property 16), high levels of weed invasion, absence of other orchids within the locality, and history	Negligible

Common Name	Scientific Name	Habitat	Likelihood of Occurrence
		of agricultural activities, there is considered to be a low likelihood of occurrence in Properties 1-15.	
Basalt Peppercress	*Lepidium hyssopifolium*	Although there are no records within the VBA within 10 kilometres, there is an informal record recorded in the Atlas of Living Australia (ALA) within Property 6 south of Buckleys Road (ALA 2025). This property has been cropped, and the specimen would no longer be present. It is understood that almost all remaining populations of Basalt Peppercress occur in heavily modified, non-natural environments, usually amongst exotic pasture grasses and weed species, sometimes with an overstorey of introduced tree species (DSE 2010c). However, the species appears to rely heavily on favourable microsite conditions, with Basalt Peppercress appearing to only establish in relatively open bare ground where there is limited competition from other plants (both native and introduced species), rather than in areas with thick ground cover (DSE 2010c). As the majority of grassland vegetation (native and non-native within Properties 1-15 supports high levels of biomass, with few patches of bare ground present, as well as the lack of other records in close proximity to the study area, there is considered a low likelihood of occurrence within the study area. Further, the biodiversity assessment and targeted surveys (for other species) did not note any specimens that meet the description of the species.	Negligible
Large-head Fireweed	*Senecio macrocarpus*	There are no known records of Large-headed Fireweed within 10 kilometres of the study area, with the closest known record located approximately 17 kilometres to the east (DEECA 2025c). Previous surveys for the species in nearby properties did not record the species (Ecology and Heritage Partners 2013b), and there is considered to be a low likelihood of occurrence that the species occurs in the locality due to the highly modified condition of habitat.	Low
Swift Parrot	*Lathamus discolor*	Swift Parrot may forage on eucalypts within the study area on occasion. However, the species breeds only in Tasmania and migrates to mainland Australia in autumn and is usually recorded between Stawell in the central west and Wodonga in the north-east. As such the study area is unlikely to provide important or limiting habitat for this species.	Negligible

Based on the information ascertained during the desktop assessments and field assessments, there is considered to be a low to very low likelihood that the species listed in Table 10 are present within the study area or will be significantly impacted by the proposed action. As such, they are not considered further within this Preliminary Documentation.

4 RELEVANT IMPACTS

The proposed action will have a direct impact on two matters of NES: NTGVVP and GSM, with all SRF proposed to be retained. Under the EPBC Act, all three MNES are listed as critically endangered.

Impacts to matters of NES associated with the proposed development are summarised in Table 11. Further details relating to each matter of NES are provided below.

Table 11. Matters of ecological significance to be impacted and retained

Ecological Value	Impacted	Retained	Total
NTGVVP	1.783 hectares	15.882 hectares	17.665 hectares
GSM	22.657 hectares	35.750 hectares	58.407 hectares
SRF	0 individuals	2,653 individuals	2,653 individuals

4.1 Natural Temperate Grassland of the Victorian Volcanic Plain

A total of 17.665 hectares of the nationally significant ecological community NTGVVP is present within the study area. According to the significant impact criteria for critically endangered ecological communities (DoE 2013), an action is likely to be significant where there is a real chance or possibility that it will reduce the extent of the ecological community.

There is no Recovery Plan or Threat Abatement Plan for this ecological community.

4.1.1 Direct and Indirect Loss

4.1.1.1 Direct Loss

A total of 1.783 hectares of NTGVVP is proposed to be directly lost as part of the proposed action. The NTGVVP within the impact area is of low quality, and although comprised of a high cover of perennial native grasses (Tussock Grass, Kangaroo Grass and Spear Grass), diversity is low, and the presence of herbs and shrubs is also negligible. This area of NTGVVP is located within Property 9 of the study area (Figure 2b).

4.1.1.2 Indirect Loss

There is not considered to be any indirect loss to other remnants of the NTGVVP. The remaining 15.885 hectares of NTGVVP recorded within the study area will be retained.

Further, the presence of non-native habitat and vegetation located between retained NTGVVP and proposed development areas will act as a buffer to construction activities, and mitigate against potential edge effects that have the potential to degrade retained NTGVVP, and therefore, no NTGVVP outside of the proposed impact area will be indirectly impacted.

Mitigation measures to ensure the 15.885-hectare remnant of NTGVVP located outside of the development footprint is retained during development activities are detailed in the Environment Management Plan (EMP) (Ecology and Heritage Partners 2025a) (Appendix 2).

4.1.1.3 Unknown, unpredictable or irreversible impacts

Impacts are not expected to be unknown or unpredictable, however loss of 1.783 hectares of NTGVVP within the study area would be considered irreversible.

4.1.2 Local, Regional and National Scale Analysis of Impacts

NTGVVP is listed as Critically Endangered under the EPBC Act, a category that is applied to threatened species and ecological communities showing an extremely high risk of extinction in the wild in the immediate future (DSEWPaC 2011a). Less than five per cent of the original extent of the community remains, although patches in good condition are likely to constitute less than one per cent, and most known remnants are less than 10 hectares in size (DSEWPaC 2011a).

The NTGVVP within the impact area does not represent a high-quality example of this listed community. Species diversity is low, and the remaining vegetation within the surrounding landscape is generally modified. Given the patchy nature of the community within the study area, it is likely that, in the absence of conservation management, the NTGVVP remnants will continue to degrade due to ongoing weed invasion.

Distribution throughout Melbourne and Victoria is highly fragmented and discrete, and few large, high quality remnants are known to occur to Ecology and Heritage Partners, and the loss of any remnants of the community are likely to be considered significant at the local, regional and national scale.

Several threats to the community persist within the landscape, namely ongoing agricultural activities that result in loss, disturbance or modification of the community, weed invasion, and excessive grazing (Threatened Species Scientific Committee [TSSC] 2008). One of the main drivers of the reduction in extent to the ecological community in recent years around Melbourne has been residential development.

However, in recent years, some high-quality remnants of the community have been recorded in the Victorian Volcanic Plain bioregion, particularly west of Melbourne, with a number having been secured and currently managed in perpetuity for conservation purposes (i.e. Ombersley, Cressy, Warrambeen). As such, although the removal of small, low quality remnants of NTGVVP such as that proposed within the study area contribute to a cumulative loss of the community, this has created an opportunity to conserve a larger, higher quality remnant present in Property 16 (see Section 6.1).

4.2 Golden Sun Moth

There is no adopted or made Recovery Plan for the GSM.

4.2.1 Direct and Indirect Loss

4.2.1.1 Direct Loss

GSM were detected within the study area with 58.407 hectares of confirmed habitat identified. The proposed development will result in a direct impact to 22.657 hectares of GSM habitat, with impacts to the remaining 35.750 hectares being avoided (Figure 3).

4.2.1.2 Indirect Loss

There is not considered to be any indirect loss or impact to GSM habitat. Areas to be retained that support GSM habitat are either undevelopable or will located within a protected offset site. Further, the presence of unsuitable GSM habitat located between retained GSM habitat and development areas will act as a buffer to construction activities, and mitigate against potential edge effects that have the potential to degrade suitable habitat for GSM, and therefore, any GSM populations existing outside of the impact area, and any other populations located outside of the study area within this region will not be indirectly impacted by the development.

Although there is potential habitat located within 300 metres to the proposed development area to the east and south-east (Long Forest Estate), due to the limited dispersal ability of the species as well as the presence of physical barriers (i.e. dwellings, roads, agriculture), any GSM populations that persist in habitat beyond 300 metres in these directions would be unlikely to regularly utilise habitat within the study area, and would effectively be considered a separate population and isolated from any habitat within the study area (DEWHA 2009a). As such, no indirect losses are considered to occur to any other populations that may occur outside the study area.

Mitigation measures to ensure the retained 35.750 hectares of GSM habitat located outside of the development footprint is retained and protected during development activities are detailed in the EMP and OMP prepared for the project (Ecology and Heritage Partners 2025a; 2025b) (Appendix 2; Appendix 3).

4.2.1.3 Unknown, unpredictable or irreversible impacts

Impacts are not considered to be unknown or unpredictable. Although the loss of existing habitat within the study area is considered irreversible, the impact will be mitigated through the protection and enhancement of retained, high quality areas of confirmed habitat.

4.2.2 Local, Regional and National Scale Analysis of Impacts

Several populations of GSM have also previously been recorded at other sites within the locality, with Ecology and Heritage Partners recording over 300 individuals at the site known as Long Forest Estate on Flanagans Drove (EPBC 2014/7251), and populations also occurring at Anthony's Cutting, Bacchus Marsh, McCormacks Road, Bacchus Marsh, and Stonehill Estate, Bacchus Marsh (EPBC 2021/9014; 2018/8228).

The numbers and distribution of previous records shown in Figure 7, as well as those recorded in the VBA (DEECA 2025c) indicates that the species is widely distributed on a local and regional scale, although it is infrequently found in high abundance (DEWHA 2009a). There will be impacts to GSM on a local scale due to the removal of 22.657 hectares of habitat within the study area. However, most of the GSM individuals recorded were within Property 5 and Property 16, with only low numbers observed throughout other areas of habitat. As such, given the wide distribution on a regional scale, the impacts to GSM are not considered to be at a regional or national scale.

4.3 Spiny Rice-flower

A national recovery plan for the SRF has been prepared (DSE 2006). The national recovery plan details the species distribution and biology, conservation status, threats and recovery objectives and actions necessary to ensure the species' long-term survival.

4.3.1 Direct and Indirect Loss

4.3.1.1 Direct Loss

Given all 2,653 SRF individuals found within Property 11 and Property 16 are to be retained as part of the proposed action, there are no direct losses to SRF.

4.3.1.2 Indirect Loss

There is not considered to be any indirect loss or impact to SRF from the proposed action. All 2,653 SRF individuals are to be retained as part of the proposed action, and no other individuals were observed during the targeted survey. The existing population will be retained as shown within the EMP (Appendix 2), and as such, there are no indirect losses to SRF associated with the proposed action.

4.3.1.3 Unknown, unpredictable or irreversible impacts

It is considered that impacts are unlikely to be unknown, unpredictable or irreversible.

4.3.2 Local, Regional and National Scale Analysis of Impacts

Populations of SRF were recorded in two separate parcels located within the study area. Given that SRF is typically found in small populations (<500 individuals) (DSE 2006), the size of the population is considered to be large, and of national significance.

However, as all specimens are proposed to be retained in accordance with the EMP, there are not considered to be any impacts at a local, regional or national scale.

5 PROPOSED AVOIDANCE AND MITIGATION MEASURES

Where appropriate, a range if mitigation measures will be implemented to manage offsite impacts to matters of NES where impacts cannot be avoided. These mitigation measures include those identified by Ecology and Heritage Partners in the Biodiversity Assessment report (Ecology and Heritage Partners 2018b).

Additional mitigation measures, prepared to ensure the confirmed presence of, or potential habitat for relevant matters of NES that are located outside of the impact area will be appropriately managed and protected before and during the development phase of the action commences are detailed in the EMP (Ecology and Heritage Partners 2025a), included in Appendix 2.

BMD will have ultimate responsibility for meeting performance criteria in accordance with the environmental objectives and mitigation measures, including satisfying requirements for monitoring, reporting and should any incidents occur, ensuring they are addressed, and appropriate corrective actions are undertaken in a timely manner.

5.1 Natural Temperate Grassland of the Victorian Volcanic Plain

5.1.1 Avoidance

A total of 17.665 hectares of NTGVVP was identified within the study area, of which 1.783 hectares of low quality NTGVVP will be impacted by the proposed action and will result in the loss of all habitat values within this area. Impacts to this community within the impact area cannot be avoided.

5.1.2 Mitigation Measures

A total of 15.885 hectares of NTGVVP will be retained within the study area.

The presence of a buffer between retained areas of NTGVVP and the proposed development footprint will reduce the potential for edge effects, and there is not considered to be any indirect impacts to retained NTGVVP.

Mitigation measures to ensure NTGVVP located outside of the on-site development footprint is retained and protected during construction activities are detailed in the EMP and OMP prepared for the project (Ecology and Heritage Partners 2025a; 2025b) (Appendix 2; Appendix 3).

5.2 Golden Sun Moth

5.2.1 Avoidance

A total of 58.407 hectares of GSM habitat was identified within the study area, of which 22.657 hectares will be impacted by the proposed action and will result in the direct loss of GSM habitat within this area. Impacts to this habitat within the impact area cannot be avoided.

5.2.2 Mitigation Measures

Of the 58.407 hectares of GSM habitat present, a total of 35.750 hectares of high quality GSM habitat will be retained within the study area.

The presence of a buffer between retained areas of GSM habitat and the proposed development footprint will reduce the likelihood of potential edge effects, and there is not considered to be any indirect impacts to GSM habitat.

Mitigation measures to ensure this habitat located outside of the on-site development footprint is retained and protected during construction activities are detailed in the EMP and OMP prepared for the project (Ecology and Heritage Partners 2025a; 2025b) (Appendix 2; Appendix 3).

5.3 Spiny Rice-flower

5.3.1 Avoidance

Impacts to all individuals recorded during the targeted surveys will be avoided with all SRF recorded during the targeted survey to be retained. These individuals were found only within Property 11 and Property 16. No other individuals or suitable habitat for SRF were observed within the study area. As such, all impacts to SRF will be avoided.

5.3.2 Mitigation Measures

A total of 2,653 SRF individuals will be retained as part of the proposed action. Measures to ensure the existing SRF population is retained and protected during construction are detailed in the EMP (Appendix 2).

The land surrounding the parcels that support the two populations are currently degraded due to historical agricultural purposes. Future residential development of the surrounding lands is not anticipated to result in any additional indirect impacts (i.e. edge effects, fragmentation), as the land is already disturbed through agricultural uses.

The majority of SRF are located in Property 16, which is ultimately proposed to be managed for conservation purposes. This will ultimately increase the quality of habitat, and result in the long-term persistence of the retained population.

6 RESIDUAL IMPACTS AND PROPOSED OFFSETS

The residual impacts associated with matter of NES within the study area are detailed in Section 4 and Section 5.

This section of the Preliminary Documentation summarises the offset strategy developed by Ecology and Heritage Partners to meet the obligations for offsets required by Commonwealth legislation.

As there are considered to be no direct or indirect impacts to SRF, no offsets are proposed for this species. The offset strategies for the NTGVVP community and GSM habitat are provided below in Section 6.1 and Section 6.2 respectively. The full OMP (Ecology and Heritage Partners 2025b; 2025c) for these matters is provided in Appendix 3 (onsite offset) and Appendix 4 (offsite offset).

6.1 Natural Temperate Grassland of the Victorian Volcanic Plain

Offsets for the NTGVVP community will be provided in a manner consistent with the requirements of the EPBC Act Environmental Offsets Policy (DSEWPaC 2012a). Further details of the offset proposal are provided in the OMP prepared by Ecology and Heritage Partners (Ecology and Heritage Partners 2025b) included in Appendix 3 of this document.

6.1.1 The Offset Site

The offset site is located within Property 16 (289 Bences Road, Merrimu) (Appendix 3). Property 16 is a large parcel of approximately 44 hectares that is ultimately proposed to be managed in its entirety for offset and conservation purposes. The offset site supports a range of ecological values, including the NTGVVP ecological community, and confirmed habitat for GSM and SRF.

The offset site has been proposed as it provides a remnant of high quality NTGVVP community that has a start quality score of 5/10 in accordance with the EPBC Offset Assessment Guide (DSEWPaC 2012b) and provides a clear conservation benefit and increase in conservation values when compared to the condition and extent of the community at the proposed clearing site.

Within Property 16 (Bences Road), the proposed offset will comprise 4.3 hectares of NTGVVP, which is part of a larger area of approximately 14.46 hectares of the community. Based on the EPBC offset calculator, the retention and management of 4.3 hectares of NTGVVP within the proposed offset site as an offset mitigates 101.75% of the impact of the removal of 1.783 hectares of the community (Table 15). This exceeds the minimum 90% direct offset requirement and is considered to be in accordance with the Commonwealth environmental offset policy.

The Bences Road offset site has been assessed several times by Ecology and Heritage Partners between 15 August and 3 July 2018 (Ecology and Heritage Partners 2018a), with more recent visits undertaken in September 2019, January 2020, December 2021 and February 2022 to confirm the quality and extent of the ecological values present. A habitat hectare assessment of the condition of the NTGVVP is provided in Table 12. The location of the 4.3 hectare-extent of the NTGVVP community to be protected and managed is within the 6.4-hectare Bences Road Offset Site in Figure 3. The quality and assessment of the NTGVVP community is

described in the Ecological Assessment report (Ecology and Heritage Partners 2018a). Recent visits undertaken in December 2021 and February 2022 confirmed the quality and extent of the ecological values present are consistent with the 2018 assessment.

6.1.1.1 Tenure Arrangements

The proposed offset property is privately owned by BMD and will be secured via a Section 69 (s69) agreement under the *Conservation, Forests and Land Act 1987* (CFL Act).

6.1.2 Ecological Values within the offset site

6.1.2.1 Site Assessment

The offset site has been assessed several times by Ecology and Heritage Partners between 15 August 2017 and 3 July 2018 (Ecology and Heritage Partners 2018a), with more recent visits undertaken in September 2019, January 2020, December 2021 and February 2022 to confirm the quality and extent of the ecological values present. The inspections sought primarily to identify the presence and extent of the NTGVVP ecological community listed under the EPBC Act.

The offset site is located on lowland plains, with poorly draining clays. The offset site support grassland species typical of the Plains Grassland EVC (EVC 132), which is also representative of the NTGVVP ecological community. NTGVVP within the offset site is considered to be a high-quality remnant of Plains Grassland EVC and the NTGVVP community. The community contained a diversity of native species, including the grasses Spurred Spear-grass, Rough Spear-grass, Common Wallaby-grass, Bristly Wallaby-grass and Kneed Wallaby-grass. Herb cover and diversity was very high, with Lemon Beauty-heads, Fuzzy New Holland Daisy and Golden Billy-buttons being particularly prevalent. Also present were Sheep's Burr, Native Flax, Common Everlasting *Chrysocephalum appiculatum*, Slender Bindweed *Convolvulus angustissimus* subsp. *omnigracilis*, Bronze Bluebell *Wahlenbergia luteola* and Cottony Fireweed *Senecio quadridentalis*

A low to moderate cover of weeds were present, predominantly comprising species such as Quaking grass *Briza spp.*, Ox-tongue *Helminthotheca echioides*, Galenia, Squirrel-tail Fescue *Vulpia myuros*, Ribwort and Cat's Ear *Hypochoeris radicata*.

Overall rock cover throughout the offset site is at approximately 20%, and cracking soils were also observed.

A habitat quality score of 7/10 has been applied to the offset site (Section 6.1.5). This rating has been determined in accordance with the Departments preference to use the habitat hectare assessment method (dividing the total by 10) when calculating habitat quality for NTGVVP.

The conservation value of this remnant of NTGVVP within the offset site is further enhanced as in accordance with the Commonwealth Listing Advice for the community (TSSC 2008), it contains:

- presence of natural exposed rock platforms and outcrops;
- presence of mosses, lichens or a soil crust on the soil surface;
- presence of threatened plant and/or animal species (SRF and GSM);
- a high native plant species richness; and,
- large patch size.

6.1.3 Method for calculating NTGVVP habitat quality

The habitat quality of the NTGVVP ecological community at the impacts and offset sites were assessed using the results of the habitat hectare assessment undertaken in accordance with the Victorian Quality Assessment (VQA) methodology (DSE 2004) within the study area, with the most recent assessment undertaken in October 2023 (Table 9).

Table 12. Habitat hectare assessment for NTGVVP (DSE 2004).

Vegetation Zone (Property/Patch #)		9 / PG4	11 / PG4	16 / PG8	16 / PG9
Bioregion		VVP	VVP	VVP	VVP
EVC		PG	PG	PG	PG
EVC #		132	132	132	132
EVC Conservation Status		En	En	En	En
Patch Condition	Large Old Trees /10	0	0	0	0
	Canopy Cover /5	0	0	0	0
	Under storey /25	5	10	15	10
	Lack of Weeds /15	4	6	6	6
	Recruitment /10	3	3	6	6
	Organic Matter /5	3	3	3	3
	Logs /5	0	0	0	0
	Treeless EVC Multiplier	1.36	1.36	1.36	1.36
	Subtotal =	**0.2040**	**0.2992**	**0.4080**	**0.3400**
Landscape Value /25		4	4	13	13
Habitat Points /100		24	34	54	47
Habitat Hectare Score		**0.24**	**0.34**	**0.54**	**0.47**

Note: PG = Plains Grassland; VVP = Victorian Volcanic Plain; En = Endangered.

The results of the October 2023 VQA assessment shows that the condition of the native vegetation within the site has declined in quality since 2017 and 2021 from 0.69 to 0.54 (22%) with no change in land management practices during this period, with the decline occurring under 'business-as-usual' practices.

6.1.4 NTGVVP Impacted Habitat Quality Calculations

The habitat quality score for the area of NTGVVP proposed to be impacted in Property 9 is provided below (Table 13). This was calculated based on the recommended method provided by the Commonwealth, which was to use the habitat hectare points (i.e. score out of 100 in Table 12), divide the total by 10 and round to the closest integer.

Table 13. Habitat Quality Calculations for Impacted NTGVVP.

Property# / patch	Area (ha)	Habitat Hectare Points (out of 100)	Habitat Quality Score*
9 / PG4	1.783	24	2

Note: # Property numbers as per Figure 2. ***** This score was calculated by dividing the habitat hectare points in column 3 of this table by 10 and rounding to the nearest integer.

6.1.5 NTGVVP Offset Habitat Quality Calculations

The method for calculating GSM habitat quality is detailed in Section 6.1.3. The habitat quality score for the NTGVVP located within the Bences Road on-site offset site is provided below (Table 14). This was calculated based on the recommended method provided by the Commonwealth, which was to use the habitat hectare points (i.e. score out of 100 in Table 12), divide the total by 10 and round to the closest integer.

Table 14. Habitat Quality Calculations for NTGVVP within the Bences Road offset site

Property / patch	Area (ha)	Habitat Hectare Points (out of 100)	Habitat Quality Score*
16 / PG8	4.3 #	54	5

Note: # This is part of a larger remnant of NTGVVP of over 14 hectares. * This score was calculated by dividing the habitat hectare points in column 3 of this table by 10 and rounding to the nearest integer.

6.1.6 Compliance with Offset Principles

The '*Environmental Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy' (DSEWPaC 2012a) outlines a set of principles that a proposed offset must meet in order to be assessed under the referral process. These principles are detail below, along with how the proposed offset meets these requirements.

1. **Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter.**

The proposed action will result in the loss of 1.783 hectares of the NTGVVP community. The proposed offset site will protect 4.3 hectares of NTGVVP of higher quality than the area being removed and supports enhanced conservation values (TSSC 2008). This offset is a part of a larger 14-hectare remnant of the community that will ultimately be protected and managed in perpetuity within a larger (future) 44 hectare offset site.

2. **Suitable offsets must be built around direct offsets but may include other compensatory measures.**

Offsets for the NTGVVP community will be wholly achieved through direct offsets. Based on the EPBC offset calculator, the retention and management of 4.3 hectares of NTGVVP within the proposed offset site as an offset mitigates 101.75% of the impact of the removal of 1.783 hectares of the community. This exceeds the minimum 90% direct offset requirement and is considered to be in accordance with the Commonwealth environmental offset policy (DSEWPaC 2012a).

The offset site will be protected via a s69 agreement under the CFL Act. Management of the ecological values present will consider key points for the protection and management of the offset site within the listing advice (TSSC 2008) and conservation advice (DEWHA 2008) for the NTGVVP community.

3. **Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.**

The loss of the NTGVVP community has been processed through the Offset Assessment Guide offset calculator (DSEWPaC 2012b). The proposed offsets are in proportion to the level of statutory protection that applies to

the community (Critically Endangered). The protection of 4.3 hectares of the NTGVVP ecological community at the offset site will exceed the offset requirement (101.75%) for a direct offset (Appendix 3).

4. **Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.**

The loss of 1.783 hectares of the NTGVVP community has been processed through the Offset Assessment Guide offset calculator (DSEWPaC 2012b). Based on the inputs (as detailed in Section 6.1.7) to the Offset Assessment Guide offset calculator (DSEWPaC 2012b), an offset of 4.3 hectares is of a size and scale that is proportionate to the residual impacts to the community.

5. **Suitable offsets must effectively account for and manage the risks of the offset not succeeding.**

The use of a direct offset presents a lower risk that other compensatory measures as ongoing management and monitoring is more likely to result in a conservation gain for the NTGVVP community. An on-title security agreement will be prepared for the 4.3-hectare offset. Additional offset sites will ultimately also be located within the broader 44-hectare property, demonstrating the landowner's willingness to actively manage land for conservation purposes. The existing quality of the proposed offset site greatly reduces the risk of the offset not succeeding. The offset site contains a high-quality grassland remnant that that will be actively managed to promote and enhance the existing values of the NTGVVP community.

The OMP (Appendix 3) outlines management and monitoring actions that must be implemented in order to maintain and improve the offset. Adaptive management under each element will identify the procedures to be followed if the objectives have not been met. The land manger will report against any specific monitoring and auditing obligations established under the EPBC Act approval conditions.

6. **Offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under schemes or programs.**

The offset site is privately owned land zoned Rural Conservation Zone (RCZ). While the eastern half of the broader offset site is affected by an Environmental Significance Overlay – Schedule 3 (ESO3), the NTGVVP community is not affected by any overlays.

The local planning regulations that apply to the offset site do not require any offsets to be established under any existing schemes or programs. The landowner is not in receipt of any stewardship funding from any conservation programs or schemes.

No land within the proposed 44-hectare offset site is already in use as an offset site for any other parties, nor has it already been set aside for any other conservation program. As such, the proposed offset is additional to what is required under the planning regulations or determined by law.

The study area has never been cultivated or subject to pasture improvement or intensive fertiliser application. However, at present pasture improvement activities and fertiliser application remain existing rights for this land.

The proposed offset is proposed to meet offset obligations under both Commonwealth and State policy.

7. **Offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable.**

Direct protection and management of 4.3 hectares of the NTGVVP ecological community is the most effective and efficient means of achieving offsets. Revegetation or the creation of habitat has not been proposed, as there is insufficient evidence that this would achieve a successful outcome.

For the current project, offsets are to be secured and implemented as soon as approval for the action is granted. The OMP utilises known management practices to protect and manage high-quality remnant vegetation present within the Victorian Volcanic Plains bioregion to the west of Melbourne (refer Appendix 3 for further detail).

8. **Suitable offsets must have transparent governance arrangements, including being able to be readily measured, monitored, audited and enforced.**

The OMP sets out clear objectives, measurable performance indicators, monitoring and reporting requirements. In addition, the Land Manager will report against any specific monitoring and auditing obligations established under the EPBC Act approval conditions.

In accordance with the Landowner Agreement required under s69 of the CFL Act, annual monitoring reports are required to be submitted to DEECA every year for at least 10 years. Any breach of management and/or reporting requirements will trigger enforcement proceedings as applicable under the EPBC Act and/or the Landowner Agreement.

6.1.7 Offset Management Plan

An OMP has been developed which outlines the ongoing management arrangements, including management actions and the roles and responsibilities of the various parties in establishing and managing the offset site (Appendix 3 – Ecology and Heritage Partners 2025b). For the purpose of this OMP, the Landowner shall also be the Land Manager.

6.1.8 Completed Offset Assessment Guide calculator

The EPBC Act offsets policy (DSEWPaC 2012a) provides the details of the offsetting approach for matters of NES; this includes an Offset Assessment Guide and offset calculator.

The Offset Assessment Guide offset calculator has been completed to determine the area of offset required to adequately compensate for the removal of the NTGVVP ecological community within the development area. The Offset Assessment Guide offset calculator is provided as supporting documentation within the OMP (Appendix 3), with a justification for the scores given provided below.

6.1.9 Offset Calculator Justification

Based on the EPBC Act offset calculator (DSEWPaC 2012b), the retention and management of 4.3 hectares of NTGVVP within the proposed offset site as an offset mitigates 101.75% of the impact of the removal of 1.783 hectares of the community (Table 15). This exceeds the minimum 90% direct offset requirement and is considered to be in accordance with the Commonwealth environmental offset policy (DSEWPaC 2012a).

Table 15. EPBC Act Offset Calculator (NTGVVP).

Offset Criteria	Response
Impact Site	
Impact Location	332 Bences Road, Merrimu
Habitat to be removed	1.783 hectares of NTGVVP
Habitat quality	2/10. The NTGVVP within the impact site is of low quality, is species poor, and has been subjected to high levels of disturbance in the form of historical grazing and soil disturbance. Although the NTGVVP comprises approximately 50% native perennial grasses, the remainder of the patch consists of perennial exotic flora, including the WoNS Serrated Tussock.
Offset Site	
Offset location	289 Bences Road, Merrimu, Victoria
Risk-related time horizon	20 years. The land will be managed in perpetuity for conservation purposes for NTGVVP.
Time until ecological benefit	10 years. The existing native vegetation condition is expected to be maintained over the 10-year active management schedule detailed in the OMP.
Start area and quality of offset site	4.3 hectares; 5/10. The offset site supports a high quality example of NTGVVP, with the habitat hectare assessment of the site assessing the overall habitat score at 54 (out of 100) (Table 12). Given the high diversity of flora recorded during the 2017 and 2018 assessments, as well as observed in 2021 and 2022, broader extent of contiguous remnant vegetation adjacent to the offset site, and the presence of enhanced conservation values as detailed in the Commonwealth Listing Advice (TSSC 2008), start quality has been assessed as 5/10 (See Section 6.1.3).
Risk of loss without offset	3.29%. There are currently no formal protection mechanisms that protect the ecological values present within the offset site. Without protection and ongoing management as an offset site, there is uncertainty regarding the future condition of the land. The 3.29% value is derived from Table 3, Figure 4 (Pathway C) and Appendix 2 of the *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act*, which provides a background rate of loss for Moorabool of 3.29% (The University of Queensland 2017). There are currently no restrictions to agricultural practices within RCZ associated with the application of high stocking rates or changing the type of animal traditionally raised within a property (i.e. changing from sheep to cattle or horses). All such practices are considered as of right uses associated with land within RCZ whether or not such areas support native vegetation. This has the potential to result in a decline in the condition and extent of NTGVVP within the offset site and surrounding areas due to an increase in the abundance and cover of non-native species such as Serrated Tussock, Wild Oat and Cocksfoot *Dactylis glomerata*. Further, this is likely to result in a decrease in biomass and species diversity resulting in a decrease in the overall quality of the NTGVVP community. Of greater risk is the ongoing encroachment into the site by the native Sifton Bush *Cassinia sifton* which is currently invading the site, and will establish within the site, reduce inter-tussock space, outcompete native grasses and herbs, and turn the grassland habitat into a scrubland habitat if not managed appropriately. Ultimately, if Sifton Bush is allowed to persist in the site, it will result in the vegetation no longer meeting the condition thresholds that define the NTGVVP ecological community. Based on the current absence of a formal protection mechanism on the site, there is a risk that the absence of active management will result in weed invasion and pest animal

Offset Criteria	Response
	disturbance that will contribute to the degradation of the offset site without management actions enacted. A protective covenant provides legal protection, which would prevent any further development, thereby averting this risk of losing the NTGVVP community (and other matters of NES) within the site. Within a 10-year period, it is considered to be a 3.29% chance of that the condition of the community within the offset site will be subject to a reduction in quality due to the continued degradation as a result of weed and Sifton Bush invasion and increased biomass as a result of unmanaged natural influences.
Future quality without offset	4/10. As detailed above, there are currently no restrictions to agricultural practices within the RCZ associated with the application of high stocking rates or changing the type of animal traditionally raised within a property (i.e. changing from sheep to cattle or horses). This has the potential to result in a decline in the condition and extent of NTGVVP within the offset site and surrounding areas. Without strategically designed grazing strategies, stock can overgraze/undergraze the community, leading to a shift in introduced species dominance and/or increased biomass resulting in a reduction in species diversity. The ongoing encroachment into the site by Sifton Bush will result in a reduction in site condition, and if left unchecked, has the potential to result in the site no longer meeting the condition thresholds that define the NTGVVP ecological community. Rabbits were recorded within and nearby the offset site. Without increased management, rabbits are likely to cause ongoing soil disturbance, which in turn, will increase opportunities for weed invasion by opportunistic species, leading to a decline in the condition and extent of the NTGVVP community. The results of the most recent VQA assessment shows that the condition of the native vegetation within the proposed offset site has declined in quality since 2017 and 2019 from 0.69 to 0.54 (22%) with no change in land management practices during this period, with the decline occurring under 'business-as-usual' practices. Without the establishment of an offset site, a decline in condition from a score of 5/10 to 4/10 is considered conservative for a 10-year period.
Risk of loss with offset	0%. When a site is secured and managed for offset purposes, the risk of loss is considered to decline significantly. This value is as per the guidance deriving 'Risk of Loss' estimates when evaluating biodiversity offsets proposals under the EPBC Act document (The University of Queensland 2017).
Future quality with offset	6/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a management plan incorporating weed control, biomass control and regular monitoring, aiming to maintain the existing condition of NTGVVP. The quality of NTGVVP will be maintained by actions outlined in the OMP (Appendix 3), and include: • Managing all high threat weeds and pest animals, reducing competition for native grasses and herbs; • Reducing rabbit populations, and thereby reducing the threat posed to on-going survival and establishment of native flora by overgrazing from exotic herbivores; and, • Ensuring that grazing regimes by stock is undertaken in a manner sensitive to the biomass requires for high quality NTGVVP.

Offset Criteria	Response
	An elevated level of weed control and permanent application of targeted management to maintain and improve the condition of NTGVVP is anticipated to by elevate the site condition score from 5 to 6 through increasing species diversity, and reducing weed cover, whilst maintaining suitable habitat structure for GSM and SRF. Proposed management actions are above and beyond both current and past management of the site. While the site is currently grazed, and has been historically grazed, the grazing periods are not managed in consideration of biodiversity values and the structure of the NTGVVP community. Further, while some weed and rabbit control has occurred on the property, the level of control committed under this management plan is well beyond current management. Based on the increased management of the site, as outlined within the OMP, which as outlined above are beyond past and current management, the habitat quality of the offset site will be maintained beyond what the site would be without implementation of the offset.
Confidence in result	80%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing condition and the commitment of the landowner to engage contractors with a demonstrated capability to manage threats through recent conservation works. The site will be protected through entering into a s69 agreement with DEECA under the CFL Act. DEECA undertakes a rigorous quality assurance process for all offset sites to ensure the landowner agreements address the management commitments in the plan. 80%. Confidence in the result associated to averted loss is relatively high due to the likely effectiveness of the management and monitoring measures proposed to achieve the designated outcomes. The management measures proposed have been successfully utilised in several other NTGVVP offset sites. Further, the landowner has committed to engage contractors with a demonstrated capability to manage and monitor threats through recent conservation works to ensure the objectives are achieved.
% of impact offset	101.75%

6.1.10 Details of Offset Site Security

The 4.3 hectares of NTGVVP, plus some additional areas of the broader site will be protected through a s69 Agreement under the CFL Act. The OMP will be attached to the on-title agreement and require the landowner to manage the offset site in accordance with the requirements detailed herein.

The s69 agreement will secure the offset site in perpetuity.

6.1.11 Estimated Cost of Offset

The overall cost of the offset proposal will be dependent on the costs associated with undertaking the management and monitoring activities detailed in the OMP. The final cost will ultimately be dependent on quotations received from relevant contractors.

6.2 Golden Sun Moth

Offsets for GSM habitat will be provided in a manner consistent with the requirements of the EPBC Act Environmental Offsets Policy (DSEWPaC 2012a). Further details of the offset proposal are provided in the OMP prepared by Ecology and Heritage Partners (2023b; 2023c), included in Appendix 3 and Appendix 4 of this document.

6.2.1 The Offset Sites

One on-site and one offsite offset site are proposed to be secured to meet the required offset obligations generated by the removal of 22.657 hectares of confirmed GSM habitat:

The proposed onsite offset will comprise 6.4 hectares of confirmed GSM habitat, which is part of a larger area of approximately 14.46 hectares of contiguous habitat in Property 16 (Bences Road) (Appendix 3).

An offsite offset site at Glenhope will comprise 38.6 hectares of habitat that is part of a larger, contiguous area of GSM habitat that exceeds 100 hectares (Appendix 4).

A breakdown of the impacts and proposed offset areas are provided in Table 16.

Table 16. Size and location of the GSM offset sites.

GSM Patch #	Proposed Impact GSM Habitat Quality	Impact Area (ha)	Offset Site	Offset Size (ha)	% of impact offset
1/2	Habitat Quality 3	10.155	Glenhope (offsite) (Habitat Quality 5)	13.3	78.98
3	Habitat Quality 3	10.155	Bences Rd (Property 16) (Habitat Quality 6)	3.8	21.13%
	Total (ha)	**10.155**		**17.1**	**100.11%**
3	Habitat Quality 4	12.502	Bences Rd (Property 16) (Habitat Quality 6)	2.6	8.81%
Offsite	Habitat Quality 4	12.502	Glenhope (offsite) (Habitat Quality 5)	25.3	91.53%
	Total (ha)	**12.502**		**27.9**	**100.34%**
	Overall Total (ha)	**22.657**		**45.00**	

Note: # Patch numbers as per Figure 3.

6.2.1.1 Onsite Offsets

Bences Road

The Bences Road offset site is located within Property 16 (289 Bences Road, Merrimu) (Figure 3). This is a large parcel of approximately 44 hectares that is ultimately proposed to be managed in its entirety for offset and conservation purposes. The offset site supports a range of ecological values, including the NTGVVP ecological community, and confirmed habitat for GSM and SRF.

The offset site has been proposed as it supports a large population of GSM, and has been attributed a start quality score of 6/10 in accordance with the EPBC Offset Assessment Guide (DSEWPaC 2012b) (Table 18) and provides a clear conservation benefit and increase in conservation values when compared to the size and condition of GSM habitat at the proposed clearing site.

The proposed offset will comprise 6.4 hectares of GSM habitat (encompassing a 4.3-hectare remnant of NTGVVP – See Section 6.1), which is part of a larger contiguous area of approximately 30 hectares of habitat.

GSM within the Bences Road site has been confirmed several times by Ecology and Heritage Partners between 2018 (Ecology and Heritage Partners 2018a) and December 2022 as it has been used as a reference site for other surveys conducted within the broader locality.

6.2.1.2 Offsite Offset

The proposed offsite offset site is 38.6 hectares in size and is located at the northern end of parcels 3C~D\PP2675 and 3E~D\PP2675, part of the broader 182-hectare property located at Boyers Road, Glenhope, Victoria (Figure 2 of Appendix 4).

The proposed offset site is in central Victoria near the locality of Glenhope, approximately 87 kilometres north-west of the Melbourne central business district. The property is within the Goldfields bioregion (DEECA 2025b). It is dominated by undulating hills with a sedimentary geology. However, outliers of quaternary basalt geology occur within and surrounding the broader property, consistent with that of the impact site and other areas throughout the Victorian Volcanic Plain bioregion (DJPR 2025).

The offset site has been proposed as it supports a large population of GSM, and has been attributed a start quality score of 5/10 in accordance with the EPBC Offset Assessment Guide (DSEWPaC 2012b) (Table 18 and provides a clear conservation benefit and increase in conservation values when compared to the size and condition of GSM habitat at the proposed clearing site.

The proposed offset will comprise 38.6 hectares of GSM habitat, which is part of a larger contiguous area of approximately 182 hectares of habitat.

A broad assessment of the proposed offset property was undertaken by Shannon LeBel (Associate Ecologist) on 1 December 2020 to determine the quality and general extent of GSM habitat. Targeted surveys for GSM within the offset site were undertaken in 2020 by Hamilton Environmental Services (2021) which confirmed the presence of a large population of GSM utilising the property. It is understood that incidental observations of GSM have been confirmed at the site several times since in 2021, 2022 and 2023.

6.2.1.3 Tenure Arrangements

The proposed onsite offset properties are privately owned by BMD and will be secured via a s69 agreement under the CFL Act.

The offsite offset is privately owned by Implexa Property Pty Ltd and will be secured via a Trust for Nature (TfN) covenant under Section 3A of the *Victorian Conservation Trust Act 1972* (VCT Act).

These security mechanisms meet the requirements under the Commonwealth offset policy (DSEWPaC 2012a).

6.2.2 Ecological Values within the Offset Sites

6.2.2.1 Onsite Offset

The offset site have been assessed several times by Ecology and Heritage Partners between 15 August 2017 and 3 July 2018 (Ecology and Heritage Partners 2018a). Targeted surveys for GSM within the offset sites were undertaken in 2017 by Ecology and Heritage Partners (2018b) which confirmed the presence of a population of GSM utilising habitat. Additional informal sightings of GSM within the Bences Road property were made by Shannon LeBel (Associate Ecologist) during December 2021 and 2022.

The offset sites support grassland species typical of the Plains Grassland EVC (EVC 132). The proposed onsite offset sites support a ground layer comprising a moderate to high cover of Wallaby-grass including Common Wallaby-grass, Bristly Wallaby-grass, and Kneed Wallaby-grass. Other native ground layer species present included Spurred Spear-grass, Rough Spear-grass and Kangaroo Grass.

Exotic flora was present throughout most areas within and adjacent to GSM habitat. The most commonly observed weeds were the declared noxious weeds (as per the Victorian CaLP Act) African Box-thorn , Artichoke Thistle, Horehound, Chilean Needle-grass and Serrated Tussock.

Overall, the onsite offset sites supports an open, grassland habitat consistent with the GSM Significant Impact Guidelines (DEWHA 2009a) and Conservation Advice (DAWE 2021), with the proposed offset sites consisting of grassland comprising bare or sparsely covered ground between grass tussocks (inter-tussock space).

A habitat quality score of 6/10 has been applied to the Bences Road offset site (Table 18). This rating has been determined in line with the key considerations outlined within the Offset Assessment Guide and Offset Policy (DSEWPaC 2012a; 2012b), including an assessment of site condition and site context within the broader property/landscape.

6.2.2.2 Offsite Offset

A broad assessment of the proposed offset property was undertaken by Shannon LeBel (Associate Ecologist) on 1 December 2020 to determine the quality and general extent of GSM habitat.

GSM baseline targeted surveys for GSM within the offset site were undertaken in 2020 by Hamilton Environmental Services (2021) as per the recommended survey guidelines for the species (DEWHA 2009a). This survey observed a total of 785 male GSM across five surveys, recording 41, 121, 166, 185 and 272 individuals respectively (Appendix 4). This equates to a total of 4.3 GSM per hectare across the broader 182-hectare site at Glenhope Road.

The proposed offset site supports a ground layer comprising a moderate cover of Wallaby-grass including Slender Wallaby-grass *Rytidosperma racemosum* var. *racemosum* and Common Wallaby-grass. Other native ground layer species present included Common Wheat-grass *Anthosachne scabra*, Wattle Mat-rush *Lomandra filiformis* and Kangaroo Grass.

Non-native grasses were also common throughout the offset site and included Wild Oat, Sweet Vernal-grass *Anthoxanthum oderatum*, Fescue *Vulpia* spp., Soft Brome *Bromus hordeaceus*, Great Brome *Bromus diandrus* and Quaking grass. In low lying areas off the drier, rockier ridges, Cocksfoot, Toowoomba Canary-grass *Phalaris aquatica* and Yorkshire Fog were also present.

Overall, the offsite offset site supports an open, grassland habitat consistent with that described in the Golden Sun Moth Significant Impact Guidelines (DEWHA 2009a) and Conservation Advice (DAWE 2021), with the proposed offset sites consisting of grassland comprising bare or sparsely covered ground between grass tussocks (inter-tussock space).

6.2.3 Method for calculating GSM habitat quality

The habitat quality of the impacts and offset site was assessed using the EPBC Act Offsets Assessments Guide to ensure it meets the requirements of the Department's EPBC Act Environmental Offsets Policy (October 2012). Assessments of species habitat quality are based on separate assessments of three parameters: site

context, site condition and species stocking rate in line with the key considerations outlined within the Offset Assessment Guide and Offset Policy (DSEWPaC 2012a; 2012b), including an assessment of site condition and site context within the broader property/landscape, and determined as follows:

- **Site context** – assessed as a score out of three where the habitat patch[1] is:
    - 0/3 = < 0.25 hectares;
    - 1/3 = > 0.25 hectares < 10 hectares;
    - 2/3 = > 10 hectares, shaped to reduce edge effects (i.e. not narrow and/or linear);
    - 3/3 = > 10 hectares, shaped to reduce edge effects, and connects previously unconnected suitable/known habitat.
- **Site condition** – assessed as a score out of three as follows:
    - 0/3 = dominated by non-native vegetation that isn't a preferred food source for GSM;
    - 1/3 = comprised of a cover of at least 20% of a known food source;
    - 2/3 = comprised of a cover of 20% - 40% of a known food source of which is predominantly native; OR, up to 40% cover of a known food source, which is predominantly non-native (i.e. Chilean Needle-grass). Limited inter-tussock space (i.e. below 10%);
    - 3/3 = comprised of a cover of at least 40% of a known food source which is predominantly native. Suitable biomass levels (defined as at least 60% and not greater than 90% and minimum of 5 centimetres high) and inter-tussock space (defined as 10-40%) present.
- **Species stocking rate** - assessed out of four as follows:
    - 0/4 = species not confirmed to be present;
    - 1/4 = species modelled to occur, or confirmed at 0-5 moths per hectare[2];
    - 2/4 = > 5-20 moths per hectare;
    - 3/4 = > 20–50 moths per hectare;
    - 4/4 = > 50 moths per hectare.

6.2.4 GSM Impacted Habitat Quality Calculations

The habitat quality score for each of the areas of GSM habitat proposed to be impacted are provided below (Table 17).

[1] A habitat patch is defined as an area of suitable habitat separated by other areas of suitable habitat by at least 200 metres of unsuitable habitat, or barrier to dispersal.
[2] Stocking rate calculated as the average # of moths per hectare across the patch as determined by the results of the targeted surveys.

Table 17. Habitat Quality Calculations for Impacted GSM habitat.

GSM Patch #	Area (ha)	Site Context	Site Condition	Species Stocking Rate	Habitat Quality Score	# GSM^	Stocking Rate ^
6	2.472	2	1	1	4	4	1.62
7	2.625	2	1	1	4	4	1.52
8	5.558	1	1	1	3	1	0.18
9	3.858	1	1	1	3	2	0.52
10	1.645	1	1	1	3	7	4.26
11	6.394	2	1	1	4	23	3.60
Total	**22.657**						

Note: # Patch numbers as per Figure 3; ^ as per targeted survey results in Ecology and Heritage Partners (2018a).

Patches 8, 9 and 10 of impacted GSM habitat exhibit similar attributes for site context, species stocking rate and site condition. These impacted areas of GSM habitat have been assessed as having a habitat quality score of 3/10. This rating has been determined based on the presence of a relatively smaller, isolated and discrete areas of low-quality GSM habitat that supports a small population of the species. Scores against the habitat quality criteria detailed in Section 6.2.3 for these patches are as follows:

- Site context score: 1/3. Sites of habitat patches are less than 10 hectares in size;
- Site condition: 1/3. Sites supports a cover of approximately 20% cover of Wallaby-grass, but otherwise dominated by non-native, non-preferred food sources;
- Species stocking rate: 1/4 (density of less than 5 moths per hectare).

Patches 6, 7 and 11 of impacted GSM habitat have been assessed as having a habitat quality score of 4/10. Scores against the habitat quality criteria detailed in Section 6.2.3 for these patches are as follows:

- Site context score: 2/3. Site of habitat patches are less than 200 metres away from other, larger patches of GSM habitat equating to greater than 10 hectares in size. Does not connect areas of previously unconnected habitat.
- Site condition: 1/3. Sites supports a cover of approximately 20% cover of Wallaby-grass, but otherwise dominated by non-native, non-preferred food sources;
- Species stocking rate: 1/4 (density of less than 5 moths per hectare).

Overall, there is a proposed impact to:

- 10.155 hectares of GSM habitat with a habitat quality score of 3; and,
- 12.502 hectares of GSM habitat with a habitat quality score of 4.

6.2.5 GSM Offset Habitat Quality Calculations

The method for calculating GSM habitat quality is detailed in Section 6.2.3.

6.2.5.1 On-site Offset Sites

The habitat quality score for Bences Road on-site offset site is provided below (Table 18).

Table 18. Habitat Quality Calculations the on-site offset sites.

GSM Patch #	Property	Area (ha)	Site Context	Site Condition	Species Stocking Rate	Habitat Quality Score	# GSM^	Stocking Rate ^
3	**16a (Bences Rd)**	6.4 **	2	2	2	6	225	14.05 *
	Total	**6.4**					**225**	

Note: # Patch numbers as per Figure 3; ^ as per targeted survey results in Ecology and Heritage Partners (2018a); *Stocking rate for entire parcel; ** Part of a larger area of approximately 47 hectares, or which approximately 30 hectares is GSM habitat.

Bences Road

A habitat quality score of 6/10 has been applied to the Bences Road offset site. This rating has been determined based on the presence of a high-quality GSM habitat that supports a large known population of the species. Scores against the offset site suitability criteria are as follows (Table 18):

- Site context score: 2/3. Site is larger than 10 hectares and connected to adjacent areas of GSM habitat and native vegetation. Buffered by edge effects due to shape of site, and presence of retained vegetation to north and south and east. Does not connect areas of previously unconnected habitat.
- Site condition: 2/3. Site supports approximately 20-40% cover of predominantly native food source (i.e. Wallaby-grass);
- Species stocking rate: 2/4 (density of 14.05 moths per hectare).

6.2.5.2 Offsite (Glenhope) Offset Site

The habitat quality score for the Glenhope offset site is provided below (Table 19).

Table 19. Habitat Quality Calculations at the Glenhope offsite offset site.

Property/Patch	Area (ha)	Site Context	Site Condition	Species Stocking Rate	Habitat Quality Score	# GSM^	Stocking Rate ^
Glenhope	38.6 *	2	2	1	5	785	4.3

Note: ^ as per targeted survey results in Hamilton Environmental Services (2021); * Part of a larger 182 hectares of confirmed GSM habitat.

A habitat quality score of 5/10 has been applied to the offsite offset site. This rating has been determined based on the presence of a relatively large extent of moderate to high quality GSM habitat that supports a known population of the species. Scores against the offset site suitability criteria are as follows:

- Site context score: 2/3. Site is larger than 10 hectares, but does not connect previously unconnected suitable/known habitat;

- Site condition: 2/3. Site supports approximately 20-30% cover of Wallaby-grass, but otherwise dominated by non-native, non-preferred food sources;
- Species stocking rate: 1/4 (density of 4.3 moths per hectare). This is based on a total of 785 moths recorded over the broader 182-hectare site supporting contiguous GSM habitat.

6.2.6 Compliance with Offset Principles

The '*Environmental Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy' (DSEWPaC 2012a) outlines a set of principles that a proposed offset must meet in order to be assessed under the referral process. These principles are detail below, along with how the proposed offset meets these requirements.

1. **Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter.**

The proposed action will result in the loss of 22.657 hectares of GSM habitat. The combined area proposed to be protected and managed across the offset sites to compensate for the loss of 22.657 hectares is 45 hectares (Table 16). The proposed offset sites are of equal or higher quality than the area being removed with ongoing, proactive management actions to be implemented for a mandatory period of 10 years, after which the offset site will be maintained in its improved state in perpetuity, with the primary management objectives consistent with the Golden Sun Moth Significant Impact Guidelines (DEWHA 2009a) and GSM conservation advice (DAWE 2021), to ensure actions that may lead to the loss, degradation or fragmentation of GSM habitat are appropriately avoided and mitigated at the offset sites.

2. **Suitable offsets must be built around direct offsets but may include other compensatory measures.**

Offsets for the GSM habitat will be wholly achieved through direct offsets. Based on the EPBC offset calculator, the retention and management of 45 hectares of GSM habitat within the proposed offset sites as an offset mitigates over 100% of the impact of the removal of 22.657 hectares of GSM habitat (Tables 13-16). This exceeds the minimum 90% direct offset requirement and is considered to be in accordance with the Commonwealth environmental offset policy (DSEWPaC 2012a).

The onsite offset sites will be protected via a s69 agreement under the CFL Act, and the offsite offset will be protected via a TfN covenant under the VCT Act. Management of the ecological values present will consider key points for the protection and management of the offset site within the significant impact guidelines (DEWHA 2009a) and conservation advice (DAWE 2021) for GSM.

3. **Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.**

The loss of GSM habitat has been processed through the Offset Assessment Guide offset calculator (DSEWPaC 2012b). The proposed offsets are in proportion to the level of statutory protection that applies to the species (Vulnerable). The protection of 45 hectares of GSM habitat at the offset sites will exceed the offset requirement (>100%) for a direct offset for the removal of 22.657 hectares (Appendix 3; Appendix 4).

4. **Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter**

The loss of 22.657 hectares of the confirmed GSM habitat has been processed through the Offset Assessment Guide offset calculator (DSEWPaC 2012b). Based on the inputs (as detailed in Section 6.2.8) to the Offset Assessment Guide offset calculator (DSEWPaC 2012b), an offset of 45 hectares is of a size and scale that is proportionate to the residual impacts to GSM habitat.

5. **Suitable offsets must effectively account for and manage the risks of the offset not succeeding.**

The use of a direct offset presents a lower risk that other compensatory measures as ongoing management and monitoring is more likely to result in a conservation gain for GSM and associated habitat. An on-title security agreement will be prepared for the offset sites ensuring the protection of existing, moderate to high quality habitat. The existing size, quality, and connectedness to areas of adjacent, confirmed GSM habitat at the proposed offset site greatly reduces the risk of the offset not succeeding.

The offset site supports a known population of GSM that will be actively managed to promote and enhance the existing values present. Key threats at the offset sites, such as weed spread, over-grazing and biomass control will be proactively managed by the landowners in accordance with the approved OMP, and the management of these threats will ensure that GSM population and habitats present across the sites are protected and enhanced, thus delivering an improved conservation outcome for the species.

The OMPs (Appendix 3; Appendix 4) outlines management and monitoring actions that must be implemented in order to maintain and improve the offset. Adaptive management under each element will identify the procedures to be followed if the objectives have not been met. The land manger will report against any specific monitoring and auditing obligations established under the EPBC Act approval conditions.

6. **Offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under schemes or programs.**

The Bences Road onsite offset site is privately owned land zoned RCZ, while the Glenhope (offsite) offset is zoned Farming Zone (FZ).

The local planning regulations that apply to the offset site do not require any offsets to be established under any existing schemes or programs. The landowners are not in receipt of any stewardship funding from any conservation programs or schemes.

No land within the proposed offset sites is already in use as an offset site for any other parties, nor has it already been set aside for any other conservation program. As such, the proposed offset is additional to what is required under the planning regulations or determined by law.

The offset sites have never been cultivated or subject to pasture improvement or intensive fertiliser application. However, at present pasture improvement activities and fertiliser application remain existing rights for this land.

7. **Offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable.**

Direct protection and management of 45 hectares of existing GSM habitat is the most effective and efficient means of achieving offsets. Revegetation or the creation of habitat has not been proposed, as there is existing, moderate to high quality habitat available that can be secured and managed.

For the current project, offsets are to be secured and implemented as soon as approval for the action is granted. The OMP utilises known management practices to protect and manage high-quality remnant vegetation present within the Victorian Volcanic Plain bioregion to the west of Melbourne (refer Appendix 3 and Appendix 4 for further detail).

8. **Suitable offsets must have transparent governance arrangements, including being able to be readily measured, monitored, audited and enforced.**

The OMP sets out clear objectives, measurable performance indicators, monitoring and reporting requirements. In addition, the Land Manager will report against any specific monitoring and auditing obligations established under the EPBC Act approval conditions.

In accordance with the Landowner Agreement required under the on-title protection mechanisms, annual monitoring reports are required to be submitted to DEECA and TfN every year for at least 10 years. Any breach of management and/or reporting requirements will trigger enforcement proceedings as applicable under the EPBC Act and/or the Landowner Agreement.

6.2.7 Offset Management Plan

An OMP has been developed for the onsite and offsite offset locations which outlines the ongoing management arrangements, including management actions and the roles and responsibilities of the various parties in establishing and managing the onsite offset site (Appendix 3) and offsite offset site (Appendix 4). For the purpose of these OMPs, the Landowner shall also be the Land Manager.

6.2.8 Completed Offset Assessment Guide calculator

The EPBC Act offsets policy (DSEWPaC 2012a) provides the details of the offsetting approach for matters of NES; this includes an Offset Assessment Guide and offset calculator.

The Offset Assessment Guide offset calculator has been completed to determine the area of offset required to adequately compensate for the proposed removal of GSM habitat within the development area. The Offset Assessment Guide offset calculators are provided as supporting documentation within the relevant OMPs (Appendix 3; Appendix 4), with a justification for the scores given provided below.

6.2.9 Offset Calculator Justification

6.2.9.1 Method for calculating offset site habitat quality

6.2.9.2 Onsite Offset

Bences Road

Based on the EPBC Act offset calculator (DSEWPaC 2012b), the retention and management of 3.8 hectares of GSM habitat within the proposed Bences Road onsite offset site (Property 16) as an offset mitigates 21.13% of the impact of the removal of 10.155 hectares of GSM quality 3 habitat, and the retention and management of 2.6 hectares of GSM habitat within the proposed Bences Road onsite offset site (Property 16) as an offset contributes 8.81% of the impact to 12.502 hectares of GSM quality 4 habitat (Table 16; Table 20).

Table 20. EPBC Act Offset Calculator for GSM habitat at the Bences Road offset site

Offset Criteria	Response
Impact Site	
Impact Location	Several Properties located in Merrimu.
Habitat to be removed	10.155 hectares of GSM habitat quality score of 3; 12.502 hectares of GSM habitat quality score of 4.
Habitat quality	3/10. Habitat proposed to be removed supports a relatively low cover of native and non-native grasses that comprise the species preferred food plants (generally 20-25% cover of Wallaby-grass and/or Chilean Needle-grass). Impacted habitat has been subjected to high levels of disturbance in the form of historical grazing and soil disturbance These areas also supported low numbers of GSM relative to higher quality areas elsewhere within the site. Impacted habitat is dominated by species such as Serrated Tussock, Brome Grass and Toowoomba Canary-grass. 4/10. Habitat proposed to be removed supports a relatively moderate cover of native and non-native grasses that comprise the species preferred food plants (generally 30-35% cover of Wallaby-grass and Chilean Needle-grass). Impacted habitat has been subjected to high levels of disturbance in the form of historical grazing and soil disturbance These areas also supported low numbers of GSM relative to higher quality areas elsewhere within the site. Impacted habitat is dominated by species such as Serrated Tussock, Brome Grass and Toowoomba Canary-grass.
Offset Site	
Offset location	289 Bences Road, Merrimu, Victoria
Risk-related time horizon	20 years. The land will be managed in perpetuity for conservation purposes for GSM
Time until ecological benefit	10 years. The existing habitat condition is expected to be protected and maintained over the 10-year active management schedule detailed in the OMP.
Start area and quality of offset site	6.4 hectares; 6/10. The habitat within the offset site is considered to be of high quality, and contiguous with other areas of confirmed GSM habitat (i.e. over 30 hectares of GSM habitat). This is due to the high cover of key food resources (Wallaby-grass) present within the offset area, and the current low cover of high threat grassy weeds that would otherwise reduce the quality of the GSM habitat. Further, the structure of the vegetation is an open native tussock grassland, with areas of bare ground and embedded and surface rock present. This combination of factors is favourable to GSM, resulting in a large population being present within the site. The definition of suitable GSM habitat has been based on information provide in the species conservation advice (DoEE 2013). The combination of habitat factors presented has resulted in the starting quality of GSM habitat being assessed as 6/10 (Table 18).
Risk of loss without offset	3.29%. There are currently no formal protection mechanisms that protect the ecological values present within the offset site. Without protection and ongoing management as an offset site, there is uncertainty regarding the future condition of the land. There are currently no restrictions to agricultural practices within the RCZ associated with the application of high stocking rates or changing the type of animal traditionally raised within a property (i.e. changing from sheep to cattle or horses). All such practices are considered as of right uses associated with land within RCZ whether or not such areas support native vegetation. This has the potential to result in a decline in the condition and extent of GSM habitat within the offset site and surrounding areas due to an increase in the abundance and cover of non-preferred GSM food species such as Serrated Tussock, Wild Oat and Cocksfoot. Further, this is likely to result in an increase in biomass resulting in a decrease in the overall density (i.e. stocking rate) of GSM present. Of greater risk is the ongoing encroachment into the site by the native Sifton Bush *Cassinia sifton* which is currently invading the site, and will establish within the site, reduce inter-tussock space, outcompete native grasses and herbs, and turn the grassland habitat into a scrubland habitat if not managed appropriately. Ultimately, if Sifton Bush is allowed to persist in the site, it will result in a reduction in habitat quality and extent for GSM.

Offset Criteria	Response
	Based on the current absence of a formal protection mechanism on the site, there is a risk that the absence of active management will result in weed invasion and pest animal disturbance that will contribute to the degradation of the offset site without management actions enacted. A protective covenant provides legal protection, which would prevent any further development, thereby averting this risk of losing GSM populations (and other matters of NES) within the site. Within a 10- year period, it is considered to be a 3.29% chance of that the habitat within the offset site will be subject to agricultural land practices and continued degradation of habitat as a result of continued Sifton Bush invasion. This is likely to result in a reduction in the current population of GSM as habitat within the site becomes more unsuitable for GSM. The 3.29% value is derived from Table 3, Figure 4 (Pathway C) and Appendix 2 of the Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offsets when evaluating biodiversity offset proposals under the EPBC Act document (The University of Queensland 2017), which provides a background rate of loss for Moorabool Shire Council of 3.29%.
Future quality without offset	5/10. Without protection as an offset site there is uncertainty regarding the future condition of the land. As detailed above, there are currently no restrictions to agricultural practices RCZ associated with the application of high stocking rates or changing the type of animal traditionally raised within a property (i.e. changing from sheep to cattle or horses. This has the potential to result in a decline in the condition and extent of GSM habitat within the offset site and surrounding areas. Without strategically designed grazing strategies, stock can overgraze/undergraze GSM host plants, leading to a shift in introduced species dominance and/or, preventing host plants from recruiting. The continued spread of Serrated Tussock and Sifton Bush into the site is also considered to be a risk to maintaining habitat suitability within the offset site which would reduce the GSM habitat quality score. Rabbits were recorded within and nearby the site. Without increased management, rabbits are likely to prevent the recruitment of host plants, leading to a decline in GSM habitat. Without the establishment of an offset site, a decline in condition from a score of 6/10 to 5/10 is considered conservative for a 10-year period.
Risk of loss with offset	0%. When a site is secured and managed for offset purposes, the risk of loss is considered to decline significantly. This value is as per the guidance deriving 'Risk of Loss' estimates when evaluating biodiversity offsets proposals under the EPBC Act document (The University of Queensland 2017).
Future quality with offset	7/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a management plan incorporating weed control, biomass control and regular monitoring, aiming to enhance habitat quality for GSM. The quality of GSM habitat will be maintained by actions outlined in the OMP (Appendix 4), and include: • Eliminating woody weeds which outcompete host plants for GSM and provide harbour for rabbits; • Managing all high threat weeds, reducing competition for host plants for GSM; • Reducing rabbit populations, and thereby reducing the threat posed to on-going survival and establishment of host plants by overgrazing from exotic herbivores; and, • Ensuring that grazing regimes by stock is undertaken in a manner sensitive to the habitat requirements for GSM. An elevated level of weed control and permanent application of targeted management to improve the habitat for GSM is expected to provide an improvement by elevating site condition score from 2/3 to 3/3 comprising a moderate to high cover of preferred native food plants to a cover of at least 40%. This would increase the habitat quality from 6/10 to 7/10. Proposed management actions are above and beyond both current and past management of the site. While the site is currently grazed, and has been historically grazed, the grazing periods are not managed in consideration of biodiversity values and GSM.

Offset Criteria	Response
	Based on the increased management of the site, as outlined within the OMP, which as outlined above are beyond past and current management, there is a high level of confidence that the habitat quality of the offset site will be maintained at a higher level that what the site would be without implementation of the offset.
Confidence in result	80%. Confidence in the result associated to habitat improvement is relatively high due to careful consideration of the offset site, existing condition and the commitment of the landowner to engage contractors with a demonstrated capability to manage threats through recent conservation works. The site will be protected through entering into a s69 agreement with DEECA under the CFL Act. DEECA undertakes a rigorous quality assurance process for all offset sites to ensure the landowner agreements address the management commitments in the plan. 80% - Confidence in the result associated to averted loss is relatively high due to the likely effectiveness of the management and monitoring measures proposed to achieve the designated outcomes. The management measures proposed have been successfully utilised in several other GSM offset sites and resulted in improvements to habitat quality. Further, the landowner has committed to engage contractors with a demonstrated capability to manage and monitor threats through recent conservation works to ensure the objectives are achieved.
% of impact offset off-site	21.13% (of impacts to 10.155 hectares of GSM quality 3 habitat) (See Table 16); 8.81% (of impacts to 12.502 hectares of GSM quality 4 habitat) (See Table 16).

6.2.9.3 Offsite Offset

Based on the EPBC Act offset calculator (DSEWPaC 2012b), the retention and management of 25.3 hectares of GSM habitat within the proposed offsite offset site as an offset mitigates 91.53% of the impact of the removal of 12.502 hectares of GSM habitat quality 4, while 13.3 hectares of GSM habitat mitigates 78.98% of the removal of 10.155 hectares of GSM quality 3 habitat (Table 16; Table 21).

Table 21. EPBC Act Offset Calculator for the offsite (Glenhope) GSM Offset site

Offset Criteria	Response
Impact Site	
Impact Location	Bences Road, Merrimu.
Habitat to be removed	10.155 hectares of GSM habitat quality score of 3; 12.502 hectares of GSM habitat quality score of 4.
Habitat quality	3/10. Habitat proposed to be removed supports a relatively low cover of native and non-native grasses that comprise the species preferred food plants (generally 20-25% cover of Wallaby-grass and/or Chilean Needle-grass). Impacted habitat has been subjected to high levels of disturbance in the form of historical grazing and soil disturbance These areas also supported low numbers of GSM relative to higher quality areas elsewhere within the site. Impacted habitat is dominated by species such as Serrated Tussock, Brome Grass and Toowoomba Canary-grass 4/10. Habitat proposed to be removed supports a relatively low to moderate cover of native and non-native grasses that comprise the species p referred food plants (generally 20-30% cover of Wallaby-grass and Chilean Needle-grass). Impacted habitat has been subjected to high levels of disturbance in the form of historical grazing and soil disturbance These areas also supported low numbers of GSM relative to higher quality areas elsewhere within the site. Impacted habitat is dominated by species such as Serrated Tussock, Brome Grass and Toowoomba Canary-grass
Offset Site	
Offset location	Parcels 3C~D\PP2675 and 3E~D\PP2675, part of the broader property located at Boyers Road, Glenhope, Victoria

Offset Criteria	Response
Risk-related time horizon	20 years. The land will be managed in perpetuity for conservation purposes for GSM.
Time until ecological benefit	10 years. The existing habitat condition is expected to be protected and maintained over the 10-year active management schedule detailed in the OMP.
Start area and quality of offset site	38.6 hectares; 5/10 (Table 19). The habitat within the offset site is considered to be of high quality, and contiguous with other areas of confirmed GSM habitat (i.e. over 100 hectares of GSM habitat). This is due to the moderate cover of key food resources (approx. 20-30% cover of Wallaby-grass, Spear-grass) present within the offset area, and the current low cover of high threat weeds or weed species that would otherwise reduce the quality of the GSM habitat. Further, the structure of the vegetation is an open native tussock grassland, with areas of bare ground and embedded and surface rock present. This combination of factors is favourable to GSM, resulting in a large population being present within the site. The definition of suitable GSM habitat has been based on information provide in the species conservation advice (DoEE 2013). The combination of habitat factors presented has resulted in the starting quality of GSM habitat being assessed as 5/10.
Risk of loss without offset	7.91%. There are currently no formal protection mechanisms that protect the ecological values present within the offset site. Without protection and ongoing management as an offset site, there is uncertainty regarding the future condition of the land. There are currently no restrictions to agricultural practices within the FZ associated with the application of fertiliser, high stocking rates, seeding areas with exotic pasture or changing the type of animal traditionally raised within a property (i.e. changing from sheep to cattle or horses). All such practices are considered as of right uses associated with land within the FZ, whether or not such areas support native vegetation. This has the potential to result in a decline in the condition and extent of GSM habitat within the offset site and surrounding areas due to an increase in the abundance and cover of introduced pasture species such as Toowoomba Canary-grass, Wild Oat and Cocksfoot, which are not known GSM food species. Further, this is likely to result in an increase in biomass resulting in a decrease in the overall density (i.e. stocking rate) of GSM present. Based on the current absence of a formal protection mechanism on the site, there is a risk that weed invasion and pest animal disturbance will contribute to the degradation of the offset site without management actions enacted. A protective covenant provides legal protection, which would prevent any further development, thereby averting this risk of losing GSM populations within the site. Within a 10-year period, it is considered to be a 7.91% chance of that the habitat within the offset site will be subject to a reduction in quality due to the continued degradation of habitat as a result of agricultural influences. This is likely to result in a reduction in the current population of GSM as habitat within the site becomes more unsuitable for GSM. The 7.91% value is derived from Table 3, Figure 4 (Pathway C) and Appendix 2 of the Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offsets when evaluating biodiversity offset proposals under the EPBC Act document (The University of Queensland 2017), which provides a background rate of loss for Mitchell Shire Council of 7.91%.
Future quality without offset	4/10. Without protection as an offset site there is uncertainty regarding the future condition of the land. As detailed above, there are currently no restrictions to agricultural practices within the FZ, and all potential practices are considered as of right uses associated with land within the FZ. This has the potential to result in a decline in the condition and extent of GSM habitat within the offset site and surrounding areas. Without strategically designed grazing strategies, stock can overgraze/undergraze GSM host plants, leading to a shift in introduced species dominance and/or, preventing host plants from recruiting. This has the potential to result in the site condition score reducing from 2/3 to 1/3 (See Table 19)

Offset Criteria	Response
	Rabbits were recorded within and nearby the offset site. Without increased management, rabbits are likely to prevent the recruitment of host plants, leading to a decline in GSM habitat. Without the establishment of an offset site, a decline in condition from a score of 5/10 to 4/10 is considered conservative for a 10-year period.
Risk of loss with offset	0%. When a site is secured and managed for offset purposes, the risk of loss is considered to decline significantly. This value is as per the guidance deriving 'Risk of Loss' estimates when evaluating biodiversity offsets proposals under the EPBC Act document (The University of Queensland 2017).
Future quality with offset	6/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a management plan incorporating weed control, biomass control and regular monitoring, aiming to enhance habitat quality for GSM. The quality of GSM habitat will be improved by actions outlined in the OMP (Appendix 4), and include: • Eliminating woody weeds which outcompete host plants for GSM and provide harbour for rabbits; • Managing all high threat weeds, reducing competition for host plants for GSM; • Reducing rabbit populations, and thereby reducing the threat posed to on-going survival and establishment of host plants by overgrazing from exotic herbivores; and, • Ensuring that grazing regimes by stock is undertaken in a manner sensitive to the habitat requirements for GSM. An elevated level of weed control and permanent application of targeted management to improve the habitat for GSM is expected to provide an improvement by elevating site condition score from 2/3 to 3/3 comprising a moderate to high cover of preferred native food plants to a cover of at least 40%. This also has the potential to facilitate an increase in the density of GSM per hectare resulting in a species stocking rate score increase from 1/4 to 2/4 (greater than 5 moths per hectare). Proposed management actions are above and beyond both current and past management of the site. While the site is currently grazed, and has been historically grazed, the grazing periods are not managed in consideration of biodiversity values and GSM. Further, while some weed and rabbit control has occurred on the property, the level of control committed under this management plan is well beyond current management. Based on the increased management of the site, as outlined within the OMP (Appendix 4), the habitat quality and/or stocking rate of the offset site is likely to be improved beyond what the site would be without implementation of the offset.
Confidence in result	80%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing condition and evidence of the landholder's capability to manage threats through recent conservation works. The landholder is experienced in land management, having actively managed several offset sites over a number of years. The site will be protected through a TfN covenant under the VCT Act. TfN undertakes a rigorous quality assurance process for all offset sites to ensure the landowner agreements address the management commitments in the plan. 80%. Confidence in the result associated to averted loss is relatively high due to the likely effectiveness of the management and monitoring measures proposed to achieve the designated outcomes. The management measures proposed have been successfully utilised by the landowner in several other GSM offset sites and resulted in improvements to habitat quality. Further, the landowner is experienced with a demonstrated capability to manage and monitor threats through recent conservation works to ensure the objectives are achieved.
% of impact offset off-site	91.53% (of the impact of the removal of 12.502 hectares of GSM habitat quality 4 (Table 16) 78.98% (of the impact of the removal of 10.155 hectares of GSM habitat quality 3 (Table 16)

6.2.10 Details of Offset Site Security

The onsite offset area will be protected through a s69 Agreement under the CFL Act. The offsite offset will be secured via a TfN covenant under part Section 3A of the VCT Act. The relevant OMP will be attached to the on-title agreement and require the landowner to manage the offset site in accordance with the requirements detailed herein.

The s69 agreement and TfN covenant will secure the respective offset sites in perpetuity.

6.2.11 Estimated Cost of Offset

The overall cost of the offset proposal will be dependent on the costs associated with undertaking the management and monitoring activities detailed in the OMP. The final cost will ultimately be dependent on quotations received from relevant contractors.

7 OTHER APPROVALS AND CONDITIONS

7.1 Victoria

7.1.1 *Planning and Environment Act 1987*

The properties are within an area identified for potential future urban development as part of the expansion of Bacchus Marsh, and Moorabool Shire Council and the VPA have jointly prepared the draft Bacchus Marsh UGF plan (VPA and Moorabool Shire Council 2018).

With the population of Bacchus Marsh expected to double from 20,000 today to 40,000 residents by 2041, the UGF plan is crucial to guide growth. It is expected that the UGF plan will be incorporated into the planning scheme (Amendment C81), and that the Merrimu PSP will thereafter be prepared in relation to the land.

Amendment C81 affects land in the urban and rural areas of Bacchus Marsh, Darley, Maddingley and Pentland Hills, together with the rural fringe areas of Merrimu, Parwan, Hopetoun Park, Coimadai (part), Long Forest (part) and Rowsley (part).

The Bacchus Marsh UGF plan was a rigorous and thorough process that examined the future growth and development of Bacchus Marsh for the next 20 years. This precinct was considered against others and was determined to be the superior location for future residential development to enable the township to grow into the future.

It is important to note that Amendment C81 does not rezone any land. It provides a strategic framework for determining where future urban growth precincts and employment growth precincts will occur. A future, separate planning scheme amendment will be required, to identify exact boundaries for these precincts and to rezone land to facilitate master-planned urban development

7.1.2 *Flora and Fauna Guarantee Act 1988*

The FFG Act is the primary legislation dealing with biodiversity conservation and sustainable use of native flora and fauna in Victoria. Proponents are required to apply for an FFG Act Permit to 'take' listed and/or protected flora species, listed vegetation communities and listed fish species in areas of public land (i.e. within road reserves, drainage lines and public reserves). An FFG Act permit is generally not required for removal of species or communities on private land, or for the removal of habitat for a listed terrestrial fauna species.

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

7.1.3 Catchment and Land Protection Act 1994

The CaLP Act contains provisions relating to catchment planning, land management, noxious weeds and pest animals. Landowners are responsible for the control of any infestation of noxious weeds and pest fauna species to minimise their spread and impact on ecological values.

Weeds listed as noxious under the CaLP Act were recorded during the assessment (Serrated Tussock). Similarly, there is evidence that the study area is currently occupied by several pest fauna species listed under the CaLP Act (European Rabbit; Red Fox).

Weed management actions will be appropriately managed through the preparation of a Construction Environment Management Plan (CEMP) (or similar) prepared as part of the project.

8 SOCIAL AND ECONOMIC MATTERS

8.1 Social and Economic Issues

Victoria's population is set to reach 10 million before 2050, requiring 1.6 million new homes to be built. With the population of Bacchus Marsh expected to double from 20,000 today to 40,000 residents by 2041, the Bacchus Marsh UGF plan (VPA and Moorabool Shire Council 2018) is crucial to guide growth. With the Merrimu PSP being prepared to ensure future development is planned at a strategic level to ensure social and economic issues can be appropriately addressed.

The project will see the delivery of a contemporary regional township that will deliver a distinctive, sustainable, high quality, high amenity community. Enhanced by an innovative approach to the early delivery of community and commercial facilities the community will provide a sensitive response to the unique landscape setting, creating a sense of connection and place that will be a hallmark of the precinct.

Bacchus Marsh is overshadowed in terms of urban growth and service provision by Ballarat, Geelong and the (Melton) urban growth corridor to the east. Although the township benefits from strong population growth occurring in the nearby the Melton urban growth corridor and Ballarat, its constrained town centre limits opportunities for additional retail, commercial and community facilities that can support a growing population.

The Merrimu precinct represents the next logical growth front for Bacchus Marsh and provides a genuine opportunity for urban development that leverages the strategic location and supports an increased provision of services for the local community.

An emerging opportunity is the nature in which the COVID-19 pandemic has prompted a substantial uptake and acceptance of remote working technology. In turn, this has strengthened the desirability of peri-urban and regional areas.

The opening of the new growth front at Bacchus Marsh will utilise major upgrades to the Ballarat Rail Line that provide for an additional 135 services per week, including trains every 20 minutes at peak times. All services between Ballarat and Southern Cross, including express services, now stop at Bacchus Marsh.

Education facilities to be delivered onsite include two government primary schools, a top-tier independent p-12 school, education programs associated with the urban farm and community gardens, and spaces for adult education programming.

The facilities will be located within walking distance of town centres and co-located to create community/education 'hubs' within the precinct. Development of the precinct will seek to deliver education facilities early to ensure that families have access to learning opportunities from the time that the community is established.

Partnerships with local Aboriginal organisations will be established throughout the planning and development process to ensure that heritage values are protected and promoted. These partnerships have potential to inform the development of programs and events in the precinct to instil a sense of connection to land and Indigenous culture.

8.2 Consultation

As part of the PSP process, extensive consultation with Moorabool Shire Council, Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation, Government and Servicing Agencies and the local Bacchus Marsh community has taken place. This has included:

- Repeat and ongoing engagement with Moorabool Shire Council;
- Precinct Vision Pitching sessions with Victorian Planning Authority, Moorabool Shire Council, and various Government and Servicing Agencies;
- Community and landowner drop in sessions hosted in Bacchus Marsh; and,
- VPA Co-Design

8.2.1 Indigenous Stakeholders

The Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation were involved in all stages of assessment for the CHMP prepared for the project. A record of consultation with all parties, including the names of the Aboriginal representatives who participated in the assessment, is included the CHMP prepared by Ecology and Heritage Partners.

9 ENVIRONMENTAL RECORD OF PROPONENT

BMD will abide by the Corporate Responsibility Policy which includes the group's environmental policies. These policies include the promotion of responsible environmental practices, minimization of risk to the environment and respect of indigenous and cultural heritage. BMD will undertake the proposed works with the objective and targets to minimise their environmental footprint by working with stakeholders in compliance with legal and other requirements and be a role model for others to follow in development practices.

BMD will engage suitably qualified and experienced consultants/contractors to carry out the proposed actions. Contractors will be required to achieve prequalification with BMD by completing and passing the 'BMD Potential Contractor WHSE Checklist' prior to being engaged to carry out the works. Checkpoints include:

- Identification of similar works previously undertaken;
- Presentation of EMP and accreditation compliance;
- Describing process for identifying relevant environmental legislation, Codes of Practice and guidelines applicable to each project;

Site and project specific EMP will also be provided prior to commencement of proposed works including specific reference to actions considered under this EPBC referral.

BMD have not previously referred any projects to the Commonwealth under the EPBC Act, nor been subject to any known prosecution for environmental breaches.

10 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The National Strategy for Ecologically Sustainable Development (ESD) (1992) sets out the policy framework for the Australian Government to make decisions and take actions to pursue ecologically sustainable development (ESD).

The National Strategy requires government departments to develop institutional arrangements to ensure that the principles and objectives of ESD are delivered and sets out the following core objectives for achieving ESD:

- to enhance individual and community well-being by following a path of economic development that safeguards the welfare of future generations
- to provide for equity within and between generations
- to protect biological diversity and maintain essential ecological processes and life-support systems.

The project response to the EPBC Act principals of ESD are provided below:

The proposed action has long-term and short-term economic, environmental, social and equitable considerations.

The proposed development has been recognised by the Victorian Government for its significance as a strategic residential development site. The subject land relevant to this project is located within the future Merrimu PSP area. Amendment C81 promotes coordinated, master-planned development of identified areas in and around Bacchus Marsh, including the Merrimu PSP, by identifying a need to:

- Contain short to medium term residential development within the existing settlement boundary (infill and greenfield);
- Prepare for medium to long term residential growth within the investigation areas at Merrimu, Parwan Station and Hopetoun Park;
- Require PSPs for any urban growth precincts at Merrimu and Parwan Station, and a development plan for any growth precinct at Hopetoun Park, and ensure that such plans provide for appropriate community and social infrastructure, activity centres, schools, integrated transport, reticulated services and local job opportunities;
- Prepare a PSP for Parwan Employment Precinct, to address key infrastructure and land use priorities that will deliver value-added and vertically or horizontally integrated agribusiness/industries; and
- Work with State Government and other relevant servicing authorities towards the servicing of Parwan Employment Precinct, with particular emphasis on the provision of reticulated water and gas.

Environmentally the project has also further applied the principles of impact "avoidance" and "minimisation" through the proposed environmental management and mitigation measures. Further, all environmental impacts can be appropriately mitigated in accordance with relevant legislation and policy.

The precautionary principle which states that a lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation where there are threats of serious or irreversible environmental damage.

Robust environmental assessments have been completed to assess the potential impacts of the project including ecological assessments, and cultural and historic heritage assessments. The level of assessment undertaken for this project provides a sound basis for understanding the likely project impacts and in developing effective environmental management and mitigation measures.

In this respect the project will be constructed consistent with a precautionary assumption that potential habitat for Swift Parrot exists outside the development footprint (i.e. Long Forest Reserve). This is being done despite Swift Parrot having not been recorded within the study area, and no priority habitat assessed as being present.

The principle of inter-generational equity which states that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

By undertaking the development activity in accordance with best-practise industry standards, the proponent will mitigate any potential indirect impacts on matters of NES. This will ensure that quality and integrity of the surrounding environment is maintained for future generations.

The proposed mitigation and offset of impacts will ensure minimal impact of the project on matters of NES.

The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.

The NTGVVP and GSM habitat being impacted within the study area does not represent high-quality examples of these matters. Species diversity is low, weed cover is high and the remaining vegetation within the surrounding landscape is generally modified. Given the patchy nature of the community and habitat within the study area, it is likely that, in the absence of conservation management, the NTGVVP remnants and GSM habitat will continue to degrade due to ongoing weed invasion.

However, in recent years, several high-quality remnants of the community and GSM habitat have been recorded in the Victorian Volcanic Plain bioregion, particularly west of Melbourne, with a number having been secured and currently managed in perpetuity for conservation purposes, (i.e. Ombersley, Cressy, Warrambeen). As such, although the removal of small, low quality remnants of NTGVVP and GSM habitats such as that proposed within the study area contribute to a cumulative loss of the community, this has created an opportunity to conserve larger, higher quality remnants that occur in western Victoria.

The removal of 1.783 hectares of NTGVVP and 22.657 hectares of GSM habitat will result in the permanent protection, conservation and management of 4.2 hectares of NTGVVP and 35.750 hectares of GSM habitat, resulting in a clear, net conservation benefit for both matters.

It is therefore considered impractical to retain the small, isolated remnant of NTGVVP and low quality GSM habitats within the context of their existing condition, the proposed development within the study area and limited long-term prospects of maintaining and/or improving the biodiversity value of the matters given their poor condition, and ongoing threat of weed invasion and site degradation.

No other matters of NES are considered to be impacted by the proposed action.

Improved valuation, pricing and incentive mechanisms should be promoted.

This ESD principal is not considered to apply to this project.

11 CONCLUSION

Ecology and Heritage Partners Pty Ltd were commissioned by BMD to prepare a response to the DCCEEWs request for Preliminary Documentation for the proposed residential development located across several parcels of land in Merrimu, Victoria (the study area) (EPBC 2018/8271).

It has been determined under Section 75 of the EPBC Act that the proposed action is a controlled action, and that the development of the study area will likely have a significant impact on 'Listed threatened species and communities. It has also been determined that the proposed action will be assessed by preliminary documentation.

The study area is approximately 460 hectares and is comprised of 16 properties bound by Gisborne Road to the west, and Bences Road to the east approximately 50 kilometres north-west of Melbourne's CBD. It should be noted that Property 16 is ultimately proposed to be secured and managed as an offset site and will not be subject to any proposed development.

The ecological surveys undertaken recorded 2,653 individuals of the nationally significant SRF, 17.665 hectares of the NTGVVP ecological community, and 58.407 hectares of confirmed habitat for GSM. No other matters of NES were recorded during ecological investigations.

The proposed action will impact on a total of 1.783 hectares of the NTGVVP ecological community and 22.657 hectares of habitat for GSM. No SRF will be impacted.

Impacts to the 1.783 hectares of NTGVVP will be appropriately mitigated through the establishment of a high quality 4.3 hectare onsite offset site that provides a clear conservation benefit and increase in conservation values when compared to the condition and extent of the community at the proposed clearing site.

Impacts to the 22.657 hectares of GSM habitat will be appropriately mitigated through the establishment of a 38.6 hectare offsite offset, and a 6.4 hectare onsite offset that provides a clear conservation benefit and increase in conservation values when compared to the condition and extent of the community at the proposed clearing site.

The onsite offset site will be protected through a s69 Agreement under the CFL Act, and the offsite offset will be protected through a TfN covenant under part Section 3A of the VCT Act. OMPs have been prepared detailing the security and ongoing management actions required to secure the onsite offset (Appendix 3) and offsite offset sites (Appendix 4).

No SRF are located within the development footprint and will be retained. The proposed action is not considered to result in a significant impact to SRF at a local, regional or national scale.

All other approval processes in accordance with relevant environmental policy in Victoria are being complied with.

As such, it is considered that the controlled action should be approved under the EPBC Act, and all impacts to matters of NES can be appropriately mitigated by the proposed offset and mitigation measures detailed within this document.

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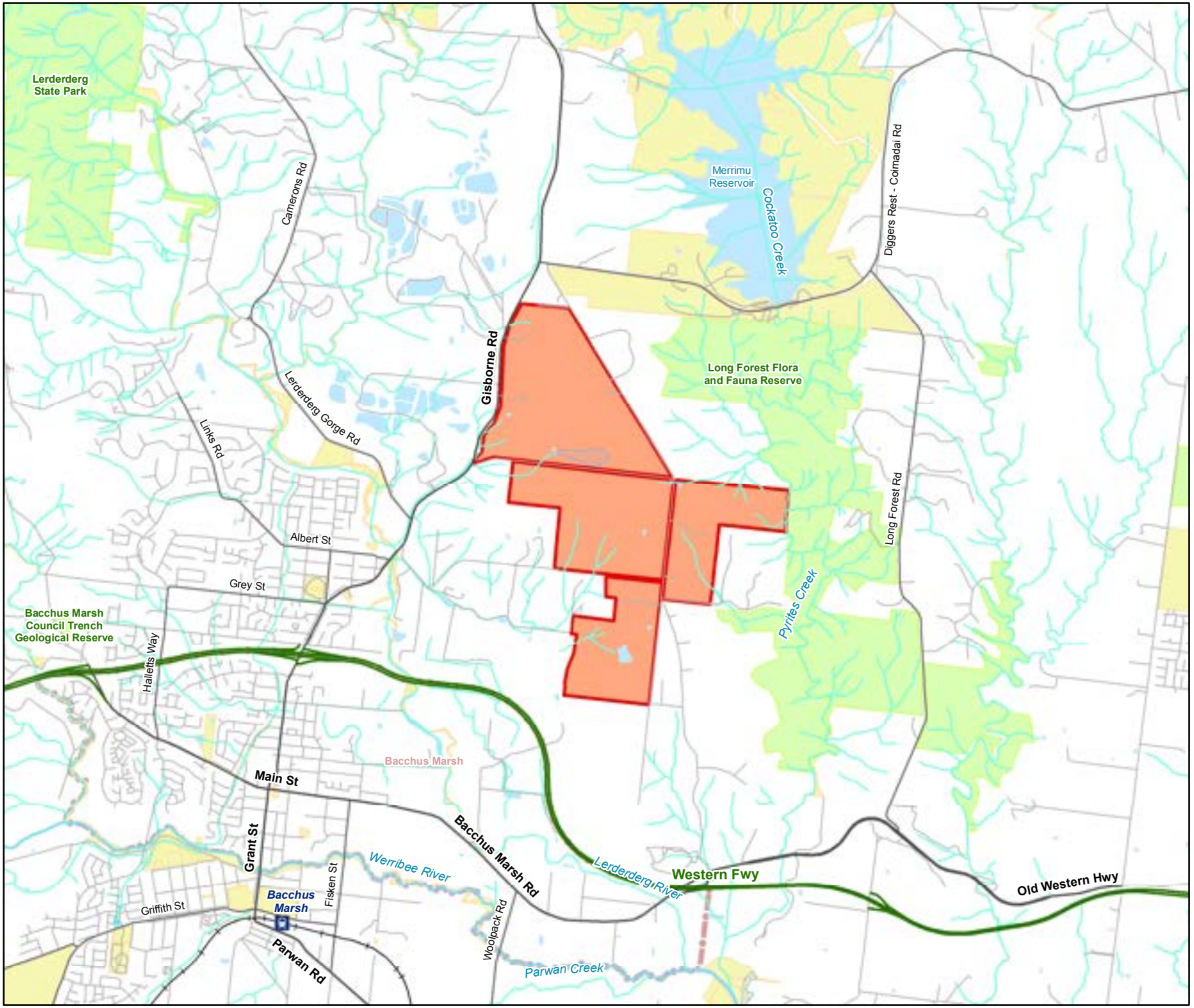
FIGURES



Legend

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

Figure 1

Location of the study area

Ecological Assessments for the Bacchus Marsh Development Project

N

0 600 1,200

Metres

ecology & heritage partners

10937_Fig01_StudyArea_fr9198 31/01/2019 psorensen

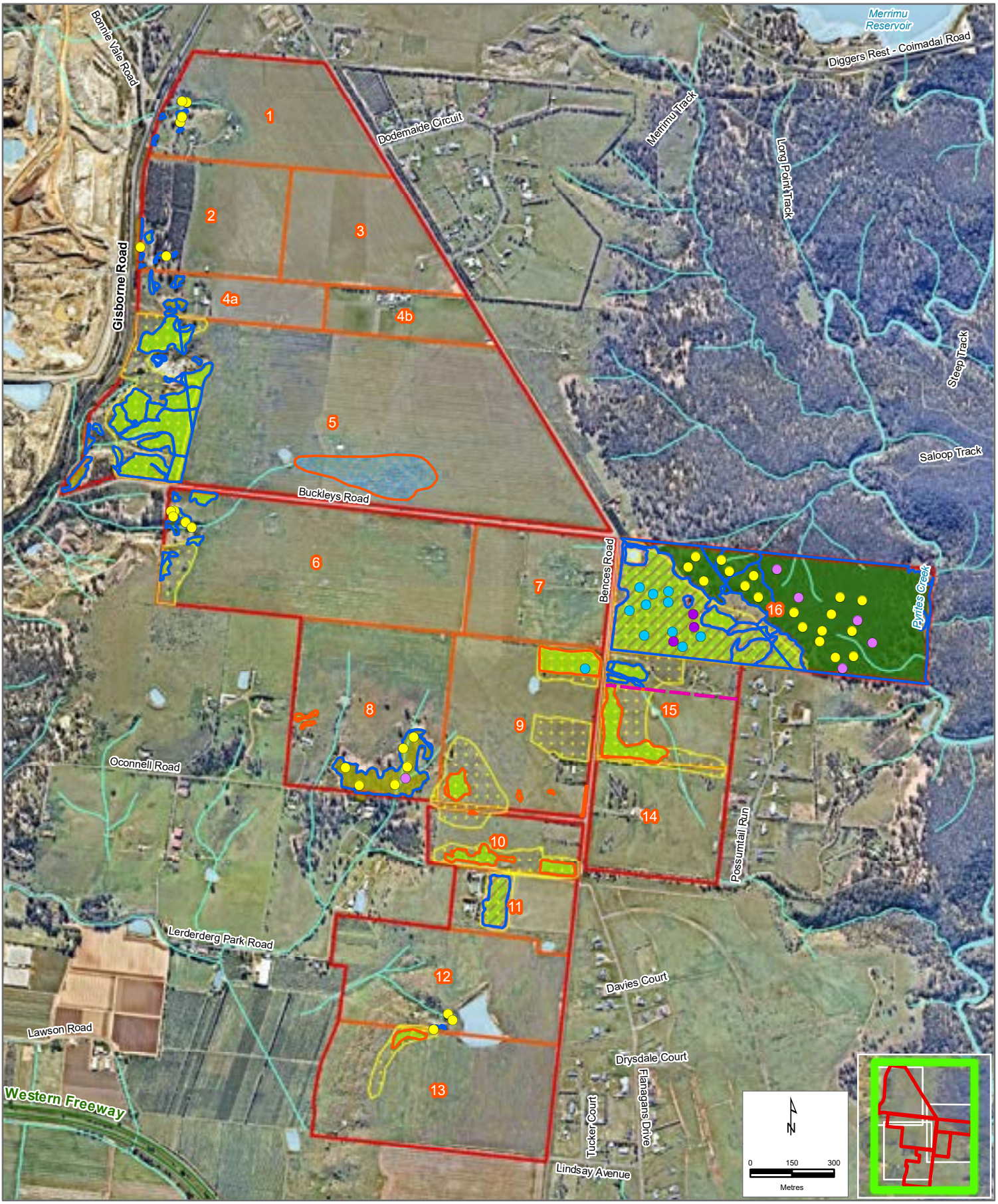


Figure 2 Overview

Ecological features

Ecological Assessments for the Bacchus Marsh Development Project

Legend

- Study Area
- Proposed lot division
- Golden Sun Moth Habitat

VROTs

- Melbourne Yellow-Gum
- Slender Bindweed
- Fragrant Saltbush
- Black Roly-Poly

Ecological Vegetation Classes

- Grassy Woodland EVC 175
- Plains Grassland EVC 132
- Plains Grassy Wetland EVC 125
- Rocky Chenopod Woodland EVC 64
- Current Wetland
- Retained vegetation
- Removed vegetation

EPBC listed vegetation community

- Natural Temperate Grassland of the Victorian Volcanic Plain proposed to be removed
- Natural Temperate Grassland of the Victorian Volcanic Plain proposed to be retained

10937_Fig02_EcolFeat_P_OV 3/12/2024 Melsley

Aerial source: Nearmap 2020

Figure 2a

Ecological features

Ecological Assessments for the Bacchus Marsh Development Project

Legend

- Study Area
- Golden Sun Moth Habitat

VROTs

- Fragrant Saltbush

Ecological Vegetation Classes

- Grassy Woodland EVC 175
- Plains Grassland EVC 132
- Plains Grassy Wetland EVC 125
- Rocky Chenopod Woodland EVC 64
- Current Wetland
- Retained vegetation
- Removed vegetation

EPBC listed vegetation community

- Natural Temperate Grassland of the Victorian Volcanic Plain proposed to be retained

N

0 65 130

Metres

10937_Fig02_EcolFeat_P_MBv2 3/12/2024 Melsley

Aerial source: Nearmap 2020

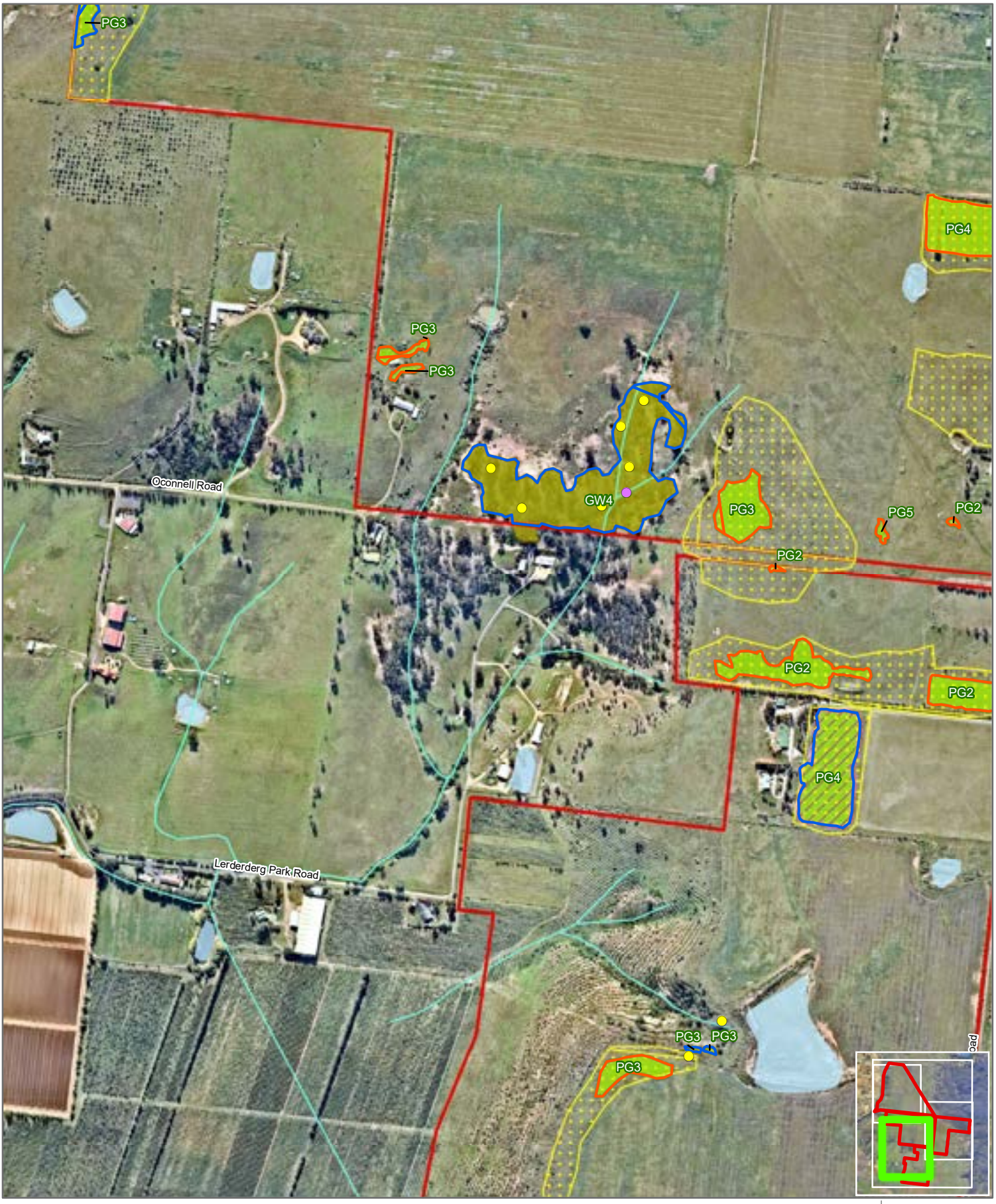


Figure 2b
Ecological features
Ecological Assessments for the Bacchus Marsh Development Project

Legend

- Study Area
- Golden Sun Moth Habitat

VROTs

- Melbourne Yellow-Gum
- Fragrant Saltbush

Ecological Vegetation Classes

- Grassy Woodland EVC 175
- Plains Grassland EVC 132
- Retained vegetation
- Removed vegetation

EPBC listed vegetation community

- Natural Temperate Grassland of the Victorian Volcanic Plain proposed to be removed
- Natural Temperate Grassland of the Victorian Volcanic Plain proposed to be retained

N

0 65 130
Metres

10937_Fig02_EcolFeat_P_MBv2 3/12/2024 Melsley

Aerial source: Nearmap 2020

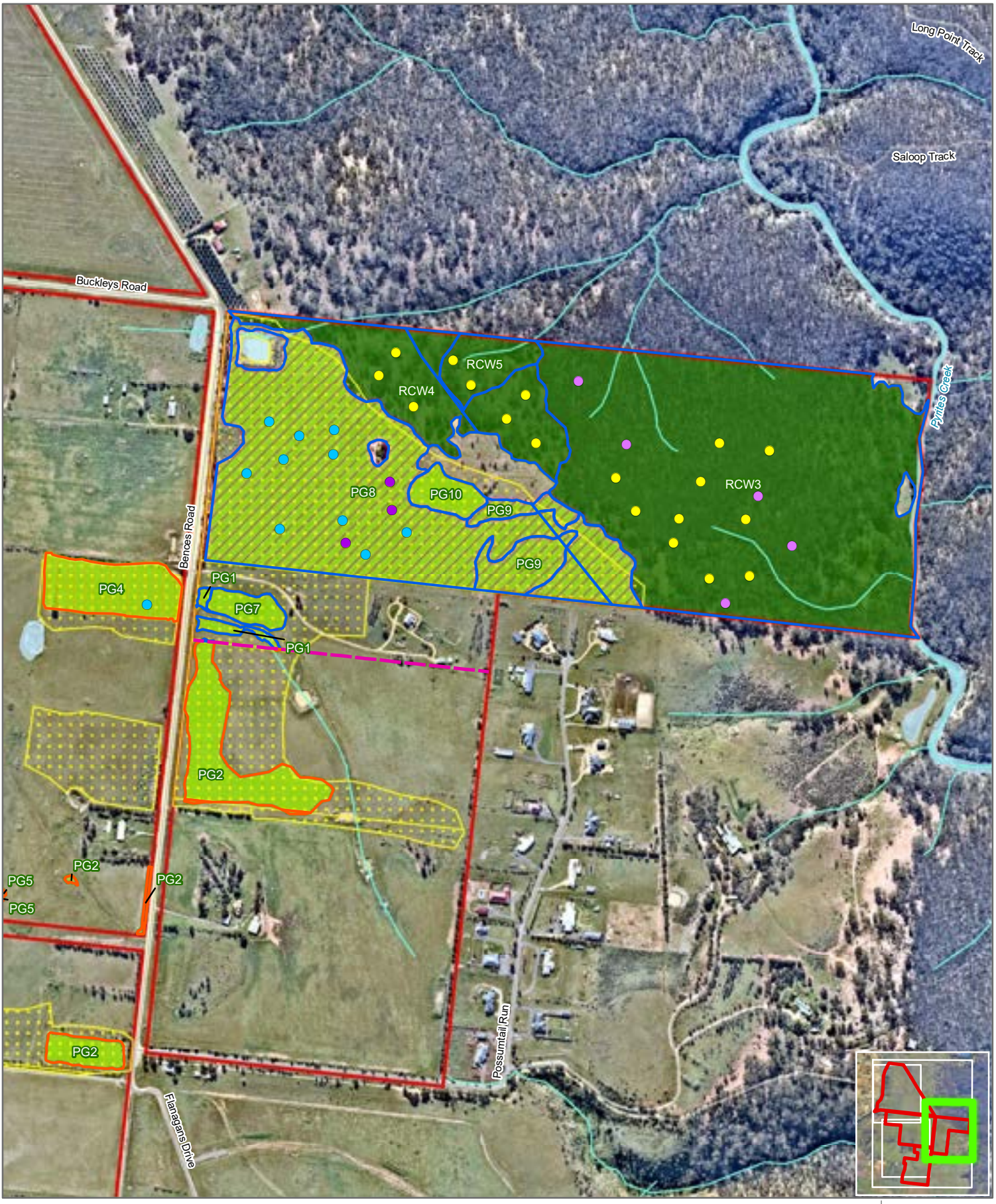


Figure 2c
Ecological features
Ecological Assessments for the Bacchus Marsh Development Project

Legend

- Study Area
- Proposed lot division
- Golden Sun Moth Habitat

VROTs

- Melbourne Yellow-Gum
- Slender Bindweed
- Fragrant Saltbush
- Black Roly-Poly

Ecological Vegetation Classes

- Plains Grassland EVC 132
- Rocky Chenopod Woodland EVC 64
- Retained vegetation
- Removed vegetation

EPBC listed vegetation community

- Natural Temperate Grassland of the Victorian Volcanic Plain proposed to be removed
- Natural Temperate Grassland of the Victorian Volcanic Plain proposed to be retained

N

0 65 130
Metres

10937_Fig02_EcolFeat_P_MBv2 3/12/2024 Melsley

Aerial source: Nearmap 2020

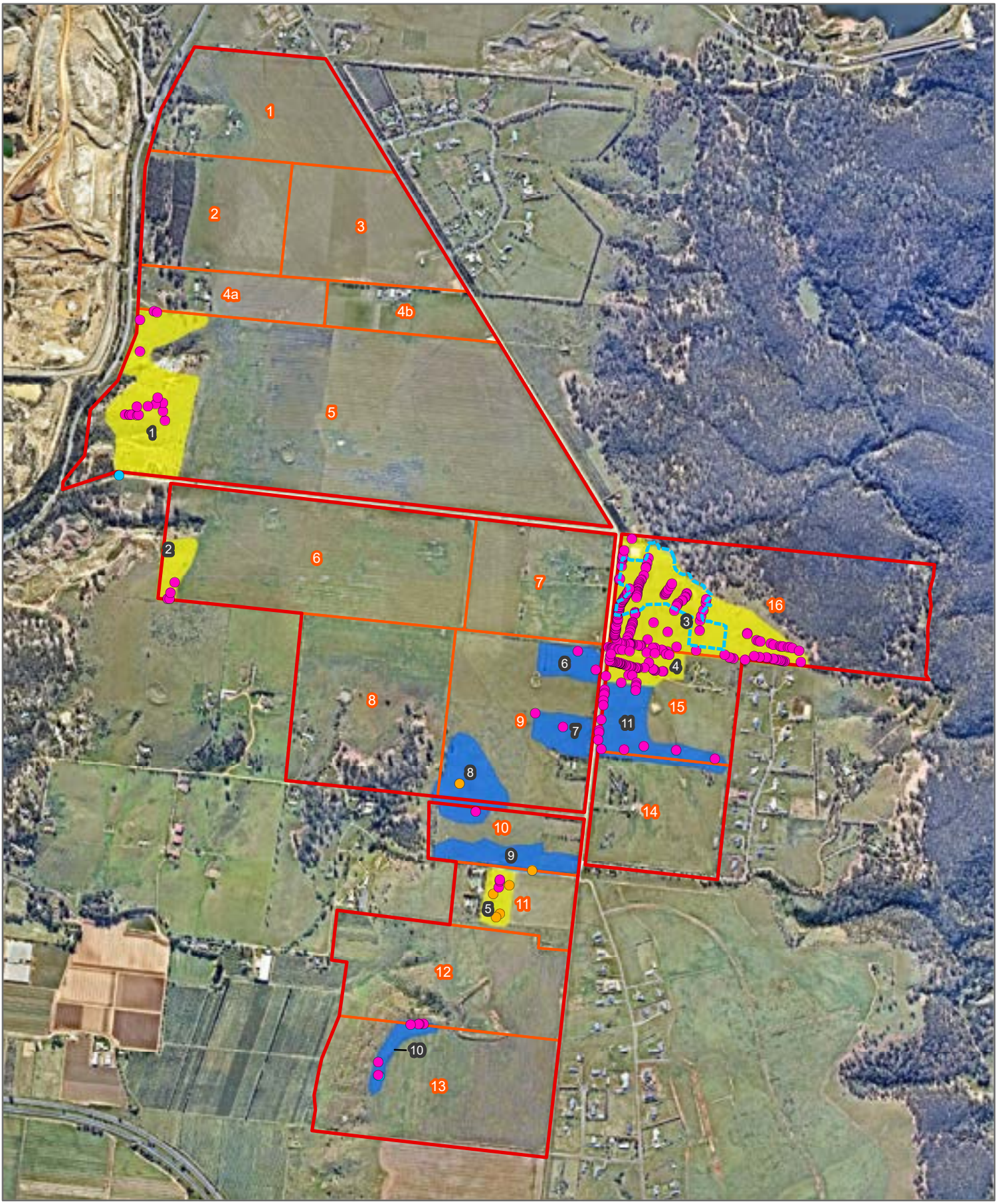


Figure 3
Golden Sun Moth habitat and records
Ecological Assessments for the Bacchus Marsh Development Project

Legend

- Study Area
- Properties
- Golden Sun Moth habitat proposed to be removed
- Golden Sun Moth habitat proposed to be retained

Golden Sun Moth records

- Survey date 30/11/17 (a)
- Survey date 30/11/17 (b)
- Survey date 12/12/17

Onsite Golden Sun Moth Offset site

- Bences Road Offset site (6.4 Ha)

2 = Golden Sun Moth patch number

10937_Fig03_GSM_P 3/12/2024 Melsley

Aerial source: Nearmap 2020

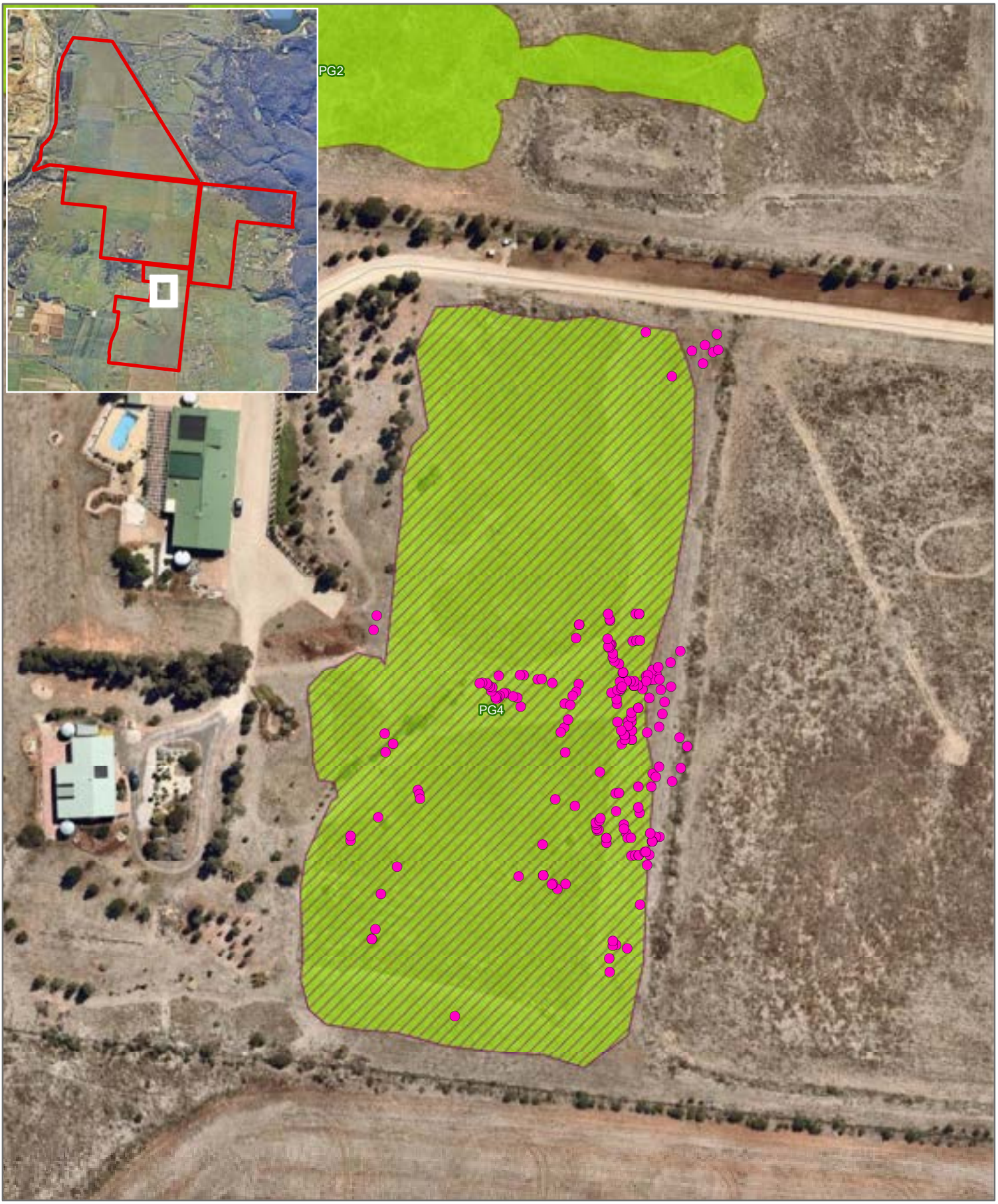


Figure 4a
Spiny Rice-flower Survey Results
Ecological Assessments for the Bacchus Marsh Development Project

Legend

- Study Area
- Spiny Rice-flower

Ecological Vegetation Classes

- Plains Grassland EVC 132

FFG Act listed community

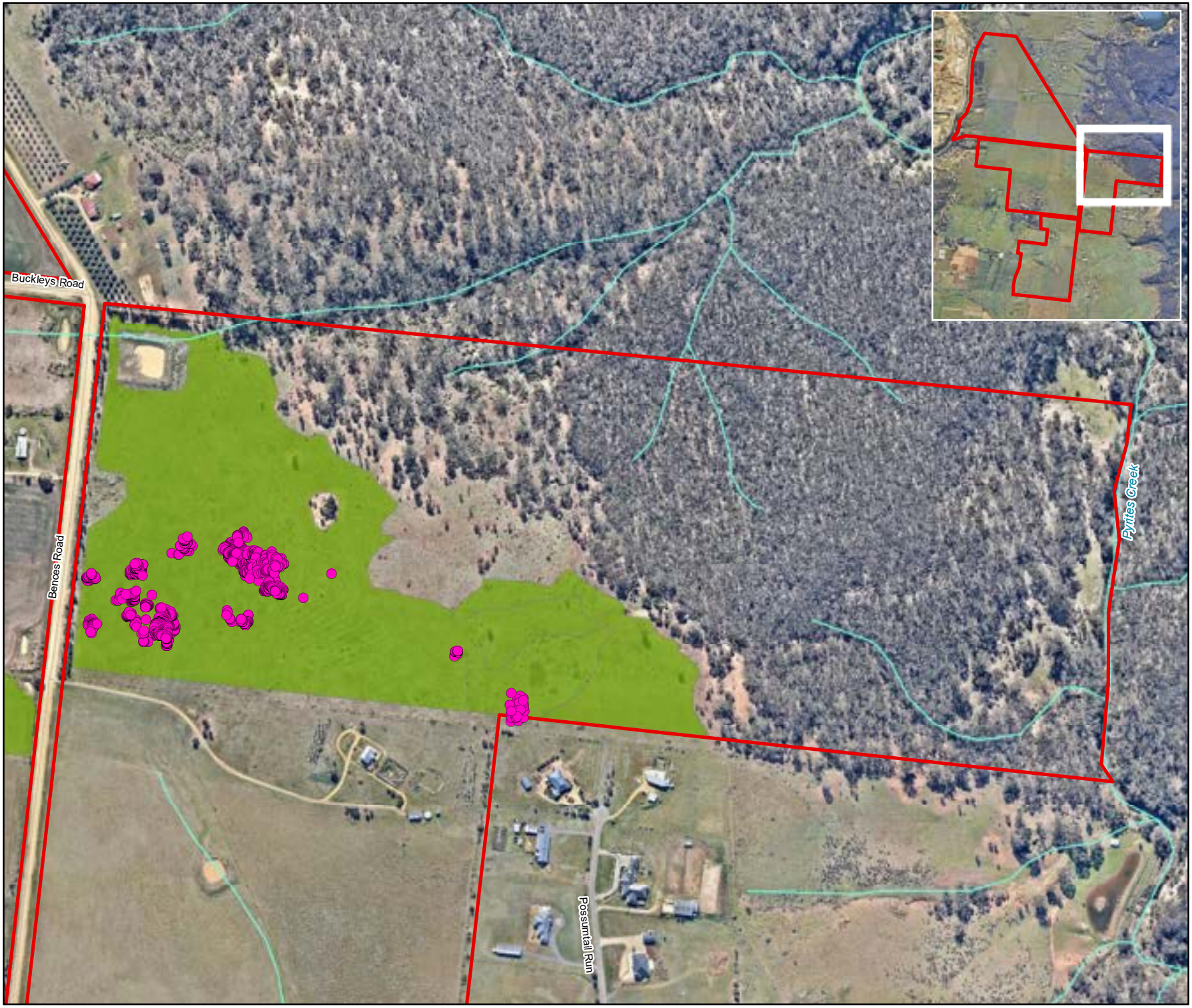
- Western (Basalt) Plains Grassland

N

0 15 30
Metres

10937_Fig03_SRF_SurvResults_fr9794 22/06/2022 Melsley

Aerial source: Nearmap 2017



Legend

- Study Area
- Spiny Rice-flower
- Natural Temperate Grassland of the Victorian Volcanic Plain

Figure 4b

Spiny Rice-flower Survey Results

Ecological Assessments for the Bacchus Marsh Development Project

N

0 50 100

Metres

ecology & heritage partners

10937_Fig03b_SRFResults_Prop16 22/06/2022 Melsley

Aerial source: Nearmap 2017

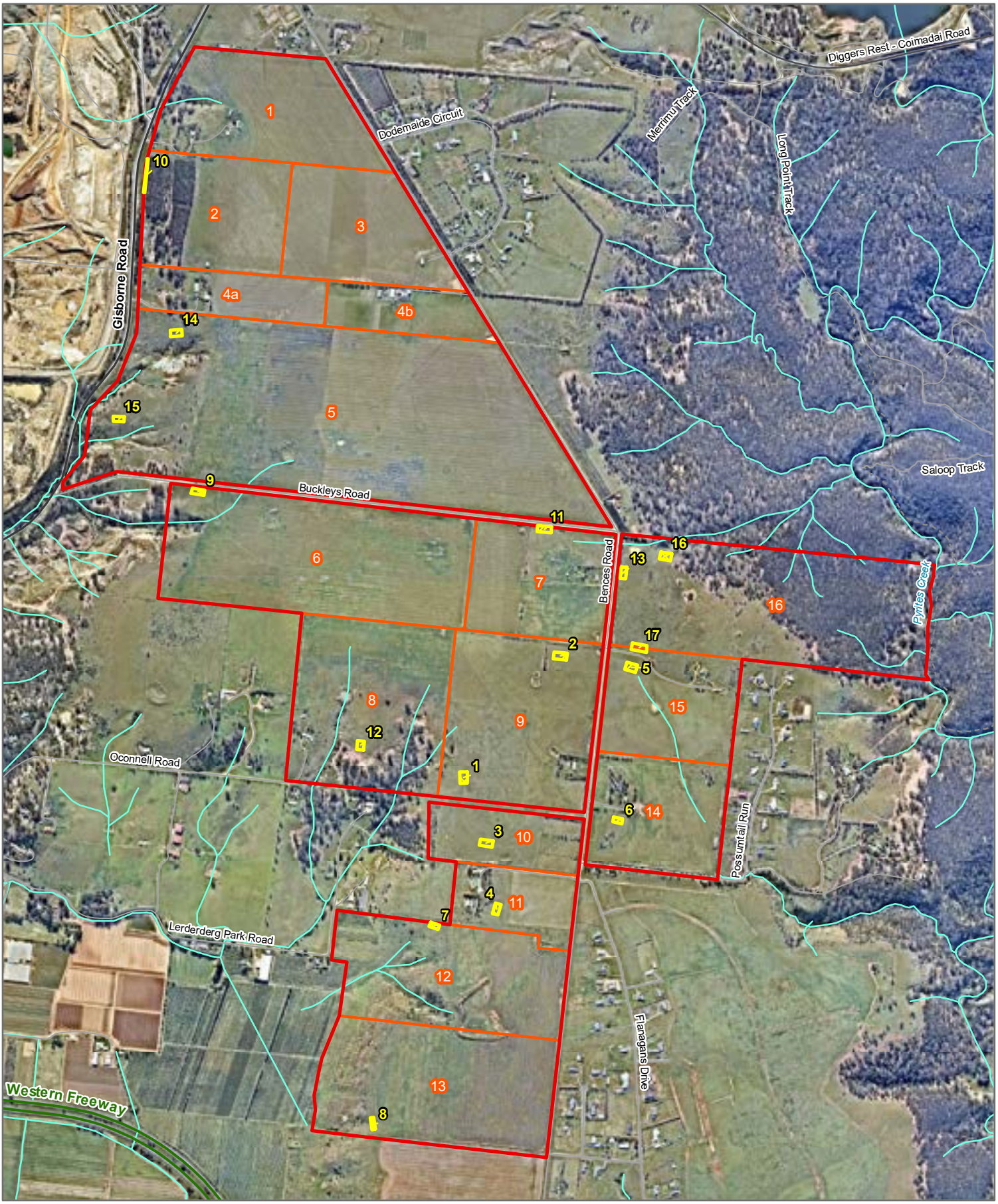


Figure 5
Striped Legless Lizard tile grid locations
Ecological Assessments for the Bacchus Marsh Development Project

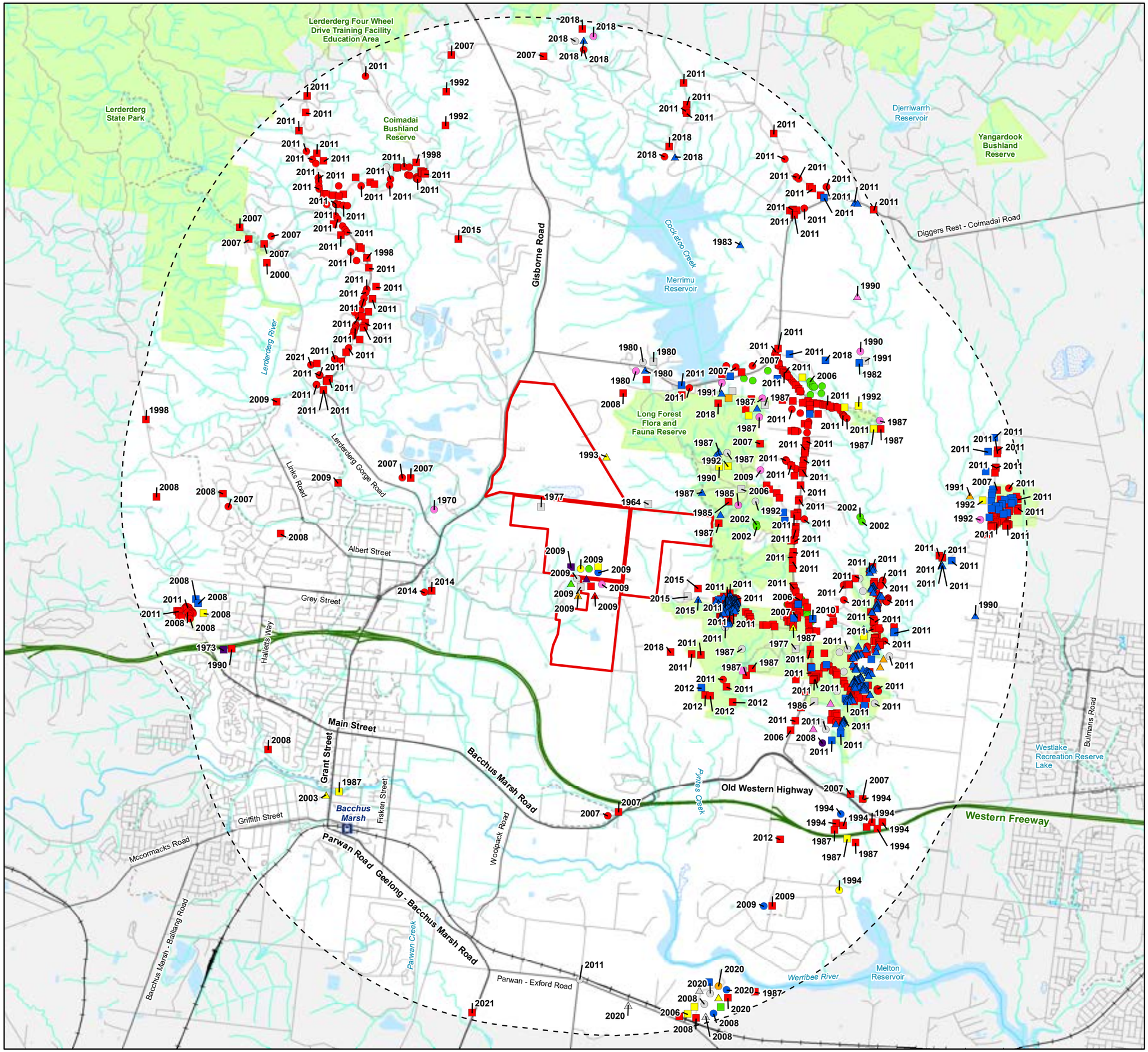
Legend
- Study Area
- Properties
- Tile grid location

N

0 200 400
Metres

10937_Fig05_SLLGrids_P 3/07/2023 melsley

Aerial source: Nearmap 2020



Legend

- Study Area

Significant flora

- Austral Tobacco
- Bacchus Marsh Wattle
- Basalt Podolepis
- Branching Groundsel
- Brittle Greenhood
- Buloke
- Cane Spear-grass
- Coast Twin-leaf
- Forked Rice-flower
- Fragrant Saltbush
- Giant Honey-myrtle
- Heath Spear-grass
- Matted Flax-lily
- Melbourne Yellow-gum
- Narrow-leaf Wax-flower
- Rough Wattle
- Rye Beetle-grass
- Satin Daisy-bush
- Snowy Mint-bush
- Spiny Rice-flower
- Tough Scurf-pea
- Werribee Blue-box
- Western Golden-tip
- Yellow Burr-daisy

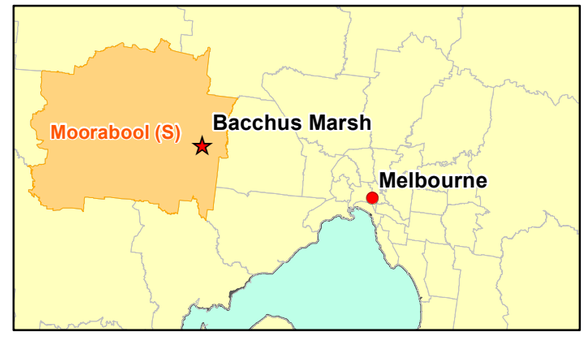


Figure 6

Previously documented significant flora within 5km of the study area

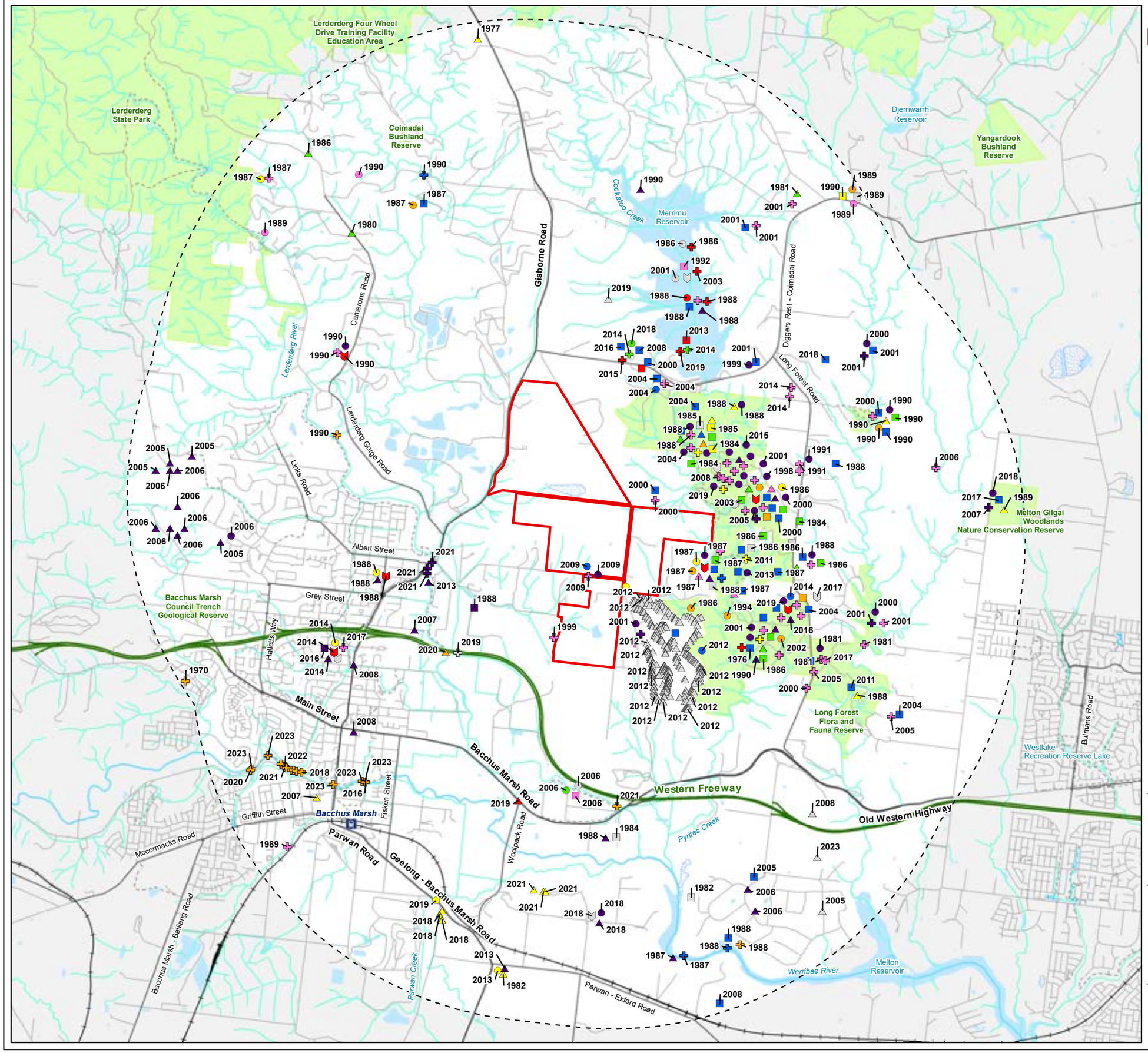
Ecological Assessments for the Bacchus Marsh Development Project

N

0 1 2

Kilometres

ecology & heritage partners



Legend

- Study Area

Significant fauna

- Australasian Shoveler
- Australian Gull-billed Tern
- Barking Owl
- Black Falcon
- Blue-billed Duck
- Blue-winged Parrot
- Brown Toadlet
- Brown Treecreeper
- Brush-tailed Phascogale
- Caspian Tern
- Chestnut-rumped Heathwren
- Common Dunnart
- Crested Bellbird
- Diamond Firetail
- Freckled Duck
- Gang-gang Cockatoo
- Golden Sun Moth
- Grey Goshawk
- Grey-headed Flying-fox
- Growling Grass Frog
- Hooded Robin
- Lace Monitor
- Latham's Snipe
- Little Eagle
- Magpie Goose
- Musk Duck
- Platypus
- Powerful Owl
- Sharp-tailed Sandpiper
- Southern Whiteface
- Speckled Warbler
- Swift Parrot
- White-bellied Sea-Eagle
- White-throated Needletail

Figure 7

Previously documented significant fauna within 5km of the study area

Ecological Assessments for the Bacchus Marsh Development Project

N

0 1 2

Kilometres

ecology & heritage partners

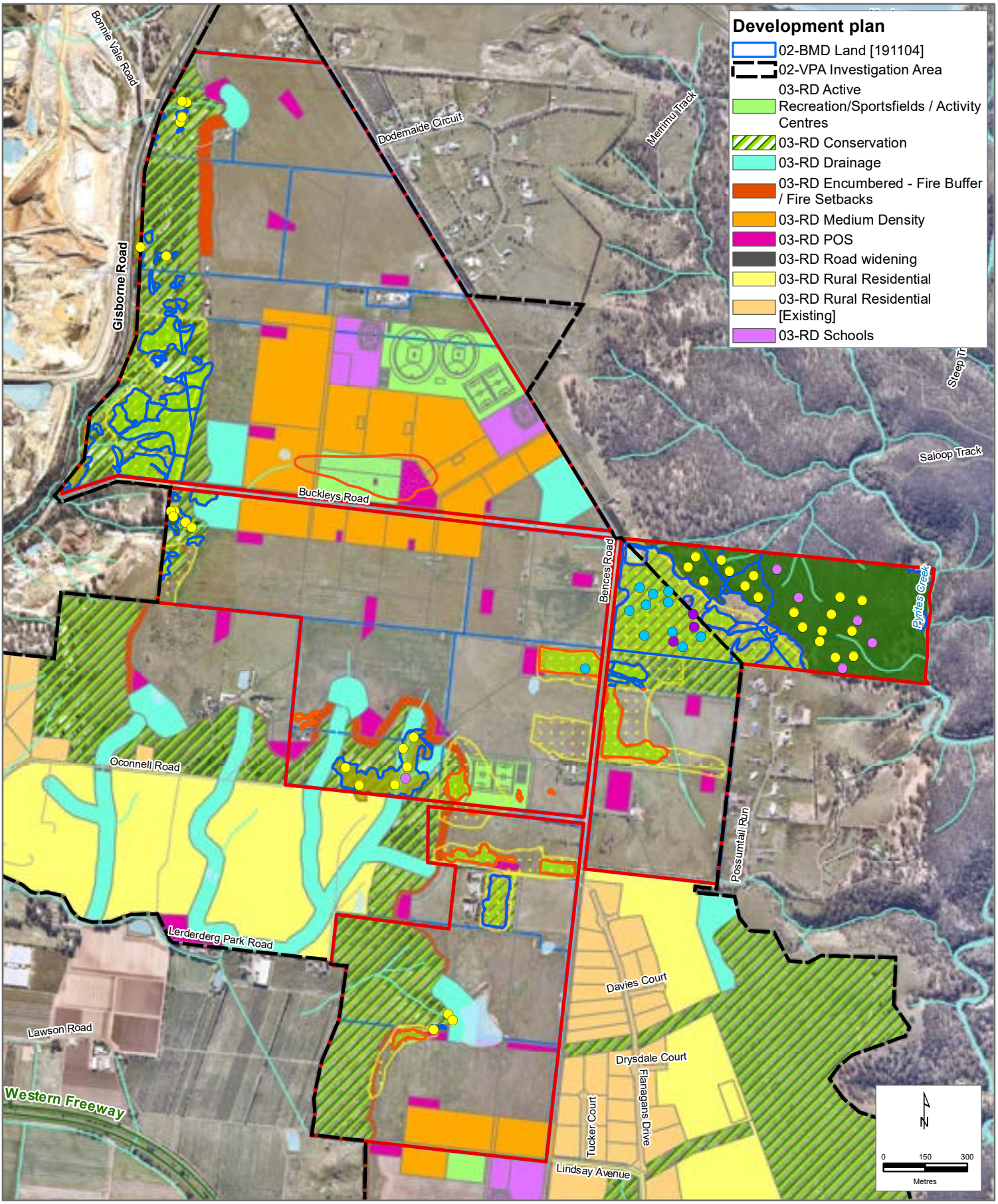


Figure 8

Develoment plan and ecological features

Ecological Assessments for the Bacchus Marsh

Legend

- Study Area
- Golden Sun Moth Habitat

VROTs

- Melbourne Yellow-Gum
- Slender Bindweed
- Fragrant Saltbush
- Black Roly-Poly

Ecological Vegetation Classes

- Grassy Woodland EVC 175
- Plains Grassland EVC 132
- Plains Grassy Wetland EVC 125
- Rocky Chenopod Woodland EVC 64
- Retained vegetation
- Removed vegetation

EPBC listed vegetation community

- Natural Temperate Grassland of the Victorian Volcanic Plain proposed to be removed
- Natural Temperate Grassland of the Victorian Volcanic Plain proposed to be retained

10937_Fig08_DP_EcoFeatP 3/12/2024 Melsley

Aerial source: Nearmap 2020

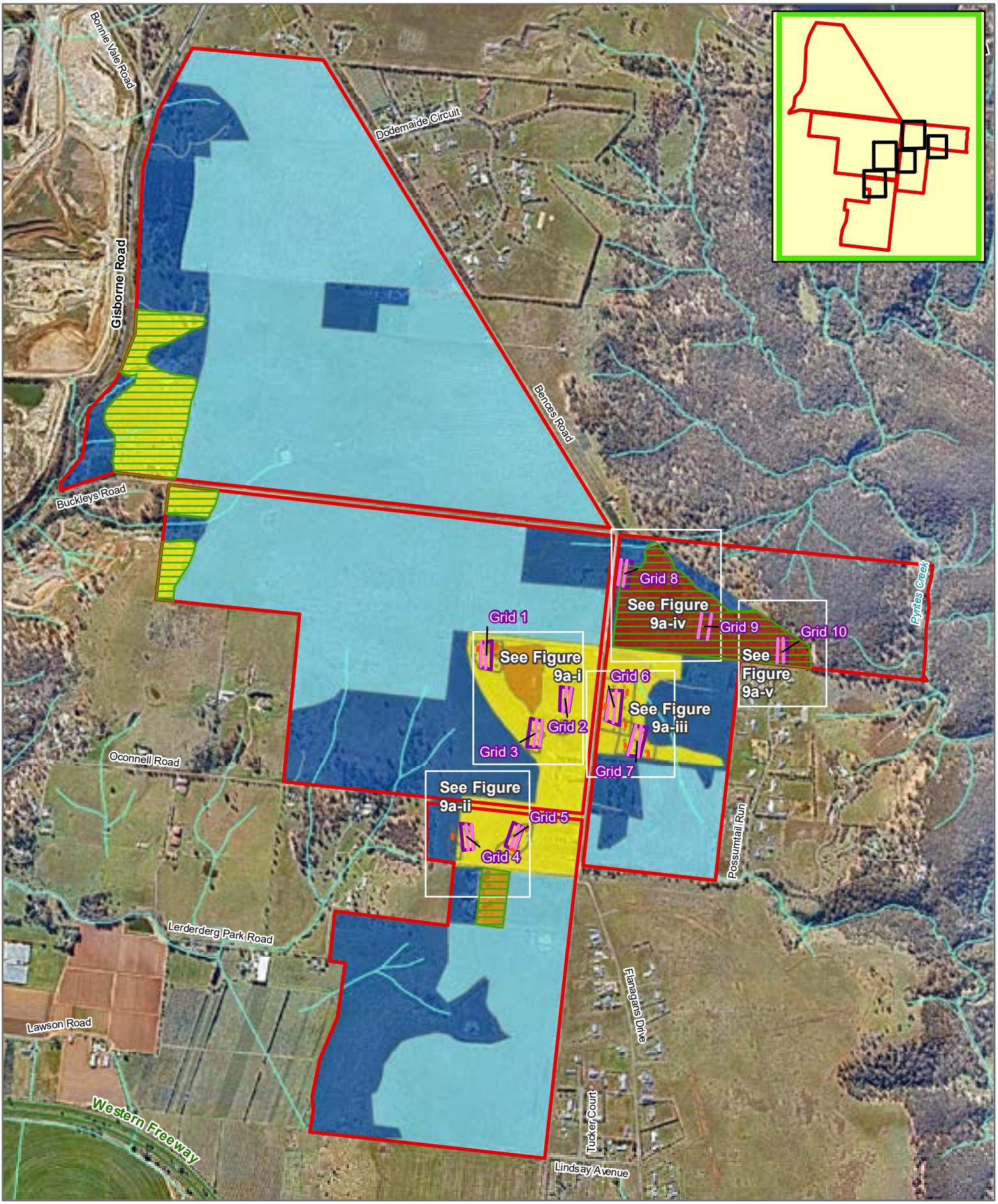


Figure 9a Overview

Victorian Grassland Earless Dragon survey methodology

Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

ecology & heritage partners

Legend

- Study Area
- Tile grids
- Burrow transects
- Mini-pitfall traps
- Areas exhibiting soil cracking
- Retained habitat

Habitat suitability

- High quality
- Moderate quality
- Low quality
- Unsuitable (Cropped/ploughed)
- Unsuitable (Other)

N

0 200 400

Metres

10937_Fig09a_VGEDMet_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

Figure 9a-i
Victorian Grassland Earless Dragon survey methodology
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Mini-pitfall traps
- Areas exhibiting soil cracking

Habitat suitability

- Moderate quality
- Low quality
- Unsuitable (Cropped/ploughed)
- Unsuitable (Other)

N

0 20 40
Metres

10937_Fig09a_VGEDMet_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

Figure 9a-ii
Victorian Grassland Earless Dragon survey methodology
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Mini-pitfall traps
- Areas exhibiting soil cracking
- Retained habitat

Habitat suitability

- Moderate quality
- Low quality
- Unsuitable (Cropped/ploughed)
- Unsuitable (Other)

N

0 20 40
Metres

10937_Fig09a_VGEDMet_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

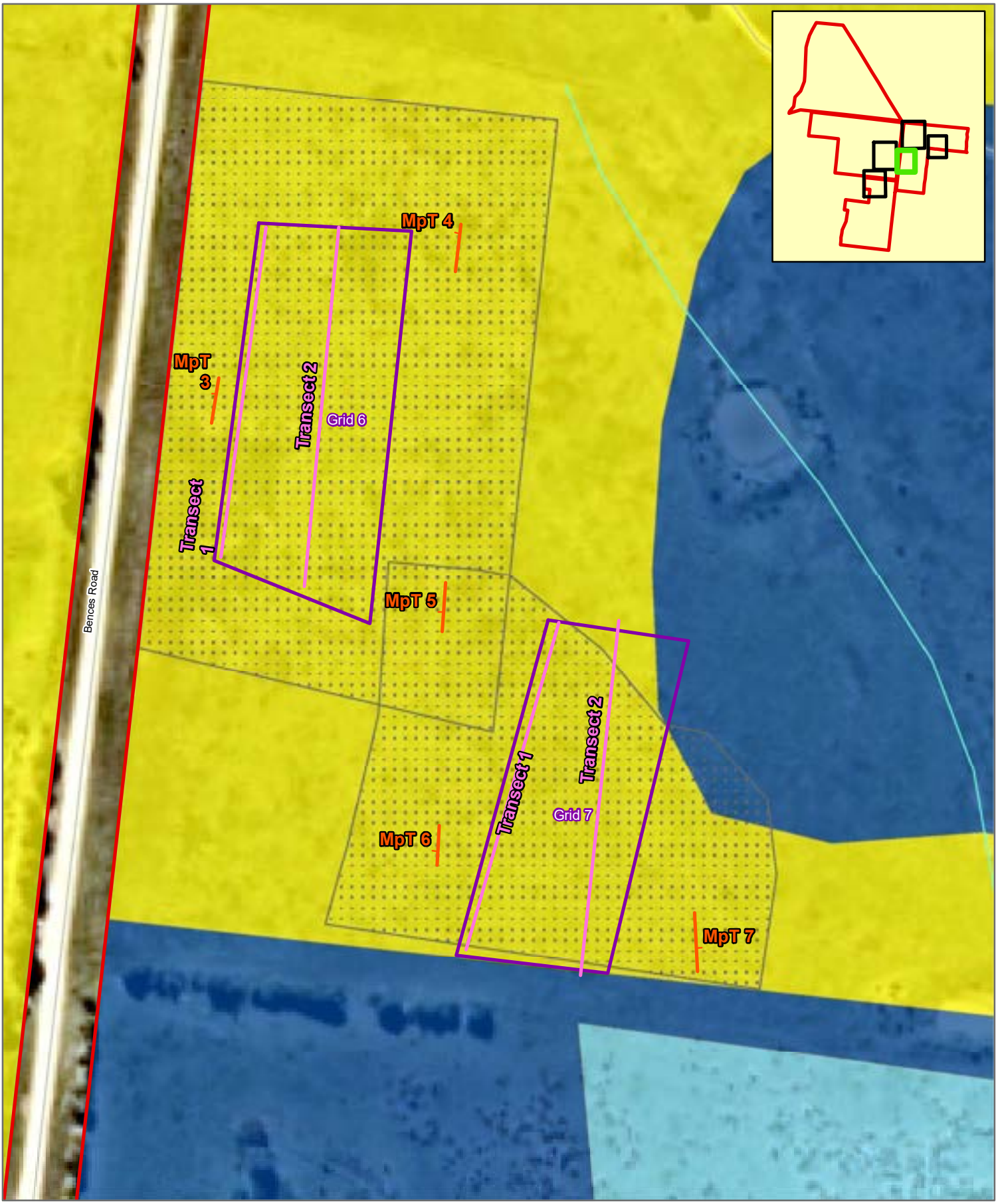


Figure 9a-iii
Victorian Grassland Earless Dragon survey methodology
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Mini-pitfall traps
- Areas exhibiting soil cracking

Habitat suitability

- Low quality
- Unsuitable (Cropped/ploughed)
- Unsuitable (Other)

N

0 15 30
Metres

10937_Fig09a_VGEDMet_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

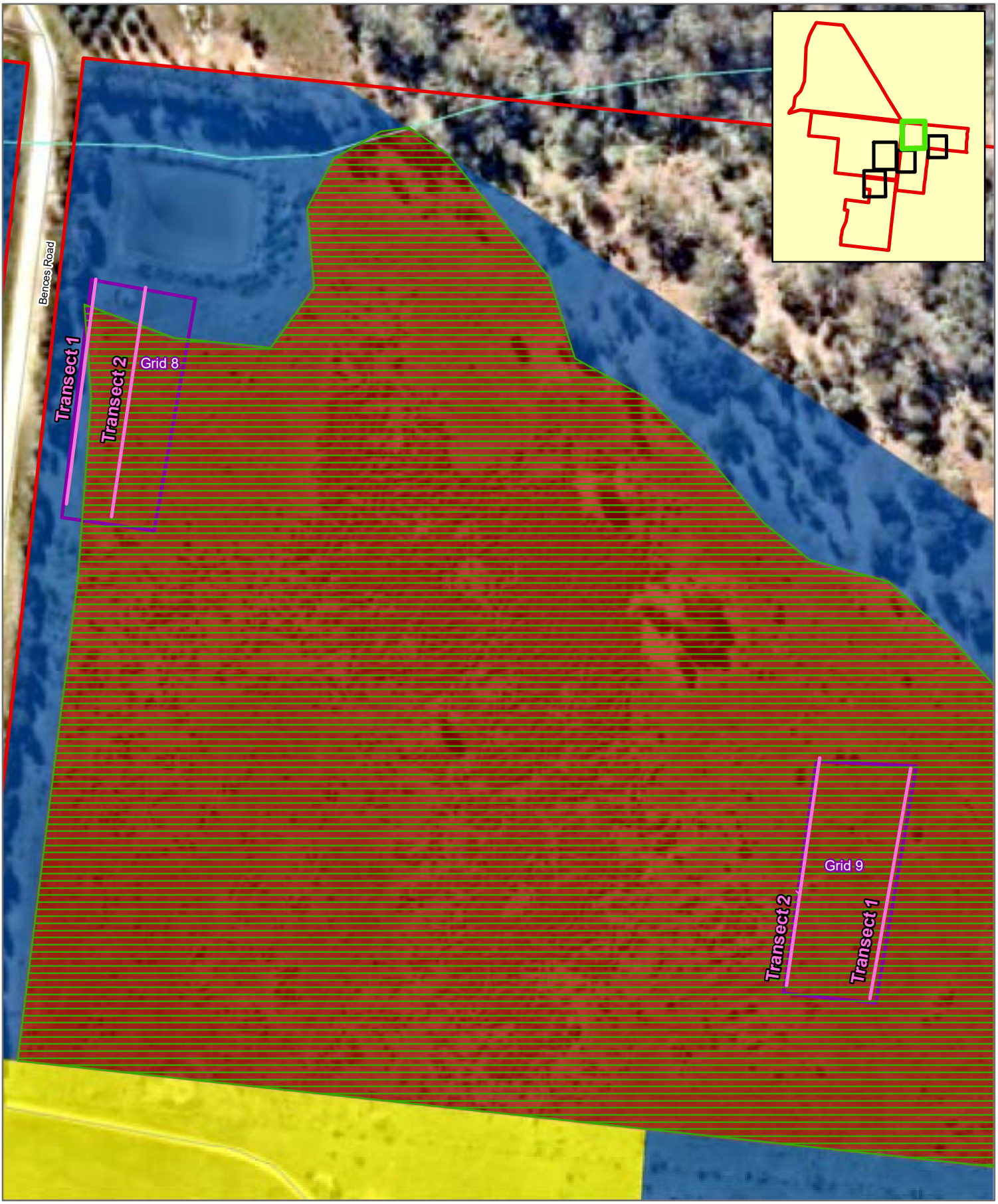


Figure 9a-iv
Victorian Grassland Earless Dragon survey methodology
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Retained habitat

Habitat suitability

- High quality
- Low quality
- Unsuitable (Other)

Moorabool (S)
Merrimu
Melbourne

N

0 20 40
Metres

10937_Fig09a_VGEDMet_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

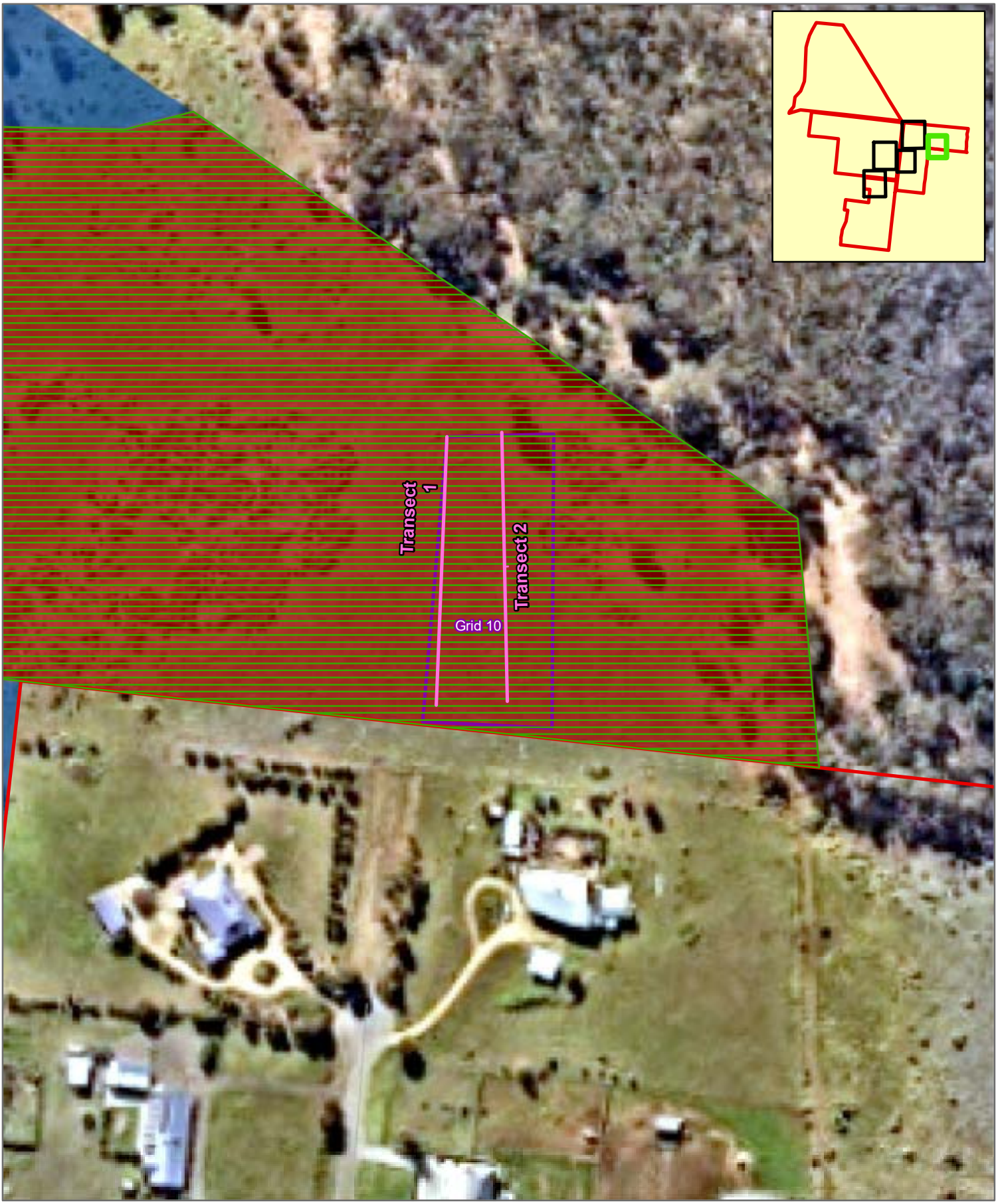


Figure 9a-v
Victorian Grassland Earless Dragon survey methodology
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Retained habitat

Habitat suitability

- High quality
- Unsuitable (Other)

N

0 15 30
Metres

10937_Fig09a_VGEDMet_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

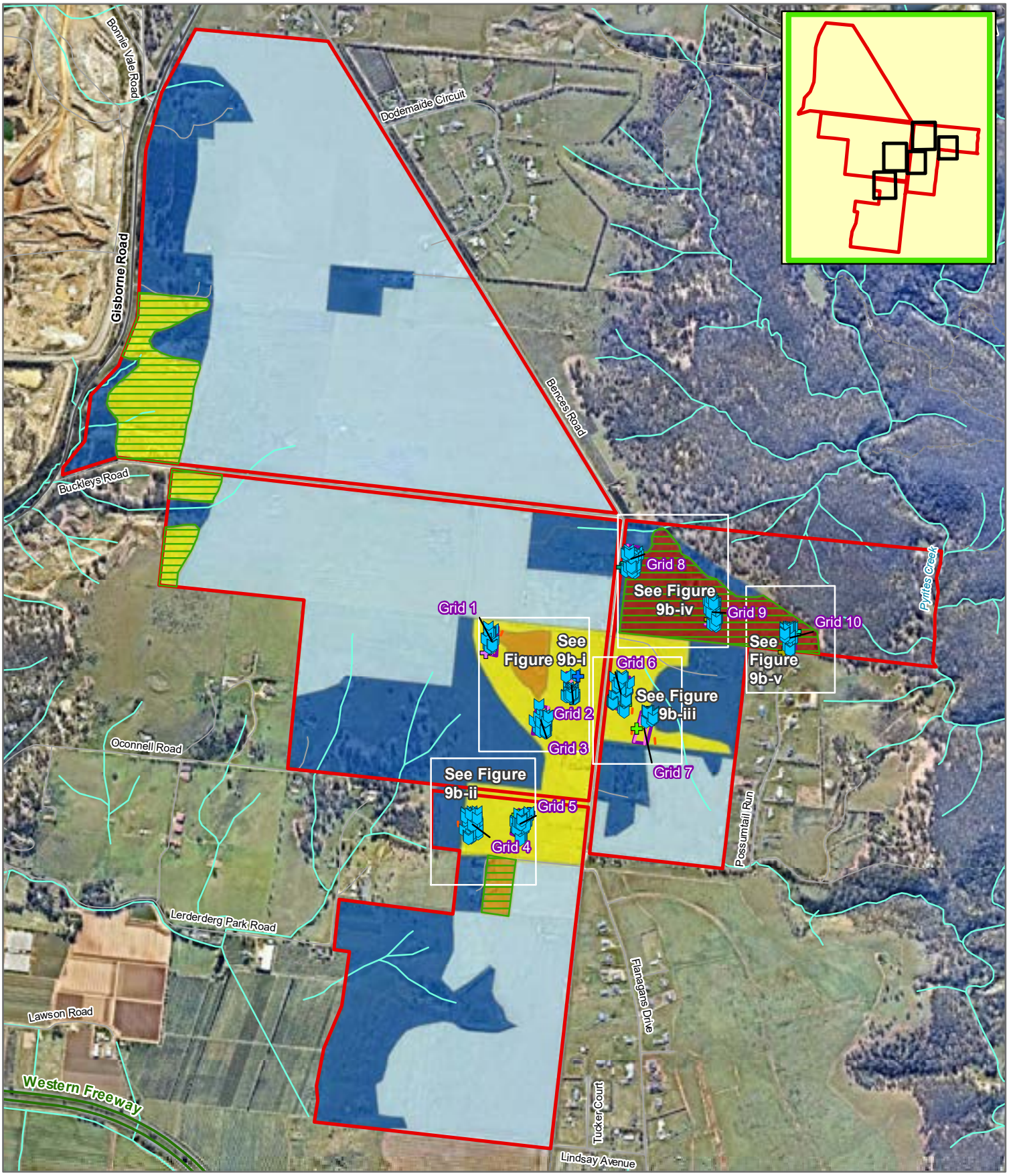


Figure 9b Overview

Victorian Grassland Earless Dragon survey results

Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Mini-pitfall traps
- Retained habitat

Species observed

- Common Garden Skink
- Eastern Blue-tongued Lizard
- Eastern Three-lined Skink
- Jacky Dragon
- Robust Striped-skink
- Southern Brown Tree Frog
- Southern Grass Skink
- Southern Marbled Gecko
- Spotted Marsh Frog

State significant species

- Tussock Skink

Habitat suitability

- High quality
- Moderate quality
- Low quality
- Unsuitable (Cropped/ploughed)
- Unsuitable (Other)

N

0 200 400

Metres

10937_Fig09b_VGEDSurveys_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

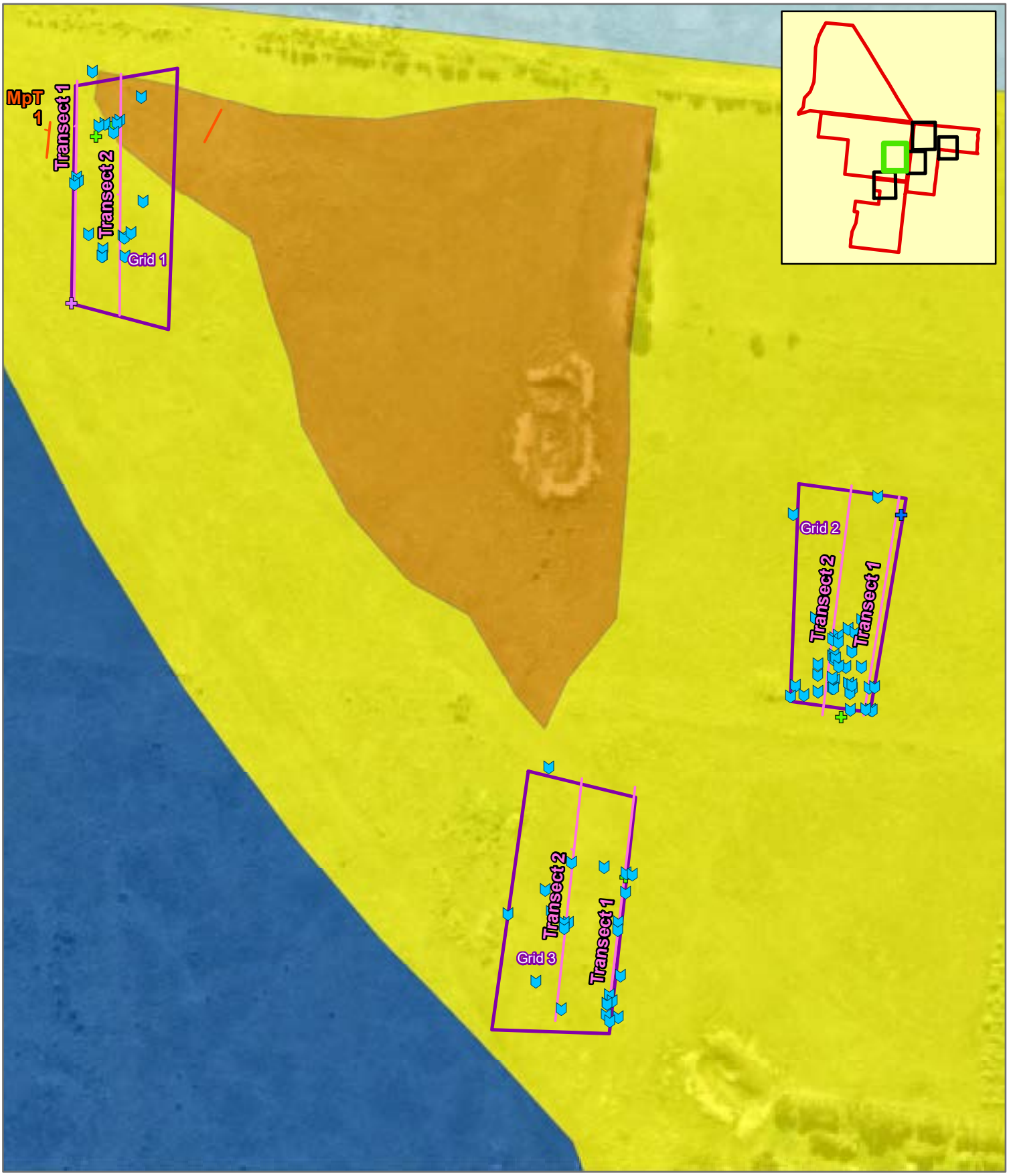


Figure 9b-i
Victorian Grassland Earless Dragon survey results
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Mini-pitfall traps

Species observed

- Common Garden Skink
- Eastern Three-lined Skink
- Spotted Marsh Frog

State significant species

- Tussock Skink

Habitat suitability

- Moderate quality
- Low quality
- Unsuitable (Cropped/ploughed)
- Unsuitable (Other)

N

0 20 40
Metres

10937_Fig09b_VGEDSurveys_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

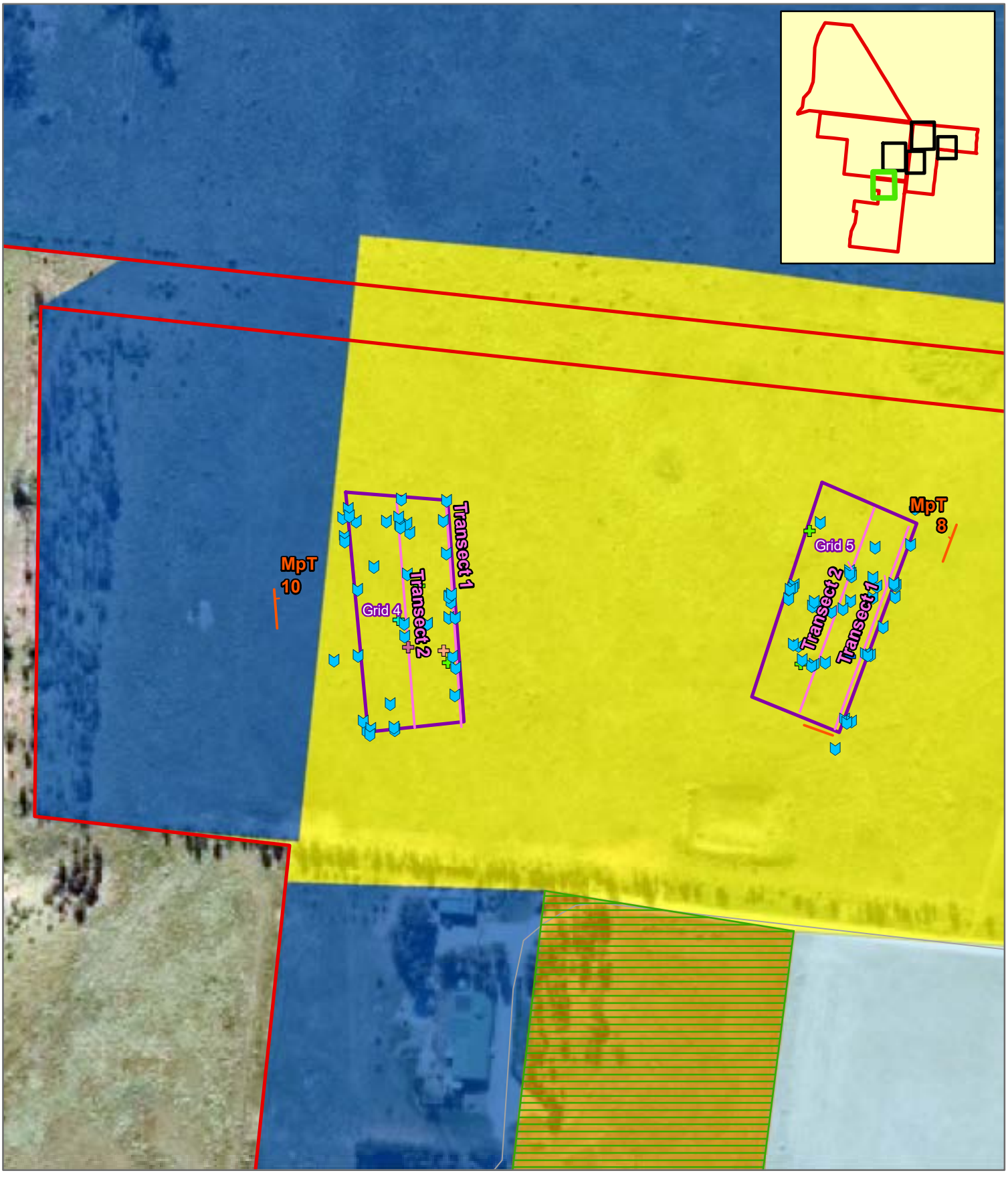


Figure 9b-ii
Victorian Grassland Earless Dragon survey results
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Mini-pitfall traps
- Retained habitat

Species observed

- Eastern Three-lined Skink
- Jacky Dragon
- Robust Striped-skink
- Southern Grass Skink
- Spotted Marsh Frog

State significant species

- Tussock Skink

Habitat suitability

- Moderate quality
- Low quality
- Unsuitable (Cropped/ploughed)
- Unsuitable (Other)

N

0 20 40
Metres

10937_Fig09b_VGEDSurveys_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

Figure 9b-iii
Victorian Grassland Earless Dragon survey results
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Mini-pitfall traps

Species observed

- Common Garden Skink
- Eastern Three-lined Skink

State significant species

- Tussock Skink

Habitat suitability

- Low quality
- Unsuitable (Cropped/ploughed)
- Unsuitable (Other)

N

0 15 30
Metres

10937_Fig09b_VGEDSurveys_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

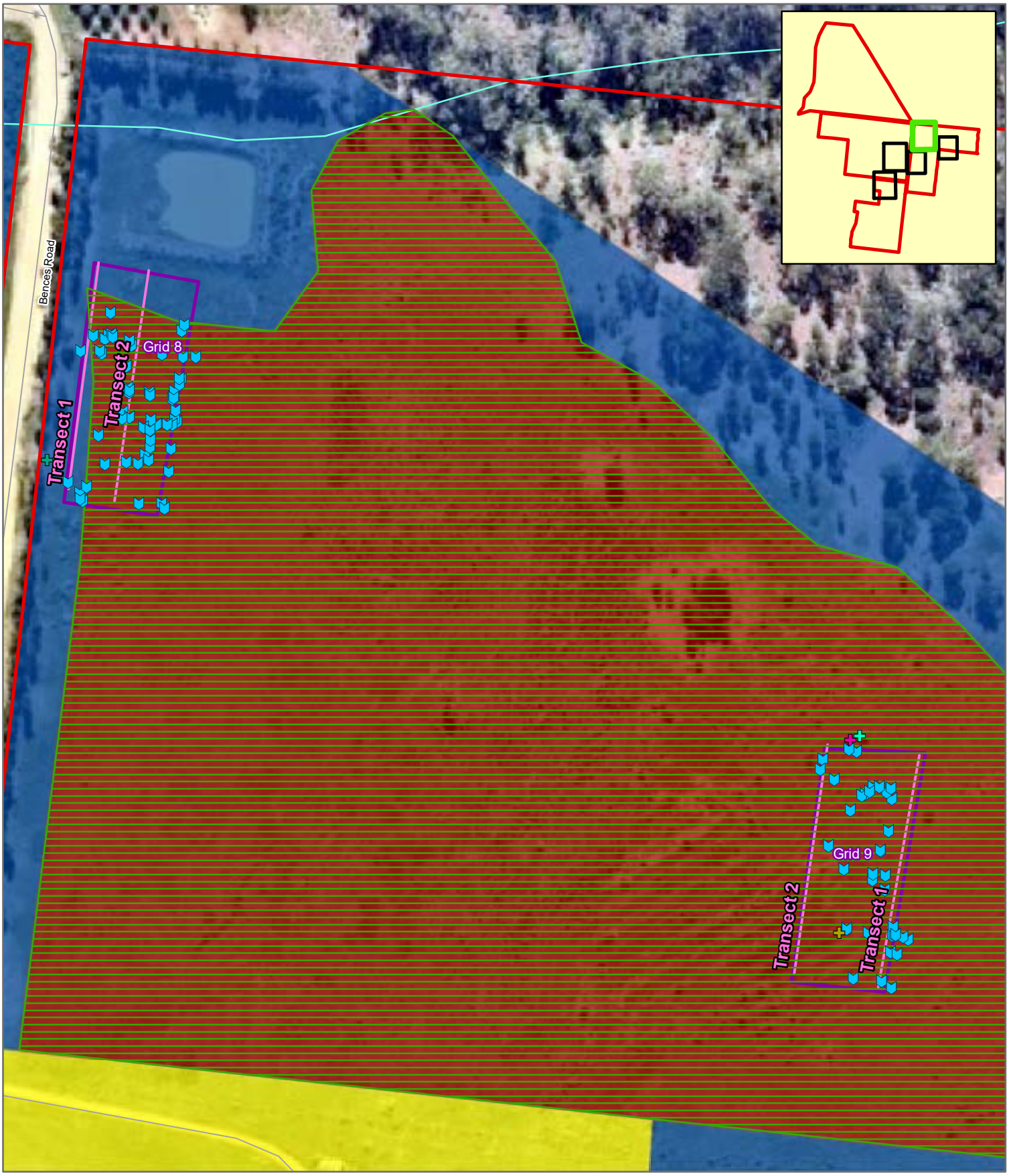


Figure 9b-iv
Victorian Grassland Earless Dragon survey results
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Retained habitat

Species observed

- Eastern Blue-tongued Lizard
- Jacky Dragon
- Southern Brown Tree Frog
- Southern Marbled Gecko

State significant species

- Tussock Skink

Habitat suitability

- High quality
- Low quality
- Unsuitable (Other)

N

0 20 40
Metres

10937_Fig09b_VGEDSurveys_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

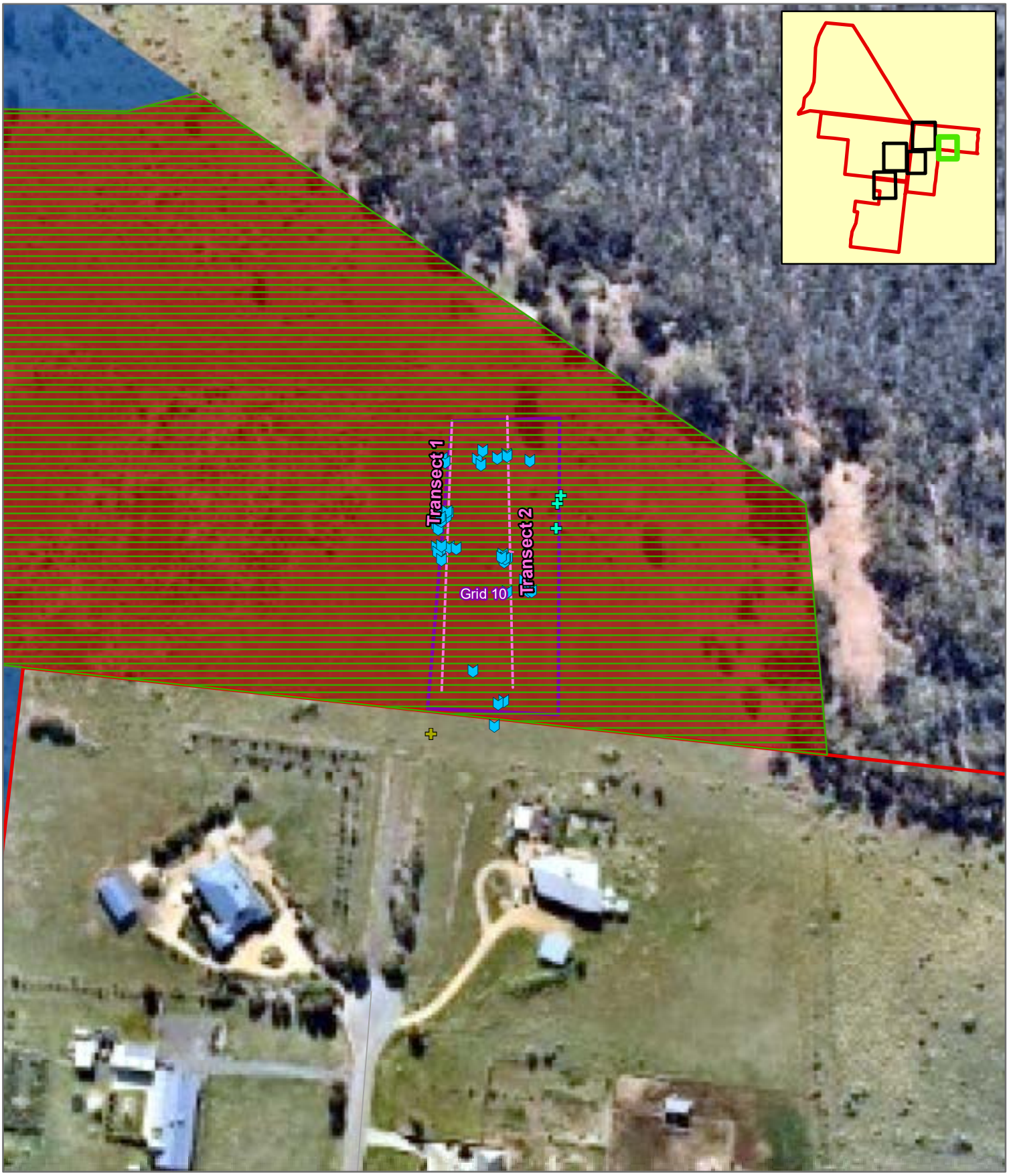


Figure 9b-v
Victorian Grassland Earless Dragon survey results
Ecological Assessments for the Bacchus Marsh Development Project

DRAFT

Legend

- Study Area
- Tile grids
- Burrow transects
- Retained habitat

Species observed

- Jacky Dragon
- Southern Brown Tree Frog

State significant species

- Tussock Skink

Habitat suitability

- High quality
- Unsuitable (Other)

N

0 15 30
Metres

10937_Fig09b_VGEDSurveys_PMB 8/12/2025 mrashidi

Aerial source: Nearmap 2020

APPENDICES

APPENDIX 1. VGED SURVEY RESULTS

Appendix 1.1. Tile Grid results

Table 22. VGED Tile Grid Survey Results. Weather and temperature data collected throughout the survey date; table shows the range within the survey period. Bold = FFG-Act listed species.

Tile Check #	Date	Grid #	Ambient Temp (°C)	Wind speed (km/ph)	Wind direction	Cloud Cover (%)	Above Tile Temp °C	Below Tile Temp °C	Rain (mm/24hr)	Observations (number of individuals if >1)
1	5/2/25	1-10	19.5-22	16.7-20.4	S,SE,SSE,SW,SSW	2-5	37.5-44.4	26.0-32.7	0	Eastern Three-lined Skink (3), Southern Grass Skink, **Tussock Skink**, Spotted Marsh Frog
2	12/2/25	1-10	23.1-32.1	7.4-16.7	E,ENE,NE,NNE	0-2	33.4-57.9	27.9-50.5	0	Eastern Three-lined Skink
3	19/2/25	1-10	14.2-21.8	14.8-24.1	S,SW,SSE,SSW	5-100	20.4-20.6	19.2-19.2	0	Eastern Three-lined Skink (6), Common Garden Skink (4), **Tussock Skink (2)**
4	24/2/25	1-10	18.9-20.0	14.8-22.2	SW,SSW	90-100	26.7-33.4	26.2-34.1	0	Eastern Three-lined Skink (4), **Tussock Skink**
5	28/2/25	1-10	25.1-33.9	24.1-46.3	N,NE,NNE,WSW	1-25	26.5-53.0	31.5-45.0	0	Eastern Three-lined Skink (2), **Tussock Skink**
6	3/3/25	1-10	16.6-21.2	18.5-27.8	S,SE,SSE,SSW	1-90	22.6-43.4	21.4-32.1	0	Eastern Three-lined Skink, **Tussock Skink (8),** Common Blue-tongue Lizard
7	5/5/25	1-10	24.9-34.2	13.0-38.9	N,NNE,NW	0-2	33.4-54.0	26.9-44.8	0	**Tussock Skink**
8	12/3/25	1-10	28.7-34.6	20.4-42.6	N,NNE,NW	65-80	31.7-45.3	30.8-37.2	0	Jacky Dragon
9	14/3/25	1-10	19.4-29.8	7.4-27.8	S,SE,SSW	3-10	38.6-50.0	29.0-44.3	0	Eastern Three-lined Skink (2), **Tussock Skink**, Jacky Dragon

Tile Check #	Date	Grid #	Ambient Temp (°C)	Wind speed (km/ph)	Wind direction	Cloud Cover (%)	Above Tile Temp °C	Below Tile Temp °C	Rain (mm/24hr)	Observations (number of individuals if >1)
10	19/3/25	1-10	20.3-32.8	7.4-29.6	N,NE,NNE,SSE	5-40	32.8-48.3	28.7-40.3	0	Eastern Three-lined Skink (4), **Tussock Skink (7)**
11	21/3/25	1-10	14.7-15.7	7.4-20.4	S,SSE,SSW	100	14.6-38.4	17.0-20.4	0.4	**Tussock Skink (16)**, Spotted Marsh Frog (2)
12	24/3/25	1-10	16.8-19.7	11.1-20.4	S,SW,SSW	98-100	17.1-23.4	13.8-21.9	0	**Tussock Skink (24)**, Jacky Dragon, Spotted Marsh Frog
13	26/3/25	1-10	17.2-20.2	7.4-22.2	S,SE,SSW,SSE	25-100	20.1-37.1	19.1-33.8	0	**Tussock Skink (20)**, Southern Brown Tree Frog
14	31/3/25	1-10	16.4-20.1	22.2-29.6	SE,SSE,ESE	50-80	21.3-27.8	19.2-24.8	0	Eastern Three-lined Skink, Southern Marbled Gecko, **Tussock Skink (25)**, Jacky Dragon (2)
15	2/4/25	1-10	16.0-24.7	1.8-18.5	N,NE,NNE,WNW	5-45	26.0-43.6	8.2-36.3	0	**Tussock Skink (23)**
16	7/4/25	1-10	14.3-17.4	16.7-33.3	WSW,SSE,SW	40-95	18.1-26.1	15.9-21.3	0	**Tussock Skink (24)**
17	9/4/25	1-10	15.0-22.7	3.7-14.8	NE,E,ESE,SW,NW	5-40	20.7-43.5	18.3-36.5	0	**Tussock Skink (12)**
18	14/4/25	1-10	18.1-21.1	14.8-24.1	S,SSE,SSW	55-100	19.9-32.1	18.8-28.7	0	**Tussock Skink (13)**; Jacky Dragon
19	16/4/25	1-10	19.6-26.2	25.9-40.8	N,NNE	60-85	23.9-42.4	25.1-35.1	0	**Tussock Skink (10)**
20	19/4/25	1-10	21.0-29.0	21.0-48.0	NE,ENE	60-80	28.0-36.9	25.7-25.6	0	**Tussock Skink (15)**
21	22/4/25	1-10	13.8-17.2	11.1-24.1	SW,SSW	85-100	12.4-25.6	12.5-21.1	0	**Tussock Skink (19)**; Eastern Striped Skink, Southern Brown Tree Frog, Spotted Marsh Frog
22	30/4/25	1-10	15.2-17.3	20.4-31.5	SE,SSE	5-30	16.8-23.9	14.7-23.6	0	**Tussock Skink (10)**
23	2/5/25	1-10	16.1-19.9	13.0-18.5	N,NW,NNW,NNE	0	21.6-31.7	14.2-21.3	0	**Tussock Skink (17)**
24	7/5/25	1-10	16.5-20.0	20.4-37.0	WNW,W,WSW	50-90	15.6-24.3	15.9-21.2	0.6	**Tussock Skink (17)**
25	9/5/25	1-10	13.6-16.4	1.8-14.8	W,WSW,SSW,S	5-60	18.7-29.5	15.8-24.8	0	**Tussock Skink (20)**

Tile Check #	Date	Grid #	Ambient Temp (°C)	Wind speed (km/ph)	Wind direction	Cloud Cover (%)	Above Tile Temp °C	Below Tile Temp °C	Rain (mm/24hr)	Observations (number of individuals if >1)
26	12/5/25	1-10	16.5-21.5	5.5-18.5	N,S,SSE	5-10	21.9-32.2	18.6-31.0	0	**Tussock Skink (24)**
27	14/5/25	1-10	14.4-19.5	9.3-13.0	SW,SSE,S	15-50	15.7-31.4	15.1-30.9	0	**Tussock Skink (19)**
28	16/5/25	1-10	10.3-15.3	11.1-13.0	W	100	13.4-24.4	10.8-22.9	0	**Tussock Skink (11)**
29	19/5/25	1-10	10.3-13.5	9.3-24.1	S,SSW,SSE,SE	0-5	15.1-22.0	10.5-18.5	0	**Tussock Skink (8)**
30	21/5/25	1-10	8.5-15.3	1.8-14.8	N,WNW,SSE,E,S	2-3	14.5-26.1	8.5-25.4	0	**Tussock Skink (10)**
31	23/5/25	1-10	13.7-15.7	0-11.1	S,SW,SSE,WSW	60-100	15.7-23.1	14.3-23.7	0	**Tussock Skink (12)**
32	26/5/25	1-10	13.7-18.8	20.4-37.0	NNE,NNW,NE	0	19.1-26.1	15.9-20.4	0	**Tussock Skink (13)**
33	28/5/25	1-10	11.9-13.9	16.7-31.5	WSW,SW	90-97	11.4-15.2	10.1-13.3	0	**Tussock Skink (3)**

Appendix 1.2. Artificial Burrow results

Table 23. VGED Artificial Burrow Survey Results. Weather and temperature data collected throughout the survey date; table shows the range within the survey period. Note: ^ = results in Appendix 1.1. Bold = FFG-Act listed species.

Tile Check #	Date	Ambient Temp (°C)	Wind speed (km/ph)	Wind direction	Cloud Cover (%)	Rain (mm/24hr)	Observations (number of individuals if >1)
1	28/2/25	^	^	^	^	^	**Tussock Skink**
2	3/3/25	^	^	^	^	^	-
3	5/3/25	^	^	^	^	^	-
4	7/3/25	21.2-28.1	3.7-14.8	WNW,SSE,E,S,W	40-70	0	-
5	12/3/25	^	^	^	^	^	-
6	14/3/25	^	^	^	^	^	-
7	17/3/25	14.3-16.4	14.8-27.8	S,SW,SSW	15-90	0	-

Tile Check #	Date	Ambient Temp (°C)	Wind speed (km/ph)	Wind direction	Cloud Cover (%)	Rain (mm/24hr)	Observations (number of individuals if >1)
8	19/3/25	^	^	^	^	^	-
9	21/3/25	^	^	^	^	^	-
10	24/3/25	^	^	^	^	^	-
11	26/3/25	^	^	^	^	^	Spotted Marsh Frog (2)
12	28/3/25	22.5-25.3	31.5-53.7	N,NNE	40-65	0	-
13	31/3/25	^	^	^	^	^	-
14	2/4/25	^	^	^	^	^	-
15	4/4/25	13.6-15.8	11.1-18.5	WSW,SW,SSW	90-98	0	-
16	7/4/25	^	^	^	^	^	-
17	9/4/25	^	^	^	^	^	-
18	14/4/25	^	^	^	^	^	-
19	16/4/25	^	^	^	^	^	-
20	22/4/25	^	^	^	^	^	-
21	24/4/25	22.7-25.0	42.6-44.5	NNE	15-50	0	-
22	30/4/25	^	^	^	^	^	-
23	2/5/25	^	^	^	^	^	Spotted Marsh Frog
24	7/5/25	^	^	^	^	^	-
25	12/5/25	^	^	^	^	^	-
26	21/5/25	^	^	^	^	^	-
27	26/5/25	^	^	^	^	^	-

Appendix 1.3. Mini-pitfall Trap results

Table 24. VGED Mini-pitfall Trap Survey Results. Weather and temperature data collected throughout the survey date; table shows the range within the survey period. Note: ^ = results in Appendix 1.1 or Appendix 1.2. Bold = FFG-Act listed species.

Tile Check #	Date	Ambient Temp (°C)	Wind speed (km/ph)	Wind direction	Cloud Cover (%)	Rain (mm/24hr)	Observations (number of individuals if >1)
1	12/4/25	27.1-29.2	11.1-18.5	SW	80	0	Spotted Marsh Frog
2	13/4/25	31.0-31.2	27.8-29.4	N	5-10	0	-
3	14/4/25	^	^	^	^	^	-
4	15/4/25	25.3-26.2	14.8-20.4	NE,ENE	5	0	Spotted Marsh Frog
5	16/4/25	^	^	^	^	^	-
6	17/4/25	^	^	^	^	^	-
7	18/4/25	30.7	37.0	N	10	0	**Tussock Skink**
8	19/4/25	^	^	^	^	^	-
9	20/4/25	20.3-25.0	16.7-37.0	NE,S	20-70	0	-
10	21/4/25	20.3	16.7	S	70	0	-
11	22/4/25	^	^	^	^	^	-
12	23/4/25	21.2	1.8	SE	15	0	-
13	24/4/25	^	^	^	^	^	-

APPENDIX 2. ENVIRONMENT MANAGEMENT PLAN

APPENDIX 3. ONSITE OFFSET MANAGEMENT PLAN

APPENDIX 4. OFFSITE OFFSET MANAGEMENT PLAN