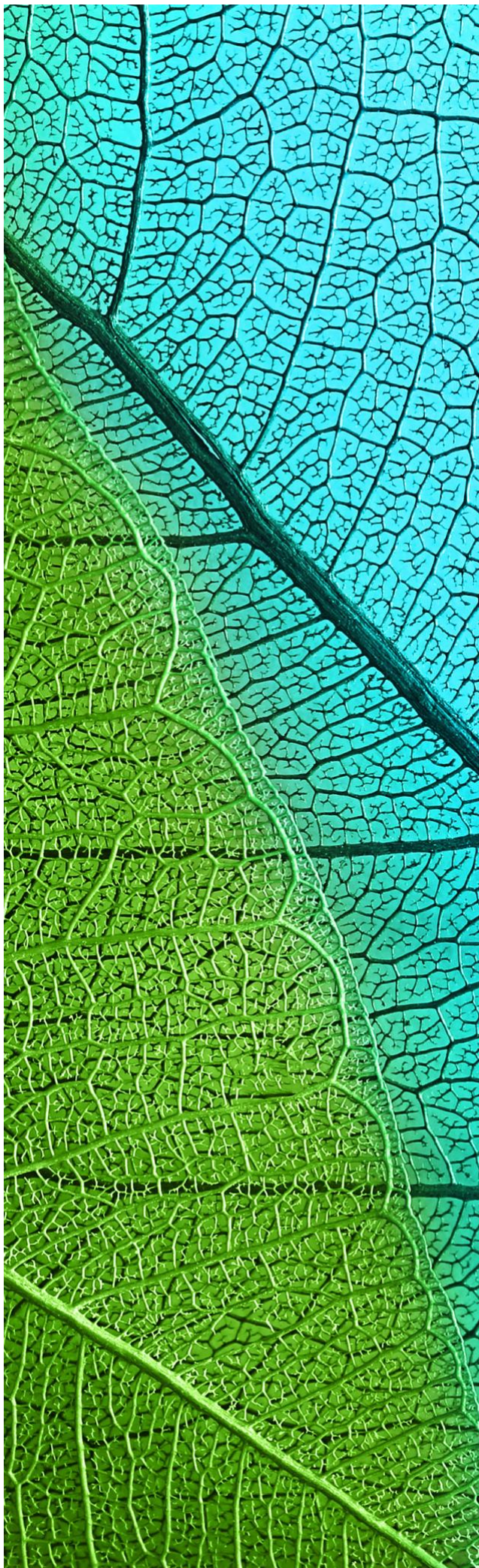




Manzeene Avenue, Lara Warrambeen Offset Site

Offset Monitoring Report

Stage 1 – Year 6

Stage 2 – Year 5

Stage 3 – Year 4

**Prepared for Manzeene Avenue
Development Project Trust**

December 2021
Report No. 11212 (12.1)



Nature Advisory

(Formerly Brett Lane & Associates Pty Ltd)

5/61-63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124

(03) 9815 2111

www.natureadvisory.com.au

Contents

1. INTRODUCTION	1
2. SITE DESCRIPTION AND BACKGROUND	2
2.1. Site Description	2
2.2. Background	2
3. METHODS	4
3.1. Field methodology	4
3.2. Offset management actions	4
3.2.1. Habitat hectare and weed cover assessment	6
3.2.2. Photography at photo points	7
3.3. Limitations of field assessment	7
4. ASSESSMENT RESULTS	8
4.1. Habitat hectare assessment	8
4.2. Threatened species	9
4.3. Access control and fencing	9
4.4. Biomass reduction	9
4.5. Pest animal monitoring	10
4.6. Pest plant monitoring	10
4.7. Qualification as NTGVVP	14
4.8. Photo points	14
5. RECOMMENDATIONS	16
5.1. Biomass management	16
5.2. Weed control	16
6. REFERENCES	17

Tables

Table 1: Photo point notes	4
Table 2: Monitoring methods	5
Table 3: Description of offset zone	8
Table 4: Summary of habitat hectare assessment results	9
Table 5: Pest plant data from 2016 to 2020	13
Table 6: Qualification of offset site at NTGVVP	14

Figures

Figure 1: Study area, native vegetation and photo points 15

Appendices

Appendix 1: Photo-point monitoring photographs 18

Appendix 2: Detailed habitat hectare assessment results 30

1. INTRODUCTION

Manzeene Avenue Development Project Trust Pty Ltd engaged Nature Advisory Pty Ltd (formerly Brett Lane & Associates) to conduct an annual offset monitoring survey of a native vegetation offset site at Warrambeen Estate, Shelford. This area is used as an offset for the permitted native vegetation removal at Manzeene Village, Lara and is subject to an offset monitoring plan prepared by Brett Lane & Associates (BL&A 2015).

Baseline monitoring of the offset site was undertaken in December 2015 for a 30-hectare area used as an offset in three stages. This report focuses on all three stages of the offset area.

This investigation was commissioned to collect:

- year-six data of the monitoring program for Stage 1 of the offset site;
- year-five monitoring data for Stage 2; and
- year-four monitoring data for Stage 3.

It includes the condition of native vegetation, extent of weed cover in the offset site and the adequacy of fencing, grazing and other biomass and weed control regimes. The data will be used in the monitoring and adaptive management of the offset site consistent with the Offset Management Plan (OMP) for this site (BL&A 2015).

Specifically, the scope of the investigation included:

- Estimation of overall weed cover and cover of each high threat [woody] weed species (refer to Table 11 of the OMP);
- Taking photographs at fixed photo point locations;
- Assessment of the integrity of offset zone fencing;
- Assessment of the level of grazing pressure;
- Monitoring of compliance with land-use commitments and other management commitments; and
- Monitoring of the quality of NTGVVP.

This report is divided into the following sections:

Section 2 provides an overview of the characteristics of the study area and describes the sources of information including the background of the project.

Section 3 describes the methods used for the field survey and monitoring.

Section 4 presents the investigation results, describing the vegetation of the study area.

Section 5 discusses the implications of the management plan implementation, analysis of results and recommendations to improve the management process.

This investigation was undertaken by a team from Nature Advisory comprising Chris Dunk (Senior Ecologist), Arend Kwak (Botanist) and Inga Kulik (Senior Ecologist and Project Manager).

2. SITE DESCRIPTION AND BACKGROUND

2.1. Site Description

Stage 1 (4.9 ha), Stage 2 (11.6 ha) and Stage 3 (13.5 ha) of the offset site (Figure 1) are located in the northern part of a large property along the Rokewood-Shelford Road, in Shelford. They form a 30-hectare area set aside for offsets in association with Manzeene Avenue in Lara, and are encompassed within a 195-hectare paddock.

The offset property, Warrambeen Gumley Land Trust, is located approximately 50 kilometres northwest of Geelong. The property is bordered by Rokewood Shelford Road to the south, Lonies Road to the east and Gumley Mount Mercer Road to the west. It has a long history of grazing by livestock (sheep), which remains active.

Large areas of native grassland exist in the area. The landowner of the property has indicated that there are over 500 hectares (including the offset site) of native grassland within the Warrambeen Gumley Land Trust alone (Landowners, *pers. comm.* 2010).

The offset site lies within the Victorian Volcanic Plain bioregion and falls within the Corangamite catchment.

2.2. Background

This project was commissioned by Manzeene Avenue Development Project Trust Pty Ltd to provide annual data for the study area, which is being used for native vegetation offset credits. These credits are a requirement under the Victorian *Biodiversity assessment guidelines* (DEPI 2013) and *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* for the construction of the Manzeene Village Development, Lara. The offset monitoring includes assessment against the requirements detailed by the offset management plan produced by Brett Lane & Associates (BL&A 2015).

The offset site within the Warrambeen property is secured as an offset by Manzeene Avenue Development Project Trust Pty Ltd under Section 173 of the *Planning and Environment Act 1987*. The requirement of the Offset Security Agreement between Manzeene Avenue Development Project Trust Pty Ltd, City of Greater Geelong and the Landowners, is to undertake annual monitoring in accordance with the approved Offset Management Plan (OMP).

Offset Management Plan

The following assessments were undertaken in order to gather monitoring data under the OMP:

- Flora surveys by a qualified botanist, documenting the overall vegetation condition and percentage cover of weed species;
- Assessment of mapped vegetation against the criteria for the EPBC Act-listed community *Natural Temperate Grasslands of the Victorian Volcanic Plain* (NTGVVP).

The offset management plan outlined the following management actions which need to be undertaken:

- *Pest Plant Control:* Herbaceous weed control to be undertaken regularly throughout the year using spot spraying technique, focusing on elimination of woody weeds and high-threat herbaceous weeds;
- *Pest Animal Control:* Monitor for signs of pest animal activity, taking action where required;
- *Access:* Regularly check integrity of fencing throughout the life of the management plan;

- **Biomass Control:** Strategically graze the study area (in winter if dry), generally spelling in spring/summer to maintain and enhance a herb-rich, open ground cover and populations of significant species every year. Avoid grazing in any ephemerally wet areas.
- **Monitoring:** Regularly monitor composition and trends of vegetation to assess management effectiveness and guide future management actions. Monitoring will occur in years 1, 2, 3, 5 and 10, with a brief report prepared for years 1 and 2, and a more detailed monitoring report at the end of year five and year 10. This report establishes year three data for the annual monitoring program for Stage 3, year four data for Stage 2 and year five data for Stage 1.

Methods employed to address the offset management plan requirements are presented in Table 2.

3. METHODS

3.1. Field methodology

Habitat hectare, weed-cover assessments and photo point monitoring was conducted on 7th December 2021. During this assessment, all stages of the offset area were inspected on foot.

Incidental records of threatened flora species were taken within all vegetation types and landforms whilst undertaking the habitat hectare and weed cover assessments. Specimens requiring identification using laboratory techniques were collected.

Photos were taken in pre-established photo points within all stages. Notes from photo points taken during the current survey are provided below in Table 1. Photos taken in these locations are provided in Appendix 1.

Table 1: Photo point notes

Stage 1		
Pole No.	Photo direction	Notes
145	S	
144	W	
143	S	
142	S	
146	S	No stake
Stage 2		
Pole No.	Photo direction	Notes
364	S	
365	E	
366	N	
363	SE	
362	SW	
367	W	
368	NW	
Stage 3		
Pole No.	Photo direction	Notes
369	S	
370	W	
371	S	
372	N	
373	S	No stake
374	E	No stake

3.2. Offset management actions

Nature Advisory have reviewed the offset management plan to ensure that the proposed methods, discussed below, correspond to the requirements of the offset management plans.

The management actions include:

- Access control and fencing;

- Biomass reduction;
- Pest plant control;
- Pest animal control; and
- Protection of significant flora and fauna.

Table 2 details the methods used for the offset site monitoring. Based on the above methodology, the following surveys were undertaken, discussed in the sections below:

- Habitat hectare assessment (including documentation of the introduced flora species occurring in the offset site); and
- Photography at fixed photo points.

Table 2: Monitoring methods

Monitoring actions	Relevant performance measures (as per OMP)	Monitoring method
Access control and fencing	Maintenance of existing fencing	Visual inspection to determine the condition of the fence
Biomass reduction	Appropriate stock grazing	Discussions with the landowner as to how stock was managed throughout the year (including when the grassland was rested from grazing)
	Maintenance of NTGVVP	Monitoring of vegetation to determined qualification as NTGVVP
Pest plant control	No increase in cover of any weed species	Visual inspection of site and through habitat hectare assessment
	No new weed species introduced	Visual inspection of site and through habitat hectare assessment
Pest animal control	Reduce the number of rabbits	Discussions with landowner as to how pest animals have been controlled
	Identify all rabbit warrens	Visual Inspection

3.2.1. Habitat hectare and weed cover assessment

In Victoria, native vegetation is assessed using the habitat hectare method, which is a DELWP approved vegetation quality assessment method. Native vegetation is currently defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. The *Biodiversity assessment guidelines* define native vegetation as belonging to two categories (DEPI 2013):

- Patch; or
- Scattered tree.

The definitions of these categories are provided below, along with the prescribed DELWP methods to assess them.

In Victoria, native vegetation is assessed using the habitat hectare method, which is a vegetation quality assessment method prescribed by the Department of Environment, Land, Water and Planning (DELWP). Native vegetation in Victoria is defined as belonging to two categories (DELWP 2017):

- Patch; or
- Scattered tree.

A description of these is provided below.

Patch

A patch of native vegetation is either:

- An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; or
- Any area with three or more native canopy trees¹ where the drip line² of each tree touches the drip line of at least one other tree, forming a continuous canopy; or
- Any mapped wetland included in the *Current wetlands map*, available in DELWP systems and tools.

Patch condition is assessed using the habitat hectare method (Parkes *et al.* 2003; DSE 2004) whereby components of the patch (e.g. tree canopy, understorey and ground cover) are assessed against an EVC benchmark. The score effectively measures the percentage resemblance of the vegetation to its original condition.

Scattered tree

A scattered tree is:

- A native canopy tree² that does not form part of a patch.

Scattered trees are counted and mapped, the species identified and their circumference at 1.3 m above the ground is recorded.

¹ A native canopy tree is a mature tree (i.e. it is able to flower) that is greater than 3 metres in height and is normally found in the upper layer of the relevant vegetation type.

² The drip line is the outermost boundary of a tree canopy (leaves and/or branches) where the water drips on to the ground.

3.2.2. *Photography at photo points*

Photographs were taken at photo monitoring points (see Figure 1) to get a representation of the vegetation types and condition within the study area. Photos were taken at pre-established photo monitoring points within all stages. Photo monitoring points 146 within Stage 1 and points 373 and 374 within Stage 3 need to be marked with permanent posts, as was done for all other photo points.

3.3. Limitations of field assessment

The temporally constrained nature of the field assessments can result in a failure to record all species and life-forms because of the seasonal absence of some species. This investigation was designed to provide an indicative assessment of site condition, rather than an exhaustive inventory of species in the study area.

The survey was undertaken in early summer, after a wet winter and spring, which is appropriate to assess most of the features of this community.

4. ASSESSMENT RESULTS

4.1. Habitat hectare assessment

Evidence on site, including floristic composition and soil characteristics, suggested that *Heavier-soils Plains Grassland Heavier Soils* (EVC 132_61) was present within the study area (Figure 1).

Heavier-soils Plains Grassland (EVC 132_61) is described in the benchmark as “treeless vegetation mostly less than 1 m tall dominated by largely graminoid and herb life forms. Occupies fertile cracking basalt soils prone to seasonal waterlogging in areas receiving at least 500 mm annual rainfall” (see Appendix 3).

One remnant patch referred to herein as Offset Zone Stages 1, 2 & 3 (see Figure 1) comprising the abovementioned EVC is pertinent to this report (Table 3).

Table 3: Description of offset zone

Offset Zone	Bioregion	EVC	Description
Stage 1	VVP	<i>Heavier-soils Plains Grassland</i> (EVC 132_61) NTGVVP	Tussock Grass, Wallaby Grass, Kangaroo Grass and Spear Grass were co-dominant across the area, with native herbs such as Scaly Buttons, Prickfoot and Poison Lobelia being common and widespread throughout the entire site. Two Small Milkwort were also found. Recruitment potential was low, with high leaf litter cover. Introduced species were present, with Flatweed, Yorkshire Fog, and Toowoomba-canary Grass having the highest cover.
Stage 2	VVP	<i>Heavier-soils Plains Grassland</i> (EVC 132_61) NTGVVP	As with Stage 1, the aforementioned native grasses were co-dominant, with the same native herbs being commonplace though lower in cover. Recruitment potential was low, with high leaf litter cover. Yorkshire Fog, Toowoomba Canary Grass and Flatweed demonstrated the highest covers for introduced species.
Stage 3	VVP	<i>Heavier-soils Plains Grassland</i> (EVC 132_61) NTGVVP	Like the previous stages, native grasses were co-dominant across the area, with native herbs such as Scaly Buttons, Blue Devil, Grassland Wood Sorrel and Poison Lobelia common across the site. Small Scurf Pea was also found in this stage. Recruitment opportunities were relatively low, with minimal bare ground cover. The area was gently undulating with a number of basalt rocky rises. Introduced species were more abundant here than the other stages, with Flatweed, Yorkshire Fog and Toowoomba Canary-grass once again having the highest cover.

The habitat hectare assessment results for this habitat zone are provided below in Table 4. More detailed habitat scoring results are presented in Appendix 2. The habitat scores for the current assessment (52 for Stage 1, 55 for Stage 2 and 44 for Stage 3) were slightly higher than the scores obtained in October 2020 (50 for Stages 1 and 2 and 43 for Stage 3).

Table 4: Summary of habitat hectare assessment results

Offset Zone	EVC	Area (ha)	Habitat Score (out of 100)
Stage 1	<i>Heavier-soils Plains Grassland (EVC 132_61)</i>	4.9	52
Stage 2	<i>Heavier-soils Plains Grassland (EVC 132_61)</i>	11.6	55
Stage 3	<i>Heavier-soils Plains Grassland (EVC 132_61)</i>	13.5	44

4.2. Threatened species

Targeted surveys for threatened species were not included in OMP. Nonetheless, two state-listed threatened flora species have previously been incidentally encountered and recorded during offset site monitoring. One Small Milkwort was recorded in Stage 1 in February 2019, and two were recorded in Stage 1 during the most recent survey. Numerous Small Scurf-pea have been recorded throughout the offset site since 2017, forming large matts in association with rock outcropping. Small Scurf Pea was recorded in Stage 3 during the most recent survey. Small Milkwort is listed as threatened under the FFG Act, while Small Scurf-pea is listed as threatened under the FFG Act.

Spiny Rice Flower, listed as critically endangered under the EPBC Act, has been recorded during the offset site monitoring. Two plants were identified (and their locations recorded with GPS) within Stage 1 during February 2019. However, these plants were not located in the most recent assessment.

The analysis within the OMP (BL&A 2015) indicated that the additional listed flora species are likely to occur or have the potential to occur:

- Clover Glycine (EPBC Act: Vulnerable).

This species is yet to be recorded anywhere within the offset site.

4.3. Access control and fencing

The fencing was found to remain appropriate, with no breaches of integrity, and is required to be maintained into the future to retain this standard. A fence surrounds the 195-hectare paddock, of which the offset site forms a portion, and no additional fence between different offset parties is required (as per BL&A 2015).

There appeared to be very little impact from vehicle access through the offset site, and people are discouraged from accessing the area unless it is absolutely necessary (Landholder pers. com., Dec 2016).

4.4. Biomass reduction

Discussions with the landholder found that during the past year of management for the offset site the site was too wet to graze effectively without damaging the native vegetation. It is understood that grazing was limited to the times below due to the high rainfall that occurred during the year and to prevent pugging of the site.

- 14 - 15 April 2021

- 18 - 25 May 2021
- 2 - 8 June 2021
- 28 August – 30 September 2021

Biomass across the site was high at the time of assessment (Photo 1).



Photo 1: High biomass observed throughout the offset site, with resultant minimal inter-tussock spacing.

4.5. Pest animal monitoring

No evidence of the presence of European Rabbit was detected at the offset site.

4.6. Pest plant monitoring

Weed species currently contribute 15% of the vegetative cover in Stage 1, 20% cover in Stage 2 and 30% cover in Stage 3. This demonstrates little change in the extent of pest plant presence onsite, as these values largely remain consistent with those recorded in October 2020 surveys. However, the composition of this weed cover is now mostly attributed to high-threat perennial weeds, such as Yorkshire Fog, Toowoomba Canary-grass and Flatweed.

Under the offset plan (BL&A 2015), to achieve site gain all weeds are required to be controlled such that their cover does not increase beyond original levels. In addition to this, there are obligations for land managers under the *Catchment and Land Protection Act 1994* with respect to eradicating regionally prohibited weeds and preventing the growth and spread of regionally controlled weeds. The pest plant species recorded on-site and their percentage cover at the time of the current survey are included in Table 5.

The most abundant weeds within the offset site were Yorkshire Fog, Flatweed and Toowoomba Canary-grass. These weeds have demonstrated a significant increase in cover since the October 2020 surveys. This is particularly evident for Yorkshire Fog and Toowoomba Canary-grass cover in Stages 2 and 3 (Photo 2). In the context of these observations, Flatweed is also considered high-threat due to its increased cover across all stages (Photo 4). This has greatly limited recruitment due to the associated decline in bare ground cover.

Evidence of spot spraying of Spear Thistle was observed, although follow up control is required as many recruits were also present (Photo 3). Sweet Briar had also been controlled using the cut and paint method, with only two juvenile plants being found in Stage 1 and 3.



Photo 2: Dense growth of Yorkshire Fog and Toowoomba Canary-grass in Stage 3.



Photo 3: Spear Thistle recruits, sheltered by Common Tussock Grass.



Photo 4: Flatweed infestation present in Stage 2.

Table 5: Pest plant data from 2016 to 2020

Common Name	Scientific name	Weed Category	Control under offset plan - Ensure cover does not increase beyond current level	Stage 1 (YR 1) - 2016	Stage 1 (YR 2) & Stage 2 (YR 1) - 2017	Stage 1 (YR 3), Stage 2 (YR 2) & Stage 3 (YR 1) - Feb 2019	Stage 2 (YR 3) - Nov 2019	Stage 3 (YR 2) - Nov 2019	Stage 1 (YR 5) - Oct 2020	Stage 2 (YR 4) - Oct 2020	Stage 3 (YR 3) - Oct 2020	Stage 1 (YR 6) - Dec 2021	Stage 2 (YR 5) - Dec 2021	Stage 3 (YR 4) - Dec 2021
Barley Grass	<i>Hordeum vulgare</i>	Low-threat	X	-	<1%	<1%	-	-	1%	-	-	-	-	<1%
Briar Rose	<i>Rosa rubiginosa</i>	High-threat woody	X	-	-	1%	<1%	-	<1%	<1%	<1%	<1%	-	<1%
Brown-Top Bent	<i>Agrostis capillaris</i>	Low-threat	X	-	-	<1%	-	-	-	-	-	-	-	-
Buck's-horn Plantain	<i>Plantago coronopus</i>	Low-threat	X	<1%	<1%	<1%	<1%	-	<1%	-	-	<1%	-	-
Capeweed	<i>Arctotheca calendula</i>	Low-threat	X	<1%	<1%	<1%	<1%	<1%	1%	<1%	<1%	-	-	<1%
Clover	<i>Trifolium</i> spp.	Low-threat	X	15%	2%	2%	2%	2%	<1%	<1%	<1%	<1%	<1%	<1%
Cocksfoot	<i>Dactylis glomerata</i>	Low-threat	X	-	-	-	-	-	<1%	-	-	-	-	-
Flatweed	<i>Hypochaeris radicata</i>	High-threat	X	1%	1%	1%	1%	1%	1%	4%	10%	2%	5%	15%
Hair Grass	<i>Aira</i> sp.	Low-threat	X	1%	<1%	<1%	<1%	<1%	-	-	-	<1%	<1%	<1%
Large Quaking-grass	<i>Briza maxima</i>	High-threat	X	-	<1%	1%	3%	3%	-	-	-	<1%	<1%	<1%
Lesser Hawkbit	<i>Leontodon saxatilis</i>	Low-threat	X	-	-	<1%	-	-	-	-	<1%	-	-	-
Narrow-leaved Clover	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Low-threat	X	<1%	<1%	<1%	<1%	<1%	<1%	-	<1%	<1%	-	<1%
Oat	<i>Avena</i> spp.	High-threat	X	4%	20%	10%	12%	15%	2%	8%	10%	1%	<1%	<1%
Onion Grass	<i>Romulea rosea</i>	High-threat	X	-	<1%	<1%	2%	2%	3%	2%	<1%	<1%	<1%	<1%
Prickly Lettuce	<i>Lactuca serriola</i>	Low-threat	X	-	-	<1%	-	-	-	-	-	-	-	-
Rough Dog's-tail	<i>Cynosurus echinatus</i>	Low-threat	X	<1%	<1%	<1%	<1%	<1%	-	-	-	<1%	<1%	<1%
Rough Sow-thistle	<i>Sonchus asper</i> s.l.	Low-threat	X	<1%	<1%	<1%	<1%	-	<1%	<1%	-	-	<1%	<1%
Saffron Thistle	<i>Carthamus lanatus</i>	Low-threat	X	<1%	<1%	<1%	<1%	<1%	-	-	-	-	-	-
Serrated Tussock	<i>Nassella trichotoma</i>	High-threat	X	-	-	-	<1%	<1%	-	-	-	-	-	-
Sheep Sorrel	<i>Acetosella vulgaris</i>	Low-threat	X	-	-	-	-	-	<1%	-	-	<1%	-	-
Soft Brome	<i>Bromus hordeaceus</i>	High-threat	X	3%	<1%	<1%	3%	4%	<1%	-	-	<1%	-	<1%
Spear Thistle	<i>Cirsium vulgare</i>	High-threat	X	<1%	<1%	1%	3%	3%	1%	1%	5%	<1%	<1%	-
Squirrel-tail Fescue	<i>Vulpia bromoides</i>	High-threat	X	<1%	5%	5%	6%	7%	-	<1%	-	<1%	<1%	<1%
Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>	Low-threat	X	-	<1%	<1%	-	-	<1%	-	1%	-	<1%	-
Toowoomba Canary-grass	<i>Phalaris aquatica</i>	High-threat	X	-	<1%	<1%	2%	1%	<1%	-	-	1%	5%	7%
Wimmera Rye-grass	<i>Lolium rigidum</i>	High-threat	X	1%	1%	1%	2%	1%	2%	2%	1%	1%	1%	1%
Wood-sorrel	<i>Oxalis</i> sp.	Low-threat	X	<1%	<1%	<1%	-	-	-	-	-	-	-	-
Yorkshire Fog	<i>Holcus lanatus</i>	High-threat	X	1%	5%	5%	5%	3%	1%	1%	2%	2%	10%	15%
Small Quaking-grass	<i>Briza minor</i>	Low-threat	X	-	-	-	-	-	-	-	-	<1%	<1%	<1%

Bold % cover is where the cover of weed species has increased since the previous year of monitoring.

4.7. Qualification as NTGVVP

The entirety of the offset site qualified as *Natural Temperate Grasslands of the Victorian Volcanic Plain* (NTGVVP) at the time of the survey as it met all the diagnostic features and two of the three condition thresholds from the listing advice (TSSC 2008), as detailed in Table 6.

Table 6: Qualification of offset site at NTGVVP

NTGVVP key diagnostic features (must meet all)	
Quaternary basalt soils within the Victorian Volcanic Plain bioregion.	Yes
At least one of the following grass genera is the dominant native species in the ground layer: Kangaroo-grass, Wallaby-grass, Spear-grass and/or Tussock-grass.	Yes
For a native vegetation remnant >1 hectare in size, the minimum contiguous size of a grassland patch is 0.5 hectare and the density of mature trees within the grassland patch should not exceed 2 trees per hectare.	Yes
NTGVVP condition thresholds (must meet at least one)	
The total perennial tussock cover represented by the native grass genera Kangaroo-grass, Wallaby-grass, Spear-grass and/or Tussock-grass is at least 50%.	Yes
The ground cover of native forbs (wildflowers) is at least 50% of total vegetation cover during spring-summer (September to February).	No
The cover of non-grass weeds is less than 30% of total vegetation cover at any time of the year.	Yes

4.8. Photo points

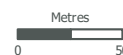
A comparison of the photographs from the photo points from this monitoring assessment to the last monitoring assessment are shown in Appendix 1. Photo monitoring points were taken within Stages 1, 2 and 3.



Figure 1: Offset site and threatened species

Project: Warrambeen Offset Site **Client:** Manzeene Avenue Development Project Trust **Date:** 10/12/2021

- | | |
|---|--|
| Offset site | Threatened flora species |
| Offset staging | ▲ Small Scurf Pea |
| ● Photo monitoring points | ▲ Small Milkwort |



**Nature
Advisory**

PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
 03 9815 2111 - info@natureadvisory.com.au

5. RECOMMENDATIONS

The following measures are recommended to be implemented at the offset site during 2021, in addition to existing requirements for ongoing monitoring, fencing maintenance and pest animal control.

5.1. Biomass management

Grazing is currently still the preferred approach for reducing biomass at the offset site. The offset site has a long history of grazing and the grassland is likely to be somewhat adapted to this kind of disturbance. Grazing is most useful where biomass reduction is primarily required for dominant species which are susceptible to a proportionally higher loss of foliage (Morgan *et al.* 2015), and this is the case at the offset site. Furthermore, grazing may be a more favourable biomass management regime than fire because of the prevalence of C3 grasses such as some spear grasses, which may be susceptible to fire in historically grazed and unburned grassland.

High winter and spring rainfall was experienced in 2021 which reduced the time grazing was possible and facilitated an increase in biomass at the site. Grazing should be increased in 2022 if weather conditions permit. Nature Advisory propose exercising two longer grazing periods ending later in the year, such as follows:

- Approximately 1,500 sheep from 1st June – 1st July; and
- Approximately 1,500 sheep from 1st October – 1st November.

This grazing regime may be adapted based on knowledge obtained through ongoing monitoring of the site and the effectiveness of management actions. For example, if it appears grazing is having a minimal effect on biomass then more sheep should be added. On the contrary, if grazing is having an exaggerated and undesirable effect on biomass management then the number of sheep may be reduced or grazing ceased until otherwise advised.

If high rainfall again prevents grazing in 2022, a cool burn should be implemented in early spring.

5.2. Weed control

The following perennial grassy weeds should be prioritised for control on the site via controlled burns and/or grazing and herbicide application:

- Yorkshire Fog
- Toowoomba Canary-grass

Additionally, the following herbaceous weeds should be prioritised for control on the site via the application of an appropriate broad-leaf herbicide:

- Flatweed
- Spear Thistle

Remaining weeds on the site are palatable to stock and it is expected that grazing will lead to a significant reduction of these weeds, especially pasture grasses.

Any emerging woody weeds must be immediately treated using the 'cut and paint' method of herbicide treatment.

6. REFERENCES

- Brett Lane & Associates (BL&A) 2015, *Manzeene Avenue, Lara – Offset Management Plan* Report No. 11212 (4.4), prepared for Manzeene Avenue Development Project Trust.
- Brett Lane & Associates (BL&A) 2016, *Manzeene Avenue, Lara – Warrambeen Baseline Offset Monitoring* Report No. 11212 (6.0), prepared for Manzeene Avenue Development Project Trust.
- Brett Lane & Associates (BL&A) 2019, *Manzeene Avenue, Lara – Warrambeen Offset Monitoring* Report No. 11212 (9.0), prepared for Manzeene Avenue Development Project Trust.
- Department of Environment, Land, Water and Planning (DELWP) 2017, *Guidelines for the removal, destruction or lopping of native vegetation*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria.
- Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) 2012, *Environmental Protection and Biodiversity Conservation Act 1999 – Environmental Offsets Policy*, Canberra, October 2012.
- Department of Sustainability and Environment (DSE) 2004, *Native Vegetation: sustaining a living landscape, Vegetation Quality Assessment Manual – guidelines for applying the Habitat Hectare scoring method (Version 1.3)*. Department of Sustainability and Environment, East Melbourne, Victoria.
- Morgan JW, Williams NSG & Marshall A, *Land of Sweeping Plains – Managing and restoring the native grasslands of south-eastern Australia*, CSIRO publishing, Clayton South, Victoria, 2015.
- Nature Advisory 2020, *Manzeene Avenue, Lara – Warrambeen Offset Monitoring* Report No. 11212 (11.0), prepared for Manzeene Avenue Development Project Trust.
- Parkes D, Newell G, & Cheal D 2003, 'Assessing the Quality of Native Vegetation: The 'habitat hectares' approach'. *Ecological Management and Restoration*, 4:29-38
- Threatened Species Scientific Committee (TSSC) 2008, *Commonwealth Listing Advice on Natural Temperate Grassland of the Victorian Volcanic Plain*, Department of the Environment, Canberra.

Appendix 1: Photo-point monitoring photographs

Photo No.	Photograph		Photo direction and date	WP #	Notes
Stage 1					
142				S 14/10/2020	37° 54' 09" S, 143° 51' 56" E EVC: <i>Heavier Soils</i> Plains Grassland (132_61)
				S 7/12/2021	
143				S 14/10/2020	37° 54' 09" S, 143° 52' 02" E EVC: <i>Heavier Soils</i> Plains Grassland (132_61)

Photo No.	Photograph		Photo direction and date	WP #	Notes
			S 7/12/2021		
144			W 14/10/2020	37° 54' 09" S, 143° 52' 06" E	EVC: Heavier Soils Plains Grassland (132_61)
			S 7/12/2021		

Photo No.	Photograph		Photo direction and date	WP #	Notes
145			S 14/10/2020	37° 54' 10" S, 143° 52' 11" E	EVC: <i>Heavier Soils</i> Plains Grassland (132_61)
			S 7/12/2021		
146			SSE 8/2/2019 (Note – Last recent photo, no pole exists at this location)	37° 54' 14" S 143° 51' 52" E	EVC: <i>Heavier Soils</i> Plains Grassland (132_61)

Photo No.	Photograph		Photo direction and date	WP #	Notes
				S 7/12/2021	
Stage 2					
362				SW 14/10/2020	37° 54' 13" S 143° 52' 06" E EVC: <i>Heavier Soils Plains Grassland</i> (132_61)
				S 7/12/2021	

Photo No.	Photograph		Photo direction and date	WP #	Notes
363			SE 14/10/2020	37° 54' 12" S 143° 52' 01" E	EVC: <i>Heavier Soils</i> Plains Grassland (132_61)
			S 7/12/2021		
364			S 14/10/2020	37° 54' 11" S 143° 51' 56" E	EVC: <i>Heavier Soils</i> Plains Grassland (132_61)

Photo No.	Photograph		Photo direction and date	WP #	Notes
				S 7/12/2021	
365				E 14/10/2020	EVC: <i>Heavier Soils Plains Grassland</i> (132_61)
				S 7/12/2021	

Photo No.	Photograph		Photo direction and date	WP #	Notes
366			N 14/10/2020	37° 54' 15" S 143° 52' 01" E	EVC: <i>Heavier Soils Plains Grassland</i> (132_61)
			S 7/12/2021		
367			W 14/10/2020	37° 54' 16" S 143° 52' 05" E	EVC: <i>Heavier Soils Plains Grassland</i> (132_61)

Photo No.	Photograph		Photo direction and date	WP #	Notes
			S 7/12/2021		
368			NW 14/10/2020	37° 54' 17" S 143° 52' 09" E	EVC: <i>Heavier Soils</i> Plains Grassland (132_61)
			S 7/12/2021		

Photo No.	Photograph		Photo direction and date	WP #	Notes
Stage 3					
369			S 14/10/2020	37° 54' 22" S 143° 52' 08" E	EVC: <i>Heavier Soils</i> Plains Grassland (132_61)
			S 7/12/2021		
370			W 14/10/2020	37° 54' 27" S 143° 52' 09" E	EVC: <i>Heavier Soils</i> Plains Grassland (132_61)
	No photograph taken.		S 7/12/2021		

Photo No.	Photograph		Photo direction and date	WP #	Notes
371			S 14/10/2020	37° 54' 20" S 143° 52' 03" E	EVC: <i>Heavier Soils</i> Plains Grassland (132_61)
			S 7/12/2021		
372			N 14/10/2020	37° 54' 24" S 143° 52' 01" E	EVC: <i>Heavier Soils</i> Plains Grassland (132_61)

Photo No.	Photograph		Photo direction and date	WP #	Notes
				S 7/12/2021	
373				S 14/10/2020	EVC: <i>Heavier Soils Plains Grassland</i> (132_61)
				S 7/12/2021	

Photo No.	Photograph		Photo direction and date	WP #	Notes
374			E 14/10/2020	37° 54' 06" S 143° 51' 57" E	EVC: <i>Heavier Soils Plains Grassland</i> (132_61)
			S 7/12/2021		

Appendix 2: Detailed habitat hectare assessment results

Habitat Zone			Stage 1	Stage 2	Stage 3
Bioregion			VVP	VVP	VVP
EVC Number			132_61	132_61	132_61
Total area of Habitat Zone (ha)			4.900	11.600	13.500
Site Condition	Large Old Trees	/10	N/A	N/A	N/A
	No. large trees in habitat zone		N/A	N/A	N/A
	Tree Canopy Cover	/5	N/A	N/A	N/A
	Lack of Weeds	/15	7	7	4
	Understorey	/25	10	10	5
	Recruitment	/10	6	6	6
	Organic Matter	/5	3	5	5
	Logs	/5	N/A	N/A	N/A
	Site condition standardising multiplier*		1.36	1.36	1.36
	Site Condition subtotal		35	38	27
Landscape Context	Patch Size	/10	8	8	8
	Neighbourhood	/10	5	5	5
	Distance to Core	/5	4	4	4
Total Condition Score		/100	52	55	44

* Modified approach to habitat scoring - refer to Table 14 of DELWP's Vegetation Quality Assessment Manual (DSE, 2004).