Draft Report

EPBC 2018/8271: On-Site Offset Management Plan: Merrimu, Victoria

Prepared for

Bacchus Marsh Developments Pty Ltd

February 2025

Ecology and Heritage Partners Pty Ltd

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DOCUMENT CONTROL

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- The landowner for access onto the proposed offset site and site information.
- Victorian Department of Energy, Environment and Climate Action (DEECA) for access to online ecological databases.

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this Management Plan (EPBC 2018/8271: Offset Management Plan, Merrimu, Victoria) is complete, current and correct.
2. I am the designated proponent or the approval holder for this action.
3. I am aware that:
    a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.
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    c. The above offences are punishable on conviction by imprisonment, a fine or both.

_____
Signed

_____
Full name (please print)

_____
Organisation (please print)

_____
Date

EXECUTIVE SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was engaged by Bacchus Marsh Developments Pty Ltd (herein referred to as BMD) to prepare an Offset Management Plan (OMP) to compensate for the proposed impacts to 22.657 hectares of confirmed habitat for Golden Sun Moth *Synemon plana* (GSM) and 1.783 hectares of the *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) ecological community associated with the proposed development of land several parcels of land located in Merrimu, Victoria (the impact site)

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 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.

Offset sites

Previous assessments conducted by Ecology and Heritage Partners have confirmed the presence of a population of GSM and the presence of a high-quality remnant of *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) within the proposed offset sites, and the information within those reports supported the preparation of this OMP.

The proposed offset site is located onsite, immediately adjacent to the proposed development area (i.e. impact site) and is located within the same bioregions and municipality as the proposed impact site.

The proposed onsite offset comprise 6.4 hectares of GSM habitat and 4.3 hectares of the NTGVVP ecological community.

The proposed offset site supports high quality GSM habitat and a high quality remnant of the NTGVVP ecological community, and comprises a ground layer comprising a moderate to high cover of Wallaby-grass including Slender Wallaby-grass *Rytidosperma racemosum* var. *racemosum* and Common Wallaby-grass *Rytidosperma caespitosum*.

The site will be protected through a Section 69 Agreement under the *Conservation, Forests and Land Act 1987*. The Victorian Department of Energy, Environment and Climate Action (DEECA) undertakes a rigorous quality assurance process for all offset sites to ensure the landowner agreements address the management commitments in the plan.

Objectives of the Offset Management Plan

This OMP provides detailed management actions for the identified GSM population and NTGVVP ecological community at the offset site that will lead to a net benefit for the species and community. The proposed removal of NTGVVP and confirmed GSM habitat at the development site will be partially offset through the protection of 6.4 hectares of confirmed GSM habitat and 4.3 hectares of NTGVVP. The objectives of the OMP is to provide:

- Maintain and improve the condition of 6.4 hectares of GSM habitat and 4.3 hectares of NTGVVP at the offset site in a manner consistent with the EPBC Act Environmental Offsets Policy;

- Support establishment of legal security arrangements for the in perpetuity protection and management of the offset site;
- Undertake management actions to protect, maintain and improve the quality of NTGVVP and GSM habitat within the offset sites;
- Provide a timetable of management and monitoring actions, outcomes and progress reviews; and,
- Detail appropriate monitoring and evaluation of management actions and completion criteria.

This OMP will allow for a net benefit to NTGVVP and GSM through long-term protection and management of the existing population and community at the proposed offset sites.

CONTENTS

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was engaged by Bacchus Marsh Developments Pty Ltd (herein referred to as BMD) to prepare an Offset Management Plan (OMP) to compensate for the proposed impacts to 22.657 hectares of confirmed habitat for Golden Sun Moth *Synemon plana* (GSM), and 1.783 hectares of the Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP) ecological community associated with the development of land several parcels of land located in Merrimu, Victoria (the impact site) (Figure 1; Figure 2).

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 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.

The intention of this OMP is to support the Preliminary Documentation (PD) response, and to detail the ongoing management actions required to protect and maintain GSM habitat and the NTGVVP ecological community at an onsite offset located at Bences Road, Merrimu, Victoria. The OMP has been written in consultation with the landowner of the offset site (BMD) and is intended to be implemented by BMD.

To partially compensate for the proposed removal of 22.657 hectares of confirmed GSM habitat and 1.783 hectares of the NTGVVP community, this OMP details the proposed management and monitoring actions associated with the proposed protection and maintenance of 6.4 hectares of confirmed GSM habitat and 4.3 hectares of high quality NTGVVP within a site located in Merrimu, Victoria (the onsite offset site).

Previous assessments conducted by Ecology and Heritage Partners (2018a; 2018b) have confirmed the presence of a population of GSM and the presence of a high-quality remnant of NTGVVP within the offset sites, and the information within those reports supported the preparation of this OMP.

The Merrimu onsite offset sites are located immediately adjacent to the proposed development area (i.e. impact site) and is located within the same bioregions and municipality as the proposed impact site.

The proposed offset sites are privately owned, supports extensive areas of remnant native grassland, and is proposed to be managed for the purposes of conservation.

1.2 Objectives

The objective of the OMP is to detail how impacts to GSM and NTGVVP will be mitigated through offsetting impacts by securing, protecting and maintaining existing GSM habitat and NTGVVP within the proposed offset site. The objectives of this plan are to:

- Maintain the condition of 6.4 hectares of GSM habitat and 4.3 hectares of the NTGVVP ecological community at the offset site in a manner consistent with the EPBC Act Environmental Offsets Policy;
- Support establishment of legal security arrangements for the in perpetuity protection and management of the offset site;

- Undertake management actions to protect and maintain the quality of GSM habitat and the NTGVVP ecological community within the offset site;
- Provide a timetable of management and monitoring actions, outcomes and progress reviews; and,
- Detail appropriate monitoring and evaluation of management actions and completion criteria.

This OMP is consistent with regional priority recovery and threat abatement actions in the Commonwealth Conservation Advice for *Synemon plana* (GSM) (DAWE 2021) and the NTGVVP community (DEWHA 2008), including:

- Establishing formal conservation arrangements, management agreements and covenants on private land;
- Preventing ongoing loss and degradation of habitat and retaining and protecting natural vegetation remnants within the known distribution of the species;
- Monitoring known populations to determine the species' status;
- Monitoring the effectiveness of management actions and the need to adapt them if necessary;
- Control of invasive weeds that threaten habitat; and,
- Implementation of appropriate grazing and burning to maintain and enhance habitat values for the species.

1.3 Report Structure

This OMP structured as follows:

Introduction (Section 1)

This section summarises the background information relevant to the Project, including the purpose and scope of the work and the assessment methodology.

Part A: Offset Suitability (Section 2)

This section assesses the suitability of the proposed offset site, and includes details regarding the proposed clearing, gain and site improvement calculations. Part A should be read in conjunction with Part B, but due to its technical nature, the information it contains is not intended to be placed on title (e.g. s69 agreement under the *Conservation, Forests and Land Act 1987* [CFL Act]).

Part B: Offset Implementation (Section 3)

This section describes how the offset is to be implemented. Part B includes details regarding landowner and EPBC Act approval holder commitments, management activities, monitoring and reporting. This section is intended for those responsible for implementing the OMP, including the landowner (and any future landowners) and the approval holder. Information in this section is intended to be placed on title.

The plan also addresses the requirements of guidelines for the preparation of an OMP under the EPBC Act Environmental Offsets Policy (DSEWPaC 2012a).

2 PART A: OFFSET SITE SUITABILITY

This section provides details of the clearing site, assesses the suitability of the proposed offset site, and includes details regarding proposed clearing, gain and site improvement calculations.

The location of the impact site and the proposed offset site are provided in Figures 1 and 2 (impact site), and Figures 3 and 4 (offset site) respectively.

2.1 Impact Site Details

A total of 58.298 hectares of GSM habitat and 17.665 hectares of the NTGVVP ecological community were identified within the proposed development site. Of this, a total of 22.657 hectares of GSM habitat and 1.783 hectares of the NTGVVP community is proposed to be removed as part of the proposed action (Table 1; Figure 2).

The proposed development site also supports a large population of Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*. However, no Spiny Rice-flower specimens are proposed to be impacted as part of the proposed action.

No other matters of National Environmental Significance (NES) were recorded within the study area or are considered likely to occur (Ecology and Heritage Partners 2018a; 2018b).

The proposed action will have a direct impact on two matters of NES: GSM and the NTGVVP ecological community. Impacts associated with the proposed development are summarised in Table 1.

Table 1. Matters of ecological significance to be impacted within the development site.

Ecological Value	Impacted	Retained	Total
NTGVVP	1.783 hectares	15.882 hectares	17.665 hectares
GSM	22.657 hectares	35.641 hectares	58.298 hectares

Of the 22.657 hectares of impact to GSM habitat, a total of 6.4 hectares of impact is proposed to be mitigated through the on-site offset (as detailed in this OMP), while 38.6 hectares of impact is proposed to be mitigated through the Glenhope offsite offset. An OMP relating to the Glenhope offsite offset has been prepared separately to this report (Ecology and Heritage Partners 2024).

Henceforth, this OMP addresses Section 6a – 6i of the Request for Additional Information as it relates to the onsite (Merrimu) offset for GSM and NTGVVP only.

2.1.1 Habitat

2.1.1.1 Golden Sun Moth

The impact site supports large expanses of the species preferred habitat (i.e. native and introduced grasslands) throughout. The species' preferred host plants (i.e. Wallaby-grasses *Rytidosperma* spp., Spear-grasses *Austrostipa* spp., and Kangaroo Grass *Themeda triandra*) are scattered throughout much of the site and occur in highest densities within patches of Plains Grassland Ecological Vegetation Class (EVC). In addition to this,

there are scattered infestations throughout the site of the Weed of National Significance (WoNS), Chilean Needle-grass *Nassella neesiana,* which is known to also provide suitable habitat for the threatened GSM.

The highest quality GSM habitat (i.e. open tussock grassland dominated by Wallaby-grass) that supported the highest numbers of GSM (i.e. Bences Road site) will be retained as part of the proposed action, with a portion of this used as an onsite offset (Figure 2; Figure 3).

Habitat proposed to be removed supports a relatively low cover of native and non-native grasses that comprise the species preferred food plants (generally at least 10% cover of Wallaby-grass and/or Chilean Needle-grass). These areas also supported low numbers of GSM relative to higher quality areas elsewhere within the site (Figure 2).

2.1.1.2 Natural Temperate Grassland of the Victorian Volcanic Plain

The nationally significant NTGVVP ecological community was identified within the study area in areas identified as Plains Grassland EVC during the initial Ecological Assessment undertaken by Ecology and Heritage Partners (2018a). Additional site visits undertaken by Ecology and Heritage Partners during June 2021 and February 2022 confirmed the presence of NTGVVP within the site.

All vegetation assessments were undertaken by ecologists experienced in the identification of NTGVVP and the associated condition thresholds as detailed in Section 3.2.1 of the Preliminary Documentation (PD).

Some remnants of habitat zone PG4 and all PG8 and PG9 met the thresholds that define the nationally significant NTGVVP ecological community (Figure 2). Patches PG8 and PG9 were of the highest quality, were contiguous with each other and other larger remnants of vegetation and supported high native species diversity including Wallaby-grasses, Spear-grass, and Kangaroo Grass, as well as a range of herbs including Berry Saltbush *Atriplex semibaccata*, Sheep's Burr *Acaena echinata*, Wingless Bluebush *Maireana enchylaenoides*, 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*.

Lower quality remnants (i.e. corresponding with PG4) were comprised of a high cover of perennial native grasses (Tussock Grass, Kangaroo Grass and Spear Grass), however species diversity is low, and the presence of herbs and shrubs is also negligible.

2.1.2 Significance of Impact

2.1.2.1 Golden Sun Moth

Given that habitat known to support GSM is proposed to be impacted, the development has resulted in a 'significant impact' under the definition outlined in the Significant Impact Guidelines for Golden Sun Moth (DEWHA 2009). As such, an onsite offset (Bences Road site) and an offsite offset (Glenhope) will be secured and managed to ensure that impacts to the population and associated habitats are appropriately mitigated over a 10-year period. The proposed onsite offset site has recent records of GSM and contains high quality GSM habitat, and active management of the site will result in the long-term conservation of the species.

2.1.2.2 Natural Temperate Grassland of the Victorian Volcanic Plain

A total of 1.783 hectares of NTGVVP is proposed to be impacted and as such the development has resulted in a 'significant impact' under the definition for *critically endangered communities* outlined in the

Commonwealth Significant Impact Guidelines (DoE 2013). As such, an onsite offset at the Bences Road site will be secured and managed to ensure that impacts to the community are appropriately mitigated over a 10-year period. The proposed onsite offset site supports a high-quality remnant of the NTGVVP community, and active management of the site will result in the long-term conservation of the community.

2.2 The Offset Site

2.2.1 Golden Sun Moth

2.2.1.1 Offset Site Location

A 6.4 hectare offset is proposed within the property at 289 Bences Road, Merrimu (Figure 3; Figure 4).

The proposed onsite offset site is located immediately adjacent to the proposed development site and is located within the Victorian Volcanic Plain bioregion (Department of Energy, Environment and Climate Action [DEECA] 2024) with similar geology to that of the impact areas (DJPR 2023).

A broad assessment of the proposed offset area was undertaken by Samantha Barron (Consultant Botanist) on 16 February 2022 to confirm the broad quality and general extent of GSM habitat.

Targeted surveys for GSM within the offset sites were undertaken in 2017 by Ecology and Heritage Partners (2018b) which confirmed the presence of a large population of GSM utilising the property. Additional informal sightings of GSM within the Bences Road property were made by Shannon LeBel (Associate Ecologist) during December 2021 and 2022.

2.2.1.2 Habitat

The proposed onsite offset site support a ground layer comprising a moderate to high cover of Wallaby-grass including Common Wallaby-grass *Rytidosperma caespitosa*, Bristly Wallaby-grass *Rytidosperma setaceum* and Kneed Wallaby-grass *Rytidosperma geniculatum* (Plate 1; Plate 2). Other native ground layer species present included Spurred Spear-grass *Austrostipa gibbosa*, Rough Spear-grass *Austrostipa scabra* subsp. *falcata* and Kangaroo Grass.

Exotic flora was common throughout most areas within and adjacent to GSM habitat. The most commonly observed weeds were the declared noxious weeds African Box-thorn *Lycium ferocissimum*, Artichoke Thistle *Cynara cardunculus*, Horehound *Marrubium vulgare*, Chilean Needle-grass *Nassella neesiana* and Serrated Tussock *Nassella trichotoma*. Other common environmental weeds present throughout included Galenia *Aizoon pubescens*, Cape Weed *Arctotheca calendula*, Wild Turnip *Brassica* spp., Perennial Rye-grass *Lolium perenne*, Barley *Hordeum* spp., Rat's-tail Fescue *Vulpia myuros*, Ribwort *Plantago lanceolata* and Soft Brome *Bromus hordeaceus*.

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

Plate 1. Lemon Beauty-head and Wallaby-grass dominated GSM habitat at the Bences Road offset site.

Plate 2. Wallaby-grass and Spear-grass dominated GSM habitat at the Bences Road offset site.

2.2.1.3 Previous Records of Golden Sun Moth

Previous targeted surveys conducted as per the survey requirements detailed in the *Significant Impact Guidelines for the Critically Endangered Golden Sun Moth* (DEWHA 2009) were undertaken by Ecology and Heritage Partners (2018b).

These surveys identified a total of approximately 250 male GSM over a single day within 16.2 hectares of confirmed habitat at the Bences Road offset site. This equates to a density of 15.4 individual moths per hectare (based on the results of a single survey).

Several populations of GSM have also previously been recorded at other sites within the locality, with Ecology and Heritage Partners recorded 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).

2.2.2 Natural Temperate Grassland of the Victorian Volcanic Plain

2.2.2.1 Offset Site Location

An onsite 4.3-hectare offset site is proposed to be established within the property located at 289 Bences Road, Merrimu (Figure 3).

The proposed offset site is part of a larger, 14.456-hectare high quality remnant of NTGVVP located within the Victorian Volcanic Plain bioregion (DEECA 2023) and connected to a further area of approximately 20 hectares of additional GSM habitat.

The proposed offset site is located immediately adjacent to the proposed development site as well as the Long Forest Nature Conservation Reserve, and will ultimately form a part of a larger, contiguous protected area.

The NTGVVP community was initially identified during assessments conducted by Ecology and Heritage Partners in 2017 and 2018 (Ecology and Heritage Partners 2018a). Additional site visits undertaken during December 2021 and 2022 confirmed the presence of high quality 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.

2.2.2.2 Vegetation Condition

The proposed 4.3-hectare offset site supports a high quality remnant of the NTGVVP community, and comprised a high native species diversity including Wallaby-grasses, Spear-grass, and Kangaroo Grass, as well as a range of herbs including Berry Saltbush, Sheep's Burr, Wingless Bluebush, Ruby Saltbush, Native Flax, Lemon Beauty-heads, Fuzzy New Holland Daisy, and Golden Billy-buttons (Plate 3; Plate 4).

Plate 3. Wallaby-grass and native herb-dominated NTGVVP at the Bences Road offset site.

Plate 4. Wallaby-grass and native herb-dominated NTGVVP at the Bences Road offset site.

Exotic flora was common throughout much of the NTGVVP, with Artichoke Thistle, Horehound, Chilean Needle-grass and Serrated Tussock being relatively common around the perimeter. Other common environmental weeds present throughout included Galenia, Wild Turnip *Brassica* spp., Perennial Rye-grass, Barley, Rat's-tail and Soft Brome.

2.3 Offset Suitability

The proposed offset sites have been subject to past current agricultural use, with the grazing of domestic stock (sheep) ongoing and potential pasture improvement may have been undertaken within the site. Adjacent sites are regularly cropped and pasture improvement has likely been undertaken within the several parcels as evidenced by the presence of Rye Grass *Lolium* spp., Wild Oat *Avena* spp. and Soft Brome *Bromus hordeaceus*.

Most of the offset areas support a cover of native vegetation that exceeds 25% and is therefore defined as a patch of native vegetation under Victoria's native vegetation policy (DELWP 2017). Most of native vegetation cover is in the form of Wallaby-grass and Spear-grass, both of which are known food plants for GSM, and are

important components of the NTGVVP ecological community. The areas selected as the proposed offset site correlates with these values (Figure 3).

Weed cover is typically dominated by annual introduced grasses. However, scattered occurrences of noxious weeds are present, including Serrated Tussock, Artichoke Thistle and African Box-thorn. While these species are present at low abundance, they retain the potential to degrade the existing GSM habitat and NTGVVP community if not managed appropriately.

2.3.1 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 (DSEWPaC 2012b) has been completed to determine the area of offset required to adequately compensate for the removal of the GSM habitat and NTGVVP community at the proposed impact site.

The Offset Assessment Guide offset calculator is provided in Appendix 1, with a justification for the scores given provided in Table 2 (GSM at Bences Road) and Table 3 (NTGVVP at Bences Road).

2.3.2 Offset Calculator Justification

2.3.2.1 Golden Sun Moth

Based on the EPBC Act offset calculator (DSEWPaC 2012b), the retention and management of 6.4 hectares of GSM habitat within the proposed onsite offset site 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 as an offset contributes 8.81% of the impact to 12.502 hectares of GSM quality 4 habitat.

Note that the method and justification for determining GSM habitat quality is provided in the Preliminary Documentation report (Ecology and Heritage Partners 2024a).

Table 2. 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

Offset Criteria	Response
	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.
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 *Casinia 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. 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 1 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

Offset Criteria	Response
	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 3), 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. 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 Section 6.2 of Ecology and Heritage Partners 2024a);

Offset Criteria	Response
	8.81% (of impacts to 12.502 hectares of GSM quality 4 habitat) (See Section 6.2 of Ecology and Heritage Partners 2024a).

2.3.2.2 *Natural Temperate Grassland of the Victorian Volcanic Plain*

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 3). This exceeds the minimum 90% direct offset requirement and is considered to be in accordance with the Commonwealth environmental offset policy (DSEWPaC 2012a).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.

Table 3. EPBC Act Offset Calculator for NTGVVP at the Bences Road offset site

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) (See Section 6.1.4 and 6.1.5 of Ecology and Heritage Partners 2024a). 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.
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 1 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

Offset Criteria	Response
	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 *Casinia 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 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. 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 2), and include:

Offset Criteria	Response
	• 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. 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%

2.4 Benefit of the Impact / Offset Approach against a 'Do Nothing' Scenario

The management actions detailed in this OMP for the onsite offset area have been designed to provide a net benefit when compared with a 'do nothing' scenario for GSM habitat and the NTGVVP community within the impact area.

Under a 'do nothing' approach, existing land management practices would continue, without regard to the GSM population present, nor the quality and extent of the NTGVVP community. While the recent practices have maintained the presence of these values, there is no guarantee that this would continue in the future, as the land is not being specifically managed for the conservation of the species or community. Alteration of grazing pressure, or not managing the spread of weeds or native shrubs (i.e. Sifton Bush) will have a negative impact on both matters of NES.

Protection of the onsite offset areas provides a degree of certainty as to the future conservation of GSM habitat and the NTGVVP community and facilitates improvement actions, and this removes the current uncertainty around future management actions and their impact on the relevant matters. The proposed offset will provide a net conservation benefit for both GSM and NTGVVP compared with a 'do nothing' scenario.

2.4.1 Existing Offset Arrangements

The proposed offset site has not been allocated for the provision of any other offsets, either under the EPBC Act Environmental Offsets Policy or for provision of offsets under any current or past Victorian policy. Other sections of the property contain habitat and records of GSM. These sections may be subject to separate, future offset arrangements for other projects.

3 PART B: OFFSET IMPLEMENTATION

This section presents the actions required to implement the OMP. The OMP details methods for the management, conservation and improvement of native vegetation at the offset site for the benefit of the protected matters (GSM and NTGVVP) over a 10- year period commencing from the date of the EPBC Act approval. These actions are required over the initial 10- year period and, while the OMP may be updated after that period with approval from DCCEEW, ecological management to maintain or improve GSM habitat and NTGVVP condition is required for a minimum 10-year period, and from thereon in perpetuity.

All works will be conducted by a suitably qualified and experienced contractor and/or the landholder. The OMP aims to achieve habitat improvement gains through on-ground actions and therefore is required to be achievable, straightforward and practical. All the management actions specified must be measurable and support the offset completion criteria.

3.1 Offset Site Details

Details summarising the attributes of the offset site, including the parcel number and landowner details are summarised in Table 4.

Table 4. Security and Management Responsibility

Landowner of Offset Site	Bacchus Marsh Developments Pty Ltd
Type of security mechanism	Section 69 agreement under the *Conservation, Forests and Land Act 1987*
Location of Offset Site	Merrimu, Victoria
Parcels	E~18\PP3095 (Bences Rd site)
Parish	Merrimu
Local Government Area	Moorabool Shire
Bioregion	Victorian Volcanic Plain

3.1.1 Security and Management of the offset site

The proposed offset site will be secured via a s69 agreement under the CFL Act and this type of security mechanism meets the requirements under the offset policy (DSEWPaC 2012a).

For the offset site to qualify as an appropriate offset to compensate for the approved removal of suitable habitat associated with the proposed action, management actions will be undertaken to protect and improve the quality of habitat of the offset site. Management actions described below are to be implemented for a mandatory period of 10 years, and the primary objective of management, which is consistent with the Golden Sun Moth Significant Impact Guidelines (DEWHA 2009) and the Approved Conservation Advice for the NTGVVP community (DEWHA 2008) to ensure actions that may lead to the loss, degradation or fragmentation of GSM habitat or NTGVVP are avoided. These actions include:

- Clearing of grassland or grassy woodland, including soil cultivation;

- Modification of habitat (e.g. changes to shading, hydrology, wind patterns, species composition;
- Management practices (e.g. changes in fire regime, slashing, mowing, increases or decreases in the intensity of a grazing regime);
- Weed cover is managed in perpetuity to ensure it does not increase beyond the level attained at year 10 of management, and prevention and control of any new and emerging weeds; and,
- Chemical application (e.g. pesticides, herbicides, fertilisers), except as allowed under this plan.

The offsets will be achieved through the active implementation of this OMP and ensuring weed levels are reduced and native grass cover is enhanced. This will deliver improved conservation outcomes for GSM and NTGVVP.

Security, management and monitoring responsibilities are summarised in Table 5.

Table 5. Security and Management Responsibility

Offset Security and Management Responsibility	
Who is liable/responsible for meeting offset requirements?	Bacchus Marsh Developments Pty Ltd
Type of security mechanism	Section 69 agreement under the *Conservation, Forests and Land Act 1987*
Date of Covenant Registration	TBC
Date 10-year offset management to commence	From date when s69 agreement is registered on title
Offset Monitoring Responsibility	Bacchus Marsh Developments Pty Ltd
Offset Site management responsibility	Bacchus Marsh Developments Pty Ltd
Auditing	Bacchus Marsh Developments Pty Ltd
Reporting Responsibility (to DEECA)	Bacchus Marsh Developments Pty Ltd
Reporting Responsibility (to DCCEEW)	Bacchus Marsh Developments Pty Ltd
Plan Review	Bacchus Marsh Developments Pty Ltd

Implementation of this management plan is the overall responsibility of BMD, who will engage an experienced bushland contractor to deliver the offset outcomes on BMD's behalf. The approval holder (BMD) is responsible for engaging a qualified, independent ecologist to conduct monitoring (Section 3.5) with reports submitted to BMD and DCCEEW. BMD will provide monitoring reports to DEECA.

Management actions by the landowner will be overseen by DEECA as part of the legal protection over the site. Implementation of the OMP will commence upon the s69 agreement being registered on title.

Funding for implementation of this OMP will be provided by BMD.

3.1.2 Objectives of the Offset Sites

This plan details methods for the management and conservation of GSM habitat and the NTGVVP community at the offset sites over the requisite 10-year management period and into perpetuity. The primary objectives of the offset sites are as follows:

1) Adequately compensate for the proposed removal of occupied GSM habitat and NTGVVP at the proposed impact sites;

2) Ensure that extant GSM populations and NTGVVP community will not be destroyed (i.e. cultivated or receive superphosphate);

3) Ensure GSM site occupancy (distribution) and population (numbers of moths) on average over the 10 years increase as vegetation / habitat quality improves, thus ensuring that the population is viable / persists in perpetuity; and,

4) Ensure that the condition of the NTGVVP community on average over the 10 years increases as vegetation structure and quality improves, thus ensuring that the community is viable / persists in perpetuity.

3.1.2.1 Key Performance Criteria

The key performance criteria for this OMP are:

- To increase the site condition score for GSM habitat; and,
- Increase the habitat quality for NTGVVP from 7 to 8.
- This will be achieved by:
    - Preventing unauthorised stock and vehicle access into the offset site;
    - Preparation of a detailed baseline report on the habitat quality and composition of the offset site against which the effectiveness of management activities can be compared;
    - Establishment of photo points to form the basis of vegetation monitoring to document changes in GSM habitat and NTGVVP condition over time, performance in continuous improvement, and assessment against completion criteria;
    - Improving GSM habitat and NTGVVP quality through the removal of all existing woody weeds and maintaining woody weed levels at <1% cover by the end of year 1 of commencement of the plan;
    - Annual monitoring and control of woody and herbaceous weeds with weed control carried out in accordance with the Management Standards for Native Vegetation Offset Sites (DELWP 2019).
    - Implementation of a biomass management (pulse grazing) regime to develop and maintain an open grassland structure and to reduce the abundance of perennial weeds while increasing the abundance of grasses which are known food plants for GSM;
    - No increase in the baseline cover of perennial grass within the offset site at the end of 10 years of management.
    - New and emerging woody weeds identified and eradicated;
    - Implementation of a GSM survey monitoring and evaluation program;
    - Implementation of a NTGVVP condition monitoring and evaluation program
    - No measurable decline in the condition or extent of NTGVVP within the offset area;
    - No measurable decline in the abundance and area of occupancy of GSM within the offset area
    - Identification and removal of surface harbour for pest animals.

- Control of rabbits and foxes in accordance with the Management Standards for Native Vegetation Offset Sites (DELWP 2019) including achieving a target of no active fox dens or rabbit warrens within the offset area.
- New and emerging pest animals identified and prevented from establishing in the offset area;
- Monitoring and management of indigenous tree and shrub regeneration to ensure regeneration does not degrade the quality of GSM habitat or NTGVVP in the offset area; and,
- Prepare annual reports detailing the monitoring and management actions and outcomes outlined in this OMP

3.2 Ongoing Management Commitments

The offset site will be managed for the conservation of GSM. From the commencement of the approved OMP and conservation agreement, the landowner agrees to undertake the following management commitments in perpetuity:

- Eliminating all woody weeds through continuous detection, treatment and infestation prevention.
- Monitoring for any new and emerging weeds and eliminate through continuous detection, treatment and infestation prevention;
- Controlling rabbits, hares and foxes to an extent above existing legal requirements;
- Retain and manage all native vegetation;
- Retaining all standing trees, dead or alive;
- Retaining fallen logs and fallen branches;
- Exclude stock except as otherwise specified under this approved plan;
- Exclude the use of stock feed such as hay or other material which could support weed seeds that is sourced from outside the offset area. Sterile feed such as pellets may be sourced externally;
- Exclude pasture improvement (but not ground cover rehabilitation to increase the cover of native grasses and herbs), and cultivation for commercial cropping; and,
- Exclude fertilizer application for the first ten years of the covenant, and only apply superphosphate fertiliser after this time in accordance with written agreement from DEECA. DEECA may permit low levels of fertilizer application if the landowner can demonstrate that this will not adversely impact native vegetation or GSM habitat quality.

3.3 Adaptive Management Approach and Risk Assessment

This OMP will use an Adaptive Management Approach to allow the flexibility to respond appropriately and effectively to the uncertainties involved in ecological processes. This will ensure that management objectives are being met while allowing for altered circumstances to be included in the OMP.

Of particular note, weed invasion and inappropriate grazing regimes (overgrazing, or loss of inter-tussock space due to undergrazing/lack of fire) are two of the main demonstrated threats to GSM (DEWHA 2009; DoE 2013) and NTGVVP (DEWHA 2008; TSSC 2008).

This OMP addresses these demonstrated threats by including management actions aimed at reducing the likelihood of weed invasion. The plan includes a basic strategy (pulse grazing) for ground-cover biomass control which is considered a major ecological management requirement for the site. Where this fails to deliver the prescribed outcome in any one year, ecological burning provides an option to achieve the required biomass management target (i.e. maintaining an open grassland environment dominated by native species). The application of one or both management actions will provide the biomass control outcome required.

It is acknowledged that the response of natural environments to management can be unpredictable and management activities need to be flexible to respond to changing conditions and unpredictable events.

Seasonal conditions can also vary greatly from year to year and influence offset site management actions in any one year. This seasonality is recognised in this offset plan by allowing for flexibility around timing of actions at the discretion of the land manager in consultation with DEECA so as to attain and maintain performance and completion criteria.

There is some risk that biomass control is not properly managed in any one year. This has the potential to occur in response to above average rainfall years when ground cover growth is persistently high and wet conditions restrict stock access or limits opportunities for the application of ecological burning to reduce biomass. If such events occur, the land manager will ensure additional efforts are made by in subsequent years to maintain the rate of improvement required.

Examples of potential risks are outlined in Table 13. Key risks identified in Table 13 include:

- Unauthorised entry of domestic stock or vehicles into the offset area;
- Woody weed infestations;
- Failure to detect and control new infestations, as well as failure to reduce existing infestations;
- Failure to increase the species composition and density of perennial native grasses;
- Rabbit infestations;
- An unexplainable decline in the abundance of GSM.

Failure of the adaptive management approach to adequately respond to risks, as identified in monitoring reports (Section 3.6) or audits (Section 3.7), will result in a review of this plan, as discussed in Section 3.8 and Table 12.

3.4 Management Actions and Land Use Commitments

The following section discusses the actions required to implement the OMP, and achieve the performance objectives by Year 10 Management actions described below are to be implemented for a mandatory period of 10 years, however, a five-year review will be undertaken to ensure that the management actions will result in the performance targets being achieved.

There are several standard actions that must be followed if the offset site is to be considered suitable as an offset site. These include:

- No cropping, no drainage/hydrology alteration;
- No rock removal or cropping;

- Weed cover is managed in perpetuity to ensure it does not increase beyond the level attained at year 10 of management;
- GSM population is maintained and habitat is improved; and,
- The NTGVVP community is maintained and condition improved.

Any proposed uses or development of the site which conflict with the landowner's commitments are not permitted under this plan. The sensitivities of the site must be considered with all management actions and all contractors entering the site need to be made aware of the values.

The following management and monitoring actions detailed in this OMP have regard to the following legislations and/or policies:

- *Environment Protection and Biodiversity Conservation) Act 1999;*
- *Flora and Fauna Guarantee Act 1988* (FFG Act)*;*
- *Catchment and Land Protection Act 1994* (CaLP Act)*;*
- Commonwealth's Threat abatement plan for competition and land degradation by rabbits (DoEE 2016);
- Significant impact guidelines for the critically endangered Golden Sun Moth (Synemon plana) (DEWHA 2009)
- Approved Conservation Advice for *Synemon plana* (Golden Sun Moth) (DoE 2013)
- Commonwealth Listing Advice on *Synemon plana* (Golden Sun Moth) (DAWE 2021).
- Commonwealth's Threat Abatement Plan for predation, habitat degradation, competition and disease transmission by feral pigs (DoEE 2017);
- Commonwealth Listing Advice on Natural Temperate Grassland of the Victorian Volcanic Plain (TSSC 2008); and,
- Approved Conservation Advice for the Natural Temperate Grassland of the Victorian Volcanic Plain (DEWHA 2008).

Further, the actions contained in this OMP address several Priority Actions included in the GSM conservation advice (DAWE 2021) and NTGVVP Conservation Advice (DEWHA 2008) that will be undertaken within the offset sites, including:

- Habitat Loss, Disturbance and Modification:
    - Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate and/or secure inclusion in reserve tenure if possible;
    - Minimise disturbance in areas where the protected matters occur, excluding necessary actions to manage the conservation of the species. Retain and protect natural grassland remnants within the known distribution of GSM;
    - Do not destroy habitat and surrounding areas by ploughing;

  - Ensure remnant populations and communities remain connected or linked to each other; in case where remnants have become isolated, consider revegetation to re-establish links and aid dispersal;
  - Manage any changes to hydrology that may result in changes to water table levels and/or increased run-off, salinity, or pollution;
  - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary; and,
  - Identify populations of high conservation priority. Search for the species in suitable habitat in areas that are proposed for development.

- Invasive Weeds
  - Management of weed infestations within the ecological community using appropriate methods, especially in grasslands where new weed incursions are establishing;
  - Development of management plans for the control of major weeds identified for the ecological community, or emerging weed threats as they develop;
  - Ensuring that chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on the ecological community; and,
  - Consider re-introducing an appropriate control method where Kangaroo-grass (*Themeda australis*) has the potential to out-compete wallaby grasses in previously grazed or slashed areas in the proposed offset.

- Trampling, Browsing or Grazing
  - Manage the extent and intensity of grazing to minimise any direct adverse effects GSM or its habitat. Indeed, the proposed grazing regime will be suitable for GSM persistence and spread across the site;
  - Development and implementation of appropriate grazing regimes for the ecological community that take into account:
    - when the stocking rate is too high;
    - when timing of intense grazing is inappropriate;
    - when the soils are too wet or soft that trampling causes pugging of the surface; and,
    - when plants are too stressed to withstand grazing (e.g. drought).

- Ecological Burning
  - Development and implementation of an optional and appropriate burning regime for the offset sites that take into account:
    - when timing and frequency of burning is inappropriate;
    - when timing of grazing is inappropriate proceeding and/or following a burn.

Note that biomass management through ecological burning is not a compulsory component of this OMP.

Prior to works being undertaken each year an annual works program will be developed by an experienced bushland regenerator or the landowner. The person undertaking the works will prepare a detailed works program which will also address issues that may not have been anticipated in formulating this original management plan. The OMP will be updated as required (as detailed in Section 3.8) with any revised versions of the OMP to be submitted to the DCCEEW for approval.

3.4.1 Access Control

Without active management and appropriate fencing, unrestricted access into the offset site may result in loss of native vegetation cover, soil disturbance and compaction, and weed facilitation.

The property boundary is currently fenced. There is no requirement to provide additional fencing for the offset area, as it is located within a fully fenced property. Monitoring of access and threats will be conducted on an ongoing basis with fencing repaired or upgraded as required to control threats.

Posts marking the boundary of the offset site will be set up at the beginning of the offset period to clearly identify the area for monitoring and management purposes. Posts will be located in accordance with advice from a qualified ecologist to ensure impacts to native vegetation are avoided.

If existing land-use rights are to be fully exercised in the remainder of the broader parcel, fencing to control stock access to the offset site will be required. Fencing will meet the minimum standard set by DEECAs fencing standards in DEECAs Management standards for native vegetation offset (DELWP 2019), to establish a sturdy stock proof fence. If rabbit populations impacting the site cannot be controlled to an adequate level (based on advice from DEECA) then fencing protecting the offset site will be upgraded to a rabbit proof standard.

Performance Criteria and Corrective Actions

Table 6 provides a summary of the performance criteria and corrections actions associated with access control. Implementation of access control measures within the offset site is the responsibility of the landowner. Monitoring is the responsibility of BMD.

Table 6. Performance criteria and corrections actions associated with access control.

Performance Criteria	Corrective Action	Completion Criteria
Preventing unauthorised stock and vehicle access into the offset site	Any damage to fencing that allows unpermitted stock, personnel or vehicle access must be repaired within seven days from identification	No unpermitted access within the offset site, by personnel, vehicles, or stock
Quarterly monitoring of fence condition is to be undertaken	If rabbit populations impacting the site cannot be controlled to an adequate level (based on advice from TfN) then fencing protecting the offset site will be upgraded to a rabbit proof standard. If unauthorised stock are observed within the offset site, monitoring and repair of stock-proof fencing must be undertaken around the offset site (or broader parcel) within 2 weeks to address identified risks	Exclusion of rabbits and unauthorised stock from the offset site.

3.4.2 Weed Control

The objectives of weed control within the offset site is to enhance the existing GSM habitat and condition of NTGVVP (in the Bences Road site) by reducing/minimising future invasion by exotic flora. This will be achieved through a combination of controlled pulse grazing (to limit opportunities for weed establishment and seed set in exotic flora), and through on-ground management activities.

The control of weed species is a key management action across the offset area and is critical to the maintenance of indigenous vegetation cover and species diversity. Effective weed control will promote the regeneration of existing populations of indigenous species and encourage recruitment from soil seed banks. Weed control work will be undertaken by a suitably qualified contractor or someone with proven plant identification skills.

The presence of non-native habitat and vegetation located between retained NTGVVP and proposed development areas has the potential to cause edge effects, such as through weed encroachment. This area will also be monitored and managed as part of this OMP.

The following general guidelines should be considered as basic management principles regarding weed control:

- Any weed control should be done in a manner that minimises soil disturbance and damage to off-target species;
- Where herbicide application is necessary, waterway sensitive products such as Roundup Bioactive®, Weedmaster Duo® or Weedmaster 360® should be employed, without the addition of surfactant;
- Where herbicides are used, selective application is preferable to broad area application but clearly the loss of non-target species needs to be balanced with the threat of incomplete control of the existing weed population;
- Selective herbicides and those that kill plants quickly and are rapidly inactivated, leaving no residues ('knockdown' herbicides) are generally preferable to residual herbicides;
- Pest plants that reproduce sexually (by seed) are best controlled before seed ripens;
- To reduce the amounts of herbicide used, the target biomass should be reduced (e.g. grazed) before application so the herbicide can also be absorbed by the actively regrowing plants. Herbicides are only effective when plants are actively growing;
- Weed control works should be monitored regularly to assess their effectiveness, perform follow up works and evaluate the feasibility of management objectives; and,
- Weed control works following grazing periods are considered essential.

Woody Weeds

Woody weeds are present on the offset site. Monitoring for new and emerging woody weeds will be conducted throughout the year for the term of the agreement, and all woody weeds will be controlled and removed within the offset site and on adjacent land between retained NGTVVP and development areas by the end of Year 1 of the OMP. Any new and emerging woody weeds will be removed on an ongoing basis.

Herbaceous Weeds

Whilst the ultimate objective is to ensure no increase in the existing cover of weed species, emphasis will be placed on priority weeds within the offset site. Priority weeds include woody weeds, all noxious weeds listed under the CaLP, and all other high threat weed species identified on site (Table 7).

The control of high threat and listed noxious weed species is a key management action within the offset sites and must be adequately addressed if the completion criteria are to be achieved. Monitoring will occur every year to ensure that high threat weed cover is reduced within the offset site and on adjacent land between retained NTGVVP and development areas. Weeds will be treated before the plant has flowered and set seed using the methods outlined in Table 7 or as otherwise approved by DEECA.

Annual weeds within the offset site are not considered a significant threat in this environment and will be managed using grazing to reduce their prominence.

The cover of species within the offset site is likely to change over time in response to seasonal conditions, or because of pulse grazing. Weed cover and species will therefore be monitored and management adapted in response to achieve desired outcomes outlined in this management plan.

Weed control will consist of manual removal and/or spot spraying with an appropriate herbicide which may involve localised slashing if spot-spraying proves ineffective. A dye will be used in the spray to mark where the spraying has occurred.

Care will be taken when spraying herbicide to ensure that the poison does not affect native vegetation in the local application area.

New and emerging herbaceous weeds

Monitoring for new and emerging herbaceous weeds will be conducted throughout the year for the term of the agreement, and any new and emerging weeds eliminated.

Any other significant environmental weeds identified within the broader property during monitoring will also be controlled.

Chilean Needle-grass has not been identified within the offset site but will be controlled should the species be detected.

Table 7. High Threat weeds to be controlled – method and timing

Common name	Scientific name	Method	Timing
Spear Thistle	*Cirsium vulgare*	Manual Removal, Annual Spraying (before seeding)	All Year (removal); late winter to early spring (spray)
Artichoke Thistle	*Cynara cardunculus* subsp. *flavescens*	Spot Spray before seeding; Controlled pulse crash grazing by sheep.	All Year (removal); late winter to early Spring (spray)
Galenia	*Aizoon pubescens*	Spot Spray before seeding	Late winter to early summer
Toowoomba Canary-grass	*Phalaris aquatica*	Spot Spray before seeding; Controlled pulse crash grazing by sheep.	Summer, Autumn (grazing) Spot Spray (Late winter to early summer)
Perennial Rye-grass	*Lolium perenne*	Spot Spray before seeding; Controlled pulse crash grazing by sheep.	Summer, Autumn (grazing) Spot Spray (Late winter to early summer)

Common name	Scientific name	Method	Timing
Yorkshire Fog	*Holcus lanatus*	Spot Spray before seeding; Controlled pulse crash grazing by sheep.	Late winter to early summer
Gazania	*Gazania linearis*	Manual Removal, Annual Spraying (before seeding)	All Year (removal); late winter to early spring (spray)
Barley	*Hordeum* spp.	Spot Spray before seeding; Controlled pulse crash grazing by sheep.	Late winter to early summer
African Box-thorn	*Lycium ferocissimum*	Manual Removal, Annual Spraying (before seeding)	All Year (removal); late winter to early spring (spray)
Horehound	*Marrubium vulgare*	Manual Removal, Annual Spraying (before seeding)	All Year (removal); late winter to early spring (spray)
Chilean Needle-grass	*Nassella neesiana*	Manual Removal, Annual Spraying (before seeding)	late winter to early spring (spray)
Serrated Tussock	*Nassella trichotoma*	Manual Removal, Annual Spraying (before seeding)	late winter to early spring (spray)
Prickly Pear	*Opuntia* spp.	Manual Removal, Annual Spraying (before seeding)	All Year (removal); late winter to early spring (spray)
Sweet Briar	*Rosa rubiginosa*	Manual Removal, Annual Spraying (before seeding)	All Year (removal); late winter to early spring (spray)
Blackberry	*Rubus fruticosus* spp. agg.	Manual Removal, Annual Spraying (before seeding)	All Year (removal); late winter to early spring (spray)

Note: this is not an exhaustive list of all weeds either present or that have the potential to occur on the site in the future.

Performance Criteria and Corrective Actions

Table 8 provides a summary of the performance criteria and corrections actions associated with weed control. Implementation of weed control measures within the offset site is the responsibility of the landowner. Monitoring is the responsibility of BMD.

Table 8. Performance criteria and corrections actions associated with weed control.

Performance Criteria	Corrective Action	Completion Criteria
Preparation of a detailed baseline report on the habitat quality and vegetation composition of the offset site against which the effectiveness of management activities can be compared		Baseline assessment and report prepared by the end of Year 1.
No increase in the cover of high threat weeds at the end of each year of management compared to baseline cover.	Immediate and intensive weed control program with an increased monitoring frequency for the next year of management, or until the performance criteria achieved	No increase in the cover of high threat weeds at the end of Year 10 compared to baseline cover
Woody weeds eliminated (i.e. <1% cover) by the end of Year 1	Immediate and intensive weed control program with an increased monitoring frequency until performance criteria achieved	Ecological monitoring data shows no woody weeds within the offset site beyond Year 1

Performance Criteria	Corrective Action	Completion Criteria
No establishment of any new or emerging high threat weeds;	Any populations of new and emerging high threat weeds will be treated promptly (within 1 month) and eliminated.	Ecological monitoring data shows all new high threat weeds are controlled and eliminated prior to establishing.

These performance indicators have been selected as there are measurable and reflect the priority actions as outlined within the Conservation Advice (DoE 2013a; DEWHA 2008) and Significant Impact Guidelines (DEWHA 2009, p4). These performance indicators must be recorded during the baseline assessment and ongoing annual site monitoring and included within annual reports (Section 3.6).

3.4.3 Biomass Control

The objective of biomass control within the offset areas is to promote the floristic diversity through the provision of inter-tussock space for germination and recruitment of native flora associated with the NTGVVP community and GSM habitat. In addition, these actions will improve habitat quality for GSM, the condition of NTGVVP and assist with minimising the weed growth.

Biomass control will aim to maintain 10% to 40% cover of bare ground or inter-tussock space to maintain optimal vegetation structure for GSM and allow sufficient space for recruitment of herbs and grasses within the NTGVVP. If the offset sites support less than 10% bare ground then biomass reduction will be implemented at the earliest opportunity (with consideration of seasonality to minimise risk to ecological values, life and assets).

The independent ecological monitoring undertaken by a suitably qualified ecologist will assess the effectiveness of the biomass control techniques applied and the need for any adjustments to the management regime to achieve or maintain the completion criteria.

Controlled sheep grazing will be applied to reduce biomass and maintain an open tussock-grass structure for this grassy ground cover.

If appropriate, ecological burning can also be utilised as a biomass control method.

Controlled Grazing

The offset properties have historically been subject to unrestricted grazing. Sheep grazing to reduce biomass is reliable to improve the ecological values within the offset area. Grazing will be undertaken in a controlled manner to ensure that biomass accumulation control within the offset site is consistent with the standards for management of ecological grazing provided by DEECA (DSE 2009). Grazing of domestic stock will be restricted to the use of sheep. Grazing by other domestic stock, including, but not restricted to, cattle, goats and horses are excluded from the offset site by this plan.

The timing of grazing will be controlled to allow native species to grow and set seed over the spring to midsummer period (DSE 2009). Stock will be excluded or only occur at very low levels (i.e. less than 20% of recommended stocking rates) from the beginning of October to the end of December annually, for the life of the OMP. However, this period will be flexible to reflect the prevailing climatic conditions and allow the period of grazing exclusion to be varied on ecological advice.

The timing of grazing must be strictly controlled to preventing pugging and other soil disturbance within the offset sites, and to enhance opportunities for native grasses to grow and set seed during Spring and early Summer.

The landowner/bushland contractor will keep records of the number of stock, timing and duration of grazing within the offset areas. This data will be provided to DEECA on an annual basis as part of the Landholder monitoring and reporting process. This data and the resultant impact on biomass will provide the basis for an on-going grazing strategy to be approved by DEECA or an independent ecologist approved by DEECA.

Grazing will occur over a short duration and exceed the standard stocking rate to prevent selective grazing within the offset site (Table 9). The maximum length of continuous grazing is four weeks with at least two weeks rest between cycles. At least three pulse grazing cycles will occur within the grazing period, one of which will occur immediately prior to the exclusion period (weather permitting).

Table 9. Grazing Management Plan within the offset site.

Grazing Requirement	Targets
Period where grazing by domestic stock is not permitted	October-December annually in perpetuity, in addition to times outside this period when standing water is present, or soil is waterlogged. However, this period will be flexible to reflect the prevailing climatic conditions and allow the period of grazing exclusion to be varied on ecological advice.
Pulse grazing cycles required	3 (minimum). Maximum of 6 (within any given 12 month period).
Minimum rest from grazing between pulse grazing events	2 weeks
Maximum continuous pulse grazing event	4 weeks
Biomass management thresholds	Minimum height of 5 cm; total vegetation cover of no less than 60% or greater than 90%.
Target inter-tussock space	Between 10-40% of total offset site cover.

Grazing may only be undertaken when there is not standing water or waterlogged soils in the offset area (Table 9).

Stock must be removed should total vegetation cover fall to or below 60%. Stock pens and heavy vehicle traffic must be confined to the areas outside that covered within this OMP. Following any high rainfall events, stock will be removed from the offset site immediately.

Ecological Burning

Burning within the offset area will be undertaken only with due consideration to relevant health and safety issues, in consultation with the Country Fire Authority and in line with a fire management plan completed by a suitably qualified consultant. The following provides guidelines for use of burning only in an ecological sense.

While grazing by domestic stock will be the typical manner in which ground cover biomass will be regulated, the controlled application of fire is an efficient and cost-effective alternative technique for reducing biomass in grassy ecosystems such as those that occur within the offset site. Importantly, burning (compared to grazing or slashing) allows greater access and efficiency for weed control and increased natural regeneration of indigenous plant species. While burning may enhance germination of indigenous species, it can also be expected to promote certain exotic species and as such post-burning weed control will be vital to effective weed control. However, stimulating the soil-stored weed seed bank is seen as positive as this allows this seed bank to be exhausted through active management.

Burning is acknowledged as an important component of the natural disturbance regime in grassy ecosystems but because of the habitat requirements for GSM, burning will be restricted to outside the GSM flight season (generally November to January in Victoria). This allows management to be consistent with the relevant conservation advice.

The controlled application of fire will be used for biomass reduction in all or parts of the offset sites. Selected areas of grassland may be burnt to tackle particular weed issues or to assist in the lowering of soil nitrogen and phosphorous which would also assist in weed control works. However no area is to be burnt more frequently than once every three years (unless approved by DEECA in consultation with a qualified ecologist).

Burning will be conducted in a mosaic pattern and any individual burn will not burn more than one third of the entire offset site. The landowner will prepare maps identifying the fire history of the offset area to ensure biomass control efforts are at appropriate frequencies and recorded. Details of fire and grazing within the offset will also be documented in the annual reporting as outlined in Section 3.6.

Any burning strategy will minimise impacts to GSM and the potential for fire to spread in an uncontrolled manner, while promoting and maintaining the floristic diversity of the NTGVVP community through the provision of inter-tussock space for germination and recruitment of native flora. Ecological burning will:

- Be in accordance with a controlled burn plan, developed in consultation with the Country Fire Authority (CFA), DEECA and following any Council requirements;
- Be applied when grazing is deemed insufficient to manage biomass, weeds or the promotion of natural recruitment;
- Only occur outside the prescribed declared fire danger period for this region;
- Only occur outside the flight season of the species (November to January) in autumn or early winter;
- Implemented in a mosaic fashion with no more than one third of the site in any one year; and,
- Be monitored, measuring the extent of burns and influence on GSM habitat and NTGVVP quality.

Burnt areas will be protected from grazing for at least 6 months immediately following the burn to allow species regeneration and recruitment to occur. A cover of ground-storey vegetation above 60% is be required before grazing can be re-introduced.

It must be noted that biomass management through ecological burning is not a compulsory component of this OMP.

Performance Criteria and Corrective Actions

Table 10 provides a summary of the performance criteria and corrections actions associated with biomass control. Implementation of biomass control measures within the offset site is the responsibility of the landowner. Monitoring is the responsibility of BMD.

Table 10. Performance criteria and corrections actions associated with biomass control.

Performance Criteria	Corrective Actions	Completion Criteria
Inter-tussock space (bare-ground) to be no less than 5% throughout offset site (on average)	If inter-tussock space falls below 5%, immediate implementation of biomass control will be implemented at the earliest opportunity (with consideration of seasonality to minimise risk to ecological values, life and assets)	Average of between 10%-40% inter-tussock space (bare-ground) after 10 years.
	Ecological burning can be applied when grazing is deemed insufficient to manage biomass;	
Vegetation cover not to fall below 60%, or minimum height of 5 centimetres due to grazing.	Stock must be removed immediately should total vegetation cover fall to or below 60%, or grazed lower than 5 centimetres (in the area being grazed).	Vegetation cover maintained at between 60%-80% cover at the end of each 12 month monitoring period.
No evidence of soil pugging in offset area	Following any high rainfall events, stock will be removed from the offset site immediately. Grazing must not resume where there is standing water or waterlogged soils.	Vegetation and soil structure in offset site maintained.
Burnt areas protected from grazing for at least 4 months.	A minimum 70% vegetation cover is required before grazing can be re-introduced. Exclude other herbivores from burnt areas.	Allow species regeneration and recruitment to occur post burning event

These performance criteria have been provided to meet the conservation outcomes for GSM and NTGVVP, as outlined within the Conservation Advice (DoE 2013a; DEWHA 2008) and the Significant Impact Guidelines (DEWHA 2009, p4). These performance criteria must be recorded during site monitoring and included within annual reports (Section 3.6).

3.4.4 Pest Animal Control

Rabbits and hares remain a threat for the regeneration/recruitment of native species throughout Victoria. All vermin harbour (i.e. burrows) will be treated, without disturbance to native vegetation or significant soil disturbance.

Ripping of rabbit warrens within the offset site is not permitted. If any warrens develop within the offset site, they will be treated by low impact measures such as fumigation or collapsing.

Foxes are a threat to native fauna and will be controlled if found on the property. Fox dens where present will be destroyed through fumigation and hand collapse.

Active control works targeting pest animals are not expected to have any negative impact on GSM located at the offset site or on the quality and extent of NTGVVP. The landowner will monitor and control rabbits, hares and foxes all year round as well as any new and emerging pest animals.

Any changes in the influences of pest animals may require a change in the management actions.

Performance Criteria and Corrective Actions

Table 11 provides a summary of the performance criteria and corrections actions associated with pest animal control. Implementation of pest animal control measures within the offset site is the responsibility of the landowner. Monitoring is the responsibility of BMD.

Table 11. Performance criteria and corrections actions associated with biomass control.

Performance Criteria	Corrective Actions	Completion Criteria
Monitoring for rabbit activity to be undertaken concurrently with vegetation management activities.	Any rabbit warrens are controlled immediately following detection. Review effectiveness of rabbit control.	Rabbit activity appropriately controlled (i.e. no active rabbit warrens) within offset site by Year 5.
Monitoring for fox activity to be undertaken concurrently with vegetation management activities.	Any fox dens recorded within offset site are destroyed immediately (hand collapse and fumigation) following detection. All fox harbour removed from offset site on detection.	Foxes appropriately controlled (i.e. no active fox dens or fox harbour) within offset site by Year 5.

Any evidence of pest animal activity must be recorded during the baseline assessment and any pest animal monitoring and management activities must be effectively documented, and included within annual reports (Section 3.6).

3.5 Monitoring

3.5.1 Baseline Monitoring

NTGVVP

While the condition of the broader area of grassland was noted during the initial site visit conducted by Ecology and Heritage Partners in 2017, 2018 and 2021, details of the specific matters relating to the Bences Road offset area will be established by the collection of baseline condition data. These data will provide the baseline information for future comparisons and assessments to define the efficacy and progress of the management of the offset site to achieve the performance targets and completion criteria.

Within the first Spring/Summer following the approval of this OMP and prior to the commencement of any management activities a suitably experienced ecologist will systematically survey the site and collect information on the quality and extent of the NTGVVP community, flora species (native and introduced) present and maintain a complete list of all vascular species observed. Notes will be taken on the distribution and location of weed species with GPS waypoints recorded to provide detailed information on the location, extent and severity of target pest plant infestations. This information will be mapped to provide a guide to both management activities and allow a visual assessment of management progress over the life of the plan.

GPS locations will be recorded and mapped to identify the location of any threatened species observed and the location of any other survey and monitoring infrastructure (i.e. photo points).

Improving the abundance and cover of Spear-grasses and Wallaby-grasses identified in the baseline vegetation condition assessment will be taken as improving the relevant food resources for GSM. The abundance of these plant genera will be measured annually. Improving these levels will be taken as the improvement of food resources for GSM, and contribute towards meeting the performance and completion criteria.

Golden Sun Moth

Baseline monitoring of the GSM population within the offset site will occur in the first flight season after the registration of the s.69 agreement on title. Monitoring will record the location and number of individuals observed along monitoring transects as described below (Section 3.5.2).

The baseline data will establish the species density (i.e. species stocking rate) within the offset site and will allow comparison against the results of subsequent years' survey to understand the effectiveness of site management to facilitate the persistence of the population of the species within the offset site.

A suitably experienced ecologist will systematically survey the site and collect information on the flora species (native and introduced) present and maintain a complete list of all vascular species observed. Notes will be taken on the distribution and location of weed species with GPS waypoints recorded to provide detailed information on the location, extent and severity of target pest plant infestations. This information will be mapped to provide a guide to both management activities and allow a visual assessment of management progress over the life of the plan.

GPS locations will be recorded and mapped to identify the location of any threatened species observed and the location of any other survey and monitoring infrastructure (i.e. photo points).

Improving the abundance and cover of Spear-grasses and Wallaby-grasses identified in the baseline vegetation condition assessment will be taken as improving the relevant food resources for GSM. The abundance of these plant genera will be measured annually. Improving these levels will be taken as the improvement of food resources for GSM.

3.5.2 Golden Sun Moth Monitoring

GSM populations are known to vary on spatial and temporal scales depending upon habitat conditions at a site. Monitoring is required to determine if GSM has persisted on the offset site and to ensure that management actions and habitats are suitable for a viable GSM population in the future.

The monitoring and reporting of GSM populations within the offset site is the responsibility of the approval holder (BMD). Monitoring of GSM populations will be undertaken every second year (i.e. Year 2, 4, 6, 8 and 10) for the duration of the OMP to evaluate the persistence and relative abundance of GSM within the offset site against the baseline data.

Specific GSM survey procedures will follow those approved monitoring guidelines for GSM prepared by the Commonwealth (DEWHA 2009). The following measures will be undertaken as part of population and habitat monitoring for GSM:

- Collection of baseline data to be used as a reference point to assess the impacts of management actions. This action will comprise targeted GSM surveys undertaken throughout the offset site in Year 1 (Section 3.5.1.2);
- Surveys are to be conducted by suitably trained observers;
- Surveys must take place during the species' flight season. In western Victoria this is generally late October to early January;
- A minimum of four surveys must be undertaken during conditions suitable for detecting the species. Male moths generally fly between 9am and 4pm on warm (over 20˚C by 10am) days with minimal cloud cover and still conditions. However, if males are observed flying after 3pm or during moderately windy conditions surveys can continue until males are no longer observed flying; and,
- Surveys will be conducted using 50-metre wide, parallel transects with observers walking or driving in a car at < 10 km / hour (flying male moths can be readily seen from a vehicle).

Tracks will be recorded using a GPS and a waypoint taken for each location where GSM are observed. Any obvious changes to the habitat characteristics of the offset area will be recorded during the GSM survey. This will be supported by relevant photos of the habitat or management issues identified.

As the species is known to occur at the offset site no reference site is required for monitoring the population of GSM. However, prior to surveys being conducted, reports of GSM flying in or around Melbourne or within the broader locality of the offset site are likely to provide a useful indicator to identify the start of the flight season around Merrimu.

Habitat Quality Calculations

Ongoing monitoring of the GSM population will quantify the stocking rate of the species within the offset site.

An increase in species stocking rate will result in the score for the species stocking rate, achieving one of the two completion criteria of the OMP (See Section 3.1.2.1 and Table 2). Alternatively, an increase in the cover of native food plants to at least 40% will also result in an increase in the GSM habitat quality score.

3.5.3 NTGVVP Monitoring

The vegetation monitoring against the targets of this OMP within the offset site is the responsibility of the approval holder (BMD). Detailed vegetation monitoring will be conducted by a qualified ecologist for an initial four-year period, and then in years 6, 8 and 10 of this management plan.

Weed monitoring will be conducted in spring (September – November). There will be three components to the monitoring:

- Inspection of the entire offset area by a suitably qualified ecologist for woody weeds, by walking and / or driving throughout the area such that a visual inspection (including with binoculars) would detect the presence of any woody weeds. All patches of infestations or individual plants will be mapped with a GPS, and the locations will be supplied to the weed management contractor/landholder for treatment. Subsequent monitoring will then revisit previously mapped/identified infestations to evaluate the success of weed control, as well as inspecting the entire offset site for new infestations.

- While conducting the woody weed surveys, notes will be taken regarding the cover of herbaceous weed species, and cover will be estimated to the nearest five percent cover. Species and areas suitable for targeted treatment (such as spot spraying), will be mapped and supplied to the weed management contractor/landholder for treatment.
- A minimum of four five by five metre quadrats will be established in selected locations across the offset site. Each monitoring quadrat will be representative overall vegetation composition in that area of the offset site. These quadrats will be used to assess and record the:
    - percentage % total vegetation cover;
    - percentage % cover of inter-tussock spaces and % cover bare ground;
    - floristic composition (with a focus on GSM food species and weed species);
    - total % cover GSM food species, % native and exotic grasses, % wallaby-grass. cover;
    - % cover of Chilean Needle-grass;
    - grassland structure and biomass using the 'golf-ball' method (Morgan 2015);
    - average height of vegetation; and
    - the cover of native and exotic life-forms.
- The permanent vegetation monitoring quadrats established by the botanist will also serve as permanent photo points. Photo points will be located to adequately characterise the current vegetation condition and include a range of weed species. Using a selected marker point for the vegetation monitoring quadrat, a photo will be taken facing the four points of the compass (N, S, E and W). These baseline photos will be used to provide a visual document and for monitoring the vegetation response to management.
- Signs of pest animals (rabbits, hares and foxes) will be recorded during weed monitoring surveys, and at all other times when visiting the offset site. In particular, the locations of any active rabbit warrens will be mapped using GPS, and the locations supplied to the pest animal management contractor/landholder for treatment. Subsequent monitoring will then revisit previously mapped warrens to check for on-going use, as well as searching for new warrens throughout the offset area.

Habitat Quality Calculations

Ongoing monitoring of the vegetation will quantify the site condition score within the offset site.

An increase in the habitat quality score from 7 to 8 will achieve the completion criteria for NTGVVP (See Table 3 and 3.1.2.1). It is anticipated that increased understory diversity and a reduced weed cover – particularly that of high-threat weeds will achieve the increase in habitat quality.

3.6 Reporting

3.6.1 Reporting to the Commonwealth

This OMP requires the BMD to submit a report to Commonwealth after years 1 - 4, 6, 8 and 10 of monitoring and management. The reports will include the results of the monitoring detailed in Sections 3.5.1 – 3.5.3 and

a review of past management works against the objectives contained within this OMP at Section 3.1.2, and performance targets detailed in Sections 3.1.2.1, 3.4.1.1, 3.4.2.4, 3.4.3.3 and 3.4.1.1. Future management priorities will also be detailed in these reports.

Reports should provide enough detail in the form of written comments and supporting evidence that an assessor can easily determine the completion of/progress against the commitments for the offset site.

Information to be provided in the report includes:

- Results of GSM population monitoring;
- Quality and extent of NTGVVP;
- A description of the specific monitoring results from ecological surveys undertaken;
- Results of weed and pest animal monitoring;
- Assessment against the performance targets;
- Any problems or issues experienced (i.e. new infestation of weed species, etc.);
- Any corrective actions and contingency measures where monitoring indicates that there has been a deterioration in the condition or extent of NTGVVP or GSM population;
- Photo points; and,
- Assessment on how the site is on track to meet or meets the conditions under the EPBC referral (EPBC 2018/8271).

If any agreed management actions or commitments are incomplete or have not been undertaken in the times specified, the landowner is to document the justification and the substituted actions that will be undertaken in order to compensate and ensure the required outcomes are achieved.

Reports are to be submitted at least two months prior to the anniversary date of the registration of the s69 agreement on title to allow time for compliance to be assessed before the anniversary date. Reports will also be published on the online within 3 months of every 12-month anniversary where reporting is required.

3.6.2 Reporting to DEECA

An Annual Report relating to fencing, weed control and pest animal control, and revegetation will be provided by the landowner, and submitted on an annual basis to DEECA two months prior to the anniversary of the registration of the s69 agreement on title. Annual Reports will provide sufficient detail in the form of written comments and supporting evidence that an assessor can easily determine the completion of/progress against the management commitments. Information to be provided in the reporting form includes:

- A copy of the Management Action Table from the OMP with information on which actions have been completed for year/s of this reporting period;
- Extent (area) of weed and pest animal control, indication of the success or failure;
- Any corrective actions and contingency measures where monitoring indicates that there has been a deterioration in the NTGVVP or GSM population;
- Provide photographs showing evidence of works; and

- Identification and management of current, new and emerging threats to GSM habitat and/or NTGVVP condition and extent.

If any agreed management actions or commitments are incomplete or have not been undertaken in the times specified, the contractor is to document the justification and the actions that will be action/s will be undertaken to implement the requirement. All records/evidence of management actions will be maintained to DEECA upon request.

3.7 Audit

The approval holder (BMD) is responsible for auditing the implementation and effectiveness of the OMP. Audits will be conducted by an independent ecologist at the following stages:

- At the end of the first year of site management - this is to ensure that initial management and monitoring actions are conducted to the satisfaction of the approval holder and DCCEEW, including implementing the legal security mechanism, ensuring the property is securely fenced, and that other initial management and baseline monitoring actions have commenced.
- At the end of the fourth year of site management – this will involve a review of four annual monitoring and management reports, as well as an independent assessment of the condition of NTGVVP and GSM habitat within the sites.
- At the end of the eighth year of site management – as per the four-year audit.
- Following the completion of the 10th year – to be an audit of the implementation and effectiveness of this OMP.

The timing of scheduled audits is detailed in Table 12. Additional audits may be triggered as a result of a plan review (Section 3.8) or following an environmental incident resulting in significant change to site conditions, as identified in the risk assessment (Table 13).

3.8 Review

This plan includes an adaptive management approach, where corrective actions may be triggered by events occurring within the offset site, or the results of monitoring activities. A review of the OMP will only be necessary in the event of a major incident that makes a significant change to the character or condition of the offset area. The most likely such event is a major wildfire or drought, as described in Table 13.

If a plan review is triggered, this will be conducted by BMD in consultation with DCCEEW. Any future adaptive management changes will be incorporated into the OMP and an updated version of the OMP will be supplied to DCCEEW for approval.

The OMP review will involve changes to any part of the OMP, in order to adequately respond to the trigger and re-direct management actions towards achieving the offset completion criteria under potentially altered site conditions. This could involve changes to:

- Specific details of offset site management methods.
- Monitoring methodology.
- Schedules of monitoring, reporting and auditing.

4 SCHEDULE OF MANAGEMENT AND MONITORING ACTIONS

Management and monitoring actions are summarised below (Table 12). The actions constitute the minimum management requirements for the offset sites over the mandatory 10-year management period.

Table 12. Summary of Management and Monitoring Actions for the Onsite Offset Sites.

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
Fencing				
1-10	All Offset Sites	Maintain fencing in good condition around entire boundary of offset site where fencing exists or is required Refer Section 3.4.1	Ongoing	Maintain fencing to DEECA fencing standards in DEECAs Management standards for native vegetation offset (DELWP 2019)
1-10	All Offset Sites	Erect temporary fencing around offset site during grazing exclusion period (if stock present during this period within the property cannot be confined to certain areas) Refer Section 3.4.1; 3.4.3.1	October -November	Exclude stock from the offset site during exclusion period to protect GSM habitat.
1-10	All Offset Sites	If a threat arises erect an additional fence immediately around the entire boundary of the offset site Refer Section 3.4.1	Immediately on identification of threat	Erect fencing to DEECA fencing standards in DEECAs Management standards for native vegetation offset (DELWP 2019)
1	All Offset Sites	Establish posts to mark the boundary of the offset site in accordance with advice from a qualified ecologist and land surveyor Refer Section 3.4.1.	Immediately on approval of Year 1 of management works	Facilitate management and monitoring of the offset site. Delineate location of temporary exclusion fence.

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
Woody Weeds				
1	All Offset Sites	Control and removal all existing woody weeds within the offset site and on adjacent land between retained NGTVVP and development areas. Refer Section 3.4.2.1	Year 1	Eliminate woody weeds (<1% cover) by end of Year 1
1-10	All Offset Sites	Eliminate all new and emerging woody weeds within the offset site and on adjacent land between retained NGTVVP and development areas. Refer 3.4.2.1	Ongoing	Eliminate woody weeds (<1% cover)
Herbaceous Weeds				
1-10	All Offset Sites	Control all herbaceous and high threat weeds. within the offset site and on adjacent land between retained NGTVVP and development areas . Refer to Table 5 for list of herbaceous weeds, their control method and timing of actions Refer Section 3.4.2.3	Refer to Table 7	Control all high threat weeds; No increase in the cover of weeds at the end of Year 10 compared to baseline cover Minimise off-target damage (avoid all native plants)
1-10	All Offset Sites	Eliminate all new & emerging herbaceous weeds within the offset site and on adjacent land between retained NGTVVP and development areas. Refer Section 3.4.2.3	Ongoing.	<1% cover of all new and emerging herbaceous weeds at the end of Year 10
Pest Animals				
1-10	All Offset Sites	Monitor and control rabbits and foxes. Refer Section 3.4.4	Ongoing	No surface disturbance within the offset site; No active rabbit warrens to be present; No active fox dens to be present; No rubbish/artificial harbour present; Minimal artificial piles of logs and rocks;

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
1-10	All Offset Sites	Monitor and control all new and emerging pest animals Refer Section 3.4.4	Ongoing	Control numbers of any new & emerging pest animals
Biomass Management				
1-10	All Offset Sites	Pulse grazing Refer Section 3.4.3.1	The maximum length of continuous grazing is four weeks with at least two weeks rest between cycles. Stock generally excluded during October -December Stock removed immediately following any high rainfall events.	Stock must be removed should total vegetation cover fall to or below 60% Sufficient bare ground (approximately 10% to 40% cover) maintained in order to maintain space for recruitment of herbs and grasses. No loss of native plant diversity as a result of grazing regimes. Reduction in weed cover.
1-10	All Offset Sites	Ecological burning, if undertaken, should occur between April and early winter. Refer Section 3.4.3.2	Between April and early winter. Outside known GSM flight season. Outside prescribed declared fire danger period	Burnt areas not be grazed for at least 6 months after the burn. Maintain open grassy tussock structure No more than one third of the offset site burnt at any one time No area to be burnt more than once every three years
Detailed GSM population monitoring				
1	All Offset Sites	Baseline GSM monitoring. Refer Section 3.5.1.2.	GSM flight season (generally November – early January)	Collection of baseline GSM data on the population density and distribution throughout the offset site.
Years 2, 4, 6, 8 and 10	All Offset Sites	GSM targeted surveys Refer Section 3.5.2	GSM flight season (generally November – early January)	Assessment of any trends in GSM population size or extent. Distribution and abundance of GSM within the offset site maintained at levels observed during baseline surveys. No measurable decline in the GSM population within the offset site.

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
Vegetation (and NTGVVP) Monitoring				
1-10	All Offset Sites	four quadrats to be monitored annually. Refer Section 3.5.3	Monitoring between September - November	Within each quadrat, record: • percentage % total vegetation cover; • percentage % cover of inter-tussock spaces and % cover bare ground; • floristic composition (with a focus on GSM food species and weed species); • total % cover GSM food species, % native and exotic grasses, % wallaby-grass. cover, and • % cover of Chilean Needle-grass; • grassland structure and biomass using the 'golf-ball' method (Morgan 2015); • average height of vegetation (and grasses/GSM food species); and • the cover of native and exotic life-forms. Photo points to be established at each quadrat.
1-10	All Offset Sites	Inspect site for all high threat weeds and woody weeds. Refer Table 5.	Monitoring between September - November	Annual monitoring of woody weeds within offset site, including areas previously treated for woody weeds to determine effectiveness Annual monitoring of herbaceous weeds within offset site, including areas previously treated to determine effectiveness. New outbreaks of weeds identified and mapped each year. Mapped location of weeds supplied to landowner within 1 month of monitoring.

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
Reporting				
1-10	All Offset Sites	Landowner to prepare and submit an annual management report and photo monitoring to DEECA. Refer Section 3.6.2	Submit at least 2 months prior to on-title agreement anniversary date	Annual report is signed, dated and submitted by the Landowner at least two months prior to the anniversary date of on-title agreement registration Report provides enough detail in the form of written comments and supporting evidence that an assessor can easily determine the completion of progress against the commitments for the offset site as detailed in the OMP and DEECA Covenant.
1-4, 6, 8, and 10	Offset Site	Submit a monitoring report to Commonwealth after years 1 - 4, 6, 8 and 10 of monitoring and management. Refer Section 3.6.1.	Submit at least 2 months prior to on-title agreement anniversary date	Annual report is signed, dated and submitted by the BMD at least 2 months prior to the anniversary date of on-title agreement registration. Report provides enough detail in the form of written comments and supporting evidence that an assessor can easily determine the completion of progress against the commitments for the offset site.
1, 4, 8 and 10	Offset Site	Audit effectiveness of OMP. Refer Section 3.7.	End of Year 1, 4, 8 and 10.	Ensure OMP is facilitating the performance target outcomes and completion criteria.

5 RISK ASSESSMENT

An assessment of potential risks associate with the objectives of this plan are outlined within Table 13. The likelihood and consequence classification is provided in Appendix 2. All risks are considered manageable and actions within subsequent sections of this OMP address relevant risks.

Table 13. Risk assessment and management table for onsite offset sites.

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity(ies)	Feasible/effective corrective actions	Notes
			L	C	RR			
To legally secure approved offset property for conservation	Failure to legally secure approved offset site	The landowner commits to enter into an agreement with DEECA. In addition, DCCEEW will require this for the site to be registered as an offset site for GSM and/or NTGVVP. This is a process that is undertaken regularly and accepted.	Unlikely	Moderate	Low	n/a	Engage a consultant	Low risk: the site will be secured with a s69 on-title agreement.
	Legislative reform prejudices proposed tenure arrangements for offset properties.	Monitor DCCEEW, DEECA, LGAs and other legislative bodies on developments regarding offsets. This is a low risk as the process is undertaken regularly.	Rare	High	Low	Newsletters, expert liaison, press releases and direct contact.	Adjust offset calculations accordingly.	
	Landowner-approval holder agreements fail to adequately address management commitments in the offset plan	Engage an expert to manage the process. Ensure all impacts are suitably offset. The expert will have proven experience with the development of the plan. DCCEEW and DEECA will undertake their QA/QC process to ensure that regularly reporting and demonstration that the actions have been appropriately implemented for	Unlikely	High	Medium	Quality assurance and monitoring	Revise on-title and/or approval holder agreements.	The site will be protected through a s. 69 agreement under the CFL Act. This agreement has a rigorous quality assurance process for all offset sites to ensure the landowner agreements address the management commitments in the plan, and that the management actions are adequately implemented during the life of the OMP.

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity(ies)	Feasible/effective corrective actions	Notes
			L	C	RR			
To achieve performance targets and completion criteria for all MNES		the conservation of GSM and NTGVVP for the life of the OMP and in perpetuity.						
	Adjacent/regional landowner's land management practices fail to support attainment of offset outcomes.	If deemed necessary, liaise with adjacent landholders. Ensure understanding of offset objectives. BMD also own the majority of the surrounding landholdings, therefore the risk of adjacent landowner management actions impacting the offset site is very low (currently fenced and private property).	Unlikely	High	Medium	Adjacent land practices begin to negatively impact offset site.	Take steps to halt negative impacts. Follow up with stakeholder discussions.	There are no dwellings within 50m of the offset sites. Based on the current land management practices in the region it is unlikely that any foreseeable land management practices within the vicinity of the proposed offset site will impact the offset site.
	Insufficient funds provided by approval holder to implement the plan.	The proponent will be responsible for adequate funding of the 10-year management actions outlined in this OMP. This will be a requirement of the approval. Regular reporting against the management actions at the offset site will be an approval requirement under the EPBC Act for the proposed development.	Unlikely	High	Medium	Monitoring and/or annual reporting	Review plan for cost efficiencies.	The landholder is committed in ensuring that the offset is managed principally for conservation, and landowner has committed the relevant funds to ensure management actions can be adequately implemented. An annual report will be prepared by the landholder for a period of 10 years.
	Stochastic events (wildfire/drought/flood) prejudice attainment of interim performance targets and/or	Ensure appropriate biomass management. Plan for scheduling delays.	Possible	High	Medium	Monitoring and/or annual reporting	Apply adaptive management to ensure the objectives of the OMP are not compromised.	The matters of NES have historically been subjected to these periodic events. Although there may be short-term impacts, it is not anticipated that additional stochastic events will have a detrimental impact on matters of NES in the medium to long-term.

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity(ies)	Feasible/effective corrective actions	Notes
			L	C	RR			
	completion criteria for GSM.							
	Approved development on/near project/offset prejudicing plan outcomes.	Ensure proper stakeholder engagement to prevent poor outcomes.	Unlikely	High	Medium	Advertisement of planning scheme amendments/planning permit applications.	Objection to proposed development/laisse with proponent to ensure the proposed development does not compromise the objectives of the OMP.	The offset sites are are within land not proposed to be developed. However, should there be any proposed development or intensification of land (e.g. cropping) adjacent to the proposed offset site it is highly unlikely that this will impact the long-term suitability of the site, as the ecological values within the offset site do not rely on habitat values within adjacent land.
GSM habitat and NTGVVP condition improved	Drought	Apply adaptive management to ensure the site is not over-grazed	Likely	Moderate	Medium	Drought Event	Apply adaptive management to ensure the site is not over-grazed.	GSM habitat and NTGVVP is located within a mosaic of native and introduced grassland, historically subject to drought and occasional wildfire. As such, the GSM habitat and NTGVVP is likely to survive / persist after such an event.
	Wildfire		Likely	Moderate	Medium	Wildfire Event		
	Uncontrolled grazing	Maintain fences and install temporary fencing, if required (Section 3.4.1)	Highly Likely	Moderate	Unlikely	Continual monitoring	Repair permanent fences, and/or install temporary exclusion fences.	The strategic grazing regimes specified within this plan aim to shift species dominance to favour native species abundance and diversity, improving the ecological condition and habitat. Further, strategic grazing strategies will improve and maintain recruitment space required for native plants to establish, further improving species diversity over time.
		Exclude stock during October-December [generally]) (see Section 3.4.3.1 and Table 6 for further information on exclusion period)						
	High biomass levels preventing	Undertake pulse grazing or ecological burning (Section 3.4.3)	Highly Likely	Moderate	Possible	Annual monitoring	Apply pulse grazing or seasonal burning in appropriate	

Management objective/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity(ies)	Feasible/effective corrective actions	Notes
			L	C	RR			
	establishment of native herbs (see	Exclude stock during October-December [generally]) (see Section 3.4.3.1 and Table 6 for further information on exclusion period)					season to reduce biomass levels (Section 3.4.3)	
	Loss of biodiversity due to competition with weeds (see Section 3.4.3.3 for performance indicators)	Spot spraying of weeds Undertake pulse grazing Annual monitoring to adapt future control works and targets (Section 3.5)	Likely	Moderate	Possible	Annual monitoring	Undertake weed control activities	The OMP includes actions to control weed cover, improving the ecological condition of the site over the ten-year period.
	Loss of biodiversity due to pest animal activity (see Section 3.4.4 for performance indicators)	Rabbit warrens or fox dens are controlled (Section 3.4.4)	Likely	Moderate	Possible	Annual monitoring	Undertake pest control activities (Section 3.4.4)	The OMP includes actions to reduce pest animal activity, thereby reducing grazing/soil disturbance by Rabbits. As a result, the GSM habitat is likely to improve.

Notes. L = Likelihood; C = Consequence; RR = Residual Risk; MNES = Matters of National Environmental Significance

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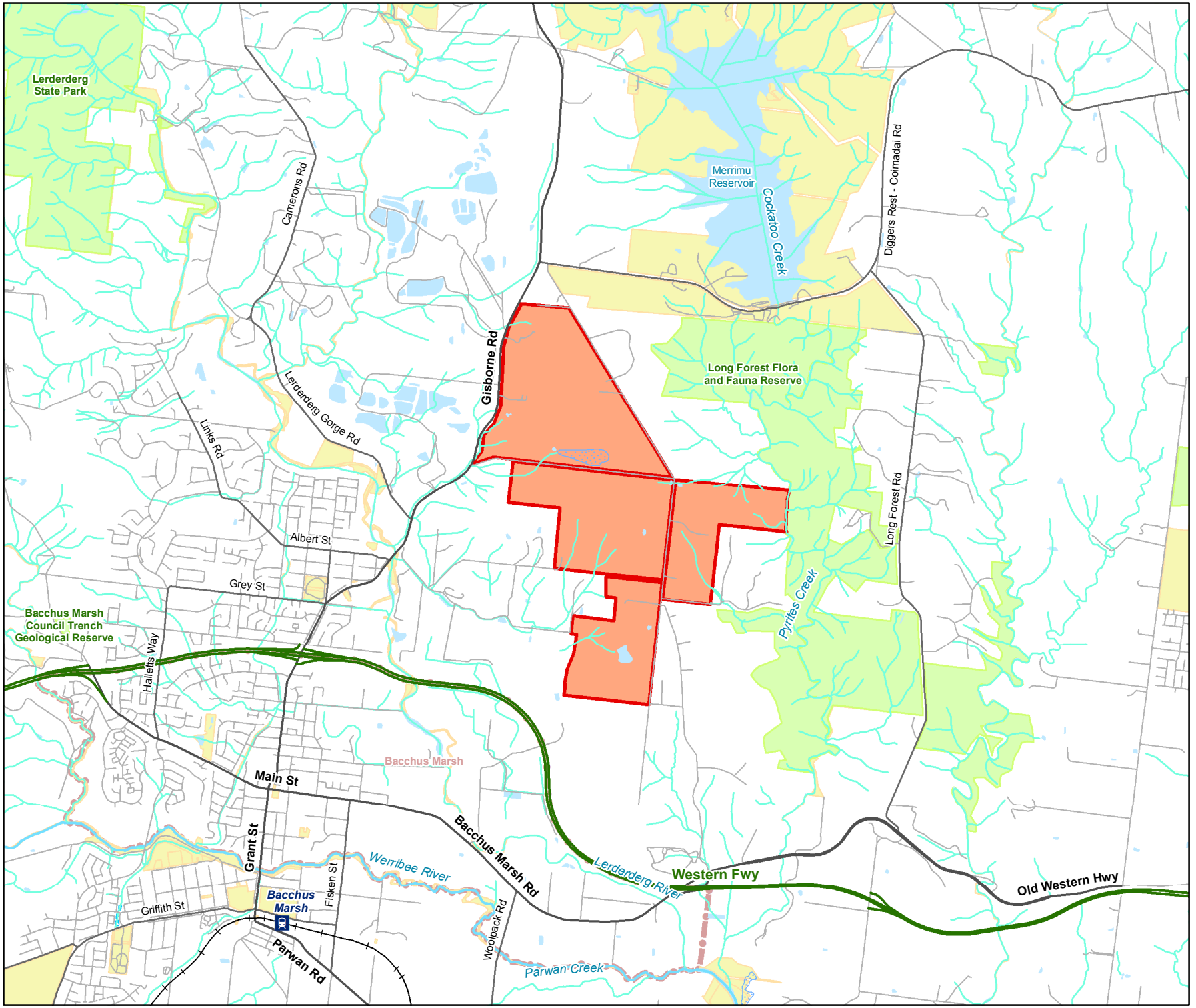

Legend

- 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

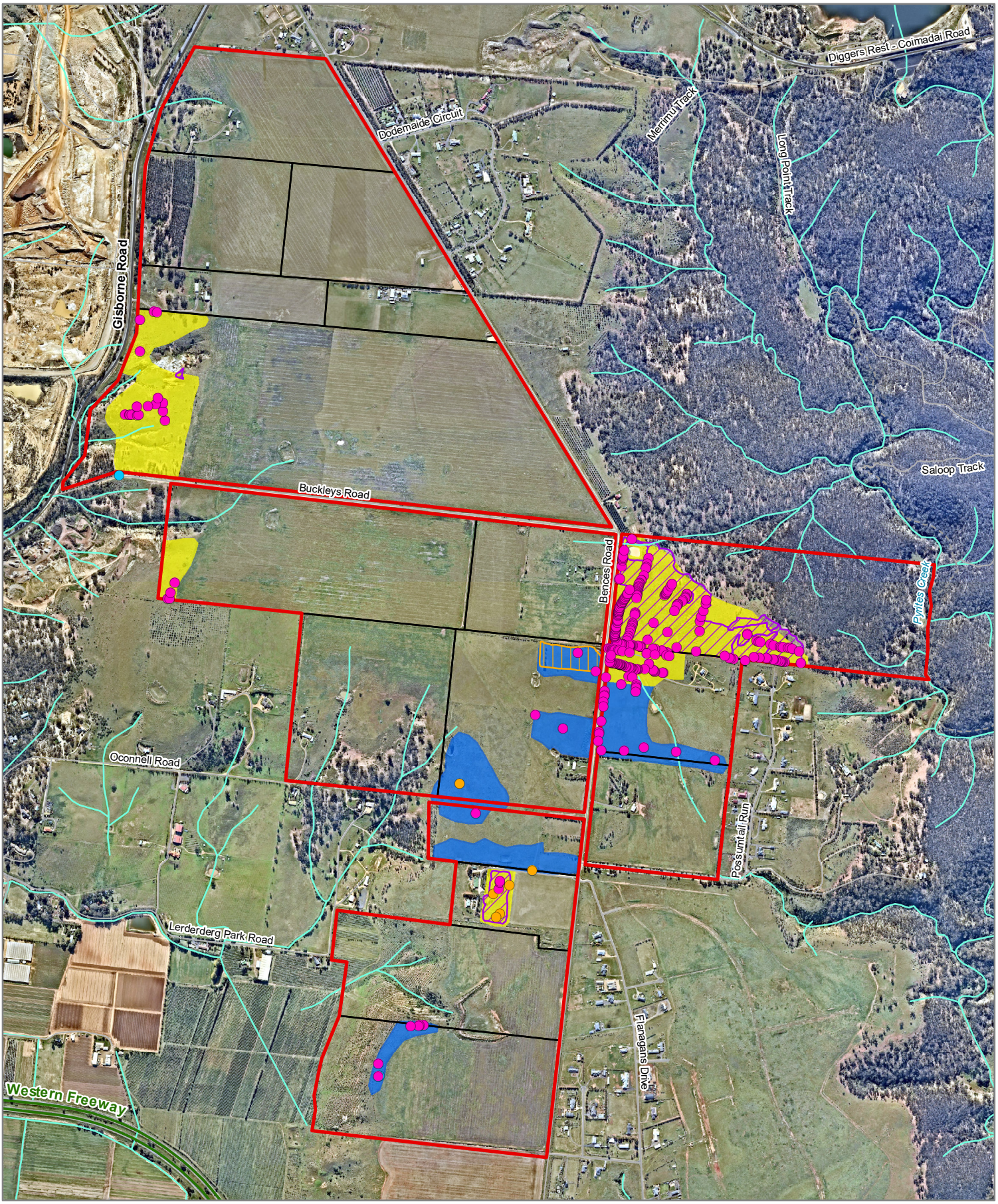

Figure 2
Ecological features at impact site
Bacchus Marsh Development Project

Legend

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

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

Golden Sun Moth records:

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

N

0 200 400
Metres

ecology & heritage partners

10937_Fig02_EcoFeat_IS_P 3/07/2023 melsley

Aerial source: Nearmap 2020

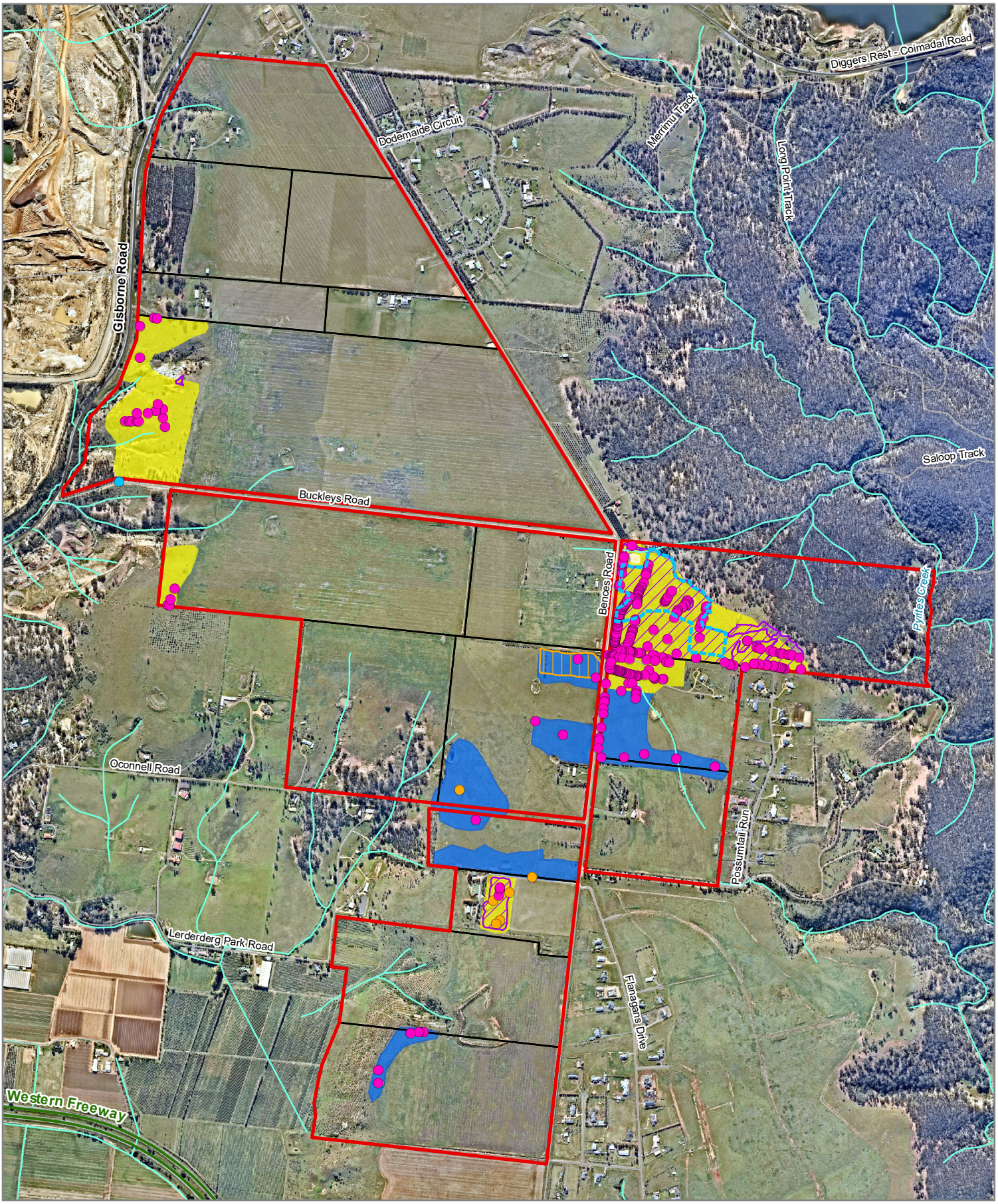

Figure 3 Overview

Onsite Offset locations

Bacchus Marsh Development Project

Legend

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

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

Onsite Golden Sun Moth Offset site

- Bences Road Offset site (6.4 Ha)

Golden Sun Moth records

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

N

0 200 400

Metres

10937_Fig03_GSM_Offset_IS_PMB 3/12/2024 Melsley

ecology & heritage partners

Aerial source: Nearmap 2020

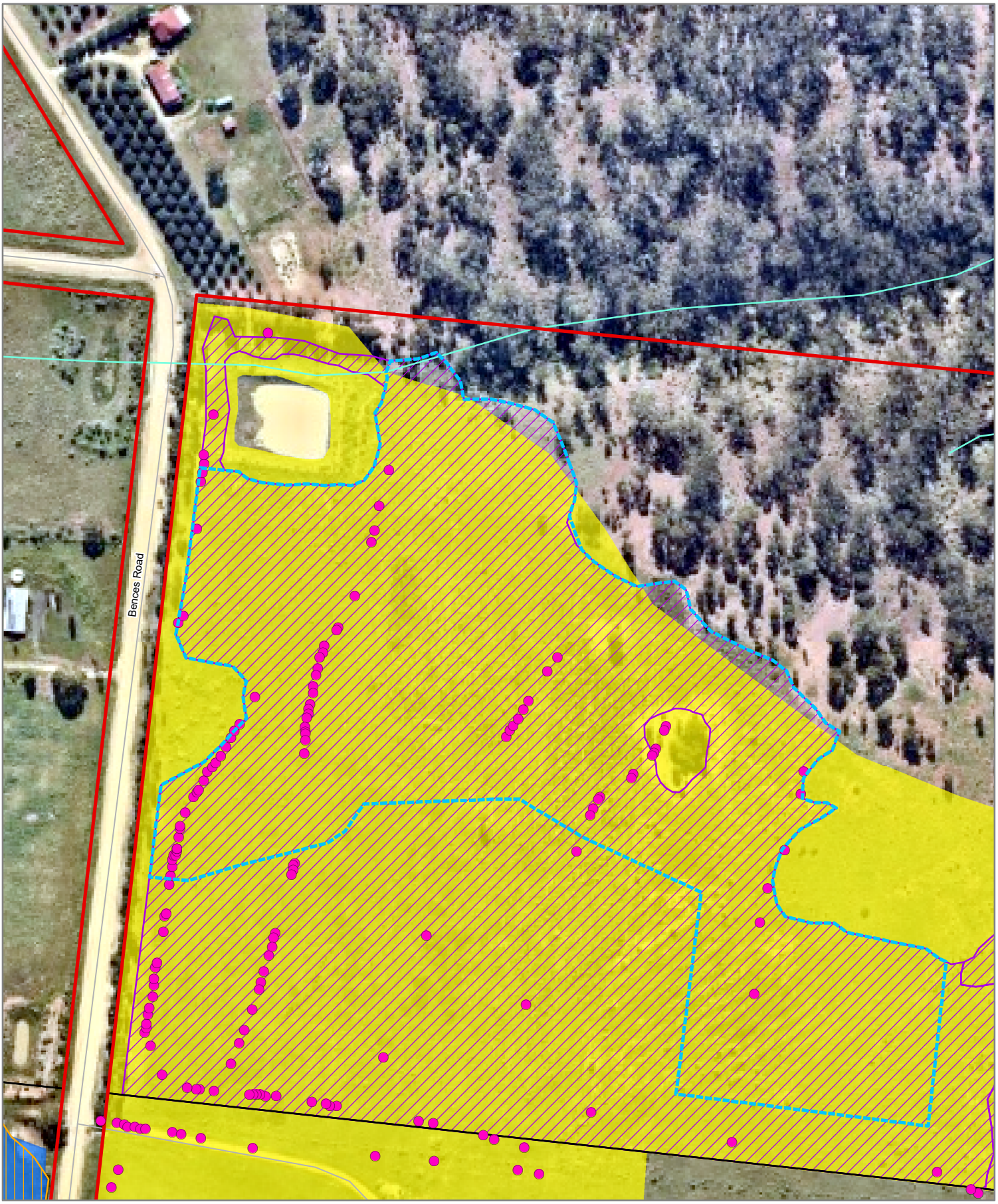

Figure 3a
Onsite Offset locations
Bacchus Marsh Development Project

Legend

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

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

Onsite Golden Sun Moth Offset site

- Bences Road Offset site (6.4 Ha)

Golden Sun Moth records

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

N

0 25 50
Metres

10937_Fig03_GSM_Offset_IS_PMB 3/12/2024 Melsley

ecology & heritage partners

Aerial source: Nearmap 2020

APPENDIX 1 – EPBC ACT OFFSET CALCULATOR

Appendix 1.1. Golden Sun Moth

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Golden Sun Moth
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes		**Area**	10.16	Hectares	Site Assessments
			Quality	**3**	Scale 0-10	
			Total quantum of impact	3.05	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	3.05	Adjusted hectares	Bences Rd - Hab Quality 3: 3.8 hectares	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	3.8	**Risk of loss (%) without offset**	3%	**Risk of loss (%) with offset**	0%								
									Future area without offset (adjusted hectares)	3.7	**Future area with offset (adjusted hectares)**	3.8	0.13	80%	0.10	0.10	0.64	21.13%	No	
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**7**	2.00	80%	1.60	1.57				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	3.0465	0.64	21.13%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Golden Sun Moth
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	GSM	**Area**	12.5	Hectares	Surveys
			Quality	**4**	Scale 0-10	
			Total quantum of impact	5.00	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)		% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																					
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**										
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0									
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**										
Threatened species habitat																					
Area of habitat	Yes	5.00	Adjusted hectares	Bences Rd - Hab Quality 4: 2.6 hectares	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	2.6	**Risk of loss (%) without offset**	3%	**Risk of loss (%) with offset**	0%	0.09	80%	0.07	0.07	0.44	8.81%	No		
									Future area without offset (adjusted hectares)	2.5	**Future area with offset (adjusted hectares)**	2.6									
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**7**	2.00	80%	1.60	1.57					
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**		**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																				
Condition of habitat Change in habitat condition, but no change in extent	No																				
Threatened species																					
Birth rate e.g. Change in nest success	No																				
Mortality rate e.g Change in number of road kills per year	No																				
Number of individuals e.g. Individual plants/animals	No																				

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	5.0008	0.44	8.81%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Appendix 1.2. Natural Temperate Grassland of the Victorian Volcanic Plain

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	NTGVVP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	NTG	**Area**	1.783	Hectares	Survey
			Quality	**2**	Scale 0-10	
			Total quantum of impact	0.36	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	0.36	Adjusted hectares	4.3	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	4.3	**Risk of loss (%) without offset**	3%	**Risk of loss (%) with offset**	0%	0.14	80%	0.11	0.03	0.36	101.75%	Yes	
									Future area without offset (adjusted hectares)	4.2	**Future area with offset (adjusted hectares)**	4.3								
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**5**	**Future quality without offset (scale of 0-10)**	**4**	**Future quality with offset (scale of 0-10)**	**6**	2.00	80%	1.60	0.83				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	0.3566	0.36	101.75%	**Yes**	$0.00	N/A	$0.00
					$0.00	**$0.00**	**$0.00**

APPENDIX 2 – RISK FRAMEWORK

		Consequence				
		Minor	Moderate	High	Major	Critical
Likelihood	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Table 2: Likelihood and consequence

Qualitative measure of likelihood (how likely is it that this event/circumstances will occur after management actions have been put in place/are being implemented)	
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances
Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Minor	Minor risk of failure to achieve the plan's objectives. Results in short term delays to achieving plan objectives, implementing low cost, well characterised corrective actions.
Moderate	Moderate risk of failure to achieve the plan's objectives. Results in short term delays to achieving plan objectives, implementing well characterised, high cost/effort corrective actions.
High	High risk of failure to achieve the plan's objectives. Results in medium-long term delays to achieving plan objectives, implementing uncertain, high cost/effort corrective actions.
Major	The plan's objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies.
Critical	The plan's objectives are unable to be achieved, with no evidenced mitigation strategies.