ecology & heritage partners

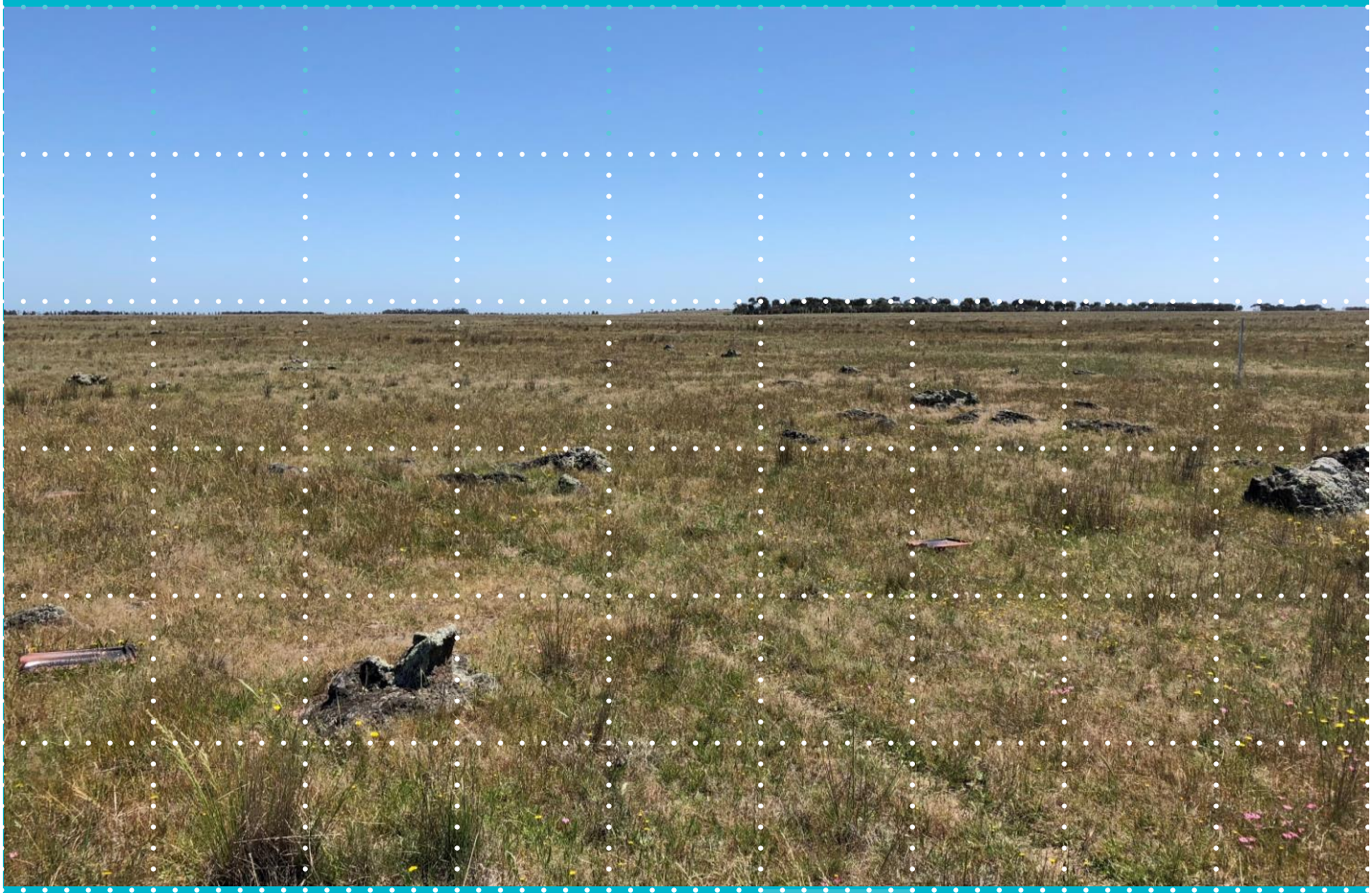
Final Report

Offset Management Plan: 6060 Hamilton Highway, Cressy, Victoria (EPBC 2018/8260) – Version 3

Prepared for

CH2M Beca (on behalf of Greater Western Water)

May 2022



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DOCUMENT CONTROL

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Version 1	Include date of approval Client comments addressed and submitted to DAWE	JM, AO	19/03/2021
Version 2	Submitted to DAWE on 30 April 2021 and included in Approval Conditions dated 4 May 2021	JM, AO	30/04/2021
Version 3	Report updated based on landholder comments and to satisfy DAWE Approval Condition 6	CR	13/05/2022

GLOSSARY

Acronym	Description
Approval holder	means the persons to whom the approval is granted, or to whom the approval is transferred under section 145B of the EPBC Act (persons taking the action).
CaLP	*Catchment and Land Protection Act 1994*
CMA	Catchment Management Authority
DELWP	Victorian Department of Environment, Land, Water and Planning
DEWHA	(former) Commonwealth Department of Environment, Water, Heritage and the Arts
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DSEWPaC	(former) Commonwealth Department of Sustainability, Environment, Water Population and Communities.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class
FFG Act	*Flora and Fauna Guarantee Act 1988*
GSM	Golden Sun Moth
NES	National Environmental Significance
NTGVVP	Natural Temperate Grassland of the Victorian Volcanic Plain
OMP	Offset Management Plan
TfN	Trust for Nature

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this Management Plan (EPBC 2018/8260: Offset Management Plan: Parwan to Melton Pipeline, Victoria is complete, current and correct.
2. I am duly authorised to sign this declaration on behalf of the approval holder.
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.
    b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.
    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 CH2M Beca to prepare an Offset Management Plan (OMP) to compensate for impacts associated with the proposed recycled water pipeline, Parwan to Melton, Victoria (EPBC 2018/8260).

The intention of this OMP is to detail the offset strategy to mitigate the loss of 5.1 hectares of Golden Sun Moth *Synemon plana* (GSM) habitat and 4.96 hectares of the ecological community, *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) at the development site. This is achieved by outlining management actions for the protection of 30 hectares of GSM habitat and 33 hectares of NTGVVP at a site located at 6060 Hamilton Highway, Cressy, Victoria. The OMP has been written in consultation with the landowner of the offset site and is intended to be implemented by the landowner (Note: Landowner name removed from document during public comment period to protect privacy).

The proposed GSM and NTGVVP offsets outlined within this OMP comprise a portion of land within the property, not the entire Cressy property. This will be managed concurrently with the area covered by this management plan.

Proposed Offset Site

The proposed offset site is located within an allocated portion of 6060 Hamilton Highway, Cressy, on land referred to as "Chathams Block". The offset site contains known habitat for GSM and patches of high-quality Plains Grassland which meet the key criteria for listing as the nationally significant ecological community NTGVVP. In accordance with the *Planning and Environment Act 1987*, 30 hectares of GSM habitat and 33 hectares of NTGVVP will be protected on-title through a Section 173 Agreement as an interim mechanism, and secured via a Trust for Nature covenant under the *Victorian Conservation Trust Act 1972* within 24 months post approval. The 30 hectares of GSM will be situated within the 33 hectare NTGVVP offset area.

Management Actions

The offset site will be managed for the purposes of conservation and will involve physical protection of the GSM habitat and NTGVVP, through the control of pest animals and environmental weeds, biomass reduction and general maintenance of the character and quality of the native vegetation, consistent with its historic context. The landholder will adopt an adaptive management approach to allow flexibility to respond appropriately and effectively to uncertainties involved in ecological processes. This will ensure that management objectives are being met while allowing for altered circumstances to be included in the management of the offset site.

Any proposed changes to the management actions for the offset site contrary to those specified within this plan must be approved by the Commonwealth Department of Agriculture, Water and Environment (DAWE) prior to implementation. Any proposed uses or development of the offset site which conflict with the landowners' commitments or maintenance/improvement of the community are not permitted under this plan.

CONTENTS

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was engaged by CH2M Beca to prepare an Offset Management Plan (OMP) to compensate for impacts associated with the proposed development for the Parwan to Melton Pipeline, Victoria (EPBC 2018/8260).

A referral for the action was submitted for assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2018/8260). The referral will be assessed under Preliminary Documentation, which requires the proponent to prepare and implement an Offset Management Plan to compensate for the removal of 10.357 hectares of Golden Sun Moth (GSM) habitat and 4.96 hectares of the nationally significant community: *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP).

The intention of this OMP is to detail the ongoing management actions required to protect 30 hectares of GSM habitat, as well as 33 hectares of NTGVVP at a third-party offset site located at 6060 Hamilton Highway, Cressy, Victoria, in order to offset the proposed impacts. The OMP has been written in consultation with the landowner of the Cressy offset site and management will be implemented by the landowner.

The OMP is both strategic and focused on management actions and performance measures (quantitative amounts indicated, where appropriate) in order to address management issues and key threats across the offset site.

2 OBJECTIVES AND CONTEXT OF THE PROJECT

2.1 Impact Site

The impact site (study area) for the proposed Parwan to Melton recycled water pipeline is located mostly within private property south of Nerowie Road and is bounded by Parwan South Road (west) and Butlers Road, approximately 60 kilometres north west of Melbourne's CBD. The impact site is long and linear and comprises the road reserve of Nerowie Road and intersects Bucklers Road, Green Hill Road, and Eynesbury Road in Eynesbury (from west-east).

At the time that the EPBC referral (2018/8260) was lodged in August 2018, two alignments were considered: a preferred and alternative alignment. The confirmed study area is the preferred (or southern) alignment, which is approximately 13 kilometres long, with a construction footprint of 35 hectares. The study area is comprised of road reserves and agricultural land used mostly for grazing and some cropping, which is generally flat until it intersects the Werribee River. Patches of native vegetation identified along the length of the pipeline are interspersed with Chilean Needle-grass *Nasella neesiana*, a preferred food plant of the GSM.

According to the Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management (NVIM) Tool (DELWP 2021a), the study area occurs within the Victorian Volcanic Plain bioregion. It is located within the jurisdiction of the Corangamite Catchment Management Authority (CMA) and transects between the Melton Shire Council and Moorabool Shire Council municipalities. Relevant Melton Planning Scheme overlays which apply to the study area are the Design and Development Overlay – Schedule 2 (DDO2), Environmental Significance Overlay – Schedule 1 (ESO1) and 4 (ESO4). The Green Wedge Zone (GWZ) also applies to the study area.

The proposed action at the impact site will have a direct impact on 10.357 hectares of GSM habitat and 4.96 hectares of NTGVVP. The objectives of this OMP are to offset the loss of 5.1 hectares of GSM habitat and 4.96 hectares of the nationally significant ecological community NTGVVP. GSM and NTGVVP are listed as Critically Endangered under the EPBC Act (at the time of the decision made on the EPBC act referral).

2.2 Offset Site

2.2.1 Description of the Offset Site

The third-party offset site (offset site) is located at a private property at 6060 Hamilton Highway, Cressy, Victoria, approximately 110 kilometres west of Melbourne's CBD (Figure 1). The offset site is in a relatively undisturbed state (i.e. no history of having been ploughed), evident through the presence of embedded rock across the site. The site is currently used for the grazing of sheep and the properties surrounding the offset site are used for a mixture of agricultural activities including grazing and cropping. The offset site is within the Farming Zone (FZ) and is a Designated Bushfire Prone Area. The offset site is not subject to any specific planning overlays however the southern portion of 680 Hamilton Highway (immediately to the east of the offset site) is subject to an Environmental Significance Overlay. No cultural heritage overlay applies to the site.

The offset site is part of a larger patch of native vegetation within an established offset site adjoining the northern boundary of the NTGVVP offset area covered by this OMP (Figure 2).

According to the Department of Environment, Water, Land and Planning (DEWLP) Native Vegetation Information Management Tool (NVIM) (DEWLP 2021a), the offset site occurs within the Victorian Volcanic Plain Bioregion. It is located within the jurisdiction of the Corangamite Catchment Management Authority (CMA) and the Colac Otway Shire municipality.

Previous assessments of the offset site were undertaken by Biosis (2019), SMEC (2019) and Ecology and Heritage Partners Pty Ltd (2018). These assessments focused on determining the ecological values present within the broader area proposed for use as future offsets. The ecological values of the offset site include high quality grassland, some of which meets the threshold to be classified as NTGVVP and grassland habitat for SLL and GSM. Previous surveys identified three MNES included within the offset site area; GSM, SLL, NTGVVP. An updated assessment of weed cover at the offset site was undertaken by Ecology and Heritage Partners on 10 February 2022.

The offset site will protect 33 hectares of land (including 33 hectares of NTGVVP, overlapping with 30 hectares of GSM habitat). The offset site is located within a larger area of native vegetation, containing approximately 262 hectares of confirmed GSM and SLL habitat, and NTGVVP (Biosis 2019; SMEC 2019).

Golden Sun Moth

Incidental records identified 55 individuals observed on 21 November 2018 (Biosis 2019). SMEC undertook surveys on 29 and 30 November 2018 and 6 and 12 December 2018, with a total of approximately 2969 individuals recorded during the survey event (SMEC 2019). GSM were distributed throughout the broader offset area, with suitable habitat present across the site. It should be noted 2018 was a year with large numbers of moths flying.

Natural Temperate Grassland of the Victorian Volcanic Plain

The entire 33 hectare proposed offset area contains high-quality Plains Grassland of which most of it meets the condition threshold to constitute NTGVVP. NTGVVP within the offset area is dominated by native grasses, including Kangaroo Grass *Themeda triandra*, Wallaby-grass *Rytidosperma* spp., Spear-grass *Austrostipa* spp., and Tussock-grass *Poa* spp. (Biosis 2019). A mixture of native herbs occurred within the site, with commonly observed species including Blue Devil *Eryngium ovinum,* Bindweed *Convolvulus angustissimus*, Cut-leaf Burr-daisy *Calotis anthemoides* and Common Woodruff *Asperula conferta* (Biosis 2019).

Weeds have previously been recorded within the offset area, primarily consisting of Flatweed *Hypochaeris radicata,* Yorkshire Fog *Holcus lanatus,* Toowoomba Canary-grass *Phalaris aquatica* and annual grasses such as Hair-grass *Aira* spp., Quaking-grass *Briza* spp., Squirrel-tail Fescue *Vulpia myuros* and Brome *Bromus* spp. No woody weeds were recorded within the offset area (Biosis 2019), which was confirmed during the February 2022 site visit.

The MNES relevant to this OMP will be protected on-title through a Section 173 Agreement under the *Planning and Environment Act* 1987 as an interim mechanism. A Trust for Nature covenant under the *Victorian Conservation Trust Act 1972* will be established in perpetuity for the area covered by this OMP. This OMP provides the specific management actions for to be implemented under both the Section 173 Agreement and the subsequent Covenant.

2.2.2 Tenure Arrangements

The proposed offset site is privately owned and is currently in the process of being protected through a Section 173 Agreement under the *Planning and Environment Act 1987.* Further, the offset site will be

protected via a Trust for Nature conservation covenant within 12 months of the EPBC Act referral (2018/8260) approval being granted. Once the Trust for Nature Covenant is secured on title, the Section 173 Agreement will be removed.

2.2.3 Environmental Condition and Values

The offset site contains a large population of GSM, which reside within the areas of NTGVVP. This OMP will focus on two matters of NES relevant to the proposed action (NTGVVP and GSM). One additional matter, Striped Legless Lizard is known to occur within the offset area.

3 RISK ASSESSMENT

An assessment of potential risks associated with the objectives of this plan are outlined within Table 1. All risks are considered manageable and actions within subsequent sections of this OMP address relevant risks.

Table 1. Risk assessment and management table for specific offset site for GSM and NTGVVP (Appendix 1).

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 properties for conservation.	Failure to legally secure approved offset site	Engage with expert offset brokers	Unlikely	Moderate	Low	n/a	Engage a consultant	Low risk: the site is currently in the process of being secured with an on-title agreement (Section 173 Agreement). Further, the site will be secured via a Trust for Nature covenant within 24 months post approval of the referral.
	Legislative reform prejudices proposed tenure arrangements for offset properties.	Monitor DAWE, DEWLP LGAs and other legislative bodies on developments to offsets	Rare	High	Low	Newsletters, expert liaison, press releases and direct contact.	Adjust offset calculations accordingly.	

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	Landowner-proponent agreements fail to adequately address management commitments in the offset plan	Engage an expert to manage this process. Ensure all impacts are suitably offset.	Unlikely	High	Medium	Quality assurance and monitoring	Revise on-title and/or proponent agreements.	The site will be protected through a Section 173 Agreement. The Section 173 Agreement will be placed on-title and therefore undergo a further review by the Titles Office. Further, the site will be secured via a Trust for Nature covenant within 24 months post approval of the referral.
To achieve performance targets and completion criteria for all MNES	Adjacent/regional landowner's land management practices fail to support attainment of offset outcomes.	Liaise with adjacent landholders. Ensure understanding of offset objectives	Unlikely	High	Medium	Adjacent land practices begin to negatively impact offset site.	Take steps to halt negative impacts. Follow up with stakeholder discussions	The adjacent land parcels contain agricultural land (grazing and/or cropping). Based on the current land management practices in the region and it is unlikely that any foreseeable land management practices within the vicinity will impact the offset site.
To achieve performance targets and completion criteria for all MNES	Insufficient funds provided by proponent to implement the plan.	Ensure reputable land holder to implement plan.	Unlikely	High	Medium	Monitoring and/or annual reporting	Review plan for cost efficiencies.	The offset funds provided by the proponent will be deposited to the land holder. The landholder

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	Stochastic events (wildfire/drought/flood) prejudice attainment of interim performance targets and/or completion criteria for MNES.	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.	-
	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 site is within a semi-rural agricultural landscape, as such, there is a low likelihood of development within adjacent properties. The ecological values within the offset site do not rely on habitat values within adjacent land.
	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	The NTGVVP offset (33 hectares) includes the GSM offset (30 hectares). The offset site sits within 262 hectares of similar quality grassland within the property. The offset site and adjacent areas have been historically subject to frequent
	Wildfire		Likely	Moderate	Medium	Wildfire Event		

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			
								drought and occasional wildfire. As such, the GSM population and NTGVVP community is likely to survive such an event.
NTGVVP habitat improved	Uncontrolled grazing	Maintain fences and install temporary fencing, if required (Section 5.5.3.)	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-November) (see Section 5.5.6 for further information on exclusion period)						
	High biomass levels preventing establishment of native herbs (see Section 5.5.6.4 for performance indicators)	Undertake pulse grazing (Section 5.5.6.)	Highly Likely	Moderate	Possible	Annual monitoring	Apply pulse grazing in appropriate season to reduce biomass levels (Section 5.5.6.2)	
		Grazing excluded between October-November annually, in perpetuity (Section 5.5.6)						
	Loss of biodiversity due to competition with weeds (see	Spot spraying of weeds (Section 5.5.4.)	Likely	Moderate	Possible	Annual monitoring	Undertake weed control activities (Section 5.5.4)	The Offset Management Plan includes actions to reduce weed cover, improving the ecological

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			
	Section 5.5.4.3 for performance indicators)	Undertake pulse grazing (Section 5.5.6)						condition of the site over the 10 year period.
		Annual monitoring to adapt future control works and targets (Section 8)						
	Loss of biodiversity due to pest animal activity (see Section 5.5.5.3 for performance indicators)	Rabbit warrens or fox dens are controlled (Section 5.5.5)	Likely	Moderate	Possible	Annual monitoring	Undertake pest control activities (Section 5.5.5.)	The Offset Management Plan includes actions to reduce pest animal activity, thereby reducing grazing/soil disturbance by the European Rabbit. As a result, the GSM population and NTGVVP ecological community is likely to improve and expand within the site as it is managed.

Notes. L = Likelihood; C = Consequence; RR = Residual Risk

4 UNAVOIDABLE LOSS AND OFFSET OBLIGATIONS

4.1 Unavoidable Loss

The proposed development at the impact site (Parwan to Melton Pipeline) will result in the removal of the following Matters of National Environmental Significance (NES):

- 10.357 hectares of Golden Sun Moth;
- 4.96 hectares of *Natural Temperate Grassland of the Victorian Volcanic Plain*, and;
- 0.266 hectares *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia.*

4.2 Offset obligations, user inputs and applying the offset guide

4.2.1 Golden Sun Moth and Natural Temperate Grassland of the Victorian Volcanic Plain

Based on the EPBC Act offset calculator (DSEWPaC 2012b), the protection and management of 30 hectares of GSM habitat (which overlaps with NTGVVP) at the Cressy offset site provides a direct offset for the impacts to 5.1 hectares of GSM habitat. (Table 2; Appendix 2). The protection and management of 33 hectares of *Natural Temperate Grassland of the Victorian Volcanic Plain* within the proposed offset site provides a direct impact offset of 100.13% (Table 3; Appendix 2). As such, 100% of the offset requirements will be met through direct offsets and are considered to be in accordance with the Commonwealth environmental offset policy (DSEWPaC 2012a).

Table 2 EPBC Act Offset Calculator (Golden Sun Moth) associated with the Cressy offset site

Offset Criteria	Response
Impact Site	
Impact Location	Parwan to Melton Pipeline: south of Nerowie Road, Parwan, VIC
Habitat to be removed	5.1 hectares of Golden Sun Moth habitat (GSM)
Habitat quality	5/10. A total of 991 moths were recorded during the 2016/17 flight season. However, most moths were recorded along the alternative alignment, which will no longer be impacted. The GSM habitat within the impact area is also dominated by Chilean Needle-grass *Nassella neesiana*, which is a noxious weed. Therefore, the habitat quality at the impact area is of moderate quality (DSEWPaC 2012b).
Offset Site	
Offset location	6060 Hamilton Highway, Cressy, Victoria
Risk-related time horizon	20 years. The land will be managed in perpetuity for conservation purposes for Golden Sun Moth.
Time until ecological benefit	10 years. The existing habitat condition is expected to be improved over the 10-year active management schedule detailed in the Offset Management Plan. Potential management activities may include, but are not limited to ecological burning, tactical grazing, bush regeneration and treatment of pest fauna. Golden Sun Moth relies upon native and/or non-native grassland

Offset Criteria	Response
	habitat (especially those dominated by tussock forming grass species). Where suitable habitat is available, the species can tolerate grazing but requires areas without a recent history of cropping. Improving vegetation structure (e.g., regrowth of heavily grazed grassland) could be achieved over relatively short time periods (i.e., 2 - 5 years), however ecological benefits arising from management would be conservatively assessed after a 10-year period to allow the species sufficient time to re-stock the site following habitat improvements.
Start area and quality of offset site	30 hectares in total, assigned a starting quality of 6/10. The offset site was assessed by SMEC during the Golden Sun Moth flight season in 2018 (SMEC 2019). The Golden Sun Moth habitat surveyed previously was high quality, with approximately 2969 moths recorded across the broader offset area (262 ha area). GSM habitat covers the entire selected offset site, which is located within a broader patch of suitable habitat approximately 262 hectares in size (SMEC 2019). The habitat quality is based on (DSEWPaC 2012b): Site condition: 6/10. The site supports a diversity of native grasses, including key grass species associated with Golden Sun Moth (Wallaby-grass *Rytidosperma* spp., Spear-grass *Austrostipa* spp.) with at least 40% cover of native grass; The starting site condition was assessed through a Vegetation Quality Assessment (VQA) using the habitat hectare assessment method. The VQA scores for site condition were as follows: understorey score of 15/25, weed score of 6/15, recruitment score of 10/10 and organic litter score of 5/5 (Biosis 2019). The presence of exotic grasses, primarily Toowoomba Canary-grass and Brown-top Bent-grass and Flatweed, negatively impacted both the weed score and understorey score. The Victorian Biodiversity Atlas has multiple records of Golden Sun Moth scattered within 10-kilometres of the study area, indicating that other suitable habitat exits within the broader region, and the population within the offset site is not an isolated population. Threats that occur to the population within and adjacent to the offset site include the loss of suitable habitat through land clearance (cropping) or disturbance (heavy grazing/slashing). The habitat at the offset site is of moderate-high quality for Golden Sun Moth. This is due to a native vegetation cover of at least 40% including key food resources (wallaby-grass, spear-grass, Kangaroo Grass) present within the offset area.
Risk of loss without offset	5%. There are currently no formal protection mechanisms that protect the ecological values present within the offset site, however additional offset sites are located adjacent to the proposed offset site, which are protected via a Trust for Nature covenant (EPBC 2019/8569). Without protection and ongoing management as an offset site, there is a degree of uncertainty regarding the future condition of the land. As the broader offset property is zoned Farming Zone (FZ), there is a risk that the Golden Sun Moth will be lost by intensified agricultural use (e.g. cropping or intensified grazing). Inappropriate grazing regimes by hard-hooved livestock at higher stocking densities will result in compaction of the soil, which negatively impacts Golden Sun Moth. Intensive agricultural activities such as ploughing, sowing pasture grasses, fertiliser application and/or tilling the soil is likely to result in complete loss of the Golden Sun Moth population. The risk posed by intensification of agricultural use is evidenced by cropping activities in properties surrounding the offset site. A protective covenant provides legal protection, averting this risk of losing the Golden Sun Moth community within the site.
Future quality without offset	5/10. Without protection as an offset site there is uncertainty regarding the future condition of the land. Without increased management as an offset, a reduction in quality over time is likely to occur due to continued pest and weed encroachment from the broader property, adjoining properties and nearby roads, as well as a lack of conservation land management, including biomass management resulting in a reduction in species diversity. Relatively small areas within the site have a high cover (30%) of Toowoomba Canary-grass, which is a fast-growing species that can quickly outcompete native grass species such as wallaby-grass

Offset Criteria	Response
	and spear-grass. Without ongoing management, this weed can displace plants that constitute important food resources for the Golden Sun Moth. Without strategically designed grazing strategies, stock can overgraze/undergraze Golden Sun Moth habitat, leading to a shift in introduced species dominance and/or, soil compaction, which reduces the viability of the offset site to support Golden Sun Moth. Rabbits were recorded within and nearby the offset site. Without increased management, rabbits are likely to prevent the recruitment of host plants, leading to a decline in the Golden Sun Moth community.
Risk of loss with offset	1%. There is a 1% chance that the GSM population will be lost with the offset being protected and managed in accordance with the OMP placed on-title. There is a low level of risk given the evidence of recent voluntary conservation works (weed control targeting GSM known habitat) within the site, these works have proved to be successful, demonstrating the landholder's capability in managing threats. Further, the availability of GSM habitat adjacent to the offset site further consolidates habitat within the property.
Future quality with offset	7/10. There is a high level of confidence that the future quality of the Golden Sun Moth offset site will increase through the active implementation of the various actions outlined in the Offset Management Plan. There is a high likelihood that the management actions provided in the Offset Management Plan will lead to an increase in the species' habitat quality, site occupancy and population size. The management actions outlined in this Plan are well known and proven, and therefore there is a high likelihood that the quality of the habitat will improve in the future (DEWHA 2009a, 2009b). Currently, the exotic vegetation cover is variable across the site, with the average cover being approximately 45%. It is expected that at the end of the 10-year management period the exotic vegetation cover will not exceed 45%. It is expected that at the end of the 10-year management of the site, the weed score will be maintained at 6/15 and the recruitment score maintained at 10/10. The weed score will be maintained through the management of exotic grasses, where biomass will be monitored to ensure adequate inter-tussock spacing, and targeted control of Toowoomba Canary-grass will be undertaken. The targeted control of Toowoomba Canary-grass will provide opportunity for native grass and herb recruitment, increasing the cover of native species and maintaining or improving the understorey score to a minimum of 15/25. Further detailed on weed control actions are detailed in Section 5.5.4. Due to the commitment of the current landowner and investment in the active management of the site these factors provide a high level of confidence that the future quality of the offset will increase (i.e. a score of seven is realistic). 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 native biodiversity. The species was previously observed in grassland areas with at least 20% native grass cover (wallaby-grass, spear-grass) and weed management is necessary to ensure that native grass cover is maintained. Appropriate livestock grazing management is necessary to ensure that soil compaction is minimised and native grasses are not overgrazed. Low density grazing can be beneficial for maintaining GSM habitat. Pest management is required to ensure rabbit populations are managed and numbers are reduced to prevent over-grazing.
Confidence in result	80-90%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing condition and evidence of the landholder's capability to manage threats through recent conservation works. The site will be protected through a Section 173 Agreement under the *Planning and Environment Act 1987* with Council. Council undertakes a quality assurance process for all offset sites to ensure the landowner agreements address the management commitments in the plan.

Offset Criteria	Response
	Further, the site will be secured via a Trust for Nature covenant under the *Victorian Conservation Trust Act 1972* within 24 months post approval of the referral.
% of impact offset off-site	30 hectares high quality GSM habitat: 100.50%

Table 3. EPBC Act Offset Calculator (Natural Temperate Grassland of the Victorian Volcanic Plain)

Offset Criteria	Response
Impact Site	
Impact Location	Parwan, VIC (linear corridor from around Werribee River to Parwan South Road)
Habitat to be removed	4.96 hectares of Natural Temperate Grassland of the Victorian Volcanic Plains (NTGVVP)
Habitat quality	The NTGVVP patches of Plains Grassland proposed to be removed are of low-moderate quality with a Habitat score of between 31-34 out of 100. The NTGVVP patches were predominately characterised by the presence of one to several native tussock grasses. Many of these have degraded since the initial site assessment due to existing or altered land use. The current condition is based on a high weed cover and the isolated nature of the patches within an agricultural landscape, which are therefore vulnerable to edge effects (livestock grazing, fertiliser use, weed encroachment and land use practices) (Ecology and Heritage Partners 2020c).
Offset Site	
Offset location	Cressy, Victoria
Risk-related time horizon	20 years. The land will be managed in perpetuity for conservation purposes for Natural Temperate Grassland of the Victorian Volcanic Plains
Time until ecological benefit	10 years. The existing habitat condition is expected to be improved over the 10-year active management schedule detailed in the Offset Management Plan.
Start area and quality of offset site	33 hectares; 6/10. The offset site was assessed by Biosis (2019) which recorded approximately 262 hectares of NTGVVP in the broader offset area. The offset site supports high quality NTGVVP. It is contiguous with larger areas of moderate to high quality NTGVVP to meet approvals for other projects under the EPBC Act. The condition of the NTGVVP area proposed to be offset is 60/100 based on the Habitat Hectare assessment completed by Biosis (2019). A rapid ground-truthing assessment of weed cover was undertaken by Ecology and Heritage Partners in February 2022 to review the weed cover, which remained relatively consistent with the Biosis assessment. The NTGVVP offset site Start area and habitat quality is based on (DSEWPaC 2012b): • Site condition: 6/10. The site supports a diversity of native grasses (Wallaby-grass., Spear-grass, Tussock Grass and Kangaroo Grass, with at least a 50% perennial cover of native species, which meets the minimum threshold criteria for NTGVVP; • Based on a review of aerial photography, predictive mapping of native vegetation extent, and knowledge of NTGVVP habitat in the region, the proposed offset site is connected to other patches of NTGVVP within the broader property. There are also isolated patches of high-quality Plains Grassland native vegetation within 10-kilometres of the site, including in road reserves along Cressy-Shelford Road to the north of the site and within private property to the south of the site. Threats that occur to the community within and adjacent to the offset site include the loss of suitable habitat through land clearance (cropping), disturbance (heavy grazing/slashing) and weed incursion.

Offset Criteria	Response
	Specifically, the habitat (site condition) and NTGVVP community extent within the surrounding landscape at the offset site are the most influential factors contributing to offset site quality. The habitat is moderate-high quality for NTGVVP. This is based on the patch identified as NTGVVP, having a moderate diversity of native grasses and herbs with minimal weed incursion. The definition for NTGVVP of sufficient quality for listing has been based on information provided in the *Nationally Threatened Ecological Communities of the Victorian Volcanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland* (DSEWPaC 2011). The combination of habitat factors presented has resulted in the starting quality of NTGVVP habitat being assessed at 6/10.
Risk of loss without offset	5%. 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. As the broader offset property is zoned Farming Zone (FZ), there is a risk that the NTGVVP will be lost by intensified agricultural use (e.g. cropping or intensified grazing). Inappropriate grazing regimes will result in excessive pugging within the grassland and inhibit reproduction of native flora due to overgrazing during the flowering period, reducing species diversity and increasing opportunities for weed invasion. Intensive agricultural activities such as ploughing, sowing pasture grasses, fertiliser application and/or tilling the soil is likely to result in complete loss of the NTGVVP population. The risk posed by intensification of agricultural use is evidenced by cropping activities in surrounding the offset site. A protective covenant provides legal protection, averting this risk of losing the NTGVVP community within the site.
Future quality without offset	5/10. Prior to European settlement, it is highly likely that the NTGVVP within the offset site was a higher quality grassland patch, not fragmented by roads, fences or cropped areas and relatively weed free. As the region has been exposed to agricultural use, more roads and land use practices have been introduced, resulting in an increase in weeds within the native grasslands, and fragmentation of patches into smaller reserves. Changing water regimes and introduction of livestock also contribute to a decline in condition. Negative impacts from continued farming use into the future are likely to result in further declines to the native grassland, as new weeds are introduced from the adjacent road and livestock entering the property, ability for the landholder to graze any livestock (i.e. introduce cattle), and intensely graze the site without conservation considerations (i.e. biomass management). In addition, an unused road reserve occurs to the east of the offset area, which if developed, poses an additional threat of weed spread into the grassland if unmanaged. Given the current land use (i.e. grazing) at the proposed offset, the absence of a security arrangement and lack of conservation management of the understorey specifically for NTGVVP, it is likely that the habitat will decline in quality in the future from an initial quality score of 6 to 5. Toowoomba Canary-grass is a perennial introduced species and had a weed cover of approximately 30% within the NTGVVP patches. This weed requires management, to ensure it does not further encroach/out-compete native grasses. Flatweed is also present in areas on the site and can cover much of the ground during wet seasons. Without strategically designed grazing strategies, stock can overgraze/undergraze NTGVVP, leading to a shift in introduced species dominance and/or, preventing host plants from recruiting. Grazing can lead to an increase in the cover of Flatweed when not managed in a way that considers conservation, therefore without the protection and incentive to manage the conservation values within the land, the cover of Flatweed (in addition to Toowoomba Canary-grass) is likely to result in a decline in quality. Rabbits were recorded within and nearby the offset site. Without increased management, rabbits are likely to prevent the recruitment of host plants, leading to a decline in the NTGVVP community.

Offset Criteria	Response
Risk of loss with offset	1%. There is a 1% chance that the offset site will be lost with the offset being protected and managed in accordance with the OMP placed on-title. There is a low level of risk given the evidence of recent voluntary conservation works (weed control) within the site, these works have proved to be successful, demonstrating the landholder's capability in managing threats. Further, the location of an adjacent offsets site (OMPs for the adjacent site currently being prepared), further consolidates habitat within the property.
Future quality with offset	6/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a management plan incorporating weed control, biomass control and regular monitoring, aiming to enhance native biodiversity. The quality of NTGVVP will be improved by actions outlined in Section 5.5, and include: • Reducing weed cover, targeting perennial grass weeds which outcompete plants that constitute NTGVVP; • Control all high threat weeds (<20% cover), reducing competition for the NTGVVP community; • 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 requirements of NTGVVP. 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 NTGVVP. 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 Section 5.5 of this plan, which as outlined above are beyond past and current management, the habitat quality of the offset site is likely to be significantly improved beyond what the site would be without implementation of the offset. Largest changes in community quality are likely to be represented by site condition. Performance indicators that demonstrate the success of management actions aimed at improving the future quality of the offset site are provided in Section 5.5.2 and Section 5.6.
Confidence in result	90%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing condition and evidence of the landholder's capability to manage threats through recent conservation works. The site will be protected through a Section 173 Agreement under the *Planning and Environment Act 1987* with Council. Council undertakes a quality assurance process for all offset sites to ensure the landowner agreements address the management commitments in the plan. Further, the site will be secured via a Trust for Nature covenant under the *Victorian Conservation Trust Act 1972* within 12 months post approval of the referral.
% of impact offset off-site	100.13%

5 OFFSET IMPLEMENTATION

5.1 Management Objectives and Strategy

The offset site will be managed for the purposes of conservation and will involve physical protection of the GSM habitat and NTGVVP, the control of pest animals and environmental weeds, biomass reduction and general maintenance of the character and quality of the native vegetation, consistent with its historic context.

The offset site will be protected in perpetuity via a Section 173 Agreement (Table 4) and a Trust for Nature Covenant. The Section 173 agreement will be an interim mechanism until the Trust for nature covenant is placed on title (within 24 months of the EPBC Act approval for the project). This OMP will be attached to the on-title agreement and require the landowner to manage the offset site in accordance with the requirements detailed herein. Security, management and monitoring responsibilities are summarised in Table 5. This OMP relates solely to the 30 hectares of GSM habitat and 33 hectares of NGTVVP and includes actions related to the ongoing monitoring and management of the ecological communities.

Table 4. Security and Management Responsibility

Offset Security and Management Responsibility	Parwan to Melton Pipeline
Who is liable/responsible for meeting offset requirements?	Greater Western Water
Type of security mechanism	Interim: Section 173 agreement Future: Trust for Nature Covenant
Agreement or Planning Permit Number (ID)	TBC/2020 EPBC 2018/8260
Date 10-year offset management to commence	Upon approval of this OMP by DAWE
Date 10-year offset management expires	10 years following approval of this OMP by DAWE
Offset site management responsibility (i.e. Landowner, Authority Name)	Landowner
Offset Monitoring Responsibility (i.e. Responsible Authority)	Landowner, Greater Western Water, DAWE, TfN

5.2 Compliance with Offset Principles

The '*Environmental Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy' (DSEWPaC 2012a) outlines a set of principles that a proposed offset must meet in order to be assessed under the referral process. These principles are detailed in Section 7 of the Preliminary Documentation (Ecology and Heritage Partners 2020b), along with how the proposed offset site meets these requirements.

5.3 Offset Targets

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

The Offset Assessment Guide offset calculator has been completed to determine the area of offset required to adequately compensate for the removal of GSM habitat and NTGVVP at the development site. The Offset Assessment Guide offset calculator is provided in Appendix 2, and a justification for the scores given in Section 4.2.

5.4 Ongoing Land-use Commitments

The offset site will be managed to facilitate an improvement in the quality of remnant NTGVVP vegetation community and maintenance of GSM habitat over 10 years. After this period of management, the land will be required to be maintained in the condition achieved as a result of that management, in perpetuity.

From the commencement of the agreement, the landowner agrees to undertake the following long-term (ongoing) management objectives in perpetuity for the 33 hectares of land:

- Retain and manage all native vegetation as directed by this OMP;
- Exclude domestic stock, except as permitted by this OMP;
- Maintain woody weeds to < 1 % cover;
- Maintain cover of exotic grassy weeds to levels described in Section 5.5.4;
- Within the GSM habitat, maintain herbaceous weed cover at the current level of approximately 45% (predominantly Flatweed);
- Within the 33 hectares of NTGVVP offset area, maintain herbaceous weed cover at the current level of approximately 45% (predominantly Flatweed);
- Achieve a VQA weed score of at least 6/15 (i.e. 25-50% cover and less than 50% high threat weeds) within the NTGVVP offset area at the end of the 10 Year management;
- Maintain a VQA weed score of at least 6/15 (i.e. 25-50% cover and less than 50% high threat weeds) within the GSM offset area at the end of the 10 Year management;
- Implement actions to control any new and emerging weeds identified during Detailed Vegetation Monitoring events (Section 8.2) and maintain to < 1% cover;
- Control rabbits; and
- Undertake biomass management (grazing).

Of note, weed invasion and inappropriate grazing regimes are two of the main demonstrated threats to NTGVVP communities and GSM populations. This OMP addresses these demonstrated threats by including management actions aimed at reducing the likelihood of weed invasion, the preparation of an appropriate grazing regime sensitive to the values that exist in the offset site and surrounds.

Due to the nature of an in-perpetuity commitment, at times weed levels may exceed the listed objectives due to unknown weed threats in the future. The landowner will endeavour to control weeds across the

offset site at the agreed levels, however, it is acknowledged that weed cover will fluctuate on temporal and spatial scales due to seasonal conditions (e.g. Flatweed) over the life of the approval and beyond.

5.5 Management Actions

Implementation of the management actions (excluding third party monitoring) outlined within this OMP is the responsibility of the landowners as detailed in the MoU prepared between Western Water and the landowner, however, direct management responsibility may be delegated to a designated site manager and/or managing ecologist with annual reports submitted to Council (until the TfN covenant is registered on title), Trust for Nature, DAWE and the Proponent (Western Water). Specific monitoring and reporting requirements are detailed in Section 8.

Management actions detailed in this OMP will commence from the date the offset site is secured on title (i.e. registration of the Section 173 Agreement). A breakdown of management actions required over the mandatory 10-year active management period is shown below (Table 10). Following the 10-year active management period, the landowner will continue to manage the offset site as specified in this plan, such that:

- By Year 10 of management, the ongoing weed control across the offset site will have the objective to reduce weed levels within the NTGVVP offset area and maintain weed levels for the remaining areas of GSM habitat based on weed levels upon inception of this plan (Section 5.5.5). Following Year 10 of this plan, the weeds within the site will be maintained at the improved state achieved at Year 10;
- GSM habitat is maintained through control of weeds and biomass control action and at minimum, maintaining the current stocking rates, and;
- NTGVVP community is improved through an increase in vegetation condition.

Funding for undertaking security, management and monitoring actions prescribed in this OMP has been agreed between the landowner and the Approval Holder, in accordance with the signed MoU between both parties.

The management and monitoring obligations are limited to those listed in this plan as approved by DAWE, the Approval Holder and Trust for Nature.

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

The management and monitoring actions detailed in this OMP have been development in accordance with the following legislation and/or policies:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *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 (DoE 2016);

- Commonwealth's Threat Abatement Plan for predation, habitat degradation, competition and disease transmission by feral pigs (DAWE 2017);
- Commonwealth Listing Advice on *Natural Temperate Grassland of the Victorian Volcanic Plain* (TSSC 2012c);
- Approved Conservation Advice for the *Natural Temperate Grassland of the Victorian Volcanic Plain* (TSSC 2008);
- Significant impact guidelines for the critically endangered Golden Sun Moth (*Synemon plana*). Department of the Environment, Water, Heritage and the Arts (DEWHA 2009a); and,
- Approved Conservation Advice for *Synemon plana* (golden sun moth). Canberra: Department of the Environment. Department of Environment (DoE 2013);

The management and monitoring obligations are limited to those listed in this Plan as approved by DAWE, the Approval Holder and Trust for Nature.

5.5.1 Golden Sun Moth

This management plan has been formulated to address several priority actions outlined within the Conservation Advice for the species (DoE 2013):

- 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;
- Retain and protect natural grassland remnants within the known distribution of the species;
- Monitor known populations to determine the species' status;
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary;
- Identify populations of high conservation priority;
- Control invasions of weeds and pasture species, and consider the impact of herbicide use in habitat; where possible use methods that directly target weeds such as spot spraying to minimise the adverse impact on GSM;
- Manage the amount of grazing to minimise any direct adverse effects on GSM or its habitat. The management regime should include some focus on grazing and fire, as combining the two in the wrong way (e.g. heavy grazing soon after a fire) is particularly damaging to perennials; and
- Engage with private landholders and land managers responsible for the land on which populations occur and encourage these key stakeholders to contribute to the implementation of conservation management actions as listed in this plan.

1.1.1.1 Existing Threats

The main threats to the offset site include the existing permitted uses associated with normal farming practices, such as inappropriate grazing regimes, pasture improvement and fertiliser application. Other threats include the expansion of the existing high threat weed populations that are present within the surrounding area, weed invasion in general and the accumulation of ground cover biomass. High threat

weeds are defined as those introduced species (including non-indigenous natives) with the ability to outcompete and substantially reduce one or more indigenous life forms in the longer terms assuming on-going current site characteristics and disturbance regime.

This OMP details the prescribed actions and outlines the relevant timing for implementation. These actions will be applied to the entire offset area identified in Figure 2.

Maintenance and protection of the offset site will be achieved by:

- Stock-proof fencing around the boundary of the offset site and low impact dividing fencing to allow more controlled grazing;
- Weed control through active management;
    - Maintaining all woody environmental weeds to < 1% cover;
    - Maintaining cover of exotic grass to approximately 450% cover;
    - Controlling herbaceous weed cover to levels outlined in Section 5.5.5.2.
- Biomass control through a combination of pulse grazing in dry years and light grazing of domestic stock (sheep only) in wet years with stock generally (depending on the season) excluded from 1st October to 31st January;
- Controlling pest animals, particularly rabbits and foxes; and
- Managing native species understorey diversity and recruitment.

1.1.1.2 Threats specific to Golden Sun Moth

The key threats to Golden Sun Moth, as identified in the Significant Impact Guidelines for the species are outlined below (Table 5) (DEWHA 2009) and addresses the management action that will be applied to the offset site to mitigate the threat. Further details regarding each management action is provided in Section 5.5.2 to Section 5.5.6, and a table of recommended management actions for each year in Section 5.6.

Table 5. Key threats to Golden Sun Moth

Key threat to GSM (DEWHA 2009)	Mitigation measure
Removal of vegetation	Habitat for Golden Sun Moth within the offset site will be protected by fencing (Section 5.5.4) and will protected through a temporary Section 173 Agreement and a perpetual Trust for Nature Covenant. Without this protection, the site may be inadvertently cropped or cleared.
Inappropriate fire regimes	Maintain biomass to reduce fuel loads across the site (Section 5.5.6). In addition, wildfires have occurred in the past at the offset site, which have not had a significant impact on Golden Sun Moth as their current population numbers remain high. The biomass level monitoring will aid in the prevention of a damaging wildfire through fuel reduction management.
Weed invasion	One main weed, Toowoomba Canary-grass, poses a threat of invasion and reducing the native grasses present within the offset site. Toowoomba Canary-grass, along with other key weed species including the declared noxious weed Serrated Tussock *Nassella neesiana* will be prioritised for control, with target levels set to be achieved within the 10-year management plan (Section 5.5.5). Without the control of

Key threat to GSM (DEWHA 2009)	Mitigation measure
	Toowoomba Canary-grass, it is likely the species would dominate the site, and reduce the habitat available to Golden Sun Moth. Therefore, efforts will be focused on reducing the cover of Toowoomba Canary-grass across the offset area. There is a substantial population of Flatweed on the site. It is acknowledged that spot spraying of Flatweed can be difficult due to the wide area it covers at certain times and the potential impact on other herbaceous species, and this is best controlled by grazing.
Overstocking (causing loss of habitat plants, changes to soil and plant structure or increase nutrient load)	Fencing will be maintained around the offset site, to ensure livestock grazing is managed within the offset site. The division of the site with low impact fencing into smaller paddocks will allow greater grazing control. When grazing is permitted, numbers will be monitored to ensure biomass levels and native grasses are not heavily impacted, and that the grazing does not impact upon plant structure within the offset site. If negative impacts from grazing are observed, livestock will be removed (Section 5.5.6). Without grazing control, the site may experience overgrazing where native species are damaged and inappropriate grazing occurs (i.e. late spring) affecting the seed distribution and regeneration of the native grassland, and ultimately reducing the amount of available Golden Sun Moth habitat.
Changes to agricultural practices (e.g. ploughing, overgrazing)	The offset site will be fenced and ultimately be protected through a Trust for Nature covenant. The landholder will commit to managing the site for conservation and will not engage in cropping within areas set aside for the offset. Grazing will be permitted with conditions, such as not during wet periods or when biomass levels are low. The protection of the offset site will secure the land for conservation purposes, which does not permit ploughing and limits grazing. Without this protection, the site is at risk to either threat.
Rank growth (loss of inter-tussock spaces)	Loss of inter-tussock space may occur if Toowoomba Canary-grass and noxious weeds Serrated Tussock-grass are not controlled and biomass across the offset site is not managed. General biomass will be managed through pulse grazing (Section 5.5.6).
Soil compaction	Soil compaction may occur as a result of grazing and will be monitored during and after grazing events. If soil compaction is evident, then grazing numbers will be reduced. This will be monitored in conjunction with the biomass control (Section 5.5.6)

5.5.2 Natural Temperate Grassland of the Victorian Volcanic Plain

This management plan has been formulated to address several priority actions outlined within the Conservation Advice for the community (DSEWPaC 2011):

- To protect and manage the NTGVVP community to maintain its natural geographical range.
- Protect and prevent impacts to habitat critical to the persistence of the community in the planning, construction and post construction phases of developments.
- Negotiate and implement conservation agreements or reserves for NTGVVP on privately owned land which do not allow high intensity grazing, cropping and pasture improvement activities and involve ongoing management.
- Identify, control and reduce the spread of invasive grasses including escaped pasture species.

- Work with fire authorities and private landholders to plan and undertake any burns proposed in areas of habitat critical to the persistence of the community in a way that will maintain or improve the habitat.

1.1.1.3 Existing Threats

The main threats to NTGVVP within the offset site include the existing permitted uses associated with normal farming practices, such as inappropriate grazing regimes, pasture improvement and fertiliser application. Other threats include the expansion of the existing high threat weed populations that are present within the surrounding area, weed invasion in general and the accumulation of ground cover biomass.

This OMP details the prescribed actions and outlines the relevant timing for implementation. These actions will be applied to the entire offset area identified in Figure 2.

Maintenance and protection of the offset site will be achieved by:

- Stock-proof fencing around the boundary of the offset site and low impact fencing dividing the site into smaller more manageable paddocks;
- Weed control through active management;
    - Ensuring that new and emerging woody weeds do not exceed < 1 % cover;
    - Controlling all weeds to reduce cover (Section 5.5.4);
- Biomass control through light grazing of domestic stock (sheep only) with stock generally excluded from 1st October to 31st January;
- Controlling pest animals, particularly rabbits and foxes; and
- Managing native species understorey diversity and recruitment.

5.5.3 Fencing and Access

An existing permanent stock-proof fence currently exists around the perimeter of the broader conservation area, where additional offset sites occur. This fence includes several gates that provide dedicated access points for farm vehicles into the offset area for management purposes. Vehicle movements through grasslands will be avoided on hot and windy days due to the risk of fire (see risk assessment and actions in Section 3). The offset site and broader property remain private property and access or disturbance to the offset site by unauthorised persons is prohibited. The existing access and security (locked gates) arrangement is adequate to service the access requirements for management of the offset site.

Permanent fencing will be placed around the 33 hectare offset site and low impact six wire and star picket fences will divide the site (Figure 2) to allow for controlled grazing across sections of the offset site, with the waterpoint(s) to be located within an exclusion zone within the conservation area. Fencing along the southern border (adjacent to the stone wall) will be constructed in a way to prevent any damage to the wall and allow sheep to graze along the edge for weed control.

Table 6 below outlines the management actions, performance indicators, corrective actions and completion criteria for the Fences and Access Management Actions. The overall aim is to ensure the offset site is

adequately protected from threats of unauthorised vehicle access and over-grazing by livestock, and that the area is clearly delineated for management and monitoring purposes.

Table 6. Management actions and completion criteria summary for fences and access.

Management Action	Performance indicator	Corrective Action (where required)	Completion criteria
Maintain existing perimeter fence of the broader conservation area to control stock and vehicle access.	Monitoring and management reports detail any damage and repairs to fence	Damage observed to fence is repaired prior to next monitoring event	Stock proof fence maintained in good condition around perimeter of broader conservation area
Establish offset area boundary fence to manage stock access within offset site.	Monitoring and management reporting ensure location of boundary fence remains in correct location and confirm that stock access points are not compromising the condition of native vegetation	Boundary fence position corrected prior to next monitoring event and stock access points altered to prevent damage to native vegetation	Boundary of offset area clearly defined, and stock proof fence established to restrict grazing access

5.5.4 Weed Control

5.5.4.1 Objectives

The objective of weed control within the offset site is to reduce the cover of exotic vegetation and improve the existing quality of Golden Sun Moth habitat and NTGVVP. This will be achieved through a combination of direct weed control methods and controlled light grazing (to limit opportunities for weed establishment and seed set in exotic flora).

Woody weeds

No woody weeds have previously been recorded within the offset area. Monitoring for new and emerging woody weeds will be conducted by a qualified ecologist during detailed Vegetation Monitoring (Section 8.2) for the term of the OMP. Any new and emerging woody weeds observed will be controlled immediately following identification.

Herbaceous weeds

The aim of management is to reduce cover of herbaceous weeds below current levels. Current herbaceous weed cover within the offset site is estimated to be approximately 40% throughout the offset area. Weeds listed in Table 7 were found within offset site. These weeds will be controlled and monitored each year to ensure their cover is reduced, with a VQA weed score of 6/15 (25-50% cover) maintained by the end of the 10-year management period within the NTGVVP area and 6/15 (25-50% cover) in the GSM area. Weeds will be treated using methods listed in Table 8 before the plant has flowered and set seed. Impacts to indigenous plants will be minimised to the extent possible during treatment of weeds.

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

Weed control methods will largely comprise targeted spot spraying with appropriate herbicides, grazing and physical removal, where appropriate. Spot spraying will be undertaken during spring and early summer, with a focus on killing weed plants prior to seed set. Care must be taken when spraying herbicide to ensure that the poison has a limited impact on native vegetation in the local application area to minimises non-target damage. A dye will be used in the spray to mark where spraying has occurred. Spot spraying will not occur on high wind days or in close proximity to threatened flora without protective measures in place (i.e. physical shielding).

In addition to spot spraying, a tractor or quad bike with an attached spray gun nozzle can be employed to target areas of high weed cover or in areas with dense weed cover restricting access. Tractors can also be used to move chemical in bulk to assist spot spraying teams. Biomass control is also considered to be an effective method for controlling and reducing weed levels and will include controlled livestock grazing (sheep).

The composition and distribution of vegetative cover across the offset site is likely to change over time in response to seasonal conditions or pulse grazing. Therefore, weed cover and species will be monitored annually (Section 8.1) and management activities adapted where necessary to ensure the desired outcomes outlined in this OMP are achieved.

New and emerging herbaceous weeds

Monitoring for new and emerging herbaceous weeds will be conducted by a qualified ecologist during detailed vegetation monitoring (Section 8.2) as well as on an ad hoc basis by the landowner throughout the year (during site management and habitat monitoring) for the term of the agreement. Any new and emerging weeds will be maintained to not exceed <2% cover. Note that several weeds occur in the surrounding paddock that may appear in the proposed offset area during some monitoring events in low numbers, including Paddy Melon *Cucumis* sp., Rye *Lolium* sp. Bathurst Burr *Xanthium spinosum* and Dock *Rumex* sp. These will be treated/managed to prevent establishment.

Any other significant environmental weeds (i.e. CaLP Act listed species or species on the WONS list) identified within the broader property during monitoring will also be controlled. The land manager may consult with a qualified ecologist regarding appropriate control techniques for any new or emerging weeds identified within the offset area. It is important to note that it is understood that the land manager may not have the expertise to identify new and emerging weeds and therefore any new weed species will be identified during the third-party habitat assessments and population monitoring.

Table 7. Herbaceous weeds to be controlled within 33 ha offset area – method and timing

Common name	Scientific name	% total cover at inception	Method	Timing
Annual Grasses	*Hordeum* spp., *Avena fatua, Aira* spp., *Briza* spp., *Bromus* spp.	25%	Controlled pulse crash grazing by sheep to limit opportunities for weed establishment (Section 5.5.7); spot spraying of herbicide.	Early Spring to avoid GSM flying season

Common name	Scientific name	% total cover at inception	Method	Timing
Flatweed	*Hypochaeris radicata*	Up To 45%	Pulse-grazing and targeted spraying with appropriate herbicide. **See below for further comments on Flatweed**	Early Spring to avoid GSM flying season Spot-Spray: Spring and early summer
Squirrel-tail Fescue	*Vulpia myuros*	25%	Targeted spot spraying with appropriate herbicide.	Spot-Spray: Spring and early summer
Serrated Tussock	*Nassella trichotoma*	<5%	Targeted spot spraying with appropriate herbicide.	Spot-Spray: Spring and early summer
Toowoomba Canary-grass	*Phalaris aquatica*	30%	Targeted spot spraying with appropriate herbicide. Pulse-grazing.	Spot-Spray: Spring and early summer; Graze: early Spring to avoid GSM flying season
Spear Thistle	*Cirsium vulgare*	<5%	Hand chip, or targeted spot spraying with appropriate herbicide.	Spot-Spray: Spring and early summer
Chilean Needle-grass	*Nassella neesiana*	<5%	Targeted spot spraying with appropriate herbicide.	Spot-Spray: Spring and early summer

Flatweed

Flatweed *Hypochaeris radicata* is a common herbaceous weed present in relatively high cover within the offset area. It is an herbaceous perennial native to northern Africa and Europe. It is considered naturalised in Australia and is one of the most prevalent weeds in the temperate zones of Victoria, NSW and Tasmania, although generally not a high threat weed. Flatweed is up to 80 cm tall with a rosette of lance-shaped leaves covered in short hairs. It is multi-stemmed with bright yellow flowers. The species produces large quantities of wind-dispersed seeds and a long taproot, which facilitate rapid spread into new areas and long-term persistence. It is often found in urban settings (e.g. gardens, lawns, footpaths), disturbed areas (e.g. roadsides, pastures) as well as natural habitats, including native grasslands and conservation reserves.

Recommended control techniques for Flatweed include a combination of spot-spraying, mechanical removal and light grazing (HerbiGuide 2021). Mechanical control can be undertaken for small infestations by removing the entire plant. Care must be taken to ensure the long taproot is removed to several inches below the root crown, as the plant can re-sprout from remnant tissue. While most effective when undertaken in early spring as soon as the leaves have appeared, this strategy can be used year-round. Herbicides for broadleaf weeds (e.g. dicamba, MCPA, glyphosate) can also be applied for infestations of larger areas. No current known biological control agents are available in Australia for the plant. Grazing is not recommended as the sole approach, as this can promote Flatweed in some circumstances (HerbiGuide 2021).

At the time of the most recent site visit (February 2022), Flatweed was estimated to cover up to 45% of the overall offset area. The cover of the species is known to fluctuate seasonally and it can be hard to predict its abundance each year. This is a common issue within grassland reserves and can make management efforts seem futile when viewed on a year by year basis, opposed to a more long-term overview.

The land-use commitments set out in Section 5.4 set to maintain a VQA weed score of 6/15 in the NTGVVP offset area, and 6/15 in the remaining GSM offset area by the end of the 10 Year active management period. Achieving this score is feasible for all species listed in Table 7, with the exception that Flatweed may be the outlier. It is proposed that future auditing of the offset site factor in the inherent difficulty that controlling Flatweed poses and whether or not it is an unusually wet period (as flatweed responds very well to wetter years),and recommends that auditors assess the overall trend of Flatweed cover within the offset site if it is the only factor affecting the weed cover targets.

If the management of the offset site is in accordance with the OMP (i.e. active management is being undertaken using methods recommended in the OMP or through reviewed adaptive management approaches), and Flatweed is showing a general decline in cover over the course of the active management, then it is suggested that this be viewed as sufficient in meeting the objectives of the OMP (in the instance that all other weeds meet or are on track to meet the land-use commitments).

High Threat Weeds

High threat weeds referred to within this management plan follow the definition provided within the *Vegetation Quality Assessment Manual* (DSE 2004). High threat weeds are considered as those weed species listed within the relevant EVC (EVC 132_61: *Heavier-soils* Plains Grassland) benchmark to have a "high impact" regardless of their invasiveness.

High threat weeds listed within the EVC benchmark applicable to the offset area are:

- Spear Thistle *Cirsium vulgare*
- Toowoomba Canary-grass *Phalaris aquatica*
- Yorkshire Fog *Holcus lanatus*
- Chilean Needle-grass *Nassella neesiana*
- Serrated Tussock *Nassella trichotoma*
- Bathurst Burr *Xanthium spinosum**

*occurred in broader paddock outside of proposed offset area

Spot Spraying

The application of herbicides is an effective and efficient control technique for a range of woody, herbaceous and grass weeds. The correct use and application of herbicides can provide targeted control of a range of species. However, all herbicides must be used in accordance with the manufacturer's specifications and occupational health and safety policies.

Application methods for herbicides include spot spraying with a knapsack, dabbing of weeds in sensitive areas with a foam-tipped application device, rig spraying with a pump for larger areas, dabbing of cut stumps and injection of woody weeds.

Timing of the interval of spot spraying is dependent upon many factors such as plant age and growth seasons, plant stress levels and climatic factors. All these factors need to be considered when develop methodologies for the application of herbicides to ensure successful outcomes. Surrounding native plants' susceptibility to herbicides and ongoing uses of the treated areas must also be considered when choosing the right herbicide to be used in a weed control program, as some herbicides are residual and may persist within the soil for varying durations.

Table 8. Management actions and completion criteria summary for weed control in 33 ha offset area.

Management Action	Performance indicator	Corrective Action	Completion criteria
Monitor offset site for weed cover and presence of new and emerging weeds. These inspections must be undertaken quarterly for each year of the OMP.	Date of monitoring event, observations and follow up actions presented in each annual report prepared for the OMP. Monitoring completed by land manager during management activities and ecologist during monitoring events	Missed reporting periods to be captured as soon as possible.	Detailed log of weed cover included in each report submitted as a part of the annual reporting requirement for the OMP.
Reduce current cover of **high threat herbaceous weeds** to 20% cover or less within the offset site through methods such as spot spraying and pulse grazing.	Monitoring and management reports detail percentage cover of high threat herbaceous weeds observed at each assessment, and management technique used to control spread.	Review management techniques and adjust method if cover is not decreasing.	Cover of high threat herbaceous weeds does not exceed 20% cover of the offset site (VQA weed score of 6/15 achieved for NTGVVP area and 6/15 for remaining GSM area)
Monitor for and manage new and emerging **high threat herbaceous weed** cover to <1%	Monitoring and management reports detail new and emerging high threat herbaceous weeds observed, and management techniques used to control.	New and emerging high threat herbaceous weeds observed during monitoring events that remain untreated are flagged with land manager for removal and removed before next monitoring event.	Cover of new and emerging high threat herbaceous weeds is <1% within the offset site.
Control herbaceous weeds	Monitoring and management reports detail current cover and control techniques used	Review and adjust weed control methods if herbaceous weed cover increases above baseline levels (currently 40%).	Cover of herbaceous weeds is reduced to maintain VQA weed score of 6/15 for NTGVVP area and 6/15 for remaining GSM area
Monitor for new and emerging **woody weeds** and control all occurrences.	Monitoring and management reports detail new and emerging woody weeds observed, and management techniques used to control.	New and emerging woody weeds observed during monitoring events that remain untreated are flagged with land manager for removal and removed before next monitoring event.	No woody weeds present within offset site at end of 10 Year OMP.

5.5.5 Pest Animals

5.5.5.1 Objectives

The objective of pest animal management is to control pest animals (e.g. rabbits, foxes) within the offset site, as required, to minimise negative impacts to the Plains Grassland communities, which provides habitat for GSM and NTGVVP. The *Catchment and Land Protection Act 1994* lists rabbits and foxes as established pest animals and requires that all landowners take reasonable steps to prevent the spread of, and as far as possible eradicate, established pest animals on their land.

No active rabbit warrens were observed within the Offset area. However, they are known to occur within the local area. An integrated approach in accordance with BushBroker Information Sheet 7 - Standards of Management – Rabbits, will be followed which will involve fumigation, hand collapsing of burrows and baiting. Any rabbit carcasses found within the offset site will be removed to prevent poisoning of native predators. These actions are in accordance with the Commonwealth's *Threat abatement plan for competition and land degradation by rabbits* (DAWE 2016).

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 must be controlled if identified within the offset site. If identified, fox dens will be destroyed through fumigation and hand collapse.

To reduce the likelihood of pest animals inhabiting the offset site on a regular basis, any artificial piles of logs and rocks that may be used as harbour by pest animals will be removed or dispersed.

Both rabbits and foxes will be controlled as detailed below (Table 9).

Table 9. Pest animals to be controlled – species, method and timing

Common name	Method	Timing
Rabbits	Baiting. When baiting collect and dispose of carcasses to prevent poisoning of native predators.	Controlled throughout the year if detected during a routine landowner inspection
Rabbits and Foxes	Fumigation and collapse of rabbit burrows and fox dens if identified. Remove or disperse surface harbour.	Controlled throughout the year if detected during a routine landowner inspection
New and Emerging pest animals	Monitor and control	Immediately, if a new threat is identified during a routine landowner inspection

5.5.5.2 Actions

- Land manager to undertake and document routine inspections for the presence of pest animals. These inspections must be taken at a quarterly frequency at a minimum.
- Control and seek to locally reduce pest animals using appropriate control techniques, including poison baits, warren fumigation and collapsing, or similar methods, without soil disturbance; and

- Fumigate rabbit warrens according to best practice management techniques. Fumigation works will be conducted by the landowner or a suitably qualified operator where rabbit or fox activity is identified.

5.5.5.3 *Performance Indicators*

- Evidence of routine pest animal inspections presented in the annual report each year. Apply pest animal control methods in response to observations of the routine inspections.
- Reduction in the abundance of pest animals observed during routine pest animal inspections when compared to baseline rabbit abundance survey, and no detectable impacts to the native grassland community;
- All monitoring and management activities are effectively documented; and
- No active rabbit warrens present within the site at Year 10 of the OMP.

5.5.5.4 *Adaptive Management*

- If pest animal management fails to achieve a reduction, or effectively control rabbit or fox numbers, or if impacts to NTGVVP community and/or GSM habitat are attributable to an increase in pest animals activities, a review of the current procedures and management measures will be undertaken and modified as required;
- Increase active monitoring of pest animal activity;
- Incorporate additional control measures (i.e. spotlighting and shooting); and
- Improve existing fencing of broader offset property to exclude pest fauna.

5.5.6 Biomass Control

5.5.6.1 *Objectives*

The objective of biomass control within the offset site is to promote and maintain floristic diversity, and inter-tussock spaces for germination and recruitment of native flora associated with the NTGVVP community. This will also have positive outcomes for managing GSM habitat. In addition, these actions will improve habitat quality for existing flora present within the offset site and assist with minimising the growth of weeds.

Biomass management is essential to enhance the ecological values throughout the offset site, including the maintenance and improvement of GSM habitat and NTGVVP. Biomass management is also required to maintain inter-tussock spaces and prevent excessive competition to grassland forbs. Biomass control will aim to maintain approximately 20% of bare ground or inter-tussock space to allow sufficient space for recruitment of herbs and grasses. If GSM or NTGVVP offset area is found to be less than 20% bare ground then biomass reduction must be implemented at the earliest possible opportunity (with consideration of seasonality in order to minimise risk to ecological values, life and assets).

The current grazing regime and historical land use is not considered to have an adverse impact on the NTGVVP community and/or GSM habitat, and given that native vegetation has persisted across the property, it is considered an appropriate method for managing biomass.

Pulse Grazing

A detailed study has been undertaken on the ecological impacts and benefits various grazing regimes on grasslands within the property, in addition to similar properties (Mavromihalis *et al.* 2013). It was concluded that a period of grazing exclusion may be beneficial for enhancing conservation values of grasslands. Further, exclusion of grazing during spring (September-November) is most beneficial, however, due to seasonal variation in vegetation composition, fixed grazing strategies were considered inappropriate, as they do not allow for temporal fluctuations. For example, in occasional years, excluding grazing during summer, rather than spring, may be beneficial in controlling annual grasses following particularly heavy spring rains; although, grazing during spring every year may lead to a decline in species richness. As such, the grazing regime within this OMP is to generally exclude stock during spring, however, seasonal variation to this period may be required in order to adapt to annual variation in vegetation composition. However, grazing during spring may not occur during more than two consecutive years; this aims to achieve a balance between having sufficient flexibility to respond to seasonal variation in plant growth and mitigating risks associated with spring grazing over extended periods.

In discussions with the Landowner it is recommended that in wet years where large numbers of sheep might cause substantial pugging damage, it is preferable to graze with lower numbers and lightly graze through winter to prevent increases in weeds and biomass to uncontrollable levels, than to have no grazing at all. The logic being this land has been grazed all year round since sheep arrived in the Western District.

Grazing will be undertaken in a controlled manner following the grazing management plan detailed in Table 10, to ensure that biomass accumulation control within the offset site is consistent with the standards for management of ecological grazing provided by DELWP (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 is prohibited within the offset site at all times.

Grazing will occur over a short duration and exceed the standard stocking rate to prevent selective grazing within the offset site. The maximum length of pulse grazing is four weeks with at least two weeks rest between cycles.

Livestock (sheep) may be permitted into the offset site for control of herbaceous/grassy weeds and biomass management under this agreement, with grazing to be generally excluded between 1st October and 31st January (see Section 5.5.7 for further details on stock exclusion periods).

Table 10. Grazing Management Plan within the offset site.

Grazing Requirement	Targets
Period where grazing by domestic stock is not generally permitted	October 1 to January 31 annually in perpetuity. However, periodic grazing, including between October and January may be required in order to adapt to annual variation in vegetation structure and composition.
Pulse grazing cycles required	3 (minimum). This is dependent site and seasonal conditions, in that the offset site will not be grazed if there is a risk of adverse impacts to native vegetation and habitats. Wetter years may require a different approach to achieve biomass reduction
Minimum rest from grazing between pulse grazing events	2 weeks

Grazing Requirement	Targets
Maximum continuous pulse grazing event	4 weeks
Biomass management targets	Aim for total vegetation cover of no greater than 80% after grazing
Target inter-tussock space	Minimum of 20% of total offset site cover in areas where tussock grasses exist.

Stock must be removed should total vegetation cover fall to or below 70%. 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 or the numbers reduced to light grazing from the offset site immediately.

Burning

The NTGVVP community would have historically been subjected to natural burning regimes due to its general location. As such, it is considered that an appropriate ecological burning regime will appropriately control biomass and enhance and promote the maintenance of species diversity within the offset site. 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 that which occur within, and directly adjacent to the offset site.
It must be noted that biomass management through ecological burning is not a compulsory component of this OMP.

It is noted that a population of Striped Legless Lizard occur within the broader offset area, with the potential to occur within the proposed offset site. **In order to avoid impacting Striped Legless Lizard, it is crucial that any prescribed burns are low-intensity and patchy**. Furthermore, **prescribed burns should be conducted in early spring (September/October) to avoid summer breeding season, or early autumn (March/April) to avoid removing large areas of vegetation during winter**. Where possible, burns should be conducted during the middle of the day or evening rather than early morning when lizards might be cold and slow moving.

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 in maintaining remnant vegetation. However, stimulating the soil stored weed seed bank is seen as positive as this allows this seed bank to be exhausted through active management, especially for species that are difficult to control such as Toowoomba Canary-grass and Flatweed. Burning and/or grazing will allow greater access and efficiency for weed control and increased natural regeneration of indigenous plant species. Periodic burning that is followed by spot spraying will be important for weed species that are difficult to control until they are replaced by native species.

Burning for biomass reduction will only be undertaken where and when there is a need to reduce cover of native grasses (i.e. the dominance of a few species resulting in a species-poor monoculture) in order to improve the condition of the understory. The aim in using fire is to increase diversity whilst ensuring biomass is maintained at an appropriate level.

The NTGVVP offset site must not be burnt more than once every five years (including planned burns following any wildfire events), unless there is above average rainfall and intertussock space is reduced indicating a more frequent burn is required. In general, the most appropriate time to burn is autumn when the weather is mild, most native plants have dropped seed. However, if special circumstances require

biomass reduction during other times of the year, burning may be undertaken with approval in consultation with Trust for Nature.

The extent of all fires must be recorded, including planned burns and wildfires. Prior to any ecological burn taking place, a burn plan must be prepared, including, but not limited to:

- Division of the offset area into burning zones with principles to maximise ecological benefits;
- Minimisation of risks to life and property (e.g. wind direction for burning to avoid smoke over public roads);
- Measures to minimise impacts to biodiversity, including use of fire breaks, minimising disturbance/compaction by vehicles;
- A fire frequency of no greater than once every 5 years will be implemented for any one area across the offset site;
- Conduct any burns in a patchy or mosaic fashion over no more than one third to half the site on any occasion;
- Prescribed burns are to be conducted in early spring (September) or early autumn (March/April) to avoid the Striped Legless Lizard summer breeding season and before weedy plants set seed; and,
- Prescribed fire can only be implemented when conditions are dry enough and open soil cracks are present and outside of the Victorian Declared Fire Danger Period.

Any ecological burns will be conducted during benign (low wind and mild temperature) weather conditions and may be patchy (i.e. not result in the uniform burning of all areas). Patchy burns are a desirable outcome. It is accepted that a wildfire event is out of the control of the landowner and is not subject to these conditions. Burnt areas will be protected from grazing for at least 6 months to allow species regeneration and recruitment to occur.

5.5.6.2 Actions

- Land manager to undertake routine inspections (minimum quarterly frequency) for grazing cells to determine the pulse grazing requirements for the upcoming season;
- Biomass will be managed by pulse grazing with sheep for a maximum period of four weeks followed by a minimum two-week period of rest, or in wet years by light grazing in smaller numbers over a longer period;
- Over the 10 year management period, grazing will be excluded annually between October 1 to January 31. However, depending on seasonal variations (e.g. high biomass) grazing may still be undertaken across the offset area during this period to ensure that vegetation structure and cover (i.e. inter-tussock space) is maintained (Mavromihalis *et al.* 2013). Ideally, grazing will not occur between October 1 to January 31 for more than two consecutive years, however, an adaptive management approach will be taken to maintain habitat values across the offset area (see Section 8.5.3);
- A fire frequency of no greater than once every 5 years will be implemented for any one area across the site;

- Prescribed fire can only be implemented when conditions are dry enough and open soil cracks are present and outside of the Victorian Declared Fire Danger Period;
- Burnt areas will be protected from grazing for at least 6 months to allow species regeneration and recruitment to occur; and,
- Landowner to monitor for evidence of soil compaction following grazing events. Stock numbers are to be reduced if soil compaction is observed. This can be documented in annual reports.

5.5.6.3 Performance Indicators

- Document observations from routine site inspections of biomass and present in the annual report;
- Achieve at least a 1 point increase in the lack of weeds score by at by the Year 5 Detailed Vegetation Monitoring for the 17 ha NTGVVP offset area.
- Maintain a lack of weeds score of 6/15 by the end of the 10 year management period (i.e. <50% cover of weeds and ≤50% of weed species present are 'high threat' weeds based on the EVC benchmark) within the NTGVVP offset area and maintain the score at the offset commencement score of 6/15 by the end of the 10 year management period for GSM offset areas outside of the NTGVVP offset area;
- Maintain an understorey score of at least 15/25 (i.e. in accordance with the habitat hectare method) by the end of the 10 year management period (i.e. ≥50-90% of life forms present and of those present <50% are substantially modified);
- Stock grazing is excluded between October 1 to January 31, except where necessary for appropriate biomass reduction and the maintenance of inter-tussock space. Grazing should not occur between October 1 to January 31 in more than two consecutive years in the same areas;
- A fire frequency of no greater than once every 5 years will be implemented for any one area across the offset site;
- Maintain organic litter at approximately 10% cover to meet the EVC benchmark for *Plains Grassland.* This will be recorded during detailed vegetation monitoring to be undertaken in years 1,3, 5, 8 and 10 of this OMP; and
- All grazing and burning events effectively documented.

5.5.6.4 Adaptive Management

Highly seasonal conditions are not uncommon across western Victoria and can result in variable habitat conditions within and between years. This is acknowledged within the OMP by allowing for a flexible approach to the timing of grazing actions at the discretion of the landowner.

5.6 Management Actions Table

Management actions proposed to compensate for the loss of native vegetation and habitat under Commonwealth legislation at the offset site are presented in Table 11. The actions constitute the minimum management requirements for the offset site over the mandatory 10-year management period and are appropriate for the management of the NTGVVP community and GSM population.

Table 11. Management Actions Table

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
Fencing				
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Establish fence around the boundary of the offset site in accordance with advice from a qualified ecologist and land surveyor Refer Section 5.5.3.	Within 18 months on commencement of OMP	Facilitate management and monitoring of the offset site. Delineate location of temporary exclusion fence.
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Maintain fencing in good condition to appropriately exclude unintended grazing by livestock over the 10 year management period. Refer Section 5.5.3	Ongoing	Maintain fencing to DELWP fencing standards in BushBroker Information Sheet 12 - Standards for Management – Fencing (excluding the southern boundary along the stone wall where a simple stock-proof fence will be used)

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
Woody Weeds				
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Control new and emerging woody weeds Refer Section 5.5.4	Ongoing	Maintain woody weeds (<1% cover)
Herbaceous Weeds				
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Control herbaceous weeds. Refer to Table 7 for list of herbaceous weeds, their control method and timing of actions Refer Section 5.5.4	Refer to Table 8	Maintain high threat weeds to levels outlined with section 5.5.4. Minimise off-target damage (avoid all native plants)
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Control all new & emerging herbaceous weeds Refer Section 5.5.4	Ongoing.	<2% cover of all new and emerging herbaceous weeds at the end of Year 10
Pest Animals				
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Control rabbits and foxes. Refer to Table 5 for a list of control methods and timing of actions Refer Section 5.5.5	Refer to Table 9	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
1-10	30 ha of GSM habitat;	Monitor and control rabbits and foxes Refer Section 5.5.5	Ongoing	Reduction in the abundance of pest animals, and no detectable impacts to the native grassland

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
	33 ha of NTGVVP			
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Monitor and control all new and emerging pest animals Refer Section 5.5.5	Ongoing	Control numbers of any new & emerging pest animals
Biomass Management				
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Pulse grazing in dry years and light graving in wet years. Refer Section 5.5.6	The maximum length of continuous grazing is four weeks with at least two weeks rest between cycles. Stock generally excluded during October - January Stock removed immediately following any high rainfall events.	Stock must be removed should total vegetation cover fall to or below 70% Sufficient bare ground (approximately 20%) maintained in order to maintain space for recruitment of herbs and grasses. Maintain or improve species richness and improve species diversity. No loss of native plant diversity as a result of grazing regimes. Reduction in weed cover. All grazing events to be documented.
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Monitor organic litter and grass density and enact ecological burn or other biomass reduction plan if appropriate Refer Section 5.5.6	Outside of the GSM active season and SLL breeding season. Do not burn an area more than once every 5 years	Sufficient bare ground (approximately 20%) maintained in order to maintain space for recruitment of herbs and grasses. Maintain or improve species richness and improve species diversity. Flush out weed seed stored in seed bank. No loss of native plant diversity as a result of burning regimes. Reduction in weed cover. All burning events to be documented.

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
Detailed native vegetation and GSM monitoring				
Years 1, 3, 5, 8 and 10	30 ha of GSM habitat; 33 ha of NTGVVP	Monitoring Refer Section 8.2, 8.3 and 8.5 Landowner responsible for arranging third party monitoring, while the Approval Holder is responsible for funding monitoring and reporting.	Spring/Summer	Assessment of the effectiveness of the management actions. Monitoring reports will include a review of past management works against the performance targets and objectives contained within this OMP, and recommended changes to management actions where required. Landowner to submit Annual Reports including surveys to TFN and the Approval Holder. The Approval Holder is responsible for submitting all reporting to DAWE.

Year from Commencement	Area	Management Action Description	Timing	Environmental outcome to be achieved
Annual reporting				
1-10	30 ha of GSM habitat; 33 ha of NTGVVP	Prepare and submit an annual report and photo monitoring to TfN and Approval Holder. Refer Section 8.5.	Submit at least 2 months prior to on-title covenant anniversary date, depending on the commencement date of the offset	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. Report will also include photos that are reviewed by a qualified ecologist. Allow for ongoing assessment of the effectiveness of management. Reports will include a review of past management works against the performance targets and objectives contained within this OMP. Future management priorities will also be detailed in these reports. Obligations of the landowner have been met and the obligations form is signed, dated and submitted with the annual report
5	30 ha of GSM habitat; 33 ha of NTGVVP	Review effectiveness of OMP. Refer Section 8.5.	End of Year 5.	If this OMP is not meeting its objectives, a review will be undertaken, and this OMP will be updated as required and implemented for the remaining 5 years of management, the Approval Holder has the responsibility of instigating this.

6 CONTINGENCY RESPONSE AND CORRECTIVE ACTIONS

The landowner will use an Adaptive Management Approach to allow the flexibility to respond appropriately and effectively to the uncertainties involved in ecological processes. This will allow management actions to adapt to changing circumstances that may occur on the site.

If after Year 5 of management, the actions detailed in this OMP are not leading to the ongoing maintenance and of the GSM habitat, and improvement of the NTGVVP community, the Approval Holder, in consultation with the landowner and TfN will instigate a review of the OMP and where required, update this management plan for implementation of the remaining five years of management. Any revisions of the OMP proposed must be submitted to DAWE to seek the agreement of the Minister.

Any proposed changes to the management contrary to that specified within this plan must be approved by the Approval Holder and TfN, prior to implementation. Any proposed uses or development of the site which conflict with the landowners' commitments or maintenance/improvement of the GSM habitat and/or NTGVVP community are not permitted under this plan.

Alternative management measures, as part of an adaptive management approach, may be implemented if:

- The performance indicators outlined within Section 5 are unable to be met based on methods outlined within this plan;
- A new management technique has been identified which is more effective in meeting the objectives of this OMP, and relevant recovery plans, threat abatement plans, conservation advices and does not increase risk of impacts to GSM habitat and NTGVVP communities. A review of the benefits and risks of the proposed management technique must be prepared and submitted to the Approval Holder; and,
- The proposed management technique has been approved by the Approval Holder and TfN.

Alternative management measures and corrective actions will be included in the monitoring report.

Where an adaptive management approach has been implemented, the success, or failure, of the approach will be outlined within subsequent third-party monitoring reports. The third-party monitoring reports will include recommendations on whether the approach should be continued, or whether subsequent alternative management is recommended.

6.1 Managing Uncertainty

An assessment of potential risks associate with the objectives of this plan are outlined within Table 1. All risks are considered manageable and actions within relevant sections of this OMP address the risks.

The proponent and the landowner acknowledge that achieving the weed control targets can be difficult in a changing ecosystem like grasslands. The Landowner agrees to implement the OMP and carry out all activities as outlined and maintain records of those activities. The proponent acknowledges that the Landowner may not be able to achieve the weed control targets outlined and will not seek to hold the Landowner liable in the event those weed control targets have not been achieved in Year 10.

7 EMERGENCY CONTACTS AND PROCEDURES

Should any environmental incident occur on-site that poses a risk to the objectives of this OMP, the relevant contacts (Table 12) must be notified as soon as possible, and no later than 24 hours following the event or the landowner becoming aware of the event. At a minimum, TfN and the Approval Holder must be notified, and if required, the relevant emergency services. Incident responders must be advised of the on-site protections to avoid inadvertent damage to ecological values (e.g. creation of graded earthen fire breaks within the site, which unless absolutely necessary, must be avoided).

Table 12. Emergency contacts

Contact	Role	Telephone
Country Fire Authority (CFA)	Bushfire emergency	000
Victoria Police	Various (e.g. unauthorised access)	000
Approval Holder	Approval Holder	13 44 99
TfN	Offset Monitoring Responsibility	(03) 8631 5888
Landholder	Offset Management	Undisclosed

8 MONITORING AND REPORTING

Ongoing monitoring is required to determine whether the GSM habitat, and NTGVVP community quality persists and remain viable over time and to verify the objectives of this OMP are being met.

Site monitoring will include:

- General habitat monitoring (i.e. as described in Section 5.5.7) by the landowner (or an appointed qualified entity on behalf of the landowner) annually; and,
- Detailed monitoring to be conducted by a qualified ecologist in Years 1, 3, 5, 8 and 10 of this management plan. This will include a detailed habitat hectares assessment in each year of the detailed monitoring.

Further details on the monitoring actions are outlined below.

8.1 Landowner Annual Monitoring of Habitat and Effectiveness of Management actions

A qualified ecologist will establish eight permanent photo-points across the offset site. These points will be physically marked by the installation of a star picket and marked via GPS, numbered and shown on a figure. Photographs taken by the landowner from these points will be representative of the vegetation and objectives of the OMP (e.g. areas of high threat weed invasion). Photographs will be taken in October/November annually and clearly labelled. Each photo will be taken from as near to the same point each year and will use the same direction, trajectory and camera settings as is practicable. Photographs will focus on a 5 x 5 metre area.

Annual monitoring must be undertaken by the landowner (or an appointed entity on behalf of the landowner) over the 10 year Offset Management Period, and must include an assessment of:

- Photographs taken at established photo-points;
- The extent, severity, trend and presence of current weed species, recognising the Landowner is not a weed expert;
- The extent, severity, trend and presence of pest animal activity;
- Biomass levels, visually assessed across the site;
- Evidence of unpermitted human/stock access; and,
- Any new threats.

The annual monitoring completed by the landholder will be undertaken for each year of the 10 years of this Offset Management Plan.

Photographs and Annual Reports are to be submitted to TfN and the Approval Holder at least two months prior to the anniversary date of the lodgement of the agreement on title to allow time for compliance to be assessed before the anniversary date, depending on the end date for the 10 year Offset Management period .

The Annual Report addresses progress against the commitments set out in this agreement. Annual Reports must 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 each zone.

A template for a landowner monitoring and reporting form is shown in Table 13. Information to be provided in the reporting form includes:

- A copy of the Management Action Table (Table 12) from the OMP with information on which actions have been completed for year/s of this reporting period;
- A description of the specific monitoring results from third party surveys undertaken (i.e. NTGVVP condition assessment);
- Success of weed and pest animal control work;
- Successful management tools (i.e. techniques used to control weed species, protection of new plants, monitoring technique, etc.);
- Any problems or issues experienced (i.e. new infestation of weed species, etc.); and,
- Provide photographs showing evidence of works.
- Copies of third party monitoring for NTGVVP and GSM as required.

If any agreed management actions or commitments are incomplete or have not been undertaken in the times specified, the landowner will document the justification and the actions that will be undertaken as a result of the incomplete action.

All records/evidence of management actions must be maintained and be submitted to TfN and/or Approval Holder upon request, and any proposed changes to management must be submitted to TfN and/or Approval Holder prior to the changes being undertaken.

Table 13. Template for landowner monitoring and reporting.

Landowner of offset site	
Location and address of offset site	
Offset site number (if applicable)	
Offset plan reference number (if applicable)	
Responsible Authority	
Report #	
Signature	
Date	
Details of works undertaken	**NTGVVP Area:**
	GSM Area:
Monitoring and Reporting Checklist	• Detailing actions completed during the reporting period; • Results of NTGVVP area third-party vegetation condition assessment in the appropriate years (Habitat Hectare Assessment); • Results of third-party GSM population monitoring in the appropriate years; • A description of the specific monitoring results from third party ecological surveys undertaken; • Results of weed and pest animal control work; • Successful management tools (i.e. techniques used to control weed species, monitoring technique, etc.); • 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 native vegetation; • Photographs showing evidence of works; and, • Progress against the performance indicators set out in this OMP.

8.2 Detailed Vegetation Monitoring (Years 1, 3, 5, 8 and 10)

Detailed NTGVVP monitoring of the 17.5 ha offset site will be instigated by the Approval Holder and conducted by a qualified ecologist in Years 1, 3, 5, 8 and 10 of this management plan, and will document the following:

- Overall assessment of the quality and quantity of vegetation and composition of species (i.e. Habitat Hectare assessment*);
- Biomass levels, assessed through 14 x 1 m^2 sampling plots equidistant along the offset site;
- The extent, severity, trend and presence of current weed species and any new and emerging weed species; and,
- All third-party monitoring as required in this OMP is to be arranged by the landowner and funded by the Approval Holder.

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

8.3 Golden Sun Moth Population Monitoring (Years 1, 3, 5, 8 and 10)

In addition to native vegetation monitoring outlined in Section 8.2, appropriate monitoring of GSM will be undertaken within the entire 33 ha offset area in years 1, 3, 5, 8 and 10 of this management plan, or thereafter upon written agreement with the Approval Holder. The GSM monitoring detailed below will to be undertaken by suitably qualified ecologists.

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

- Surveys are to be conducted by suitably qualified ecologists during the local flying season (November to early January);
- Surveys will concentrate in areas identified as supporting indigenous grassland, namely those supporting wallaby-grass which is a known food source for GSM;
- Surveys will be conducted over a minimum of four separate days during the known flight season (i.e. November to early January) at least a 4 day interval;
- Observers will walk/drive transects spaced at 50 metres apart to and count observations for GSM recorded across the entire offset site.
- Surveys will be undertaken at a time which is considered suitable for detecting the species (i.e. when adult males are flying), and when GSM was observed flying at nearby locations. (The male of this species generally flies between 11am and 3pm on calm, warm (over 20°C), sunny days);
- All third-party monitoring and reporting as required in this OMP will be arranged by the landowner and funded by the Approval Holder.
- GSM monitoring should consist of 4 visits per year for years 1 and 3 and then at least 2 visits per year for the remainder of the offset.

8.4 Baseline Rabbit Abundance and Ongoing Monitoring

The CaLP Act requires that landowners take all reasonable measures to control or eradicate any pest animal population on their land. The control of declared pest animal is a requirement of this OMP alongside the legal requirement under the CALP Act.

8.4.1 Baseline Rabbit Abundance Survey

Baseline data on the abundance of rabbits and distribution of warrens throughout the site must be established in order to provide to text to future assessment of the effectiveness of control actions prescribed in Section 5.5.6. A baseline abundance survey must be undertaken by a qualified ecologist during Year 1 of the OMP.

The baseline abundance survey will:

- Assess the entire 33 hectare offset area and an area of 100 metres surrounding the offset area within the overall property;
- Map with handheld GPS existing warrens and area of harbour (i.e. rock piles or woody weeds including African Boxthorn and Sweet Briar);
- Note the location and abundance of any observations of European Rabbit or European Hare within the offset site or overall property;
- Note observation of any secondary evidence of rabbit presence (i.e. grazing, scats or diggings); and
- Provide the data collected to the landowner to inform the implementation of initial rabbit control efforts.

8.4.2 Ongoing Rabbit Monitoring

Monitoring of the rabbit population within the site will be undertaken by the landowner during routine site inspections outlined in Section 5.5.5.

Routine inspections for the purpose of pest animal population monitoring will be undertaken by the landowner at a minimum quarterly frequency.

The routine inspections will:

- Note the presence of any new warrens within the site; and
- Note the location and abundance of any observations of European Rabbit or European Hare within the offset site or overall property.

Observations of rabbits and any other pest animals recorded during the routine site inspections must be presented in the annual report (8.1).

8.5 Reporting

8.5.1 Annual Reporting

This OMP requires the landowner to submit a report annually to TfN and the Approval Holder for each year of the 10 Years of this Offset Management Plan. Any monitoring and reporting beyond the 10 years (i.e. until the end of the approval) will be the responsibility of the Approval Holder (not the landowner) to ensure that any additional information required by DAWE and/or Trust for Nature is provided.

Reports are to be submitted at least two months prior to the anniversary date of the execution of the agreement to allow time for compliance to be assessed before the anniversary date. The Approval Holder will forward the annual report to DAWE. Reports will summarise the results of the annual monitoring as per Section 8.1 above and progress against the performance indicators set out in this OMP, as outlined in the Landowner Reporting Template.

The annual reports will 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 (listed in Section 5.4).

Information to be provided in the annual reports includes:

- Detailing actions completed during the reporting period;
- Results of NTGVVP area third-party vegetation condition assessment in the appropriate years (Habitat Hectare Assessment);
- Results of third-party GSM population monitoring in the appropriate years;
- A description of the specific monitoring results from third party ecological surveys undertaken;
- Results of weed and pest animal control work;
- Successful management tools (i.e. techniques used to control weed species, monitoring technique, etc.);
- 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 native vegetation;
- Photographs showing evidence of works; and,
- Progress against the performance indicators set out in this OMP.

If any agreed management actions or commitments (excluding third party monitoring) 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.

8.5.2 Detailed Assessment Reporting

Detailed assessment reports will summarise the findings of the Year 1, 3, 5, 8 and 10 Detailed Vegetation Monitoring (Section 8.2) and include a review of the effectiveness of management actions against

performance indicators of this OMP. This will be completed by a qualified ecologist and provided to the permit holder. A general assessment against the predicted EPBC offset gain calculator outcomes will also be provided. This component of reporting is to be completed by a qualified ecologist and funded by the Approval Holder. The Approval Holder will provide all detailed assessment reports to TfN and DAWE.

8.5.3 Corrective Action

Upon completion of the 10 Year OMP, ongoing annual reporting is required to be completed until the end of approval (i.e. 2040). The annual reporting will confirm the condition of the vegetation within the offset site following the Year 10 management targets, to ensure the ongoing land-use commitments are maintained (Section 5.4).

If one or several of the land-use commitments are reported as having declined since the end of the 10 Year management period, then corrective management action/s must be taken by the landholder and the proponent in an effort to meet the commitments. During the period of corrective action, detailed monitoring will be completed relevant to the commitment to be achieved. For example, if an annual reporting event between years 11 and end of approval record a VQA score of less than 6/15 for weed cover in the NTGVVP offset area, then corrective management actions must be undertaken to re-achieve the 6/15 weed cover score. Detailed vegetation monitoring (Section 8.2) will be undertaken each year following the missed target, until the target is reached again.

8.5.4 Offset Management Plan Review

The OMP will be reviewed by a suitably qualified ecologist, in consultation with the landowner, TfN and Approval Holder following the detailed Year 5 assessment. This will be the responsibility of the Approval Holder to arrange. Where relevant, the review will make recommendations to improve the performance of management actions. The OMP review is to be instigated and funded by the Approval Holder. It is the responsibility of the landowner to implement the relevant management actions described within this OMP, decisions regarding adaptive management and the ultimate performance of the OMP are the responsibility of the Approval Holder.

The Approval Holder will forward the 5-year review to DAWE. Should any material changes to the OMP be proposed as a result of the 5-year review, the Approval Holder will seek DAWE's approval prior to implementation of the changes.

A Year-10 review will also be conducted to determine whether the outcomes of the management plan have met the predicted outcomes of the EPBC offset gain calculator.

All records/evidence of management actions will be maintained by the landowner and be submitted to DAWE upon request.

8.5 Monitoring and Reporting Timeline

Table 14. Timeline of Monitoring and Reporting requirements throughout the 10 year Offset Management Period

OMP Year	Task	Responsibility	Relevant OMP Section
1	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1
1	Detailed NTGVVP Monitoring 17.5 ha site	Undertaken by a qualified ecologist and funded by the Approval Holder	8.2
1	GSM Population Monitoring	Undertaken by a qualified ecologist and funded by the Approval Holder	8.3
1	Baseline Rabbit Abundance Survey	Undertaken by a qualified ecologist and funded by the Approval Holder	8.4.1
1	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.4.2
1	Annual Report- (Complete template provided)	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1
1	Detailed Assessment Reporting	Undertaken by a qualified ecologist and funded by the Approval Holder	8.5.2
2	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1
2	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.4.2
2	Annual Report - See Template	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1
3	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1
3	Detailed Vegetation Monitoring	Undertaken by a qualified ecologist and funded by the Approval Holder	8.2
3	GSM Population Monitoring	Undertaken by a qualified ecologist and funded by the Approval Holder	8.3
3	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.4.2

OMP Year	Task	Responsibility	Relevant OMP Section
3	Annual Report	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1
3	Detailed Assessment Reporting	Undertaken by a qualified ecologist and funded by the Approval Holder	8.5.2
4	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1
4	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.4.2
4	Annual Report	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1
5	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1
5	Detailed Vegetation Monitoring	Undertaken by a qualified ecologist and funded by the Approval Holder	8.2
5	GSM Population Monitoring	Undertaken by a qualified ecologist and funded by the Approval Holder	8.3
5	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.4.2
5	Annual Report	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1
5	Detailed Assessment Reporting	Undertaken by a qualified ecologist and funded by the Approval Holder	8.5.2
5	Offset Management Plan Review	A qualified ecologist engaged by the Approval Holder. Review to be completed in consultation with the Landowner and TfN	8.5.3
6	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1
6	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.5.2
6	Annual Report	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1
7	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1

OMP Year	Task	Responsibility	Relevant OMP Section
7	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.4.2
7	Annual Report	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1
8	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1
8	Detailed Vegetation Monitoring	Undertaken by a qualified ecologist and funded by the Approval Holder	8.2
8	GSM Population Monitoring	Undertaken by a qualified ecologist and funded by the Approval Holder	8.3
8	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.4.2
8	Annual Report	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1
8	Detailed Assessment Reporting	Undertaken by a qualified ecologist and funded by the Approval Holder	8.5.2
9	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1
9	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.4.2
9	Annual Report	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1
10	Annual Monitoring of Habitat and Effectiveness of Management Actions	Landowner	8.1
10	Detailed Vegetation Monitoring	Undertaken by a qualified ecologist and funded by the Approval Holder	8.2
10	GSM Population Monitoring	Undertaken by a qualified ecologist and funded by the Approval Holder	8.3
10	Ongoing Rabbit Monitoring	Undertaken by Landowner during site inspections and incorporated into annual reports	8.4.2
10	Annual Report	Prepared and submitted by the Landowner annually to TfN and the Approval Holder	8.5.1

OMP Year	Task	Responsibility	Relevant OMP Section
10	Detailed Assessment Reporting	Undertaken by a qualified ecologist and funded by the Approval Holder	8.5.2
10	Offset Management Plan Review	A qualified ecologist engaged by the Approval Holder. Review to be completed in consultation with the Landowner and TfN	8.5.3

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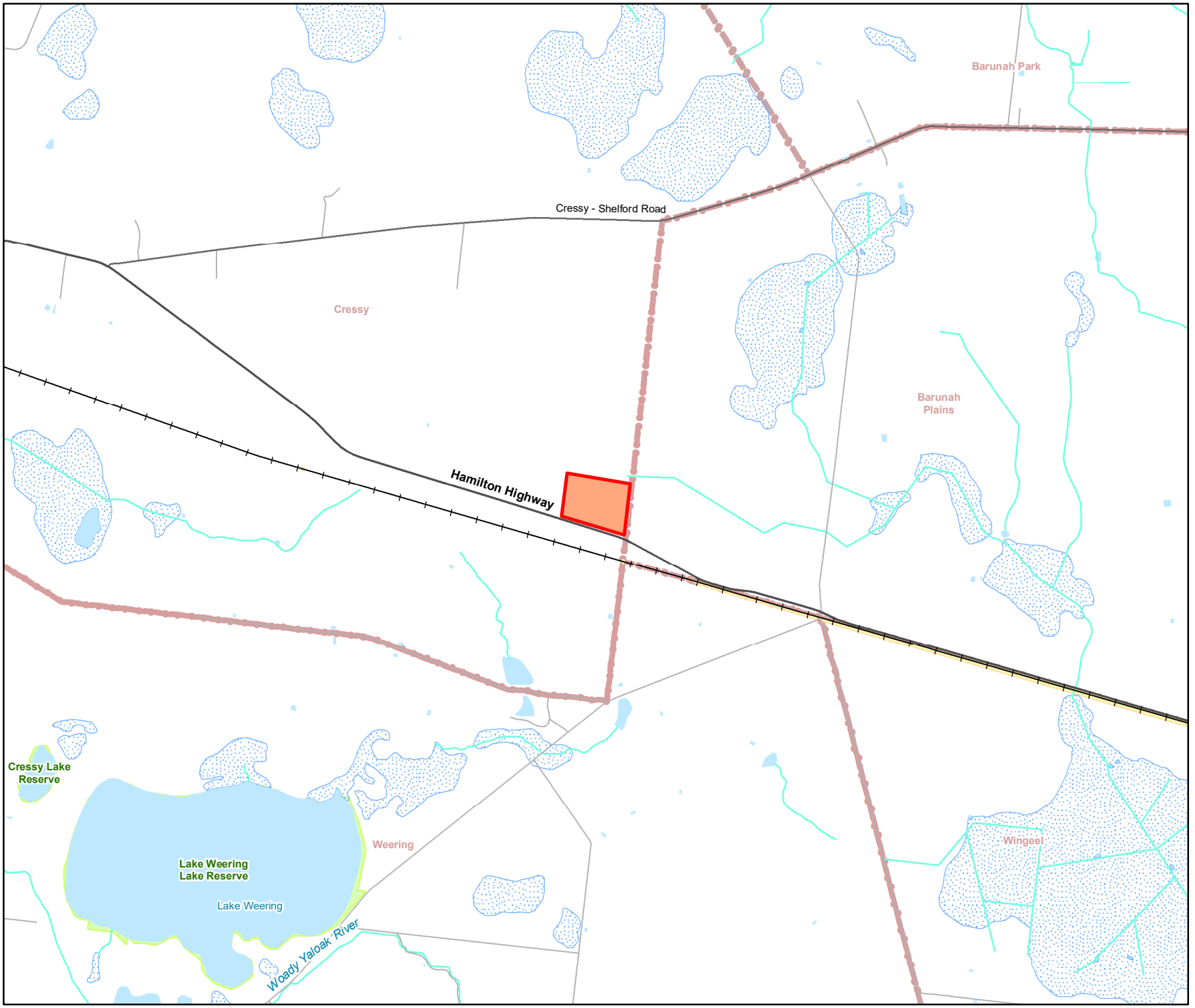

Legend

- Proposed offset site
- Railway
- Major Road
- Collector Road
- Minor Road
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Parks and Reserves
- Crown Land
- Localities

Figure 1

Location of the offset site

Offset Management Plan for Parwan Melton Pipeline

N

0 750 1,500

Metres

ecology & heritage partners

14751_Fig01_Loc_OffsetSite 17/02/2021 melsley

Legend

- Proposed Golden Sun Moth offset site (30 ha)
- NTGVVP offset site (33 ha)
- Property boundaries
- Existing offset site
- Water point exclusion zone

Figure 2

Offset locations within the property

Offset Management Plan for Parwan Melton Pipeline

N

0 150 300

Meters

ecology & heritage partners

Appendix 1. Risk Assessment and Management Definitions

Risk framework

		Consequence				
Likelihood		Minor	Moderate	High	Major	Critical
	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

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.

Appendix 2. EPBC OFFSET CALCULATOR

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	NTGVVP	**Area**	4.961	Hectares	
			Quality	**3**	Scale 0-10	
			Total quantum of impact	1.49	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			Field mapping
			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	1.49	Adjusted hectares	17.5 ha at Cressy Off-site Offset	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	33	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	1%	1.32	90%	1.19	0.32	1.49	100.13%	Yes		
									Future area without offset (adjusted hectares)	31.4	**Future area with offset (adjusted hectares)**	32.7									
					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)**	**6**	1.00	80%	0.80	0.41					
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)**			75%							
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	1.4883	1.49	100.13%	**Yes**	$0.00	N/A	$0.00
					$0.00	**$0.00**	**$0.00**