

While not recorded during the current survey, previous surveying at the property by Damien Cook at Australian Ecosystems detected additional threatened flora species:

- Salt-lake Tussock-grass (listed as *vulnerable* under the EPBC Act, *threatened* under the FFG Act and *vulnerable* on DEPI's advisory list)
- Fragrant Leek-orchid (listed as *endangered* under the EPBC Act, *threatened* under the FFG Act and *endangered* on DEPI's advisory list)
- Annual Bitter-cress (*endangered* on DEPI Advisory list)
- Small Milkwort (*threatened* of FFG Act and *endangered* on DEPI Advisory list)
- Golden Cowslips (*vulnerable* on DEPI Advisory list)
- Pale Swamp Everlasting (*vulnerable* on DEPI Advisory list)
- Derrinallum Billy-buttons (*endangered* on DEPI Advisory list)
- Plains Yam-daisy (*vulnerable* on DEPI Advisory list)

Additional threatened flora species considered to potentially occur in the study area due to the presence of suitable habitat detected during the current survey include:

EPBC Act and FFG Act listed species

- Adamson's Blown-grass
- Basalt Greenhood
- Clover Glycine (landowner has previously identified this species on site)
- Curly Sedge

Listed on the Advisory List of Rare and Threatened Plants in Victoria (DEPI)

- Metallic Sun-orchid
- Southern Swainson-pea (landowner has previously identified this species on site)

5.1.2. Ecological Vegetation Classes

Pre-European EVC mapping (DSE 2012b) indicates that the study area and surrounds would have supported Plains Grassland (EVC 132), Plains Grassy Woodland (EVC 55), Plains Grassy Wetland (EVC 647), Stony Knoll Shrubland (EVC 649) and other wetland aggregates prior to European settlement based on modelling of factors including rainfall, aspect, soils and remaining vegetation.

Evidence on site, including floristic composition and soil characteristics, suggested that *Heavier-soils* Plains Grassland (EVC 132_61), Plains Grassy Wetland (EVC 125), Stony Knoll Shrubland (EVC 649), Creekline Tussock Grassland (654), and Brackish Wetland (EVC 656) was present throughout the study area (Figure 1).

***Heavier-soils* Plains Grassland (EVC 132_61)** has an *endangered* conservation status in the Victorian Volcanic Plain bioregion. The benchmark for this EVC describes it as "treeless vegetation mostly less than one metre tall dominated by largely graminoid and herb life forms. It occupies fertile cracking basalt soils prone to seasonal water logging in areas receiving at least 500 millimetres annual rainfall" (Appendix 3).

Plains Grassy Wetland (EVC 125) has an *endangered* conservation status in the Victorian Volcanic Plain bioregion. The benchmark for this EVC describes it as "usually treeless, but in some instances can include sparse River Red Gum *Eucalyptus camaldulensis* or Swamp Gum *Eucalyptus ovata*. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas" (Appendix 3).

Brackish Wetland (EVC 656) has an *endangered* conservation status in the Victorian Volcanic Plain bioregion. The benchmark for this EVC describes it as a "Treeless EVC dominated by sedges and herbs that are generally indicative of saline conditions. True halophytic species such as samphires, if present, only occur with very low cover. Occurs in estuaries and along poorly defined drainage lines or associated with shorelines of brackish lakes" (Appendix 3).

Stony Knoll Shrubland (EVC 649) has an *endangered* conservation status in the Victorian Plain bioregion. The benchmark for this EVC describes it as "shrubland to 3 m tall or low non-eucalypt woodland to 8 m tall with a grassy understorey. It occurs on low stony rises on basalt flows. The soils are fertile and well drained but shallow with out-cropping rock, causing severe summer dryness".

Creeklane Tussock Grassland (EVC 654) has an *endangered* conservation status in the Victorian Volcanic Plain bioregion. The benchmark for this EVC describes it as occurs along low gradient ephemeral and intermittent drainage lines across the volcanic plains. Soils are generally fertile heavy dark clays. Exposed basalt rocks can be common. Dominated by a dense sward of Common Tussock-grass *Poa labillardierei* primarily with small herbs and typically mat-forming grasses in the inter-tussock spaces. This EVC often includes small areas of sedgeland and/or wetland".

A total of 22 remnant patches (referred to herein as habitat zones) totalling approximately 200 hectares and comprising the abovementioned EVC were identified in the study area. It is important to note that due to time constraints only 11 of the habitat zones (Table 1) mapped were assessed for quality under 'the Framework'. The habitat hectare assessment results for these 11 habitat zones are provided in Table 2. More detailed habitat scoring results are presented in Appendix 2.

Table 1: Description of habitat zones in the study area

Habitat Zone	EVC	Bioregional Conservation Status	Description
PG1 and PG2	Heavier-soils Plains Grassland (EVC 132_61)	Endangered	High quality habitat Structure and species richness in both zones was optimal; number of life forms present, cover and species richness across life forms near benchmark. Dominant species were Kangaroo Grass, spear grasses, with a reasonable coverage of wallaby grass species. Weed coverage was moderate and dominated by annuals such as Brown-top Bent-grass. Organic litter was low at the time of survey, likely to be due to recent grazing in part of this area.
PG3 and PG4	Heavier-soils Plains Grassland (EVC 132_61)	Endangered	High quality habitat Structure and species richness optimal; number of life forms present, cover and species richness across life forms near benchmark. Dominant species were Kangaroo Grass, Grey Tussock-grass, spear and wallaby grasses, and a large variety of indigenous forbs. Introduced weed cover was moderate; majority of cover comprising moderate threat annual species such as Brown-top Bent-grass. Other assessable habitat components, such as organic litter cover and recruitment potential, were optimal.
PG5 and PG6	Heavier-soils Plains Grassland (EVC 132_61)	Endangered	High quality habitat Structure and species richness in both zones was optimal; number of life forms present, cover and species richness across life forms near benchmark. Most likely due to management practices including stock exclusion and fire. Dominant species were Kangaroo Grass, spear grasses, with a high coverage of Lemon Beauty-heads. Weed coverage very low dominated by Wild Oat. Of the other assessable habitat components, organic litter cover and recruitment potential was moderate.
PG7	Heavier-soils Plains Grassland (EVC 132_61)	Endangered	Moderate to Low quality habitat Structure and species richness sub-optimal to poor; number of life forms present, cover and species richness across life forms well below benchmark. Dominant species were Kangaroo Grass, Grey Tussock-grass, and to a lesser degree spear and wallaby grasses. Introduced weed cover was moderate-high; majority of cover comprising moderate threat species. Of the other assessable habitat components, organic litter cover was near optimal and recruitment potential was sub-optimal.

Habitat Zone	EVC	Bioregional Conservation Status	Description
PG 8	Heavier-soils Plains Grassland (EVC 132_61)	Endangered	<p>High quality habitat</p> <p>Structure and species richness optimal; number of life forms present, cover and species richness across life forms near benchmark. Dominant species were Common Tussock Grass, Kangaroo Grass, wallaby grasses, with a high coverage of Lemon Beauty-heads. Weed coverage very low. Of the other assessable habitat components, organic litter cover and recruitment potential was moderate.</p>
PGW1	Plains Grassy Wetland (EVC 125)	Endangered	<p>Moderate quality habitat</p> <p>Structure and species richness sub-optimal; number of life forms present, cover and species richness across life forms is below benchmark. Dominant species were Common Tussock Grass, with a scattered occurrence of wallaby grasses. Forb density and diversity across the zone was well below benchmark average. Introduced weed cover was low-moderate; majority of cover comprising moderate threat species. Other assessable habitat components, such as organic litter cover and recruitment potential, were optimal.</p>
BW1	Brackish Wetland (EVC 656)	Endangered	<p>High quality habitat</p> <p>Structure and species richness was optimal; a diverse number of life forms present, cover and species richness across life form's near benchmark. Dominant species were Australian Salt-grass, Common Spike-rush, arrow-grass species along with Creeping Brookweed and Shiny Swamp-matt with a large variety of indigenous forbs. Introduced weed cover was low-moderate; majority of cover comprising high threat species. Of the other assessable habitat components, organic litter cover was optimal and recruitment potential was optimal.</p>

Habitat Zone	EVC	Bioregional Conservation Status	Description
BW2	Wetland Formation (EVC 656)	Endangered	<p>Moderate-low quality habitat</p> <p>A levee bank has been constructed between habitat zones BW1 and BW2 resulting in a modified example of this evc east of the constructed levee. Structure and species richness was sub-optimal; a limited number of life forms present, cover and species richness across life forms near was below benchmark. Dominant species were Australian Salt-grass, Common Blown-grass, and Creeping Brookweed and Shiny Swamp-matt to a lesser degree. Introduced weed cover was moderate; majority of cover comprising rye grass and Brown-top Bent-grass. Of the other assessable habitat components, organic litter cover was well below benchmark and recruitment potential was optimal largely due to disturbance such as drainage and a change in hydrology.</p>

* = Introduced or non-indigenous native species

Notes: Benchmark = EVC benchmark, a standard vegetation quality reference point, which represents the average characteristics of a mature and apparently long-undisturbed stand of the same vegetation type; **Habitat Zone C** was found to be outside the study area and therefore is not considered further

The conservation significance of habitat zones is based on the bioregional conservation status of the EVC, habitat score of the vegetation, any significant site attributes and the results of the best/remaining 50% habitat assessment. The assessment for best/remaining 50% of habitat is performed for each species listed as threatened on DEPI's advisory lists which is considered to potentially occur in each habitat zone, and each recorded ecological community listed as threatened under the FFG Act. This results in the ascription of a level of conservation significance for each habitat zone depending on the conservation status of the threatened species and whether the habitat for that species was determined to constitute either the *best* or *remaining* 50% (DSE 2007a; DSE 2010b).

Table 2: Summary of habitat hectare assessment results

Habitat Zone	EVC no.	Area (ha)	Habitat score (out of 100)	Habitat hectares	Conservation significance	NTGVVP (Y/N)	WBPGC (Y/N)
PG1	132_61	29.583	54	15.97	Very high	Yes	Yes
PG2	132_61	19.441	54	10.5	Very high	Yes	Yes
PG3	132_61	19.581	62	12.14	Very high	Yes	Yes
PG4	132_61	2.334	62	1.45	Very high	Yes	Yes
PG5	132_61	4.457	65	2.9	Very high	Yes	Yes
PG6	132_61	3.35	65	2.18	Very high	Yes	Yes
PG7	132_61	1.442	47	0.68	Very high	Yes	Yes
PG8	132_61	0.874	59	0.53	Very high	Yes	Yes
PGW1	125	10.92	62	6.77	Very high	N/A	N/A
BW1	656	22.171	58	12.86	Very high	N/A	N/A
BW2	656	5.283	53	2.8	Very high	N/A	N/A
Totals		119.44		68.78			

Notes: NTGVVP = *Natural Temperate Grassland of the Victorian Volcanic Plain*; WBPGC = *Western (Basalt) Plains Grasslands Community*; Habitat Zone C was found to be outside the study area and therefore is not presented here

All Habitat Zones were assigned the maximum conservation significance (very high) due to habitat score alone, and therefore an assessment for best/remaining 50% of habitat was superfluous but was undertaken to assist in the threatened species assessment (see Appendix 4).

5.1.3. Listed threatened ecological communities

EPBC Act

Based on the field assessment, the 81.062 hectares of *Heavier-soils Plains Grassland* (EVC 132_61) was found to constitute the listed threatened ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP). Refer to Figure 1 for the locations of NTGVVP in the study area and Appendix 2 for the area of each unit of NTGVVP. NTGVVP is listed as *critically endangered* under the EPBC Act.

FFG Act

Based on the field assessment, all 81.062 hectares of *Heavier-soils Plains Grassland* (EVC 132_61) were found to constitute the listed threatened ecological community *Western (Basalt) Plains Grasslands Community* (WBPGC).

6. THREATENED FAUNA LIKELIHOOD OF OCCURRENCE

This section identifies the study areas confirmed threatened fauna species assets and its potential to provide offsets for additional threatened fauna species in the area. The likelihood of species occurrence in the study area is displayed in Table 3 below.

6.1.1. *Fauna species*

The review of existing information and current field survey indicated that 190 fauna species may occur within the study area.

6.1.2. *Listed threatened fauna species*

The review of existing information and current field survey indicate that within the search region 29 rare or threatened fauna species (23 bird, 1 mammal, 3 reptile, 1 frog, and 1 invertebrate) listed on the EPBC Act, FFG Act and/or the DEPI advisory list (DSE 2007c) may occur within the study area. Their likelihood of occurrence within the study area is assessed and presented in Table 3. Species that occur or are likely to occur are highlighted. It is important to note that oceanic, and coastal specialists (such as albatrosses, petrels and some marine migratory birds), have been eliminated from this list due to the lack of suitable habitat within the study area.

Table 3 indicates whether any of the listed rare or threatened species are also listed as migratory species under the EPBC Act.

Table 3: Threatened fauna identified as occurring or potentially occurring in the study area

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	DEPI		
Black Falcon	<i>Falco subniger</i>			VU	Woodlands, open country and terrestrial wetlands; in arid and semi-arid zones; mainly over open plains and undulating land with large tracts of low vegetation (Marchant and Higgins 1993).	Limited sub-optimal habitat present in study area – potential to occur
Blue-billed Duck	<i>Oxyura australis</i>		L	EN	Terrestrial wetlands and prefers deep permanent, well vegetated water bodies (Marchant and Higgins 1990).	No suitable habitat in study area – unlikely to occur
Brolga	<i>Grus rubicunda</i>		L	VU	Wetlands that include permanent open water and deep freshwater marsh (Marchant and Higgins 1993).	Suitable habitat present in study area - Not recorded during current survey; however; recorded by land owners – previously recorded by land owner
Cattle Egret	<i>Ardea ibis</i>	M (JAMBA, CAMBA)			Wooded lands and terrestrial freshwater wetlands and pasture, in association with cattle (Marchant and Higgins 1990).	No suitable habitat in study area – unlikely to occur
Corangamite Water Skink	<i>Eulamprus tympanum marileae</i>	EN	L	CE	Basalt outcrops and drystone walls near Lakes Corangamite and Bolac (Wilson and Swan 2003).	Suitable habitat present in study area - Not recorded during current survey; however; recorded by land owners – previously recorded by landowner

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	DEPI		
Curlew Sandpiper	<i>Calidris ferruginea</i>	M (JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H))		EN	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins and Davies 1996).	Suitable habitat present in study area – potential to occur
Eastern Great Egret	<i>Ardea modesta</i>	M (JAMBA, CAMBA)	L	VU	Occurs in a variety of wetlands including: permanent water bodies on flood plains; shallows of deep permanent lakes; either open or vegetated with shrubs or trees; semi-permanent swamps with tall emergent vegetation (e.g. Typha) and herb dominated seasonal swamps with abundant aquatic flora (Marchant and Higgins 1990).	Suitable habitat present in study area – potential to occur
Emu	<i>Dromaius novaehollandiae</i>			NT	Widespread and found in a variety of habitats from timbered areas to open country (Marchant and Higgins 1990).	Suitable habitat present in study area – potential to occur irregularly
Fat-tailed Dunnart	<i>Sminthopsis crassicaudata</i>			NT	Native grasslands associated with rocky areas, rough pastures and the edges of stubble paddocks (Menkhurst 1995).	Suitable habitat present in study area – potential to occur
Fork-tailed Swift	<i>Apus pacificus</i>	M (JAMBA, CAMBA, ROKAMBA)			Aerial, over inland plains, sometimes above foothills or in coastal areas, over cliffs and urban areas (Higgins 1999).	May occasionally fly over study area – potential to occur

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	DEPI		
Growing Grass Frog	<i>Litoria raniformis</i>	VU	L	EN	Permanent, still or slow flowing water with fringing and emergent vegetation in streams, swamps, lagoons and artificial wetlands such as farm dams and abandoned quarries (Clemann and Gillespie 2004).	Suitable habitat present in study area - Not recorded during current survey however, recorded on site by land owners and Damien Cook at Australian ecosystems - previously recorded
Golden Sun Moth	<i>Synemon plana</i>	CE	L	CE	Areas that are, or have been native grasslands or grassy woodlands. It is known to inhabit degraded grasslands with introduced grasses being dominant, with a preference for the native wallaby grass being present (DEWHA 2009).	Suitable habitat present in study area - Not recorded during current survey however recorded on site in December 2012 by ecologists at ENICS solutions - previously recorded
Gull-billed Tern	<i>Gelochelidon nilotica</i>		L	EN	Shallow freshwater and saline wetlands; Intertidal mudflats, also in sheltered inshore marine waters where they roost on sandbars and beaches (Higgins and Davies 1996).	Suitable habitat present in study area - potential to occur irregularly
Hardhead	<i>Aythya australis</i>			VU	Inhabits large, deep waters where vegetation is abundant; particularly deep swamps and lakes, pools and creeks. Also occur on freshwater meadows, seasonal swamps with abundant aquatic flora, reed swamps, wooded lakes and swamps, rice fields, and sewage ponds (Marchant and Higgins 1990).	No suitable habitat in study area - unlikely to occur

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	DEPI		
Latham's Snipe	<i>Gallinago hardwickii</i>	M (JAMBA, CAMBA, ROKAMBA, Bonn A2H)	N	NT	Occurs in wide variety of permanent and ephemeral wetlands; it prefers open freshwater wetlands with dense cover nearby, such as the edges of rivers and creeks, bogs, swamps, waterholes (Naarding 1983; Higgins and Davies 1996).	Limited habitat in study area. Not recorded during current survey however previously recorded by Damien at Australian Ecosystems – previously recorded
Malleefowl	<i>Leipoa ocellata</i>	VU, M (JAMBA)	L	EN	Mainly in semi-arid zones (200–450 mm rainfall), but in higher rainfall area of heath and mallee-heath; rarely arid zones. Associated with mallee, particularly floristically rich tall dense mallee of higher rainfall areas (Marchant and Higgins 1993).	No suitable habitat in study area – unlikely to occur
Musk Duck	<i>Biziura lobata</i>			VU	It inhabits terrestrial wetlands, estuarine habitats and sheltered inland waters. Almost entirely aquatic; preferring deep water of large swamps, lakes and estuaries, where conditions are stable and aquatic flora abundant (Marchant and Higgins 1990).	No suitable habitat in study area – unlikely to occur
Rainbow Bee-eater	<i>Merops ornatus</i>	M (JAMBA)			Usually in open or lightly timbered areas, often near water. Occur in partly cleared land such as farmland and in sand-dunes, both coastal and inland (Higgins 1999).	May occasionally fly over study area – potential to occur

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	DEPI		
Red-necked Stint	<i>Calidris ruficollis</i>	M (JAMBA, CAMBA, ROKAMBA, Bonn Convention (A2H))			Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins and Davies 1996).	Suitable habitat present in study area — potential to occur
Royal Spoonbill	<i>Platalea regia</i>			NT	Terrestrial wetlands, sheltered marine habitats and wet grasslands. Foraging limited to shallow waters, often among aquatic or emergent vegetation or submerged logs that shelter prey and favour coastal habitats (Marchant and Higgins 1990).	Suitable habitat present in study area — potential to occur
Rufous Fantail	<i>Rhipidura rufifrons</i>	M (Bonn Convention (A2H))			Primarily found in dense, moist habitats. Less often present in dry sclerophyll forests and woodlands (Higgins et al. 2006).	No suitable habitat in study area — unlikely to occur
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	M (Bonn Convention (A2H))			Tall forests and woodlands in wetter habitats but not in rainforest (Higgins et al. 2006)	No suitable habitat in study area — unlikely to occur
Striped Legless Lizard	<i>Delma impar</i>	VU	L	EN	Tussock grasslands on the volcanic plains, often associated with scattered rocks and cracked soils (Cogger 2000).	Suitable habitat present in study area. Surveys have taken place although presence not confirmed — potential to occur
Tussock Skink	<i>Pseudemolapagenstecheri</i>			VU	Tussock grasslands with few or no trees (Wilson and Swan (2003).	Suitable habitat present in study area — potential to occur

Common name	Scientific name	Conservation status			Habitat	Likelihood of occurrence
		EPBC	FFG	DEPI		
Whiskered Tern	<i>Chlidonias hybridus javanicus</i>		NT		Inhabit shallow terrestrial freshwater wetlands, either permanent or ephemeral, including lakes, swamps, river pools, reservoirs, sewage farms and others (Higgins and Davies 1996).	Suitable habitat present in study area. Not recorded during current survey however previously recorded by Damien at Australian Ecosystems – previously recorded
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	M (CAMBA)	L	VU	Maritime habitats, terrestrial large wetlands and coastal lands of tropical and temperate Australia and offshore islands, ranging far inland only over large rivers and wetlands (Marchant and Higgins 1993).	May occasionally fly over study area whilst foraging – potential to occur
White-throated Needletail	<i>Hirundapus caudacutus</i>	M (JAMBA, CAMBA, ROKAMBA)		VU	Aerial, over all habitats, but probably more over wooded areas, including open forest and rainforest. Often over heathland and less often above treeless areas such as grassland and swamps or farmland (Higgins 1999).	May occasionally fly over study area – potential to occur

CE = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Lower risk, near threatened; DD = data deficient; L = Listed as threatened under FFG Act; M = Listed migratory species; (JAMBA) = Japan-Australia Migratory Bird Agreement; (CAMBA) = China-Australia Migratory Bird Agreement; (ROKAMBA) = Republic of Korea-Australia Migratory Bird Agreement; (Bonn) = Bonn Convention



7. OFFSET POTENTIAL

7.1. EPBC Act listed biological values

Under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), offsets for the approved removal of listed values entail the protection, maintenance and improvement of like values, either within retained areas of properties where removal occurred, or within other properties as third-party offsets.

This section explores the offset potential for listed EPBC Act listed values present, or potentially present, in the study area to provide third party offsets.

7.1.1. *Listed threatened flora species*

A total of 32 individuals of the listed Spiny Rice-flower plant were recorded by BL & A in Habitat Zones PG5 and PG6. Following BL&As survey, landowners s47F conducted a survey for the species and recorded a total of 152 individual's (pers comm. s47F). The extent of this species in the study area should be determined through further targeted surveying in suitable habitat during its regular flowering period - between April and August

It was also considered that a number of other EPBC Act listed flora species have the potential to occur in the study area based on the review of existing information and suitability of habitat in the study area (Section 5.1.1). Should any of these species be recorded in the study area in future, such plants would also be available as third party offsets. A large population of Fragrant Leek Orchid has been recorded within habitat zone PG1 (pers comm. s47F) in the past but due to the timing of the investigation no biological material was present. This will require confirmation and appropriate management strategies for the species should be incorporated into any future offset management plan.

7.1.2. *Golden Sun Moth habitat*

Previous surveying by Enics Solutions (2012) recorded Golden Sun Moth in the study area. Considering the structure and health of the habitat during the investigation, the study area has the potential to contain 182.367 hectares of Golden Sun Moth habitat. It is noted that this figure includes the areas mapped in the assessment but not scored for condition. Targeted surveying for Golden Sun Moth (GSM) is recommended to determine the extent/size of the population of GSM onsite.

7.1.3. *Other EPBC Act listed threatened fauna*

The listed Striped Legless Lizard was considered to potentially occur in all Plains Grassland habitat zones recorded in the study area. Should any future targeted surveys detect this species, habitat in which it was found would be available as a third party offset.

The listed Growling Grass Frog was considered to potentially occur within the Brackish Wetland, Plains Grassy Wetland habitat zones (BW1, BW2 and PGW) and the mapped Creekline tussock grassland that was not assessed for its habitat value. Land owner s47F has confirmed that the Growling Grass Frog has been recorded regularly in habitat zone BW1. Targeted surveys to confirm the status of this species in the habitat zones would be required prior to the study area being available as a third party Growling Grass Frog habitat offset.

The listed Corangamite Water Skink was considered to potentially occur within the Brackish Wetland habitat zones (BW1, and BW2). Targeted surveys to confirm the status of this species in the habitat zone would be required prior to the study area being available as a third party Corangamite Water Skink habitat offset.

Other EPBC Act listed migratory fauna species were considered to potentially occur in the study area due to the presence of suitable habitat as indicated in Table 3.

7.1.4. Protection of listed threatened ecological communities

This investigation recorded a total of 81.06 hectares of the EPBC Act listed threatened ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) in the study area in the form of *Heavier-soils Plains Grassland* (EVC 132_61). This would be available as a third party offset. It is anticipated that this figure would increase once the remainder of the mapped study area is assessed for quality.

7.2. Victorian statutory planning offsets

Victoria's Native Vegetation Management – a Framework for Action (DNRE 2002) (the 'Framework') is an incorporated document of the Victorian *Planning and Environment Act 1987*, which sets out how approved native vegetation losses are offset to achieve a state-wide net gain in the overall habitat value of native vegetation. This is achieved by protecting, maintaining and improving the quality of existing native vegetation to over-compensate for losses of such in area.

Through a complex accounting system, the Framework allows landowners to utilise remnant patch vegetation as offsets to generate gains in a unit known as *habitat hectares*. This is achieved through landowners agreeing to various landholder commitments and meeting various management targets over a set timeframe. Such gains can then be traded through the Department of Sustainability and Environment's market based BushBroker Scheme to meet offset targets resulting from the approved removal of native vegetation by other parties in other locations.

All of the native vegetation recorded within the study area has potential for use as third party offsets.

7.3. Recommendations

It is recommended that additional targeted surveys for EPBC Act listed flora and fauna species be undertaken as required, at the appropriate time of year, to determine the status/extent of the species in the study area, and hence, their potential for third party offsetting. The following species should be given particular attention, given the current demand for offsets for these species:

- Golden Sun Moth – surveys during suitable weather conditions in November-December (up to the end of January in some years); and
- Spiny Rice-flower – April to August during the flowering period.
- Fragrant Leek Orchid – October to January during the flowering period.

Targeted surveys for Striped Legless Lizard and Corangamite Water Skink may be undertaken as the need arises – i.e. if a proponent requires confirmation of their presence.

It is recommended that the remaining unassessed native vegetation within the study area be assessed for habitat quality which will substantially increase the habitat hectares available to be offered as a third party offset.

It is also recommended that the landholder enter into discussion with DEPI's BushBroker team or Trust for Nature in relation to developing a management plan to improve the vegetation quality. Once a plan is determined the potential improvement gains can be calculated and the value of the offset quantified.

8. REFERENCES

- Braby, MF & Dunford, M 2006, Field Observation on the Ecology of the Golden Sun Moth, *Synemon plana* Walker (Lepidoptera: Castniidae). *Australian Entomologist*. 33 (2): pp. 103-110.
- Department of Natural Resources and Environment 1997, *Victoria's Biodiversity – Our Living Wealth*. Department of Natural Resources and Environment, Victoria.
- Department of Natural Resources and Environment 2002, *Victoria's Native Vegetation Management – a Framework for Action*, Department of Natural Resources and Environment, Victoria.
- Department of Sustainability and Environment 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.
- Department of Sustainability and Environment 2006, *Native Vegetation: Vegetation Gain Approach – Technical basis for calculating gains through improved native vegetation management and revegetation*. Department of Sustainability and Environment, East Melbourne, Victoria.
- Department of Sustainability and Environment 2007a, *Native Vegetation: Guide for assessment of Referred Planning Permit Applications*. Department of Sustainability and Environment, East Melbourne, Victoria.
- Department of Sustainability and Environment 2007b, *Advisory List of Rare or Threatened Plants in Victoria*. Department of Sustainability and Environment, East Melbourne, Victoria.
- Department of Sustainability and Environment 2007c, *Advisory List of Threatened Vertebrate Fauna in Victoria*. Department of Sustainability and Environment, East Melbourne, Victoria.
- Department of Sustainability and Environment 2010a, *Flora and Fauna Guarantee Act 1988 - Threatened List*, Department of Sustainability and Environment, East Melbourne, Victoria, viewed 2nd January 2013, <http://www.dse.vic.gov.au/__data/assets/pdf_file/0014/103136/20101021_FG_threatened_list_Oct_10.pdf>
- Department of Sustainability and Environment 2010b, *Native Vegetation – Technical information sheet: Degraded treeless vegetation, Best and remaining habitat determinations, Tree protection/retention requirements*, Department of Sustainability and Environment, East Melbourne, Victoria.
- Department of Sustainability and Environment 2012a, *Ecological Vegetation Class (EVC) Benchmarks by Bioregion*, Department of Sustainability and Environment, East Melbourne, Victoria, viewed 2nd January 2013, <<http://www.dse.vic.gov.au>>.
- Department of Sustainability and Environment 2012b, *Biodiversity Interactive Map 2.0*. Department of Sustainability and Environment, East Melbourne, Victoria, viewed 2nd January 2013, <<http://www.dse.vic.gov.au>>.
- Department of Sustainability, Environment, Water, Populations and Communities 2013, *Environmental Protection and Biodiversity Conservation Act 1999, Protected Matters Search Tool*. Department of Sustainability, Environment, Water,

Populations and Communities, Canberra, viewed 2nd January 2013, <<http://www.environment.gov.au>>.

- Gibson, L 2006, *Surveys of the Golden Sun Moth (Synemon plana Walker) population and ant assemblages at the Craigieburn Grassland Reserve*. Hons. Thesis. Bundoora, Victoria: La Trobe University.
- Gilmore, D, Koehler, S, O'Dwyer, C & Moore, W 2008. Golden Sun Moth *Synemon plana* (Lepidoptera: Castriidae): results of a broad survey of populations around Melbourne. *The Victorian Naturalist*. 125 (2): pp. 39-46.
- O'Dwyer, C & Attiwill, PM 1999, A comparative study of habitats of the Golden Sun Moth *Synemon plana* Walker (Lepidoptera: Castniidae): implications for restoration, *Biological Conservation*. 89: pp. 131-142.
- Parkes, D, Newell, G, & Cheal, D 2003, 'Assessing the Quality of Native Vegetation: The 'habitat hectares' approach'. *Ecological Management and Restoration*, vol. 4, supplement, pp. 29-38.
- Viridans Biological Databases 2012a, Victorian Flora Information System, Viridans Pty. Ltd., Bentleigh East, Victoria.
- Viridans Biological Databases 2012b, Atlas of Victorian Wildlife, Viridans Pty. Ltd., Bentleigh East, Victoria.

Appendix 1: Flora species recorded in the study area and threatened species known (or with the potential) to occur in the search region

Origin	Common Name	Scientific Name	Family Name	EPBC	FFG	DEPI	Recorded
	Clover Glycine	<i>Glycine latrobeana</i>	Fabaceae	V	L	V	
	Sphyn Rice-flower	<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	Thymelaeaceae	C	L	e	X
	Button Wrinklewort	<i>Rutidosia leptorhynchooides</i>		E	L	e	
	Curly Sedge	<i>Carex tasmanica</i>		V	L	V	
	Small Golden Moths	<i>Diuris basaltica</i>	Orchidaceae	E	L	e	
	Trailing Hop-bush	<i>Dodonaea procumbens</i>		V		V	
	Adamson's Blown-grass	<i>Lachnagrostis adamsonii</i>	Poaceae	E	L	V	
	Salt-lake Tussock-grass	<i>Poa saliacustris</i>	Poaceae	V	L	V	
	Fragrant Leek-orchid	<i>Prasophyllum suaveolens</i>	Orchidaceae	E	L	e	
	Basalt Greenhood	<i>Pterostylis basaltica</i>	Orchidaceae	E	L	e	
	Metallic Sun-Orchid	<i>Thelymitra epipactoides</i>	Orchidaceae	E	L	e	
	Small Milkwort	<i>Comesperma polygaloides</i>	Polygalaceae		L	V	
	Basalt Sun-orchid	<i>Thelymitra gregaria</i>	Orchidaceae		L	e	
	Pale Swamp Everlasting	<i>Coronidium scorpioides</i> 'aff. <i>rutidolepis</i> (Lowland Swamp	Asteraceae			V	
	Brackish Plains Buttercup	<i>Ranunculus diminutus</i>	Ranunculaceae			r	X
	Purple Blown-grass	<i>Lachnagrostis punicea</i> subsp. <i>punicea</i>	Poaceae			r	X
	Southern Swainson-pea	<i>Swainsona behriana</i>	Fabaceae			r	
	Wedge-leaf Daisy	<i>Brachyscome cuneifolia</i>	Asteraceae			k	
	Basalt Tussock-grass	<i>Poa labillardierei</i> var. (Volcanic Plains)	Poaceae			k	
	Large River Buttercup	<i>Ranunculus papulentus</i>	Ranunculaceae			k	
	Short Sun-orchid	<i>Thelymitra exigua</i>	Orchidaceae			k	
	Derrinallium Billy-buttons	<i>Craspedia</i> sp. 2	Asteraceae			e	

Origin	Common Name	Scientific Name	Family Name	EPBC	FFG	DEPI	Recorded
	Sheep's Burr	<i>Acaena echinata</i>	Rosaceae				X
*	Sheep Sorrel	<i>Acetosella vulgaris</i>	Polygonaceae				X
*	Hair Grass	<i>Aira spp.</i>	Poaceae				X
	Common Wheat-grass	<i>Anthosachne scabra s.l.</i>	Poaceae				X
*	Cape Weed	<i>Arctotheca calendula</i>	Asteraceae				X
	Common Woodruff	<i>Asperula conferta</i>	Rubiaceae				X
	Woodruff	<i>Asperula spp.</i>	Rubiaceae				X
	Fine-head Spear-grass	<i>Austrostipa oligostachya</i>	Poaceae				X
	Rough Spear-grass	<i>Austrostipa scabra</i>	Poaceae				X
	Spear Grass	<i>Austrostipa spp.</i>	Poaceae				X
*	Wild Oat	<i>Avena fatua</i>	Poaceae				X
	Salt Club-sedge	<i>Bolboschoenus caldwellii</i>	Cyperaceae				X
	Brome	<i>Bromus spp.</i>	Poaceae				X
	Lemon Beauty-heads	<i>Calocephalus citreus</i>	Asteraceae				X
*	Slender Centaury	<i>Centaurium tenuiflorum</i>	Gentianaceae				X
*	Spear Thistle	<i>Cirsium vulgare</i>	Asteraceae				X
	Bindweed	<i>Convolvulus spp.</i>	Convolvulaceae				X
	Common Billy-buttons	<i>Craspedia glauca spp. agg.</i>	Asteraceae				X
	Austral Bear's-ear	<i>Cymbonotus preissianus</i>	Asteraceae				X
*	Rough Dog's-tail	<i>Cynosurus echinatus</i>	Poaceae				X
	Long-hair Plume-grass	<i>Dichelachne crinita</i>	Poaceae				X
	Australian Salt-grass	<i>Distichlis distichophylla</i>	Poaceae				X
	Scented Sundew	<i>Drosera aberrans</i>	Droseraceae				X
	Pale Sundew	<i>Drosera peltata subsp. peltata spp. agg.</i>	Droseraceae				X

Origin	Common Name	Scientific Name	Family Name	EPBC	FFG	DEPI	Recorded
	Parson's Bands	<i>Eriochilus cucullatus</i> s.l.	Orchidaceae				X
*	Big Heron's-bill	<i>Erodium botrys</i>	Geraniaceae				X
	Blue Devil	<i>Eryngium ovinum</i>	Apiaceae				X
	Prickfoot	<i>Eryngium vesiculosum</i>	Apiaceae				X
	Crane's Bill	<i>Geranium</i> spp.	Geraniaceae				X
	Cut-leaf Goodenia	<i>Goodenia pinnatifida</i>	Goodeniaceae				X
	Varied Raspwort	<i>Haloragis heterophylla</i>	Haloragaceae				X
*	Ox-tongue	<i>Helminthotheca echlroides</i>	Asteraceae				X
*	Yorkshire Fog	<i>Holcus lanatus</i>	Poaceae				X
*	Barley-grass	<i>Hordeum leporinum</i>	Poaceae				X
	Stinking Pennywort	<i>Hydrocotyle laxiflora</i>	Arallaceae				X
*	Smooth Cat's-ear	<i>Hypochoeris glabra</i>	Asteraceae				X
*	Flatweed	<i>Hypochoeris radicata</i>	Asteraceae				X
	Club-sedge	<i>Isolepis</i> sp.	Cyperaceae				X
	Rush	<i>Juncus</i> spp.	Juncaceae				X
	Finger Rush	<i>Juncus subsecundus</i>	Juncaceae				X
	Common Blown-grass	<i>Lachnagrostis filliformis</i> s.l.	Poaceae				X
*	Hare's-tail Grass	<i>Lagurus ovatus</i>	Poaceae				X
*	Hairy Hawkbit	<i>Leontodon taraxacoides</i> subsp. <i>taraxacoides</i>	Asteraceae				X
	Scaly Buttons	<i>Leptorhynchus squamatus</i>	Asteraceae				X
	Poison Lobelia	<i>Lobelia pratensis</i>	Campanulaceae				X
*	Perennial Rye-grass	<i>Lolium perenne</i>	Poaceae				X
	Dwarf Mat-rush	<i>Lomandra nana</i>	Xanthorrhoeaceae				X
*	Horehound	<i>Marrubium vulgare</i>	Lamiaceae				X

Origin	Common Name	Scientific Name	Family Name	EPBC	FFG	DEPI	Recorded
	Tree Violet	Melicytus dentatus s.l.	Violaceae				X
	Weeping Grass	Microlaena stipoides var. stipoides	Poaceae				X
	Creeping Monkey-flower	Mimulus repens	Phrymaceae				X
	Yellow Wood-sorrel	Oxalis corniculata s.l.	Oxalidaceae				X
	Grassland Wood-sorrel	Oxalis perennans	Oxalidaceae				X
*	Toowoomba Canary-grass	Phalaris aquatica	Poaceae				X
*	Buck's-horn Plantain	Plantago coronopus	Plantaginaceae				X
	Variable Plantain	Plantago varia	Plantaginaceae				X
	Common Tussock-grass	Poa labillardierei	Poaceae				X
	Velvet Tussock-grass	Poa rodwayi	Poaceae				X
	Grey Tussock-grass	Poa sieberiana	Poaceae				X
	Tussock Grass	Poa spp.	Poaceae				X
	Feather Heads	Ptilotus macrocephalus	Amaranthaceae				X
*	Onion Grass	Romulea rosea	Iridaceae				X
*	Clustered Dock	Rumex conglomeratus	Polygonaceae				X
	Wiry Dock	Rumex dumosus	Polygonaceae				X
	Common Wallaby-grass	Rytidosperma caespitosum	Poaceae				X
	Short Wallaby-grass	Rytidosperma carphoides	Poaceae				X
	Brown-back Wallaby-grass	Rytidosperma duttonianum	Poaceae				X
	Wallaby Grass	Rytidosperma spp.	Poaceae				X
*	Wild Sage	Salvia verbenaca	Lamiaceae				X
	Creeping Brookweed	Samolus repens var. repens	Primulaceae				X
	Beaded Glasswort	Sarcocornia quinqueflora subsp. quinqueflora	Chenopodiaceae				X
	Common Bog-sedge	Schoenus apogon	Cyperaceae				X

Origin	Common Name	Scientific Name	Family Name	EPBC	FFG	DEPI	Recorded
	Shiny Bog-sedge	Schoenus nitenis	Cyperaceae				X
	Shiny Swamp-mat	Selliera radicans	Goodeniaceae				X
	Smooth Solenogyne	Solenogyne dominii	Asteraceae				X
*	Rough Sow-thistle	Sonchus asper s.l.	Asteraceae				X
*	Common Sow-thistle	Sonchus oleraceus	Asteraceae				X
	Sun Orchid	Thelymitra spp.	Orchidaceae				X
	Kangaroo Grass	Themeda triandra	Poaceae				X
*	Suckling Clover	Trifolium dubium	Fabaceae				X
*	Clover	Trifolium spp.	Fabaceae				X
	Streaked Arrowgrass	Triglochin striata	Juncaginaceae				X
*	Fescue	Vulpia spp.	Poaceae				X

* = introduced species; # = native species occurring outside of natural range; L = listed as threatened; EPBC = status under EPBC Act; DEPI = status under DEPI's Advisory List; C = critically endangered; E, e = endangered; V, v = vulnerable; R, r = rare; K = insufficiently known

Appendix 2: Detailed habitat hectare assessment results

Habitat Zone		PG2	PG3	PG4	PG5	PG6	PG7	PG8	PGW1	BW1	BW2	
		132_62	132_62	132_62	132_62	132_62	132_62	132_62	132_62	132_62	132_62	
EVC Number	Total area of Habitat Zone (Ha)	29.583	19.441	19.581	2.334	3.35	1.442	0.874	10.92	22.171	5.283	
	Large Old Trees	/10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Tree Canopy Cover	/5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Lack of Weeds	/15	9	9	9	11	4	13	9	6	9	
	Understorey	/25	15	15	15	15	15	15	15	15	5	
	Recruitment	/10	0	6	6	6	0	0	6	6	10	
	Organic Matter	/5	3	3	3	3	3	3	3	3	3	
	Logs	/5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Site Condition subtotal		27	33	33	35	48	30	31	33	30	27
	Standardiser = 1.36	Standardised subtotal	37	37	45	45	8	8	8	8	8	8
Landscape Context	Patch Size	/10	8	8	8	9	5	5	5	5	4	
	Neighbourhood	/10	5	5	5	3	4	4	4	4	4	
	Distance to Core	/5	4	4	4	4	4	4	4	4	4	
Total Habitat Score	/100	54	54	62	62	65	47	59	62	58	53	
Habitat score out of 1		0.54	0.54	0.62	0.62	0.65	0.47	0.61	0.62	0.58	0.53	
Habitat Hectares in Habitat Zone#		15.97	10.5	12.14	1.45	2.18	0.67774	0.53	6.77	12.86	2.8	
Bioregion		VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	VVP	
EVC Bioregional Conservation Status		E	E	E	E	E	E	E	E	E	E	
Conservation Significance	Conservation Status x Habitat Score	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	
	Threatened Species Rating	High	High	High	High	High	High	High	High	High	High	
	Other Site Attribute Rating	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	
	Overall Conservation Significance (highest)	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High	

Notes: Hectares = habitat score (out of 1) x area in zone. * Modified approach to habitat scoring - refer to Table 14 of DSE's Vegetation Quality Assessment Manual (DSE, 2004); ^ Conservation significance at maximum due to habitat score alone.



Appendix 3: EVC Benchmarks

Heavier-soils Plains Grassland (EVC 132_61) – Victorian Volcanic Plain bioregion

Plains Grassy Wetland (EVC 125) – Victorian Volcanic Plain bioregion

Brackish Wetland (EVC 656) – Victorian Volcanic Plain bioregion

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 132_61: *Heavier-soils* Plains Grassland

Description:

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.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	2	5%	LH
Medium Herb	12	20%	MH
Small or Prostrate Herb	4	5%	SH
Large Tufted Graminoid	1	5%	LTG
Medium to Small Tufted Graminoid	13	40%	MTG
Medium to Tiny Non-tufted Graminoid	4	5%	MNG
Bryophytes/Lichens and Soil Crust*	na	20%	BL

* Note: treat as one life form in this EVC

LF Code	Species typical of at least part of EVC range	Common Name
SS	<i>Pimelea humilis</i>	Common Rice-flower
LH	<i>Rumex dumosus</i>	Wiry Dock
MH	<i>Calocephalus citreus</i>	Lemon Beauty-heads
MH	<i>Acaena echinata</i>	Sheep's Burr
MH	<i>Leptorhynchus squamatus</i>	Scaly Buttons
MH	<i>Eryngium ovinum</i>	Blue Devil
SH	<i>Solenogyne dominii</i>	Smooth Solenogyne
SH	<i>Lobelia pratioides</i>	Poison Lobelia
LTG	<i>Austrostipa bigeniculata</i>	Kneed Spear-grass
LTG	<i>Dichelachne crinita</i>	Long-hair Plume-grass
MTG	<i>Themeda triandra</i>	Kangaroo Grass
MTG	<i>Austrodanthonia caespitosa</i>	Common Wallaby-grass
MTG	<i>Elymus scaber</i> var. <i>scaber</i>	Common Wheat-grass
MTG	<i>Schoenus apogon</i>	Common Bog-sedge
MNG	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
MNG	<i>Thelymitra pauciflora</i> s.l.	Slender Sun-orchid
MNG	<i>Microtis unifolia</i>	Common Onion-orchid
SC	<i>Convolvulus erubescens</i>	Pink Bindweed

Recruitment:

Episodic/Fire or Grazing. Desirable period between disturbances is 5 years.

Organic Litter:

10% cover

EVC 132_61: *Heavier-soils* Plains Grassland - Victorian Volcanic Plain bioregion

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	<i>Plantago lanceolata</i>	Ribwort	high	low
LH	<i>Cirsium vulgare</i>	Spear Thistle	high	high
LH	<i>Sonchus oleraceus</i>	Common Sow-thistle	high	low
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
MH	<i>Leontodon taraxacoides</i> ssp. <i>taraxacoides</i>	Hairy Hawkbit	high	low
MH	<i>Trifolium subterraneum</i>	Subterranean Clover	high	low
MH	<i>Plantago coronopus</i>	Buck's-horn Plantain	high	low
MH	<i>Trifolium striatum</i>	Knotted Clover	high	low
MH	<i>Trifolium dubium</i>	Suckling Clover	high	low
LTG	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	high	high
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high
MTG	<i>Romulea rosea</i>	Onion Grass	high	low
MTG	<i>Vulpia bromoides</i>	Squirrel-tail Fescue	high	low
MTG	<i>Briza minor</i>	Lesser Quaking-grass	high	low
MTG	<i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>	Soft Brome	high	low
MTG	<i>Briza maxima</i>	Large Quaking-grass	high	low
MTG	<i>Lolium rigidum</i>	Wimmera Rye-grass	high	low
MTG	<i>Lolium perenne</i>	Perennial Rye-grass	high	low
MTG	<i>Nassella neesiana</i>	Chilean Needle-grass	high	high
MNG	<i>Cynosurus echinatus</i>	Rough Dog's-tail	high	low
MNG	<i>Juncus capitatus</i>	Capitate Rush	high	low

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 125: Plains Grassy Wetland

Description:

This EVC is usually treeless, but in some instances can include sparse River Red Gum *Eucalyptus camaldulensis* or Swamp Gum *Eucalyptus ovata*. A sparse shrub component may also be present. The characteristic ground cover is dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	5	5%	LH
Medium Herb	6	10%	MH
Small or Prostrate Herb	3	10%	SH
Large Tufted Graminoid	3	15%	LTG
Large Non-tufted Graminoid	1	5%	LNG
Medium to Small Tufted Graminoid	8	30%	MTG
Medium to Tiny Non-tufted Graminoid	2	10%	MNG
Bryophytes/Lichens	na	10%	BL

LF Code

Species typical of at least part of EVC range

Common Name

LH	<i>Epilobium billardierianum</i>	Variable Willow-herb
LH	<i>Villarsia reniformis</i>	Running Marsh-flower
LH	<i>Epilobium billardierianum ssp. cinereum</i>	Grey Willow-herb
MH	<i>Potamogeton tricarinatus s.l.</i>	Floating Pondweed
MH	<i>Lilaeopsis polyantha</i>	Australian Lilaeopsis
MH	<i>Utricularia dichotoma s.l.</i>	Fairies' Aprons
SH	<i>Eryngium vesiculosum</i>	Prickfoot
SH	<i>Neopaxia australasica</i>	White Purslane
SH	<i>Lobelia pratensis</i>	Poison Lobelia
LTG	<i>Juncus flavidus</i>	Gold Rush
LTG	<i>Deyeuxia quadriseta</i>	Reed Bent-grass
LTG	<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass
LTG	<i>Poa labillardierei</i>	Common Tussock-grass
MTG	<i>Triglochin procerum s.l.</i>	Water Ribbons
MTG	<i>Glyceria australis</i>	Australian Sweet-grass
MTG	<i>Juncus holoschoenus</i>	Joint-leaf Rush
MTG	<i>Austrodanthonia duttoniana</i>	Brown-back Wallaby-grass
MNG	<i>Eleocharis acuta</i>	Common Spike-sedge
MNG	<i>Eleocharis pusilla</i>	Small Spike-sedge

Recruitment:

Episodic/Flood. Desirable period between disturbances is 5 years.

Organic Litter:

20% cover

Logs:

5 m/0.1 ha.(where trees are overhanging the wetland)

EVC 125: Plains Grassy Wetland - Victorian Volcanic Plain bioregion

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
LH	<i>Cirsium vulgare</i>	Spear Thistle	high	high
MH	<i>Leontodon taraxacoides ssp. taraxacoides</i>	Hairy Hawkbit	high	low
MH	<i>Hypochoeris radicata</i>	Cat's Ear	high	low
LTG	<i>Phalaris aquatica</i>	Toowoomba Canary-grass	high	high
LNG	<i>Holcus lanatus</i>	Yorkshire Fog	high	high
MTG	<i>Briza minor</i>	Lesser Quaking-grass	high	low
MTG	<i>Romulea rosea</i>	Onion Grass	high	low
TTG	<i>Cyperus tenellus</i>	Tiny Flat-sedge	high	low

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EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Volcanic Plain bioregion

EVC 656: Brackish Wetland

Description:

Treeless EVC dominated by sedges and herbs that are generally indicative of saline conditions. True halophytic species such as samphires, if present, only occur with very low cover. Occurs in estuaries and along poorly defined drainage lines or associated with shorelines of brackish lakes.

Life Forms:

Life form	#Spp	%Cover	LF code
Large Herb	1	5%	LH
Medium Herb	3	15%	MH
Small or Prostrate Herb	3	10%	SH
Large Tufted Graminoid	1	10%	LTG
Large Non-tufted Graminoid	2	10%	LNG
Medium to Small Tufted Graminoid	2	5%	MTG
Medium to Tiny Non-tufted Graminoid	3	15%	MNG
Scrambler or Climber	1	1%	SC
Soil Crust	na	10%	S/C
Total understorey projective foliage cover		80%	

LF Code	Species typical of at least part of EVC range	Common Name
LH	<i>Persicaria decipiens</i>	Slender Knotweed
LH	<i>Epilobium billardierianum</i> ssp. <i>billardierianum</i>	Smooth Willow-herb
MH	<i>Sarcocornia quinqueflora</i>	Beaded Glasswort
MH	<i>Samolus repens</i>	Creeping Brookweed
MH	<i>Suaeda australis</i>	Austral Seablite
SH	<i>Selliera radicans</i>	Shiny Swamp-mat
SH	<i>Crassula helmsii</i>	Swamp Crassula
SH	<i>Mimulus repens</i>	Creeping Monkey-flower
LTG	<i>Gahnia filum</i>	Chaffy Saw-sedge
LNG	<i>Juncus kraussii</i> ssp. <i>australiensis</i>	Sea Rush
LNG	<i>Phragmites australis</i>	Common Reed
MTG	<i>Poa poiformis</i>	Coast Tussock-grass
MTG	<i>Lachnagrostis filiformis</i>	Common Blown-grass
MNG	<i>Bolboschoenus caldwellii</i>	Salt Club-sedge
MNG	<i>Distichlis distichophylla</i>	Australian Salt-grass
MNG	<i>Schoenoplectus pungens</i>	Sharp Club-sedge
MNG	<i>Triglochin striatum</i>	Streaked Arrowgrass
SC	<i>Calystegia sepium</i>	Large Bindweed

Recruitment:

Episodic/Flood: desirable period of disturbance is every five years

Organic Litter:

10% cover

Weediness:

There are no consistent weeds in this EVC.

EVC 656: Brackish Wetland - Victorian Volcanic Plain bioregion

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Appendix 4: Best / Remaining 50% habitat assessment for rare and threatened species

Species and DEPI Conservation Status		Habitat Zones		Assessment Process		Outcome		Conservation significance		Justification	
Flora											
Adamson's Blown-grass, v		PG 1, 2, 3, 4, 5, 6, 7, and 8		A, D, No		No further Consideration		N/A		Sub-optimal habitat exists on site but not reasonable to expect it to be recorded in next 10 years	
Basalt Greenhood, e		PG 1, 2, 3, 4, 5, 6, 7, and 8		A, D, F, No		Remaining 50%		Medium		Habitat exists on site	
Basalt Sun-orchid, e		PG 1, 2, 3, 4, 5, 6, 7, and 8		A, D, No		No further Consideration		N/A		Not reasonable to expect the species will be recorded on the site in the next 10 years	
Brackish Plains Buttercup, r		PGW1, W1, W2, PG8, and PG4		A, C, Yes		Best 50%		High		Recorded In Study Area	
Button Wrinklewort, e		PG 1, 2, 3, 4, 5, 6, 7, and 8		A, D, No		No further Consideration		N/A		Not reasonable to expect the species will be recorded on the site in the next 10 years	
Clover Glycine, v		PG 1, 2, 3, 4, 5, 6, 7, and 8		A, D, F, Yes		Best 50%		Very High		Habitat exists on site	
Curly Sedge, v		PGW1, W1, W2, PG8, and PG4		A, D, F, No		Remaining 50%		Medium		Habitat exists on site, reasonable to expect the species will be recorded on site in next 10 years	
Derrillium Billy-buttons, e		PG 1, 2, 3, 4, 5, 6, 7, and 8		A, D, F, No		Remaining 50%		High		Habitat exists on site	

Species and DEPI Conservation Status	Habitat Zones	Assessment Process	Outcome	Conservation significance	Justification
Fragrant Leek-orchid, e	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, C, Yes	Best 50%	Very High	Recorded In Study Area
Metallic Sun-Orchid, e	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, D, F, No	Remaining 50%	Medium	Habitat exists on site
Pale Swamp Everlasting, v	PGW1, PG8, PG3	A, B, E, F, No	Remaining 50%	High	Habitat exists on site, reasonable to expect the species will be recorded on site in next 10 years
Purple Blown-grass, r	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, C, Yes	Best 50%	High	Recorded In Study Area
Salt-lake Tussock-grass, v	PGW1, W1, W2, and PG8	A, D, F, Yes	Best 50%	Very High	Habitat exists on site
Small Golden Moths, e	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, D, No	No further Consideration	N/A	Not reasonable to expect the species will be recorded on the site in the next 10 years
Small Milkwort, v	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, D, F, No	Remaining 50%	Medium	Habitat exists on site
Southern Swainson-pea, r	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, D, No	No further Consideration	N/A	Not reasonable to expect the species will be recorded on the site in the next 10 years
Spiny Rice-flower, e	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, C, Yes	Best 50%	Very High	Recorded In Study Area
Trailing Hop-bush, v	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, D, No	No further Consideration	N/A	Limited habitat, not reasonable to expect the species will be recorded on the site in the next 10 years

Fauna

Species and DEPI Conservation Status	Habitat Zones	Assessment Process	Outcome	Conservation significance	Justification
Black Falcon, v	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, D, No	No further Consideration	N/A	Occasional use for foraging, old records
Brolga, v	PGW1, W1, W2, PG1, 2, 3, 4, 5, 6, 7, and 8	A, C, Yes	Best 50%	Very High	Recorded In Study Area (pers comm. Kate Calvert)
Corangamite Water Skink, ce	Margins of W1	A, C, Yes	Best 50%	Very High	Recorded in Study Area (pers comm. Kate Calvert)
Curlew Sandpiper, e	W1, and W2	A, D, No	No further Consideration	N/A	Small area of habitat present would not make sufficient use of the Study Area
Eastern Great Egret, v	PGW1, W1, W2	A, D, No	No further Consideration	N/A	Habitat exists on site
Growing Grass Frog, e	PGW1, W1, W2	A, C, Yes	Best 50%	Very High	Recorded in Study Area (pers comm. Kate Calvert)
Gull-billed Tern, e	W1, and W2	A, D, No	No further Consideration	N/A	Habitat present, would use irregularly
Golden Sun Moth, ce	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, C, Yes	Best 50%	Very High	Recorded in Study Area (pers comm. Kate Calvert)
Mallee Fowl, e	Nil	A, D, No	No further Consideration	N/A	No habitat present on site. Not reasonable to expect the species will be recorded on the site in the next 10 years
Royal Spoonbill, v	PGW1, W1, W2	A, D, No	No further Consideration	N/A	Habitat present, would use irregularly
Striped Legless Lizard, e	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, D, F, No	Remaining 50%	High	Habitat exists on site

Species and DEPI Conservation Status	Habitat Zones	Assessment Process	Outcome	Conservation significance	Justification
Tussock Skink, v	PG 1, 2, 3, 4, 5, 6, 7, and 8	A, D, F, No	Remaining 50%	High	Habitat exists on site
White-bellied Sea-Eagle, v	All Habitat Zones	A, D, No	No further Consideration	N/A	Occasional use for foraging, old records
White-throated Needletail, v	All Habitat Zones	A, D, No	No further Consideration	N/A	Aerial Species would not make sufficient use of the Study Area

Notes: For habitat zones refer to Figure 2; Assessment process refers to Table 2 in the Guide for Assessment of referred planning permit applications (DSE 2007a)

APPENDIX 3: ENICS SOLUTIONS GOLDEN SUN MOTH SURVEY

**Terrinallum South
Golden Sunmoth Survey December 2012**

Terrinallum South has a large amount of habitat suitable for Golden Sun Moths (GSM). Suitable GSM habitat consists of native grassland containing Wallaby Grass (*Rytidosperma* spp and *Austrodanthonia* spp.). GSM are best observed in warm conditions (over 20 degrees) with low wind. Terrinallum South was surveyed on 10 December 2012, three sites were surveyed. No GSM were observed on the east facing bank around the lake or the paddock containing the ARI trial site. Though, it was noted that the habitat was suitable. GSM were observed in the flat wallaby grass paddock on the opposite side of the road to the house.

On 11 December 2012 ecologists returned to Terrinallum South. GSM survey was not the purpose of this visit, however GSM were observed in the area around the lake and the ARI trial site. The table below details the findings of the GSM survey. Given the large areas of suitable habitat and the continuation of appropriate land management practices it is likely that many populations of GSM occur on Terrinallum South.

GSM survey

date	location (UTM GDA94)	location (UTM GDA94)	site name	site description	observers	survey start time	cloud cover	average wind speed	maximum wind gust	temperature (degrees)	relative humidity	transect spacing	survey method	GSM observed	males observed	females observed	dominant flora species at site	% bare ground	general observations notes
10/12/2012	143.0331	37.939462	CAL003	paddock near lake	Laura Weedon, Lauren Eddy and Tom Calvert	10:52	0-25%	2.6	20.6	19.7	52.4	25 intervals	walking transects at 25m intervals	no	0	0	Poa labillardierei, Themeda triandra, Eryngium ovinum, Rydospisma spp, Calocephalus citrons	8	day was possible a little too cool, habitat suitable
11/12/2012	143.0331	37.939462	CAL004	paddock near lake	Laura Weedon and Lauren Eddy	11:45	0-25%	slight breeze	not recorded	25-30	not recorded	n/a	incidental sighting, observe red while walking	yes	3	0	Poa labillardierei, Themeda triandra, Eryngium ovinum, Rydospisma spp, Calocephalus citrons	8	GSM observed 100 meters from where cameras were placed. This paddock was searched thoroughly the day before and GSM were not observe red. It was slightly warmer and later in the morning on the day they were observed.
10/12/2012	143.0375	37.93697	CAL003	paddock with ARI trial site on one edge	Laura Weedon, Lauren Eddy and Tom Calvert	12:00	0-25%	8.6	12	22	51	50 intervals	walking transects at 50m intervals	no	0	0	Themeda triandra, Rydospisma spp, Calocephalus citrons	1	day was possible a little too cool, habitat suitable
11/12/2012	143.0375	37.93697	CAL003	paddock with ARI trial site on one edge	Laura Weedon and Lauren Eddy	12:30	0-25%	slight breeze	not recorded	25-30	not recorded	n/a	incidental sighting, observe red from slow moving vehicle	yes	2	0	Themeda triandra, Rydospisma spp, Calocephalus citrons	1	GSM observed adjacent to ARI trial site, this paddock was searched thoroughly the day before and GSM were not observe red. It was slightly warmer and later in the day on the day they were observed.
10/12/2012	143.0699	37.93877	CAL005	opposite side of road to house, flat Watlaby grass paddock	Laura Weedon, Lauren Eddy, Tom Calvert and Kate Calvert	12:45	0-25%	8.3km/h	17km/h	23	47	25m intervals	walking transects at 25m intervals	yes	3	2	Eryngium ovinum, Rydospisma spp, Vulpia sp.	3	Followed males and looked for females where males came to rest. One female observed in act of laying eggs. No moths GSM were observe red flying after 2:30pm



Left: Female Golden Sun Moth at site CAL005 on
Terrinallum South 10-12-2012

Below: Male Golden Sun Moth at site CAL005 on
Terrinallum South 10-12-2012



APPENDIX 4: PLUME ECOLOGY NET GAIN ASSESSMENT

DSE Gain Calculator

Version 1.2, October 2008

About DSE Gain Calculator

STEP 1 Enter site details

NAME or EVC CODE: Merrick
 SITE CODE (number):
 SITE LOCATION/ADDRESS: Dunkeld
 PROPERTY SIZE: >=10 Ha

STEP 2 Habitat zone code (hzc): b
 Zone Type: Offset (Stat Planning)

STEP 3 Select bioregion: Victorian Volcanic Plain

STEP 4 Select EVC: Plains Grassy Woodland
 Other EVC selected: EVC: Standard bear
 - enter EVC as Standard bear
 - enter assessed habitat score manually under STEP 10 based on EVC BCS

STEP 5 Enter size of habitat zone, to one decimal place (or, reservation area): 26.4 ha

STEP 6 Select current land tenure: freehold

STEP 7 Select current:

- no entitlement to graze with domestic stock
- no entitlement to remove trees - live
- no entitlement to remove trees - dead
- no entitlement to remove dead vegetation
- no entitlement to remove fallen timber
- requirement for regular fuel reduction
- other, please insert

STEP 8 Select proposal type: Remnant patch

STEP 9 Select total patch size class - including adjoining zones: >=20Ha

STEP 11 Choose the appropriate management options as required

(a) Exclude stock and ensure that weed cover does not increase beyond current level?
 (b) Retain all standing trees - dead or alive
 (c) Retain all fallen timber, branches and fuel
 (d) Eliminate high threat woody weeds & control pathogens
 (e) Eliminate all dead fuel that woody & control pathogens
 (f) Supplementary planting
 (g) Introduce type
 (h) Any other large scale management actions
 If (h) is selected, select management actions from below:

Ecological thinning
 Ecological burning
 Ecological flooding
 Other

For Grassland type EVCs only
 Replace management option (a) above with:
 Low Productivity - Exclude Stock (no grazing)

All grassland management actions must ensure no further weed spread

STEP 10 Current Habitat Score

Attribute	Max	Default	Assessed	Comments
Large Trees	10	4	3	
Tree canopy cover	5	3	3	
Understorey	25	15	15	
Lack of weeds	15	4	4	
Recruitment	10	0	0	
Organic litter	5	4	4	
Logs	5	0	0	
Landscape context	25	18	14	
Standardised Habitat Score	100	43		

STEP 12 Gain Scores for Remnant Management

Attribute	Maintenance Gain/ha		Improvement Gain/ha		Comments
	Calculated	Assessed	Calculated	Assessed	
Large Trees	na	na	na	na	
Tree canopy cover	na	na	0.4	na	
Understorey	15	na	25	na	
Lack of weeds	na	na	na	na	
Recruitment	0	na	na	na	
Organic litter	0.4	na	na	na	
Logs	0.4	na	na	na	
Total	23		70		

STEP 13 Choose security arrangement: Registered on-title agreement or crown land equivalent

Standardised Sum Main + Impr Gain/ha	10.20
Prior Mgt Gain/ha	4.3
Security Gain/ha	4.3
Total Gain/ha	18.80

Calculating the total gain

Total Gain (HHa)	4.95
------------------	------

STEP 14 User details

USER NAME: s47F
 ORGANISATION:
 CONTACT TELEPHONE:
 CONTACT EMAIL:

Native Vegetation Gain Calculation Summary

EOI Code / land manager name		Merrick			
Site code (number) / Habitat Zone ID (letter)		a			
Land tenure		freehold			
Property Size		>=10 Ha			
Patch Size		>=20Ha			
Zone type		Offset (Stat Planning)			
Proposal type		Remnant patch			
Security arrangement		Registered on-title agreement			
Bioregion		Victorian Volcanic Plain			
EVC name		Plains Grassy Woodland			
BCS		E			
EVC standardiser		1			
		Max	Current condition	Maintenance gain/ha	Improvement gain/ha
Scores	Large Trees	10	3	na	
	Tree Canopy Cover	5	3	na	0.4
	Understorey	25	15	1.5	5
	Lack of Weeds	15	9		4
	Recruitment	10	0	0	4
	Organic Litter	5	5	0.5	0
	Logs	5	0	0.4	0
	Standardised Site Condition	75	35		
	Landscape Context	25	14		
	HabHa Score	100	49		
	Subtotal of gains			2.4	13.4
Standardised Sum Main + Impr Gain/Ha				15.8	
Prior Mgt Gain/Ha				4.9	
Security Gain/Ha				4.9	
Total Gain/Ha				25.6	
Size of habitat zone (Ha)				4.09	
TOTAL GAIN (HHa)				1.05	

From: [s47F]@plumeecology.com.au]
Sent: Monday, 2 December 2013 2:44 PM
To: [s47F]@deslinkservices.com.au
Cc: grampiansreveg@hotmail.com
Subject: FW: Proposed Dunkeld Offset Site - A + T Merrick

Hi [s47F]

I have assessed the proposed Plains Grassy Woodland offset site near Dunkeld with [s47F] (a few weeks ago).

I can confirm that the site offers:

- Victorian Volcanic Plain EVC 55_61: Plains Grassy Woodland, remnant patches totalling 30.44ha (some areas relatively intact, some poorer quality, but still qualify as remnant patches of PGW).
- A remaining area (not meeting the patch definition) approx. 10.06ha that could be restored and considered for additional revegetation gains (14 LOTs/VLOTs).
- 37 Large Old Trees (most VLOTs) across the two zones remnant patches (this component scores low in the HH assessment as the trees are very (very very!) large old trees, so naturally there will be less of them (especially as grazing has suppressed natural recruitment).
- Two habitat zones with a total of exactly 6.0 HH of gain available (and 37 LOTs) – see attached gain calculations spreadsheet (+ a further approx. 14 LOTs in the revegetation zone).

I can also confirm that the vegetation across the two remnant patches (totalling 30.44ha) **does meet** the **description** and **condition thresholds** outlined in the listing advice for the national (EPBC-listed) ecological community 'Grassy Eucalypt Woodland of the Victorian Volcanic Plain'. This applies to each zone individually (the 4.09ha zone meets criterion 1 and the 26.35ha zone meets criterion 2) and also when the 30.44ha is considered to be one entire patch. The tree canopy cover is just below the lower limit (less than 5%), however it is considered that in the context of the EPBC listed community, the vegetation within the 30.44ha area can be described as 'regenerating woodland'.***

***Derived, or secondary, grasslands occur when the native tree and/or shrub layers are removed (to <5% crown cover) but a native ground layer remains largely intact. Derived grasslands should exhibit clear evidence from tree stumps, fallen logs, historical records, photographs, or reliable modelling of pre-European vegetation that the site formerly contained the Grassy Eucalypt Woodland of the Victorian Volcanic Plain ecological community as described here, and that the grassland patch is not considered to be Natural Temperate Grassland of the Victorian Volcanic Plain. If the characteristics of the ground layer, as outlined in the Description and Condition thresholds, are also met, then the derived grassland is included as part of the listed ecological community.

Other notes:

- Given that the site was assessed in spring when weed growth was quite prolific, I am certain that a mid-late summer survey would yield a better habitat score in both zones which may alter the HH available. It may also mean that the site is an even better example/representation of the EPBC-listed ecological community (GEWVVP).

- The site has very high potential to support Clover Glycine, Growling Grass Frog and Golden Sun Moth (based on my experience in the field looking for these little things, and these species have been recorded close by) – may also support other threatened species (flora and fauna).

Please let me know if you need any further information.

Kind regards, s47F (Habitat Hectares accreditation no. HH092).



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Draft Report

Offset Management Plan:

s47F

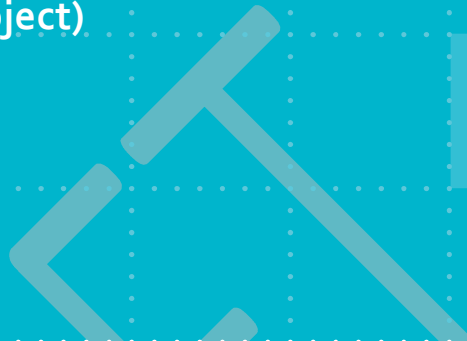
s47F

s47F

Prepared for

VicRoads (Western Highway Project)

March 2014



Ecology and Heritage Partners Pty Ltd

ACKNOWLEDGEMENTS

We thank the following people for their contribution to the project:

- s22 [REDACTED] (VicRoads) for project information;
- The landowners who provided access to the study area.

DRAFT

DOCUMENT CONTROL

Assessment	Offset Management Plan
Address	s47F [REDACTED]
Project number	5682
Project manager	s47F [REDACTED] (Senior Ecologist)
Report author(s)	s47F [REDACTED] (Senior Botanist)
Report reviewer	s47F [REDACTED] (Consultant Zoologist)
Other EHP staff	N/A
Mapping	s47F [REDACTED]
File name	5682_EHP_Dunkeld_Draft_OMP_030314
Client	VicRoads (Western Highway Project)
Bioregion	Central Victorian Uplands (CVU) bioregion and Victorian Volcanic Plains (VVP) bioregion
CMA	Glenelg-Hopkins Catchment Management Authority
Council	Western section: City of Ararat Eastern section: Shire of Pyrenees

Report versions	Comments	Comments updated by	Date submitted
Draft 1	-		03/03/2014

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1 TITLE OFFSET PLAN

Title information for the offset site is documented in Table 1.

Table 1. Title information for the offset site

Title Offset Plan	
Planning Permit Number (ID) / Work Authority No:	TBC
Proponent:	VicRoads (Western Highway Project)
Address:	237 Ring Road, Wendouree, Victoria, 3355
Landowner and Permit (Work Authority) Holder Statement	
Permit (Work Authority) Holder	
Print Name:	VicRoads (Western Highway Project)
Signature:	
Date:	
Landowner of Offset Site	
Print Name:	s47F
Signature:	
Date:	
Referral Authority Statement	
The native vegetation credits described in this plan provide an offset for the removal of native vegetation specified in this plan to the satisfaction of the Department of Environment and Primary Industries.	
Print Name:	Department of Environment and Primary Industries
Position:	
Signature:	
Date:	
Responsible Authority Approval	
This Offset Plan has been approved and is endorsed by the responsible authority.	
Print Name:	
Position:	
Responsible Authority:	
Signature:	
Date:	
Date of Commencement:	

2 INTRODUCTION

2.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by VicRoads (Western Highway Project) to develop an Offset Management Plan (OMP) for the Western Highway Project, Beaufort to Ararat (Section 2), Victoria (Figure 1).

The Western Highway (A8) is being progressively upgraded as a four-lane divided highway for approximately 110 kilometres (km) between Ballarat and Stawell, and this is referred to as the Western Highway Project. As the principal road link between Melbourne and Adelaide, the Western Highway serves interstate trade between Victoria and South Australia and is the key corridor through Victoria's west, supporting farming, grain production, tourism and a range of manufacturing and service activities. Currently, more than 5,500 vehicles travel on the highway west of Ballarat each day, including 1,500 trucks.

The Western Highway Project consists of three stages:

- Section 1: Ballarat to Beaufort
- Section 2: Beaufort to Ararat
- Section 3: Ararat to Stawell.

A flora, fauna and Net Gain assessment as well as targeted flora, fauna and aquatic surveys were conducted by Ecology and Heritage Partners Pty Ltd between October 2010 and January 2012 in order to document flora and fauna values and legislative implications of the proposed development between Beaufort to Ararat (Section 2) (Ecology and Heritage Partners Pty Ltd 2012).

2.1.1 *Planning and Environment Act 1987*

A planning permit for the project is required from local Council. The project is subject to the provisions of the *Native Vegetation Framework: A Framework for Action* (the Framework) (NRE 2002). The *Permitted Clearance Regulations* and *Biodiversity Assessment Guidelines* (DEPI 2013), which supersede the Framework for projects granted approval prior to 30 December 2013, are not relevant as the planning permit was granted prior to the changes being implemented.

2.1.2 *Environment Protection and Biodiversity Conservation Act 1999*

One flora species, two ecological communities and two fauna species listed under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded within the proposed alignment (Ecology and Heritage Partners Pty Ltd 2012). Based on the EPBC Act Significant Impact Guidelines (DEWHA 1999; 2009), the Project will have a significant impact on Golden Sun Moth *Synemon plana* and the Grassy Eucalypt Woodland of the Victorian Volcanic Plain and Natural Temperate Grassland of the Victorian Volcanic Plain ecological communities.

An EPBC Act referral has been submitted for the proposed construction works. VicRoads were advised by the Department of the Sustainability, Environment, Water Population and Communities on 17 December

2010 that the proposed project is a controlled action requiring assessment and approval in accordance with the EPBC Act.

2.2 Objectives

The objective of the OMP is to document the clearing site and offset site details to meet Net Gain requirements by securing, maintaining and improving remnant vegetation within the designated offset site.

Specifically, the objectives of the OMP are to:

- Review offset requirements based on vegetation clearance and the outcomes of the Planning Permit conditions;
- Review the previous habitat hectare assessment of the proposed offset site; and,
- Develop an OMP to compensate for the permitted loss of vegetation as part of the proposed development. This will include but not be limited to the following:
 - Means of calculating the offsets;
 - Location of the offset sites;
 - Type of offsets to be provided;
 - Details of management actions for remnant vegetation;
 - Investigate an appropriate 'security' arrangement, if applicable;
 - Based on available information from the client, prepare a map of the offset sites;
 - Develop a timetable of proposed management actions, outcomes and progress reviews; and,
 - Suggest appropriate monitoring and evaluation of management actions.

2.3 Report Structure

The structure and content of the OMP is consistent with the requirements of the 'Standard Offset Plan' template provided by the Department of Environment and Primary Industries (DEPI) and is organised in several parts:

- *Introduction* - This section summarises the background information relevant to the Project, including the purpose and scope of the work and the assessment methodology.
- *Part A: Offset Suitability* - This section assesses the suitability of the proposed offset sites, and includes details regarding approved clearing, Like-for-Like criteria and gain calculations. Part A should be read in conjunction with Part B, but due to its technical nature, the information it contains is not intended to be placed on title (e.g. covenant or Section 173 Agreement pursuant to the *Planning and Environment Act 1987*).
- *Part B: Offset Implementation* - This section describes how the offset is to be implemented. Part B includes details regarding landowner commitments, management activities monitoring and reporting. This section is intended for those responsible for implementing the plan, including future landowners. Information in this section is intended to be placed on title.

3 METHODS

3.1 Database and Literature Review

The Victorian Biodiversity Atlas (DSE 2011a; 2011b), the Flora Information System (Viridans 2012a) and the Victorian Fauna Database (Viridans 2012b) were reviewed to identify previous records of native and exotic flora and fauna species within the local area, as well as threatened flora and fauna species that have the potential to occur within 10 kilometres of the proposed offset site.

Information pertaining to matters protected under the EPBC Act including listed taxa, ecological communities and Ramsar wetlands, was obtained from the Department of Environment (DoE) Protected Matters Search Tool (DoE 2014).

Reports and documents detailing the ecological features of the study area as relevant to the OMP were reviewed, in particular:

- Ecology and Heritage Partners Pty Ltd 2012. *Western Highway Project: Section 2, Beaufort to Ararat, Victoria. Impact Assessment Report – Flora, Fauna and Ecological Communities*. Report prepared for VicRoads.
- Brett Lane and Associates 2013. 'Terrinallum South', s47F [REDACTED] Native Vegetation and Threatened Species Assessment. Report prepared for s47F [REDACTED].
- Enics Solutions 2012. Terrinallum South Golden Sun Moth Survey, December 2012. Report prepared for s47F [REDACTED].

This OMP has been developed based on *Victoria's Native Vegetation Management: A Framework for Action* (The Framework) (DNRE 2002), as well as relevant vegetation management guidelines and other relevant templates published by DEPI.

3.2 Gain Scoring Method

3.2.1 The Framework

Gains in habitat score can be achieved via a number of means, where a commitment is made to designate an area as a permanent offset site to compensate for vegetation loss elsewhere. Gains can also be achieved through revegetation of formerly modified land where such offset types are permitted.

Four types of gains are recognised by DEPI for existing vegetation offset sites (DSE 2006a), including:

- *Prior Management Gain* – This gain acknowledges actions to manage a freehold site and usually attracts a score of 10% of the current habitat score of the offset site;
- *Security Gain* – This is gain resulting from actions to enhance the security of the on-going management and protection of native vegetation. This gain usually attracts between 10 and 40% of the current habitat score of the offset site, depending on the security agreement reached and land tenure of the offset site;

- *Maintenance Gain* – This is gain from commitments that contribute to the maintenance of current vegetation quality over time (i.e. avoiding any decline); and,
- *Improvement Gain* – This is gain resulting from management commitments beyond existing obligations under legislation to improve the current vegetation quality.

The amount of gain achieved also depends on the land tenure of the offset site. Gain scores must be consistent with the Vegetation Gain Approach – Technical basis for calculating gains through improved native vegetation management and revegetation (DSE 2006a) and the Native Vegetation: Scoring Gain from an offset – DSE Gain Calculator user instructions (DSE 2006b).

Gain scores for managing existing vegetation and revegetation works are to be achieved over a ten year management period. The vegetation quality achieved from these activities at year ten of management must be protected and maintained in similar condition in perpetuity (DNRE 2002).

Gain scoring was assessed using the (former) Department of Sustainability and Environment (DSE) Gain Calculator (DSE 2010). The calculator allocates maintenance and improvement gain, prior management gain and security gain scores based on the habitat hectare measures and vegetation management actions used to maintain or improve vegetation quality over the mandatory 10 year management period (DSE 2006b).

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4 PART A - OFFSET SUITABILITY

4.1 Clearing Site Details

The clearing site details are provided in Table 2. A detailed description of ecological values within the study area is provided in the Impact Assessment Report (Ecology and Heritage Partners Pty Ltd 2012).

Table 2. Clearing Site Details

Clearing Site Details	
Landowner of clearing site	VicRoads
Location and address of clearing site	Western Highway, Section 2 (Beaufort to Ararat)
Local Government Area	Western section: City of Ararat Eastern section: Shire of Pyrenees
Catchment Management Authority	Glenelg-Hopkins Catchment Management Authority
Responsible Authority	DEPI
Applicant	VicRoads
Planning Permit Number (ID)	TBC
Date approved	TBC

4.1.1 Significant Species and Communities

A total of 227 plant taxa (151 indigenous, 76 exotic) were recorded within the study area (Ecology and Heritage Partners Pty Ltd 2012). One nationally significant flora species (Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*), two nationally significant flora communities (Natural Temperate Grassland of the Victorian Volcanic Plain and Grassy Eucalypt Woodland of the Victorian Volcanic Plain), three State significant flora species (Yarra Gum *Eucalyptus yarraensis*, Emerald-lip Greenhood *Pterostylis smaragdina* and Golden Cowslips *Diuris behrii*), two State significant ecological communities (Western (Basalt) Plains Grassland and Victorian Temperate Woodland Bird Community) and numerous species of regional significance were identified.

A total of 76 fauna species (67 indigenous, 9 exotic) were recorded within the study area (Ecology and Heritage Partners Pty Ltd 2012). Two nationally significant fauna species (Dwarf Galaxias *Galaxiella pusilla* and Golden Sun Moth *Synemon plana*), two State significant species (Brown Toadlet *Pseudophryne bibronii* and Brown Treecreeper *Climacteris picumnus*) and one regionally significant species (Baillon's Crake *Porzana pusill*) were identified. In addition, the State significant Powerful Owl *Ninox strenua* and Brush-tailed Phascogale *Phascogale tapoatafa* were reported to be present within the study area by a local landholder whose property lies south of the intersection of Martins Lane and Western Highway. Based on the EPBC Act Significant Impact Guidelines (DEWHA 1999; 2009), the Project will have a significant impact on Golden Sun Moth and the NTGVVP and GEWVVP ecological communities.

4.1.2 Ecological Vegetation Classes

The alignment footprint intersects ten Ecological Vegetation Classes (EVCs) with varying quality and extent including Alluvial Terraces Herb-rich Woodland, Creekline Grassy Woodland, Grassy Dry Forest, Grassy Woodland, Heathy Dry Forest, Hills Herb-rich Woodland, Heathy Woodland, Plains Grassland, Plains Grassy Woodland and Plains Grassy Wetland.

The Plains Grassland, Plains Grassy Woodland, Alluvial Terraces Herb-rich Woodland, Creekline Grassy Woodland and Plains Grassy Wetland EVCs are considered endangered within the Victorian Volcanic Plain bioregion. Within the Central Victorian Uplands bioregion, the Grassy Woodland, Creekline Grassy Woodland and Alluvial Terraces Herb-rich Woodland EVCs are listed as endangered, the Hills Herb-rich Woodland EVC is listed as vulnerable, the Grassy Dry Forest and Heathy Woodland EVCs area listed as depleted and Heathy Dry Forest EVC is listed as least concern.

4.2 Summary of Losses and Net Gain targets

4.2.1 State (Victoria)

Offset requirements and multipliers are specified in accordance with Appendix 4, Table 6, pp. 54-55 of the Framework (DNRE 2002) and Table 5 of the Glenelg Hopkins Native Vegetation Plan (GHCMA 2006). A detailed description of vegetation losses is provided in the Flora and Fauna Impact Assessment Report (Ecology and Heritage Partners Pty Ltd 2012).

4.2.1.1 Vegetation Patches and Large Old Trees

Total losses and Net Gain targets for remnant native vegetation and Large Old Trees associated with the clearing site are outlined in Table 4.

4.2.1.2 Scattered Trees

Total losses and Net Gain targets for scattered trees associated with the clearing site are outlined in Table 5.

4.2.2 Federal

Losses associated with Matters of National Environmental Significance (NES) are summarised in Table 3. Offset targets were determined through discussions with the federal DoE and in accordance with the EPBC Act Offsets Policy (October 2012).

Table 3. Losses associated with Matters of NES

Matter of NES	Losses	Offset Target
Spiny Rice-flower	1 plant	N/A (Plant to be translocated)
Golden Sun Moth	31.56 hectares	79.2 hectares
Dwarf Galaxias	None proposed	N/A
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	11.14 hectares	23.5 hectares
Natural Temperate Grassland of the Victorian Volcanic Plain	5.25 hectares	21.10 hectares

Table 4. Vegetation losses and Net Gain targets

Bioregion	Target EVC	Conservation significance	Vegetation				Large Old Trees				
			Total Losses (Ha)	Total Losses (HabHa)	Net Gain Multiplier*	Net Gain Target (HabHa)	Total Losses	Protection Multiplier	Total to be Protected	Recruitment Multiplier	Total to be Recruited
CVU	ATHrW	V. High	7.36	3.48	2	6.96	40	8	320	40	1,600
	CGW	V. High	0.01	0	2	0	8	8	64	40	320
	GDF	High	9.69	5.1	1.5	7.65	6	4	24	20	120
		Low	3.2	0.7	1	0.7	0	0	0	0	0
		Medium	4.09	1.57	1	1.57	5	2	10	10	50
	GW	V. High	1.38	0.8	2	1.6	2	8	16	40	80
	HDF	High	2.99	1.76	1.5	2.64	6	4	24	20	120
		Low	0.35	0.2	1	0.2	5	0	0	0	0
	HHRW	High	7.44	3.13	1.5	4.7	5	4	20	20	100
		V. High	4.88	2.93	2	5.86	29	8	232	40	1,160
HW	High	1.58	0.94	1.5	1.41	10	4	40	20	200	
VVP	ATHrW	V. High	4.14	1.82	2	3.64	36	8	288	40	1,440
	CGW	High	0.87	0.25	1.5	0.38	10	4	40	20	200
		V. High	5.71	1.82	2	3.64	16	8	128	40	640
	GW	V. High	0.96	0.54	2	1.08	1	8	8	40	40
	PG(HS)	High	6.93	2.08	1.5	3.12	0	4	0	20	0
		V. High	3.93	1.16	2	2.32	0	8	0	40	0
	PGW	High	26.36	8.21	1.5	12.32	34	4	136	20	680
		V. High	5.77	2.82	2	5.64	8	8	64	40	320
	PGWe	High	0.21	0.06	1.5	0.09	0	4	0	20	0
V. High		0.05	0.01	2	0.02	0	8	0	40	0	
Total			97.9	39.38		65.54	221		1,414		7,070

Notes: CVU = Central Victorian Uplands, VVP = Victorian Volcanic Plain, GDF = Grassy Dry Forest, PG (HS) = Heavier-soils Plains Grassland, HHRW = Hills Herb-rich Woodland, PGWe = Plains Grassy Wetland, CGW = Creekline Grassy Woodland, GW = Grassy Woodland, ATHrW = Alluvial Terraces Herb-rich Woodland, PGW = Plains Grassy Woodland, HDF = Heathy Dry Forest, HW = Heathy Woodland. Alignment area has not been fully assessed for Net Gain (i.e. indicative Due Diligence assessment undertaken in some areas). As such Net Gain targets may vary marginally following detailed assessment. Large Old Tree targets are based on estimates of trees present and potential losses within each patch, further assessment is required to determine the number of Large Old Trees within all patches within the study area.

Table 5. Scattered Tree losses and Net Gain targets

Study Area	Conservation Significance	Size	Losses	Protect		Recruit		Recruit Only	
				Multiplier*	Target	Multiplier*	Target	Multiplier*	Target
VVP	High	LOT	41	2	82	10	410	100	4,100
		MOT	5	1	5	5	25	50	250
		ST	22	0	0	0	0	0	0
		VLOT	45	4	180	20	900	200	9,000
CVU	High	LOT	24	2	48	10	240	100	2,400
		MOT	4	1	4	5	20	50	200
		VLOT	3	4	12	20	60	200	600
	Low	LOT	7	0	0	5	35	50	350
		MOT	4	0	0	5	20	50	200
		ST	2	0	0	0	0	0	0
		VLOT	5	1	5	5	25	50	250
	Medium	LOT	4	1	4	5	20	50	200
		MOT	3	1	3	5	15	50	150
		VLOT	1	2	2	10	10	100	100

Notes: CVU = Central Victorian Uplands, VVP = Victorian Volcanic Plain, VLOT = Very Large Old Tree, LOT = Large Old Tree, MOT = Medium Old Tree, ST = Small Tree.

4.3 Offset Management Strategy

Several offset sites have been identified to meet State and federal offset requirements. Sites include:

- Dunkeld property – Offset Management Plan located within current document.
- Darlington property – Offset Management Plan: s47F (Ecology and Heritage Partners Pty Ltd 2014).

The following summarises offset requirements for the clearing site and indicates how State and federal offset requirements will be met.

4.3.1 State (Victoria)

4.3.1.1 Vegetation Patches

Table 6 summarises the quantity and location of offsets identified to compensate for losses associated with Large Old Trees and Scattered Trees.

Table 6. Offsets associated with loss of patches of native vegetation

Bioregion	Target EVC	Conservation significance	Total Losses (HabHa)	Net Gain Target (HabHa)	Offsets identified (HabHa); Location	Offsets to be sourced (HabHa)
CVU	ATHrW	V. High	3.48	6.96	-	6.96
	CGW	V. High	0	0	-	0
	GDF	High	5.1	7.65	-	7.65
		Low	0.7	0.7	-	0.7
		Medium	1.57	1.57	-	1.57
	GW	V. High	0.8	1.6	-	1.6
	HDF	High	1.76	2.64	-	2.64
		Low	0.2	0.2	-	0.2
	HHRW	High	3.13	4.7	-	4.7
		V. High	2.93	5.86	-	5.86
HW	High	0.94	1.41	-	1.41	
VVP	ATHrW	V. High	1.82	3.64	-	3.64
	CGW	High	0.25	0.38	0.38; Darlington	0
		V. High	1.82	3.64	-	3.64
	GW	V. High	0.54	1.08	-	1.08
	PG(HS)	High	2.08	3.12	3.12; Darlington	0
		V. High	1.16	2.32	2.32; Darlington	0
	PGW	High	8.21	12.32	1.82; Dunkeld	10.5
		V. High	2.82	5.64	5.64; Dunkeld	0
PGWe	High	0.06	0.09	0.09; Darlington	0	
	V. High	0.01	0.02	-	0.02	

4.3.1.2 Trees

Table 7 summarises the quantity and location of offsets identified to compensate for losses associated with Large Old Trees and Scattered Trees.

Table 7. Offsets associated with loss of Large Old Trees and Scattered Trees

Bioregion	Trees	Scattered	LOT	Total	Offsets identified (no. trees); Location	Offsets to be sourced (no. trees)
CVU	Total Losses	57	116	173	N/A	N/A
	To be Protected	78	750	828	-	828
	To be Recruited	445	3750	4195	-	4195
	Recruit Only	4450	N/A	4450	N/A	N/A
VVP	Total Losses	113	105	218	N/A	N/A
	To be Protected	267	664	931	53; Dunkeld	878
	To be Recruited	1335	3320	4655	265; Dunkeld	4390
	Recruit Only	13350	N/A	13350	N/A	N/A

Notes: Offsets sourced must be either “protect and recruit” or “recruit only”. Under “protect and recruit” five (5) trees are assumed recruited for every one (1) tree that is protected.

4.3.2 Federal

Table 8 summarises the quantity and location of offsets identified to compensate for losses associated with Matters of NES.

Table 8. Offsets associated with Matters of NES

Matter of NES	Losses	Offset Target	Offsets identified (Ha); Location
Spiny Rice-flower	1 plant	N/A	N/A (plant to be translocated)
Golden Sun Moth	31.56 hectares	79.2 hectares	79.2 hectares; Darlington
Dwarf Galaxias	None proposed	N/A	N/A
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	11.14 hectares	23.5 hectares	23.5 hectares; Dunkeld
Natural Temperate Grassland of the Victorian Volcanic Plain	5.25 hectares	21.10 hectares	21.10 hectares; Darlington

4.3.2.1 Environment Protection and Biodiversity Conservation Act 1999 Offsets Policy

Offset targets were determined through discussions with DoE and in accordance with the EPBC Act Offsets Policy (October 2012). The EPBC Act Offsets calculator (Excel spreadsheet) was used to determine appropriate offset targets to compensate for the loss of Matters of NES. The calculator spreadsheets are provided in Appendix 1, and the assumptions used to populate the calculator are presented below.

Golden Sun Moth

- *Offset location* = Darlington property.
- *Habitat to be removed* = 31.56 hectares.
- *Habitat quality* = 4/10. The majority of Golden Sun Moth habitat to be removed comprises grassland areas that do not qualify as a remnant patch due to a native species cover of less than 25%, and with a high cover of weed species. These areas do, however, support scattered tussocks of wallaby grass *Rytidosperma* spp., a preferred food source for Golden Sun Moth.
- *Time over which loss is averted* = 10 years. The land will be managed in perpetuity for conservation purposes for Golden Sun Moth.
- *Time until ecological benefit* = 2 years. Native vegetation is expected to improve in extent, species diversity and density within 2 years through applied weed and biomass control regimes.
- *Start area and quality* = 79.2 hectares and 6/10. The offset site supports native grassland habitat of moderate quality. Cover of indigenous grass and herb species is high, however, the diversity of species is low and there is little inter-tussock space particularly in areas of dense Kangaroo Grass *Themeda triandra*.
- *Risk of loss without offset* = 10%. Without protection as an offset site there is uncertainty regarding the future use of the land. Most likely the property would continue to be managed under the current regime, however there remains potential that the property will be cropped or grazing intensity will be increased, as is the case with surrounding properties.
- *Future quality without offset* = 6/10. Assumes management proceeds in accordance with the current regime and quality remains at 6/10.
- *Risk of loss with offset* = 0%. The land will be managed in perpetuity for conservation purposes for Golden Sun Moth.
- *Future quality with offset* = 8/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a vegetation management plan incorporating weed control and regular monitoring, aiming to maintain and enhance native biodiversity.
- *Confidence in result* = 80%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing habitats and landscape context.

Natural Temperate Grassland of the Victorian Volcanic Plain

- *Offset location* = Darlington property.
- *Habitat to be removed* = 5.25 hectares.

- *Habitat quality* = 6/10. The majority of NTGVVP to be removed is located along the existing Western Highway and comprises of a high cover of indigenous grass, herb and shrub species. These areas are modified due to previous disturbance from road and rail construction, farming and their close proximity to the road with high levels of weed infestations particularly along the road verge.
- *Risk-related time horizon* = 10 years. The land will be managed in perpetuity for conservation purposes for NTGVVP.
- *Time until ecological benefit* = 2 years. Native vegetation is expected to improve in extent, species diversity and density within 2 years through applied weed and biomass control regimes.
- *Start area and quality* = 20.3 hectares and 5/10. The offset site supports native grassland habitat of moderate quality. Cover of indigenous grass and herb species is high, however, the diversity of species is low and the opportunity for further recruitment of indigenous species is also low.
- *Risk of loss without offset* = 10%. Without protection as an offset site there is uncertainty regarding the future use of the land. Most likely the property would continue to be managed under the current regime, however there remains potential that the property will be cropped or grazing intensity will be increased, as is the case with surrounding properties.
- *Future quality without offset* = 5/10. Assumes management proceeds in accordance with the current regime and quality remains at 5/10.
- *Risk of loss with offset* = 0%. The land will be managed in perpetuity for conservation purposes for NTGVVP.
- *Future quality with offset* = 7/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a vegetation management plan incorporating weed control and regular monitoring, aiming to maintain and enhance native biodiversity.
- *Confidence in result* = 80%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing habitats and landscape context.

Grassy Eucalypt Woodland of the Victorian Volcanic Plain

- *Offset location* = Dunkeld property.
- *Habitat to be removed* = 11.14 hectares.
- *Habitat quality* = 4/10. The majority of GEVVVP persists within road reserves along the Western Highway and other adjoining roads. These areas comprised of an intact overstorey of River Red-gum *Eucalyptus camaldulensis* with a modified grassy understorey and very few shrub species.
- *Risk-related time horizon* = 10 years. The land will be managed in perpetuity for conservation purposes for GEVVVP.
- *Time until ecological benefit* = 5 years. Native vegetation is expected to improve in extent, species diversity and density within 5 years through applied weed and biomass control regimes.
- *Start area and quality* = 23.5 hectares and 4/10. The offset site supports native woodland habitat in moderate condition. Scattered River Red-gums are present throughout the site with a predominantly indigenous grass understorey, however shrubs and many herbs species are absent.

- *Risk of loss without offset* = 15%. Without protection as an offset site there is uncertainty regarding the future use of the land. Most likely the property would continue to be managed under the current regime, and it is likely that further degradation of indigenous grass cover due to the spread of exotic pasture grasses and the loss of remnant trees with little or no chance of regeneration will occur over time.
- *Future quality without offset* = 4/10. Assumes management proceeds in accordance with the current regime and quality remains at 4/10.
- *Risk of loss with offset* = 0%. The land will be managed in perpetuity for conservation purposes for GEWVVP.
- *Future quality with offset* = 7/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a vegetation management plan incorporating weed control and regular monitoring, aiming to maintain and enhance native biodiversity.
- *Confidence in result* = 80%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing habitats and landscape context.

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5 DESCRIPTION OF THE OFFSET SITE

The study area supports one broad vegetation and habitat type: native grassland. Vegetation condition and habitat quality are discussed in further detail below.

5.1 Vegetation Condition

Vegetation within the study area is dominated by grassland, located throughout the property along with several other vegetation types. Based on the field assessment, grassland within the study area is consistent with the Plains Grassland EVC. This is broadly consistent with extant DEPI mapping which shows these areas are dominated by Plains Grassland (EVC 175) and Plains Grassy Wetland (EVC 125) (DEPI 2014b).

Plains Grassland is described as treeless vegetation mostly less than one metre tall dominated by largely graminoid and herb life forms (DEPI 2014a).

Remnant vegetation within the study area consisted of high quality grassland dominated by indigenous grass species including Kangaroo Grass *Themeda triandra*, wallaby grasses *Rytidosperma* spp. and Common Tussock-grass *Poa labillardierei*. Due to the sub-optimal timing of the survey, a low diversity of herb species was observed (Sheep's Burr *Acaena echinata*, Blue Devil *Eryngium ovinum*, Varied Raspwort *Haloragis heterophylla*, Lemon Beauty-heads *Calocephalus citreus*, and Pink Bindweed *Convolvulus angustissimus* subsp. *angustissimus*). A higher diversity of herbs may be observed during spring as indicated by Brett Lane and Associates (BLA 2013).

The site is currently rotationally grazed by sheep at a low rate. Paddocks are secured through well maintained and planned internal fences to control stock access throughout the property. Weed infestations were scattered but often found in areas where sheep are likely to congregate e.g. tanks, troughs etc. These areas were typically dominated by the noxious weeds Horehound *Marrubium vulgare* and Spear Thistle *Cirsium vulgare* as well as other exotic grass and herb species. Grassy pasture species including Toowoomba Canary-grass *Phalaris aquatica*, Cocksfoot *Dactylis glomerata*, Perennial Rye-grass *Lolium perenne*, and Squirrel-tail Fescue *Vulpia bromoides* were found throughout the site in varying densities and distributions. Typically the areas of Plains Grassland included in this offset plan had a relatively low weed cover (<25%) (Figure 2).

5.1.1 Natural Temperate Grassland of the Victorian Volcanic Plain

One nationally listed vegetation community, NTGVVP listed as critically endangered under the EPBC Act, was recorded within the study area. The NTGVVP ecological community is also listed as Western (Basalt) Plains Grasslands Community under the *Flora and Fauna Guarantee Act 1988* (FFG Act), and has been mapped as Plains Grassland (Figure 2).

The key diagnostic criteria and condition thresholds present within the study area, as outlined in Policy Statement 3.8 (EPBC Act Policy Statement 3.8 2008) for NTGVVP include:

- At least one of the following grass genera is the dominant native species in the ground layer: Themeda (Kangaroo-grass), Austrodanthonia (Wallaby-grass), Austrostipa (Spear-grass) and/or Poa (Tussock-grass).

- For a native vegetation remnant >1 hectare in size, the minimum contiguous size of the grassland patch is 0.5 hectare.
- The total perennial tussock cover represented by the native grass genera Themeda, Austrodanthonia, Austrostipa or Poa is at least 50%.

Remnant Plains Grassland (Habitat Zones 1, 2, 3, 4, 5, 6, 7, 8 and 10) meets the condition thresholds outlined above and is considered to be representative of the NTGVVP vegetation community (Figure 2). Remnant vegetation within Habitat Zones 9 and 11 do not meet the condition thresholds and are not considered to correspond with this ecological community. There is approximately 126 hectares of NTGVVP available for offset within the study area.

5.2 Fauna Habitat

Native grassland within the offset site provides moderate to high quality habitat for native fauna. These areas are likely to be utilised by birds adapted to open areas and large macropods including Australian Magpie *Gymnorhina tibicen*, Magpie-lark *Grallina cyanoleuca* and Eastern Grey Kangaroo *Macropus giganteus*. Nocturnal and diurnal raptors are likely to forage over these areas, with Black-shouldered Kites *Elanus axillaris* observed during the site assessment, hovering over grassland areas. Areas of native grassland, particularly those with a high cover of wallaby-grasses *Rytidosperma* spp. provide known and likely habitat for the nationally significant Golden Sun Moth. Areas identified as Stony Knoll Shrubland (Figure 2) support cracking soils as well as surface and embedded rock, which may provide sheltering habitat for reptiles and small mammals including the nationally significant Striped Legless Lizard *Delma impar* and the regionally significant Fat-tailed Dunnart *Sminthopsis crassicaudata*.

Previous surveys identified numerous significant fauna species across the entire property, listed in Table 9 (Damien Cook, Australian Ecosystems in Brett Lane and Associates Pty Ltd 2013; Enics Solutions 2012). Of these species, Brolga *Grus rubicunda* and Golden Sun Moth *Synemon plana* are likely to occur within the offset site.

Table 9. Significant fauna identified during previous surveys

Species	DEPI Advisory List	FFG Act	EPBC Act	Recorded by
Australian Shoveler <i>Anas rhynchos</i>	Vu	-	-	1
Whiskered Tern <i>Chlidonias hybridus</i>	NT	-	-	1
Spotted Harrier <i>Circus assimilis</i>	NT	-	-	1
Brown Quail <i>Coturnix ypsilophora</i>	NT	-	-	1
Latham's Snipe <i>Gallinago hardwickii</i>	NT	-	-	1
*Brolga <i>Grus rubicunda</i>	Vu	L	-	1
Growling Grass Frog <i>Litoria raniformis</i>	En	L	Vu	1
Caspian Tern <i>Hydroprogne caspia</i>	NT	L	-	1
*Golden Sun Moth <i>Synemon plana</i>	Cr	L	Cr	2
Corangamite Water Skink <i>Eulamprus tympanum marnieae</i>	En	L	Cr	3

Notes: 1 = Damien Cook, Australian Ecosystems in Brett Lane and Associates Pty Ltd 2013; 2 = Enics Solutions 2012; 3 = identified by landowner in Brett Lane and Associates Pty Ltd 2013. Cr = Critically Endangered; En = Endangered; Vu = Vulnerable; NT = Near Threatened; L = Listed. * = Suitable habitat within the offset site.

An ecological assessment undertaken by Brett Lane and Associates Pty Ltd (2013) identified suitable habitat for numerous additional fauna species which have potential to occur across the entire property. These species include Black Falcon *Falco subniger*, Curlew Sandpiper *Calidris ferruginea*, Eastern Great Egret *Ardea modesta*, Emu *Dromaius novaehollandiae*, Fat-tailed Dunnart *Sminthopsis crassicaudata*, Fork-tailed Swift *Apus pacificus*, Gull-billed Tern *Gelochelidon nilotica*, Rainbow Bee-eater *Merops ornatus*, Red-necked Stint *Calidris ruficollis*, Royal Spoonbill *Platalea regia*, Striped Legless Lizard *Delma impar*, Tussock Skink *Pseudemoia pagenstecheri*, White-throated Needletail *Hirundapus caudacutus* and White-bellied Sea-Eagle *Haliaeetus leucogaster*. Of these species, there is suitable habitat within the offset site for Striped Legless Lizard, Fat-tailed Dunnart and Tussock Skink.

5.2.1 Golden Sun Moth

Golden Sun Moth was identified within the study area during a previous ecological assessment (Enics Solutions 2012). Five male Golden Sun Moths were identified within the study area on 11 December 2012 (Figure 2). Three male and two female Golden Sun Moths were identified on 10 December 2012 approximately 200 metres east of the study area (Figure 2). Moths were recorded within remnant grassland vegetation with a high cover of wallaby grasses, a preferred food source for Golden Sun Moth. Targeted surveys ceased upon identification of five Golden Sun Moth individuals, confirming the presence of Golden Sun Moth but not their abundance or habitat extent throughout the property. However, based on habitat present within the study area, landscape context and the presence of a known population, Golden Sun Moth is considered highly likely to occur throughout the study area where suitable habitat is present. Suitable habitat includes all areas identified as Plains Grassland and Stony Knoll Shrubland, comprising 79.2 hectares within the offset site, and 178 hectares across the entire property (Figure 2).

6 LIKE-FOR-LIKE CRITERIA

In determining the appropriate offset responses for permitted vegetation clearance, the Framework sets out several like-for-like criteria, which must be met for any offset site (DNRE 2002). Relevant like-for-like criteria are shown in Table 10.

Based on the criteria in Table 10, the quality objectives have been met for all vegetation losses.

Table 10. Summary of offset site requirements to meet Net Gain criteria

Offset Attributes	Conservation Significance			
	Very High	High	Medium	Low
Vegetation or habitat type	The same vegetation / habitat type	The same vegetation / habitat type OR a Very High significance vegetation / habitat in the same Bioregion	Any EVC in the Bioregion OR a Very High or High significance vegetation / habitat in an adjacent Bioregion	
Landscape role	Similar or more effective ecological function AND land protection function as impacted by the loss	Similar or more effective ecological function OR land protection function as impacted by the loss	Similar or more effective land protection function as impacted by the loss	
Quality	90% of the quality being lost	75% of the quality being lost	50% of the quality being lost	
Revegetation	10%	25%	50%	100%
'Trading up'	Where gains are achieved in vegetation / habitat of a higher significance than the vegetation lost, then the amount of the offset will be proportionally reduced. E.g. offsetting losses in Medium conservation significance with Very High conservation significance gains will reduce the amount of the offsets by half, i.e. the Medium multiplier (1) divided by the Very High multiplier (2).			

6.1 Gains Available in Proposed Offset Site

Quantification of the available gains at the offset site is shown in Table 11. The gains available at the offset site are based on several commitments, such as managing existing remnant vegetation (i.e. by retaining and protecting vegetation, all fallen coarse woody debris within all zones and controlling high-threat weeds) and increasing security (through an on-title agreement, such as a Section 173 agreement or Trust-for-Nature covenant). The offset site is private land for the purposes of calculating gain as per DEPI guidelines (DSE 2010a). Therefore prior management, security, maintenance and improvement gains are available (DSE 2006a, Table 2a. p.7; DSE 2010a).

The gains achievable from the “proposed offsets” from remnant vegetation are presented within this section.

6.1.1 Remnant vegetation gains available

A habitat hectare assessment has previously been undertaken with part of the site (BLA 2013). These sites and their condition scores were reviewed and additional assessments were conducted on remnant patches of Plains Grassland vegetation outside of the original assessment area within the offset site (Table 11). In

total, four Habitat Zones are proposed to be utilised as part of the offset site with a combined area of 79.2 hectares, comprising 45.78 habitat hectares of Very High conservation significance Plains Grassland. This vegetation is considered of Very High conservation significance, as Plains Grassland vegetation is endangered in the Victorian Volcanic Plain bioregion (DSE 2013b).

The native vegetation Gains available in the study area have been calculated using the habitat scores for each Plains Grassland habitat zone recorded above, DSE's Gains Calculator and Vegetation Gain Approach (DSE 2006) (Table 11). A total gain of 16.39 habitat hectares of Very High conservation significance Plains Grassy Woodland is available in the four habitat zones recorded in the study area.

These Gains are available on the basis that the site will be secured with an on-title agreement (e.g. Section 173 or equivalent) and contains an approved 10-year Offset Management Plan outlining the management actions required to maintain and improve the current condition of native vegetation recorded.

6.1.2 Remnant trees gains available

No remnant trees are proposed to be retained within the site.

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Table 11. Meeting Like-for-Like criteria for clearing remnant patches

Target #	Clearing site						Offset site						
	Habitat Zones	Bioregion	EVC	Conservation Significance	Min. Habitat Score for Target	Other Like-for-Like Requirements	Trading up	Offset Zones	Bioregion	EVC	Conservation Significance	Habitat Score	Other Like-for-Like Attributes
H1	PG	VVP	Plains Grassland	Very High	0.43	Best 50% of habitat for GSM	No	PG1	VVP	Plains Grassland	Very High	0.54	GSM habitat confirmed
H2	PG	VVP	Plains Grassland	High	0.24	N/A	Yes	PG1	VVP	Plains Grassland	Very High	0.54	N/A
H3	PGWe	VVP	Plains Grassy Wetland	High	0.22	N/A	Yes	PG1	VVP	Plains Grassland	Very High	0.54	N/A
H4	CGW	VVP	Creekline Grassy Woodland	High	0.24	N/A	Yes	PG1	VVP	Plains Grassland	Very High	0.54	N/A
H5	PGW	VVP	Plains Grassy Woodland	High	0.39	N/A	Yes	PG1, PG9, PG10	VVP	Plains Grassland	Very High	0.54, 0.45, 0.53	N/A

Table 12. Native vegetation gains available

EOI Code / land manager name		Darlington			Darlington			Darlington			
Site code (number) / Habitat Zone ID (letter)		PG1			PG10			PG9			
Land tenure		freehold			freehold			freehold			
Property Size		>=10 Ha			>=10 Ha			>=10 Ha			
Patch Size		>=20Ha			<5 ha			>=20Ha			
Zone type		Offset (Stat Planning)			Offset (Stat Planning)			Offset (Stat Planning)			
Proposal type		Remnant patch			Remnant patch			Remnant patch			
Security arrangement		Registered on-title agreement or crown land equivalent			Registered on-title agreement or crown land equivalent			Registered on-title agreement or crown land equivalent			
Bioregion		Victorian Volcanic Plain			Victorian Volcanic Plain			Victorian Volcanic Plain			
EVC name		Plains Grassland			Plains Grassland			Plains Grassland			
BCS		E			E			E			
EVC standardiser		1.36			1.36			1.36			
		Max	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha
Scores	Large Trees	10	na	na		na	na		na	na	
	Tree Canopy Cover	5	na	na	na	na	na	na	na	na	na
	Understorey	25	15	3.75	0.625	15	3.75	0.625	15	3.75	0.625
	Lack of Weeds	15	9		1	6		1	6		1
	Recruitment	10	0	0	0.5	6	1.5	0.5	0	0	0.5
	Organic Litter	5	3	0.75	0.5	3	0.75	0.5	3	0.75	0.5
	Logs	5	na	na	na	na	na	na	na	na	na
	Standardised Site Condition	75	37			41			33		
	Landscape Context	25	17			12			12		
	HabHa Score	100	54			53			45		
Subtotal of gains				4.5	2.625		6	2.625		4.5	2.625
Standardised Sum Main + Impr Gain/Ha			9.69			11.73			9.69		
Prior Mgt Gain/Ha			5.4			5.3			4.5		
Security Gain/Ha			5.4			5.3			4.5		
Total Gain/Ha			20.49			22.33			18.69		
Size of habitat zone (Ha)			54.2			6.8			8.43		
TOTAL GAIN (HHa)			11.11			1.52			1.58		

6.2 Summary of Available Gains

The gains available within the proposed offset site were calculated based on the quality and condition of the remnant native vegetation as well as applicable management actions and objectives. The following gains are available within the offset site (Table 12, Figure 2):

- 14.21 habitat hectares of Very High conservation significance Plains Grassland (EVC 132).

Remnant vegetation identified in Figure 2 within the offset site is proposed to be protected as part of this OMP. Additional areas within the offset site are available for protection including additional areas of Plains Grassland and other EVCs (Stony Knoll Shrubland, Plains Grassy Wetland, Creekline Tussock Grassland and Brackish Wetland). Some areas of Plains Grassland have also been assigned as offsets for other project and are pending formal approval.

6.3 Allocation of Native Vegetation Gains

Based upon the retained vegetation and the potential gains available within the proposed offset site, Table 13 documents how the Net Gain targets can be partially met via the retention, protection and management of the offset site. The total gains to be utilised within the offset site (16.39 habitat hectares) forms part of the offset strategy for the total gain targets required. Not all offsets can be satisfied with the available gain within the offset site due to the like-for-like criteria for some offsets. As such, additional gains must be secured at other offset sites to meet total gain targets for the proposed losses.

A surplus of 3.49 habitat hectares of Very High conservation significance Plains Grassland remains after the allocation of gain to all suitable offset targets where like-for-like criteria can be met.

Table 13. Allocation of native vegetation gains for clearing a remnant patch

Gain Target				Trading Up	Gain Target	Source of gains to meet targets		Outcome	
Target #	EVC	Conservation significance	Target (Hha)	Discount	Gain Target	Offset Zone	Gain (Hha)	Total Gains from designated offset area (Hha)	Surplus/Deficit (Hha)
1	PG	Very High	2.32	0	2.32	PG1	11.11	2.32	+8.79
2	PG	High	3.12	0.75	2.34	PG1	(+8.79)^	2.34	+6.45
3	PGWe	High	0.09	0.75	0.07	PG1	(+6.45)^	0.07	+5.38
4	CGW	High	0.38	0.75	0.29	PG1	(+5.38)^	0.29	+5.09
5a	PGW	High	10.50	0.75	7.88	PG1	(+5.09)^	7.88	-2.79*
5b	PGW	High	10.50	0.75	7.88	PG10	1.52	2.79~	-1.27
5c	PGW	High	10.50	0.75	7.88	PG9	1.58	1.27	+0.31
Total			16.32		12.9		14.21	12.9	+0.31

Notes: ^Carry over from previous line, indicates surplus from PG1. * Indicates remaining deficit that must be satisfied through another remnant patch. ~Indicates deficit carried over from Target 5a.

7 PART B – OFFSET IMPLEMENTATION

This section presents the actions required to implement the OMP. The plan details methods for the management and conservation of native vegetation at the offset site over the requisite ten year management period and in perpetuity.

It is anticipated that the offset management works will begin prior to the clearing of native vegetation associated with the proposed development. It is envisaged that all works would be conducted by a suitably qualified and experienced contractor.

The plan aims to achieve vegetation gains through on-ground actions and therefore is required to be simple and practical. However, the management actions must be measurable against the commitments made in the calculation of habitat gain scoring (i.e. measures to achieve the Net Gain target).

7.1 Details of Offset Site

Table 14 provides details of the offset site.

Table 14. Offset Site Details

Offset Site Details	
Landowner of offset site	s47F
Type of offset (onsite, 3rd party)	3rd Party
Location and address of offset site	s47F
Area of offset site (ha)	79.2 hectares in total
Offset site number (if applicable)	N/A
Volume	-
Folio	-
Parish	-
Allotment	Lot 1 TP320279
Local Government Area	Moyne Shire Council
Responsible Authority	DEPI
Bioregion	Victorian Volcanic Plain

7.2 Strategy for Offset Site

The offset site is to be secured and managed for conservation purposes in perpetuity. The management strategy for the proposed offset site consists of implementing a vegetation management plan incorporating weed control and regular monitoring. Details of security and management responsibility are shown in Table 15.

Table 15. Security and Management Responsibility

Offset Security and Management Responsibility	
Who is liable/responsible for meeting offset requirements?	VicRoads
Type of security i.e. Planning Permit Condition, Section 69 of the <i>Conservation, Forest and Lands Act 1987 (Vic)</i> , Section 173 of the <i>Planning and Environment Act 1987 (Vic)</i> Covenant under the <i>Victorian Conservation Trust Act 1972 (Vic)</i>	TBC
Agreement or Planning Permit Number (ID)	TBC
Date 10-year offset management to commence	03/2014
Date 10-year offset management expires	03/2024
Registered on title? (Yes/No)	Yes
Offset site management responsibility (i.e. Landowner, Authority Name)	VicRoads
Offset Monitoring Responsibility (i.e. Responsible Authority, DEPI)	VicRoads

7.3 Management Objectives

The offset site will be managed for the purposes of conservation. Management of these sites will involve physical protection of the proposed offset site, the control of pest animals and a number of high threat environmental weeds, biomass reduction and general maintenance of the character and quality of the native vegetation, consistent with its occurrence in an area of remnant grassy woodland. Where appropriate, the offset management plan and specified management actions should form part of a broader strategy for long-term management of ecological values within contiguous land.

7.4 Management Actions

This section presents the actions required to implement the management strategy for remnant grassy woodland within the offset site. The site is to be secured and managed for conservation purposes in perpetuity. Management actions described below are to be implemented for a period of 10 years. The landowners will continue to manage the offset site after the completion of year 10 as specified in this plan, such that:

- weed cover is managed in perpetuity to ensure it does not increase beyond the level attained at year 10 of management;
- pest animals are controlled in perpetuity to the level attained at year 10 of the management; and,
- Golden Sun Moth populations are maintained or improved.

Any proposed uses or development of the site which conflict with the landowners commitments are not permitted under this plan.

7.4.1 Security Arrangements

The offset site will have on-title legal agreements put in place (conservation covenant [*Victorian Conservation Trust Act 1972*], Section 173 [*Planning and Environment Act 1987*] or a Section 69 [*Conservation, Forests and Lands Act 1987*] in accordance with the relevant Responsible Authority) to ensure it is secured and managed appropriately in perpetuity. The agreement will be implemented and the offset site secured prior to clearing of vegetation associated with the development.

7.4.2 Access Control

Without active management and appropriate fencing, unrestricted access into the offset site may result in loss of native vegetation cover, soil disturbance and compaction, and weed facilitation. The perimeter of the property is currently enclosed by permanent post-and-wire fencing, with several internal fences that have been severed and require maintenance or removal. Access control will proceed in accordance with the following:

- Maintain permanent fences surrounding the offset site and repair or remove severed internal fencing. Any new fencing should be constructed with minimal impact to the offset site (i.e. no materials or soil stock piling); and,
- Fence condition will be monitored on an annual basis with any gaps or holes repaired immediately.

7.4.3 Biomass Control

The current biomass reduction method applied throughout the site consists of low-intensity rotational grazing by sheep. This grazing regime is considered appropriate as a method for managing biomass within the offset set on the provision that total vegetation cover remains to be at least 70%. It is also important to minimise stock 'camping' during grazing periods and allow adequate 'rest' between grazing periods.

Alternatively, low intensity mosaic burns can be used to maintain biomass levels as well as aid in the recruitment of indigenous species. Given the presence of suitable habitat for Golden Sun Moth, these activities should be conducted outside of the normal activity period for the species (e.g. employing cool autumn burns). Biomass reduction via ecological burning will be implemented on an as-needed basis, with consideration of the success of stock grazing and based on recommendations presented in vegetation monitoring reports (see Section 7.5).

7.4.4 Pest Control

7.4.4.1 Weed Control

The control of weed species is a key management action within the offset area and is critical to achieving a Net Gain. Effective weed control should promote the regeneration of existing populations of indigenous species and encourage recruitment from soil stored seed. Care should therefore be taken to ensure this ultimate objective is not compromised by excessive treatment. Weed control work should be carried out by a suitably qualified contractor.

Whilst all weeds should be treated, emphasis is placed on priority weeds within the offset site and adjacent land. Priority weeds include woody weeds, all noxious weeds listed under the *Catchment and Land Protection Act 1994* (CaLP), species listed as Weeds of National Significance (WONS) or those high threat

species that compete with native flora. High priority weeds that require immediate attention within the offset site and surrounds are listed in Table 16. The control of high threat weed species is a key management action within the offset site and must be adequately addressed if Net Gain is to be achieved.

The following general guidelines should be taken as basic management principles in regards to weed control:

- Weed control methodology for eradicating graminoid and herbaceous weeds will consist of manual removal and/or spot spraying weeds with an appropriate herbicide. Care should be taken when spraying herbicide to ensure that the poison does not affect native vegetation in the local application area. Weed species should be treated before seed is set, which may involve localised slashing if spot-spraying proves ineffective. A dye should be used in the spray to mark where the spraying has occurred;
- Selective herbicide application is preferable to broad area application but clearly the loss of non-target species needs to be balanced with the threat of incomplete control of the existing weed population;
- Eliminate high threat environmental weeds (cover reduced to <1%) within higher quality vegetation with low weed cover and controlling high threat environmental weeds within vegetation with medium cover of weeds (cover reduced to <5%);
- Control all other weeds within all habitat zones (cover reduced to <5%);
- Weed control to be conducted outside of the normal active period for Golden Sun Moth (November to February) and activities will be conducted in a mosaic fashion to avoid any unexpected impacts affecting the entire population at the same time, and consideration to the application of herbicides as the effects of such chemicals on Golden Sun Moth larvae remain unknown;
- Any weed control should be done in a manner that minimises soil disturbance;
- Where herbicide application is employed, waterway sensitive products and non-residual herbicides are to be employed;
- Pest plants that reproduce sexually (by seed) are best controlled before seed set. and,
- To reduce the amounts of herbicide used, the target biomass should be reduced (e.g. slashed) before application so the herbicide can also be absorbed by the actively regrowing plants. Herbicides are only effective when plants are actively growing; and,

Weed control works should be monitored regularly to assess their effectiveness, perform follow up works and evaluate the feasibility of management objectives.

Table 16. Weeds to be controlled

Common Name	Scientific Name	Control Method	Timing	Current Cover	Goal
Herbaceous Weeds					
Thistles*	<i>Cirsium spp.</i>	SS, CH	All Year	1%	Eliminate (<1%)
Horehound*	<i>Marrubium vulgare</i>	SS, CH	All Year	1%	Eliminate (<1%)
Ox-tongue	<i>Helminthotheca echioides</i>	SS, CH	Winter-Spring	1%	Control
Grassy Weeds					
Annual Grasses – Various species	<i>Vulpia, Avena spp.</i>	M, SS	Mid-winter to late spring	10%	Maintain low cover (<5%)
Perennial Grasses – Various species	<i>Lolium, Dactylis, Phalaris, spp.</i>	MR, SS, M	All year	10%	Control (<5%)

Notes: CP = Cut and Paint; RB = Ringbark; WB = Weed Burner; SS = Spot-spray; M = Frequent Mowing; DF = Drill and Fill; MR = Manual removal; CH = Chip Out or Hand Pull. Weed Status: * = Declared Noxious Weed (DPI 2008)

7.4.4.2 Pest Animal Control

European Rabbits remain a threat for the regeneration/recruitment of native species throughout western Victoria. All vermin harbour (i.e. burrows) should be removed, without disturbance to native vegetation or significant soil disturbance. The land owner/contractor is to monitor pest animal use of the offset site whilst undertaking vegetation management works. Any changes in the influences of pest animals may require a change in the management actions.

The following key management actions will be undertaken to ensure success of the pest animal program:

- Identify potential harbour and burrows, and destroy if soil disturbance can be minimised and all native vegetation retained;
- Undertake a pest animal control program (e.g. baiting, trapping and shooting of foxes, hares, rabbits or feral cats); and,
- Monitor the population of pest animals during weed control works and adapt management as considered appropriate.

7.4.5 Supplementary Planting

It is anticipated that natural regeneration of remnant native vegetation and implementation of weed control measures are likely to improve the overall cover and diversity of indigenous flora within the offset site and hence contribute to Net Gain targets. As such, direct seeding and supplementary planting is not essential at this stage of proceeding and has not been included as a required management action as part of this plan. However, through discussions with the landholders, there may be opportunity to undertake some form of grassland revegetation within the site through appropriate trials. Any proposed revegetation should be undertaken using seed of local provenance appropriate to the Plains Grassland EVC and with reference to DEPI's planting guidelines (DSE 2006c). Any requirement for direct seeding and supplementary planting should be reviewed at the end of each year of management works.

7.4.6 Threatened Species

There is suitable habitat throughout the property, including within the proposed offset site, for several significant flora and fauna species (Section 5). Management actions should be undertaken to ensure that; firstly these species are protected, and; secondly recruitment or expansion of the species is encouraged. Ongoing management activities need to be aware of any significant species that may persist on the site. All workers involved in the control of pest plants and animals must be able to identify the significant plant and animal species present within the study area.

7.5 Monitoring and Reporting

Monitoring of native vegetation and Golden Sun Moth habitats should be undertaken by a suitably qualified ecologist to ensure key performance targets are met and the responsible authorities notified of the successes and failures of works through regular progress reports. Progress reports will be provided to the responsible authority at the end of year 2, 5 and 10 of the program (Table 17).

7.5.1 Monitoring

7.5.1.1 *Native vegetation*

Monitoring is required to assess the positive and negative impacts of management actions on the integrity of the offset site, and to implement change if required. Vegetation monitoring will be conducted annually, with progress reports provided to the responsible authority at the end of year 2, 5 and 10 of the program.

This monitoring will be undertaken by a suitably qualified ecologist, with some input from the landowners. However, the frequency of monitoring may need to vary to allow for seasonal variations and to target periods of active weed growth. Similarly, pest animal monitoring should be undertaken at a time of year when these animals are most active so that an accurate assessment of population sizes can be made.

It is recommended that monitoring be undertaken by qualified ecological consultants familiar with the methodology as well as any offset and EPBC Act referral requirements. Monitoring and progress reports should include the following:

- Collection of baseline data to be used as a reference point to assess the impacts of management actions;
- Overall condition and composition of vegetation as well as consideration of Net Gain measurable outcomes;
- Condition and health of scattered trees;
- Biomass levels;
- The extent, severity, trend and presence of current weed species and any new and emerging weed species; and,
- Implementation of permanent photo points. Photographs must be taken at the same location and during the same time of each year. Photo points will allow monitoring of weed populations and maintenance of the current condition of native vegetation within the offset site. Details of photo points and photographs will be provided to DEPI where required as evidence of progress.

7.5.1.2 *Golden Sun Moth*

Golden Sun Moth populations are known to vary on spatial and temporal scales depending upon habitat conditions at a particular site. Monitoring is required to determine if Golden Sun Moth has persisted in grassland areas, to determine reproductive success and to ensure that management actions and habitats are suitable for a viable Golden Sun Moth population in the future.

Annual monitoring of Golden Sun Moth populations will be undertaken for an initial 4 year period, and then in years 6, 8 and 10 (within the ten year management timeframe). If, at the end of the four year monitoring program, the results indicate a decline in the Golden Sun Moth population or degradation of Golden Sun Moth habitat, the OMP will be re-evaluated and adapted accordingly.

Specific survey procedures will follow those approved by DoE and outlined in the Biodiversity Precinct Planning Kit (DSE 2009). The following will be undertaken as part of population and habitat monitoring of Golden Sun Moth habitat for the initial 4 year period (and extended if required):

- Collection of baseline data to be used as a reference point to assess the impacts of management actions. This will comprise targeted Golden Sun Moth surveys undertaken throughout the extent of the offset site, and the remainder of the property where possible;
- Surveys are to be conducted by suitably trained observers;
- Surveys must take place during the species' flight season. This is generally late October to early January. Ensure moths are active on the day of assessment by using a reference site where the species is known to be present;
- Surveys must be undertaken during conditions suitable for detecting the species. Male moths generally fly between 10am and 3pm on warm (over 20°C by 10am) days with minimal cloud cover and still conditions. However if males are observed flying after 3pm or during moderately windy conditions surveys can continue until males are no longer observed flying; and,
- Surveys should be conducted using 50 metre wide, parallel transects with two observers walking or, if terrain permits, driving in a car at < 10 km / hour (flying male moths can be readily seen from a vehicle) until moths are observed. Tracks (transects) must be recorded with a GPS to show where survey has been undertaken.

7.5.1.3 *Other Monitoring*

Information relating to fencing and signage, weed control and pest animal control will be provided by landowners and the relevant contractors, with a landowner monitoring form completed on an annual basis (see below). This information will be included in the progress report, discussed below.

7.5.2 Reporting

Progress reports will be provided to the responsible authority at the end of year 2, 5 and 10 of the program. Information to be provided in the progress report includes:

- A copy of the Management Actions Table (Table 17) detailing actions completed during the reporting period;
- Landowner monitoring and reporting forms;
- A description of the specific monitoring results from ecological surveys undertaken;
- Results 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.);
- Any corrective actions and contingency measures where monitoring indicates that there has been a deterioration in the native vegetation or Golden Sun Moth population; and,
- Photographs showing evidence of works.

In order to meet EPBC Act referral conditions, all records/evidence of management actions must be maintained, and be submitted to DoE upon request, and any proposed management changes must be submitted to DoE prior to the changes being undertaken.

If any agreed management actions or commitments are incomplete or have not been undertaken in the times specified, the contractor is to document the justification and the actions that will be undertaken to implement the requirement.

7.5.2.1 Landowner Monitoring and Reporting Form

Information relating to fencing and signage, weed control and pest animal control will be provided by landowners and the relevant contractors, with a landowner monitoring form completed on an annual basis (see below). The template for a landowner monitoring and reporting form is shown in Table 18.

If any agreed management actions or commitments are incomplete or have not been undertaken in the times specified, the responsible party must explain the reasons why and what program of action/s will be undertaken to implement the action. If no action has been undertaken please explain the reason(s) and how the targets specified will be met.

7.6 Management Actions Table

Management actions are summarised in Table 17. The actions constitute the minimum management requirements for the offset site over the mandatory 10 year management period.

Table 17. Management Actions Table

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
0	0.1	Implement on-title legal agreements for offset site	Liaise between the landowner, DEPI and Council.	Prior to clearing of native vegetation	Section 7.4.1	
0	0.3	Acquire baseline monitoring data	Suitably qualified ecological specialist	Prior to clearing of native vegetation	Section 7.5.1	
1	1.1	Maintain permanent fences surrounding the offset site and construct internal fencing of offset site, as required	Landowner	Prior to clearing of native vegetation	Section 7.4.2	
1	1.2	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
1	1.3	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
1	1.4	Conduct monitoring for vegetation and Golden Sun Moth	Suitably qualified ecological specialist	One year after commencement of OMP	Section 7.5.1	
1	1.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
2	2.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
2	2.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
2	2.3	Conduct monitoring for vegetation and Golden Sun Moth	Suitably qualified ecological specialist	Two years after commencement of OMP	Section 7.5.1	
2	2.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
2	2.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
2	2.6	Monitor and assess works, and prepare progress report	Suitably qualified ecological specialist	Two years after commencement of OMP	Section 7.5	

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
3	3.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
3	3.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
3	3.3	Conduct monitoring for vegetation and Golden Sun Moth	Suitably qualified ecological specialist	Three years after commencement of OMP	Section 7.5.1	
3	3.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
3	3.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
4	4.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
4	4.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
4	4.3	Conduct monitoring for vegetation and Golden Sun Moth	Suitably qualified ecological specialist	Four years after commencement of OMP	Section 7.5.1	
4	4.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
4	4.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
5	5.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
5	5.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
5	5.3	Conduct monitoring for vegetation	Suitably qualified ecological specialist	Five years after commencement of OMP	Section 7.5.1	
5	5.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
5	5.5	Monitor biomass density and implement stock grazing regime or develop ecological	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
		burn/ fuel reduction plan if appropriate				
5	5.6	Monitor and assess works, and prepare progress report	Suitably qualified ecological specialist	Five years after commencement of OMP	Section 7.5	
6	6.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
6	6.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
6	6.3	Conduct monitoring for vegetation and Golden Sun Moth	Suitably qualified ecological specialist	Six years after commencement of OMP	Section 7.5.1	
6	6.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
6	6.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
7	7.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
7	7.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
7	7.3	Conduct monitoring for vegetation	Suitably qualified ecological specialist	Seven years after commencement of OMP	Section 7.5.1	
7	7.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
7	7.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
8	8.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
8	8.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
8	8.3	Conduct monitoring for vegetation and Golden Sun Moth	Suitably qualified ecological specialist	Eight years after commencement of OMP	Section 7.5.1	

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
8	8.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
8	8.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
9	9.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
9	9.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
9	9.3	Conduct monitoring for vegetation	Suitably qualified ecological specialist	Nine years after commencement of OMP	Section 7.5.1	
9	9.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
9	9.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
10	10.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 16	Section 7.4.4	
10	10.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
10	10.3	Conduct monitoring for vegetation and Golden Sun Moth	Suitably qualified ecological specialist	Ten years after commencement of OMP	Section 7.5.1	
10	10.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
10	10.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
10	10.6	Monitor and assess works, and prepare final report	Suitably qualified ecological specialist	Ten years after commencement of OMP	Section 7.5	

Table 18. Landowner Monitoring and Reporting Form

Landowner of offset site		
Location and address of offset site		
Offset site number (if applicable)		
Offset plan reference number (if applicable)		
Responsible Authority		
Report #		
Actions completed within the offset site (since commencement)	Date and details of action	Key performance target met (Y/N)
Signature		
Date		

8 REFERENCES

- Brett Lane and Associates Pty Ltd 2013. 'Terrinallum South', s47F Native Vegetation and Threatened Species Assessment. Report prepared for s47F.
- DEPI 2014a. EVC Benchmarks. www.depi.vic.gov.au. Department of Environment and Primary Industries, Melbourne, Victoria.
- DEPI 2014b. Biodiversity Interactive Map 3.1., available from URL: www.depi.vic.gov.au/about-dse/interactive-maps. Department of Environment and Primary Industries, Melbourne, Victoria.
- DNRE 2002. Victoria's Native Vegetation Management: A Framework for Action. Department of Natural Resources and Environment, Victoria.
- DPI 2008. Declared Noxious Weeds – Listed by Common Name. Landcare Notes. Department of Primary Industries.
- DSE 2004. Vegetation Quality Assessment Manual: Guidelines for Applying the Habitat Hectares Scoring Method, Biodiversity and Natural Resources Division, Department of Sustainability & Environment, East Melbourne, Victoria.
- DSE 2006a. Vegetation Gain Approach – Technical basis for calculating gains through improved native vegetation management and revegetation. Victorian Government, Department of Sustainability and Environment, East Melbourne.
- DSE 2006b. Native Vegetation: Scoring Gain from an offset – DSE Gain Calculator user instructions. Victorian Government, Department of Sustainability and Environment, East Melbourne.
- DSE 2006c. Native Vegetation Revegetation planting standards – Guidelines for establishing native vegetation for net gain accounting. Victorian Government, Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE 2007. Native Vegetation: Guide for Assessment of Referred Planning Permit Applications, Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE 2010. Net Gain Calculator, Version 1.2.5., Department of Sustainability and Environment, East Melbourne.
- DSE 2011a. Victorian Biodiversity Atlas (VBA). Sourced from: 'VBA_FLORA25' and 'VBA_FLORA100', Department of Sustainability and Environment, Victoria.
- DSE 2011b. Victorian Biodiversity Atlas (VBA). Sourced from: 'VBA_FAUNA25' and 'VBA_FAUNA100', Department of Sustainability and Environment, Victoria.
- DoE 2014. Environment Protection and Biodiversity Conservation Act 1999 Protected Matters Search Tool (PMST). <http://www.environment.gov.au/erin/ert/epbc/index.html>. The Department of Environment, Canberra.

Ecology and Heritage Partners Pty Ltd 2012. Western Highway Project: Section 2, Beaufort to Ararat, Victoria. Impact Assessment Report – Flora, Fauna and Ecological Communities. Report prepared for VicRoads.

Enics Solutions 2012. Terrinallum South Golden Sun Moth Survey, December 2012. Report prepared for **s47F**.

GHCMA 2006. Glenelg Hopkins Catchment Management Authority Native Vegetation Plan. Glenelg Hopkins Catchment Management Authority, Victoria.

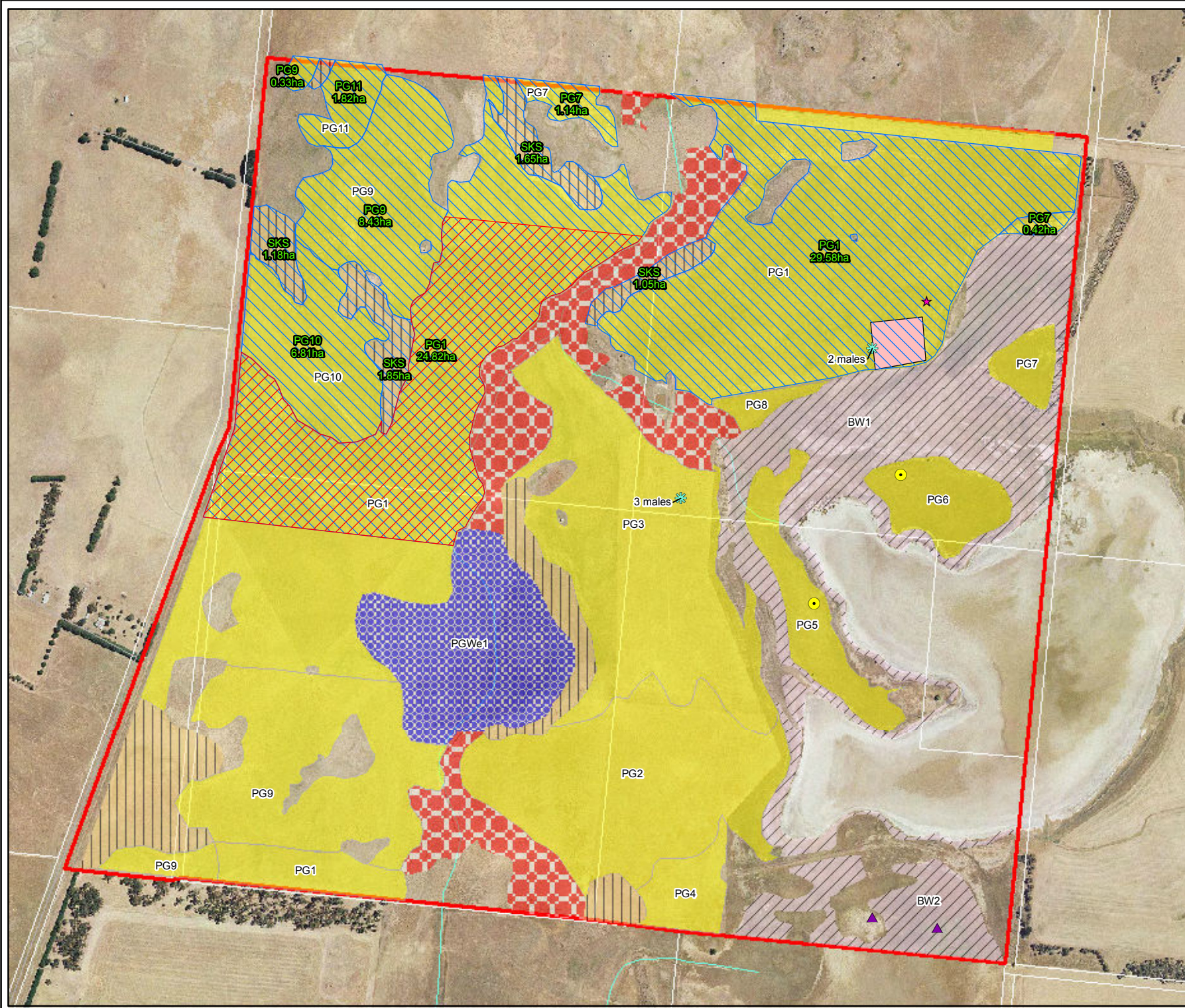
Viridans 2012a. Flora Information System (FIS), Viridians Biological Databases Pty Ltd, Department of Sustainability and Environment, East Melbourne, Victoria.

Viridans 2012b. Victorian Fauna Database (VFD), Viridians Biological Databases Pty Ltd, Department of Sustainability and Environment, East Melbourne, Victoria.

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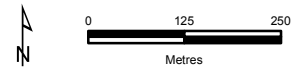
FIGURES

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- Legend**
- Study Area
 - ARI Trial site
- Proposed Offset**
- NTGVVP
 - GSM Habitat
- Vegetation**
- Creekline Tussock Grassland
 - Plains Grassland
 - Plains Grassy Wetland
 - Stony Knoll Shrubland
 - Brackish Wetland
- BLA Threatened Flora Results**
- ▲ Brackish Plains Buttercup individual
 - ★ Fragrant Leek Orchid population
 - Spiny Rice-flower population
- Enics Solutions Threatened Fauna Results**
- ★ Golden Sun Moth (Dec 2012)

Figure 2
Location of the study area
Terrallum South, Darlington



VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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APPENDIX 1 – EPBC ACT OFFSET CALCULATORS

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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	GEWVVP
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							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	<i>Ecological communities</i>						
	Area of community	Yes	11.14 hectares of GEWVVP	Area	11.14	Hectares	Site assessments and EES report
				Quality	4	Scale 0-10	
				Total quantum of impact	4.46	Adjusted hectares	
	<i>Threatened species habitat</i>						
	Area of habitat	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Number of features e.g. Nest hollows, habitat trees	No						
Condition of habitat Change in habitat condition, but no change in extent	No						
<i>Threatened species</i>							
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																				
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			
	<i>Ecological Communities</i>																			
	Area of community	Yes	4.46	Adjusted hectares	23.5 hectares GEWVVP	Risk-related time horizon (max. 20 years)	10	Start area (hectares)	23.5	Risk of loss (% without offset)	15%	Risk of loss (% with offset)	0%							
								Future area without offset (adjusted hectares)	20.0	Future area with offset (adjusted hectares)	23.5	3.53	80%	2.82	1.46	4.47	100.37%	Yes	\$1,175,000.00	Cost estimated at \$50,000 per hectare. Based on current market value
							Time until ecological benefit	5	Start quality (scale of 0-10)	4	Future quality without offset (scale of 0-10)	4	Future quality with offset (scale of 0-10)	7	3.00	80%	2.40	1.73		
	<i>Threatened species habitat</i>																			
	Area of habitat	No				Time over which loss is averted (max. 20 years)		Start area (hectares)		Risk of loss (% without offset)		Risk of loss (% with offset)								
								Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0									
							Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)							
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start value	Future value without offset	Future value with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source			
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
<i>Threatened species</i>																				
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								
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	4.456	4.47	100.37%	Yes	\$1,175,000.00	N/A	\$1,175,000.00
						\$1,175,000.00	\$0.00	\$1,175,000.00

Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Golden Sun Moth
EPBC Act status	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
<i>Ecological communities</i>					
Area of community	No		Area		
			Quality		
			Total quantum of impact	0.00	
<i>Threatened species habitat</i>					
Area of habitat	Yes	31.56 hectares of Golden Sun Moth habitat	Area	31.56	Hectares
			Quality	4	Scale 0-10
			Total quantum of impact	12.62	Adjusted hectares
<i>Threatened species</i>					
Number of features e.g. Nest hollows, habitat trees	No				
Condition of habitat Change in habitat condition, but no change in extent	No				
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	
<i>Ecological Communities</i>																	
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (%) without offset	Risk of loss (%) 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	
							0.0	0.0									
							Future area without offset (adjusted hectares)	Future area with offset (adjusted hectares)									
Area of habitat	Yes	12.62	Adjusted hectares	79.2 hectares of confirmed GSM habitat	Time over which loss is averted (max. 20 years)	Start area (hectares)	Risk of loss (%) without offset	Risk of loss (%) 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	
							10	10%									
							79.2	71.3									
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)	2	6	6	8	2.00	80%	1.60	1.40	12.62	100.00%	Yes	\$3,960,000.00	Cost estimated at \$50,000 per hectare. Based on current market prices.	
<i>Threatened species habitat</i>																	
<i>Threatened species</i>																	
Number of features e.g. Nest hollows, habitat trees	No																
Condition of habitat Change in habitat condition, but no change in extent	No																
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	12.624	12.62	100.00%	Yes	\$3,960,000.00	N/A	\$3,960,000.00
Area of community	0				\$0.00		\$0.00
					\$3,960,000.00	\$0.00	\$3,960,000.00

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							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	<i>Ecological communities</i>						
	Area of community	Yes	5.25 hectares of NTGVVP	Area	5.25	Hectares	Site assessments and EES report
				Quality	6	Scale 0-10	
				Total quantum of impact	3.15	Adjusted hectares	
	<i>Threatened species habitat</i>						
	Area of habitat	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Number of features e.g. Nest hollows, habitat trees	No						
Condition of habitat Change in habitat condition, but no change in extent	No						
<i>Threatened species</i>							
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																						
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					
	<i>Ecological Communities</i>																					
	Area of community	Yes	3.15	Adjusted hectares	20.3 hectares NTGVVP	Risk-related time horizon (max. 20 years)	10	Start area (hectares)	20.3	Risk of loss (% without offset)	10%	Risk of loss (% with offset)	0%	2.03	80%	1.62	0.84	3.15	100.05%	Yes	\$1,015,000.00	Cost estimated at \$50,000 per hectare. Based on current market value
							Future area without offset (adjusted hectares)	18.3	Future area with offset (adjusted hectares)	20.3	2.00	80%	1.60	1.40								
							Time until ecological benefit	2	Start quality (scale of 0-10)	5	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	7								
	<i>Threatened species habitat</i>																					
	Area of habitat	No				Time over which loss is averted (max. 20 years)		Start area (hectares)		Risk of loss (% without offset)		Risk of loss (% with offset)										
							Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0												
							Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)									
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start value	Future value without offset	Future value with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source					
Number of features e.g. Nest hollows, habitat trees	No																					
Condition of habitat Change in habitat condition, but no change in extent	No																					
<i>Threatened species</i>																						
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								
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	3.15	3.15	100.05%	Yes	\$1,015,000.00	N/A	\$1,015,000.00
						\$1,015,000.00	\$0.00	\$1,015,000.00

Draft Report

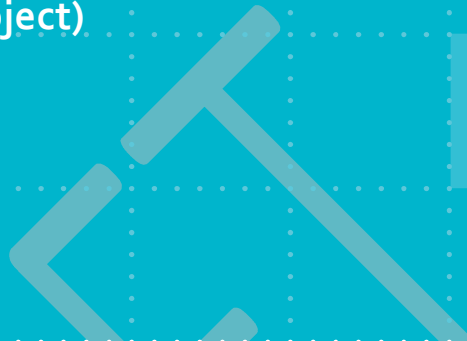
Offset Management Plan:

s47F

Prepared for

VicRoads (Western Highway Project)

March 2014



Ecology and Heritage Partners Pty Ltd

ACKNOWLEDGEMENTS

We thank the following people for their contribution to the project:

- s22 [REDACTED] (VicRoads) for project information;
- The landowners who provided access to the study area.

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DOCUMENT CONTROL

Assessment	Offset Management Plan
Address	s47F [REDACTED]
Project number	5682
Project manager	s47F [REDACTED] (Senior Ecologist)
Report author(s)	s47F [REDACTED] (Senior Botanist)
Report reviewer	s47F [REDACTED] (Consultant Zoologist)
Other EHP staff	N/A
Mapping	s47F [REDACTED]
File name	5682_EHP_Dunkeld_Draft_CMP_03032014
Client	VicRoads (Western Highway Project)
Bioregion	Central Victorian Uplands (CVU) bioregion and Victorian Volcanic Plains (VVP) bioregion
CMA	Glennelg-Hopkins Catchment Management Authority
Council	Western section: City of Ararat Eastern section: Shire of Pyrenees

Report versions	Comments	Comments updated by	Date submitted
Draft 1	-		03/03/2014

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1 TITLE OFFSET PLAN

Title information for the offset site is documented in Table 1.

Table 1. Title information for the offset site

Title Offset Plan	
Planning Permit Number (ID) / Work Authority No:	TBC
Proponent:	VicRoads (Western Highway Project)
Address:	237 Ring Road, Wendouree, Victoria, 3355
Landowner and Permit (Work Authority) Holder Statement	
Permit (Work Authority) Holder	
Print Name:	VicRoads (Western Highway Project)
Signature:	
Date:	
Landowner of Offset Site	
Print Name:	s47F
Signature:	
Date:	
Referral Authority Statement	
The native vegetation credits described in this plan provide an offset for the removal of native vegetation specified in this plan to the satisfaction of the Department of Environment and Primary Industries.	
Print Name:	Department of Environment and Primary Industries
Position:	
Signature:	
Date:	
Responsible Authority Approval	
This Offset Plan has been approved and is endorsed by the responsible authority.	
Print Name:	
Position:	
Responsible Authority:	
Signature:	
Date:	
Date of Commencement:	

2 INTRODUCTION

2.1 Background

Ecology and Heritage Partners Pty Ltd was commissioned by VicRoads (Western Highway Project) to develop an Offset Management Plan (OMP) for the Western Highway Project, Beaufort to Ararat (Section 2), Victoria (Figure 1).

The Western Highway (A8) is being progressively upgraded as a four-lane divided highway for approximately 110 kilometres (km) between Ballarat and Stawell, and this is referred to as the Western Highway Project. As the principal road link between Melbourne and Adelaide, the Western Highway serves interstate trade between Victoria and South Australia and is the key corridor through Victoria's west, supporting farming, grain production, tourism and a range of manufacturing and service activities. Currently, more than 5,500 vehicles travel on the highway west of Ballarat each day, including 1,500 trucks.

The Western Highway Project consists of three stages:

- Section 1: Ballarat to Beaufort
- Section 2: Beaufort to Ararat
- Section 3: Ararat to Stawell.

A flora, fauna and Net Gain assessment as well as targeted flora, fauna and aquatic surveys were conducted by Ecology and Heritage Partners Pty Ltd between October 2010 and January 2012 in order to document flora and fauna values and legislative implications of the proposed development between Beaufort to Ararat (Section 2) (Ecology and Heritage Partners Pty Ltd 2012).

2.1.1 *Planning and Environment Act 1987*

A planning permit for the project is required from local Council. The project is subject to the provisions of the *Native Vegetation Framework: A Framework for Action* (the Framework) (NRE 2002). The *Permitted Clearance Regulations* and *Biodiversity Assessment Guidelines* (DEPI 2013), which supersede the Framework for projects granted approval prior to 30 December 2013, are not relevant as the planning permit was granted prior to the changes being implemented.

2.1.2 *Environment Protection and Biodiversity Conservation Act 1999*

One flora species, two ecological communities and two fauna species listed under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded within the proposed alignment (Ecology and Heritage Partners Pty Ltd 2012). Based on the EPBC Act Significant Impact Guidelines (DEWHA 1999; 2009), the Project will have a significant impact on Golden Sun Moth *Synemon plana* and the Grassy Eucalypt Woodland of the Victorian Volcanic Plain and Natural Temperate Grassland of the Victorian Volcanic Plain ecological communities.

An EPBC Act referral has been submitted for the proposed construction works. VicRoads were advised by the Department of Environment (formerly Department of the Sustainability, Environment, Water Population

and Communities) on 17 December 2010 that the proposed project is a controlled action requiring assessment and approval in accordance with the EPBC Act.

2.2 Objectives

The objective of the OMP is to document the clearing site and offset site details to meet Net Gain requirements by securing, maintaining and improving remnant vegetation within the designated offset site.

Specifically, the objectives of the OMP are to:

- Review offset requirements based on vegetation clearance and the outcomes of the Planning Permit conditions;
- Review the previous habitat hectare assessment of the proposed offset site; and,
- Develop an OMP to compensate for the permitted loss of vegetation as part of the proposed development. This will include but not be limited to the following:
 - Means of calculating the offsets;
 - Location of the offset sites;
 - Type of offsets to be provided;
 - Details of management actions for remnant vegetation;
 - Investigate an appropriate 'security' arrangement, if applicable;
 - Based on available information from the client, prepare a map of the offset sites;
 - Develop a timetable of proposed management actions, outcomes and progress reviews; and,
 - Suggest appropriate monitoring and evaluation of management actions.

2.3 Report Structure

The structure and content of the OMP is consistent with the requirements of the 'Standard Offset Plan' template provided by the Department of Environment and Primary Industries (DEPI) and is organised in several parts:

- *Introduction* - This section summarises the background information relevant to the Project, including the purpose and scope of the work and the assessment methodology.
- *Part A: Offset Suitability* - This section assesses the suitability of the proposed offset sites, and includes details regarding approved clearing, Like-for-Like criteria and gain calculations. Part A should be read in conjunction with Part B, but due to its technical nature, the information it contains is not intended to be placed on title (e.g. covenant or Section 173 Agreement pursuant to the *Planning and Environment Act 1987*).
- *Part B: Offset Implementation* - This section describes how the offset is to be implemented. Part B includes details regarding landowner commitments, management activities monitoring and reporting. This section is intended for those responsible for implementing the plan, including future landowners. Information in this section is intended to be placed on title.

3 METHODS

3.1 Database and Literature Review

The Victorian Biodiversity Atlas (DSE 2011a; 2011b), the Flora Information System (Viridans 2012a) and the Victorian Fauna Database (Viridans 2012b) were reviewed to identify previous records of native and exotic flora and fauna species within the local area, as well as threatened flora and fauna species that have the potential to occur within 10 kilometres of the proposed offset site.

Information pertaining to matters protected under the EPBC Act including listed taxa, ecological communities and Ramsar wetlands, was obtained from the Department of Environment (DoE) Protected Matters Search Tool (DoE 2014).

Reports and documents detailing the ecological features of the study area as relevant to the OMP were reviewed, in particular:

- Ecology and Heritage Partners Pty Ltd 2012. *Western Highway Project: Section 2, Beaufort to Ararat, Victoria. Impact Assessment Report – Flora, Fauna and Ecological Communities*. Report prepared for VicRoads.
- Plume Ecology Pty Ltd 2014. Email summarising ecological values present within s47F [REDACTED], including attached offset gain calculator. Sent from s47F [REDACTED] (Plume Ecology Pty Ltd) to s47F [REDACTED] (ESLink Services Pty Ltd), 31/01/2014 at 2.22pm.

This OMP has been developed based on *Victoria's Native Vegetation Management: A Framework for Action* (The Framework) (DNRE 2002), as well as relevant vegetation management guidelines and other relevant templates published by DEPI.

3.2 Gain Scoring Method

Gains in habitat score can be achieved via a number of means, where a commitment is made to designate an area as a permanent offset site to compensate for vegetation loss elsewhere. Gains can also be achieved through revegetation of formerly modified land where such offset types are permitted.

Four types of gains are recognised by DEPI for existing vegetation offset sites (DSE 2006a), including:

- *Prior Management Gain* – This gain acknowledges actions to manage a freehold site and usually attracts a score of 10% of the current habitat score of the offset site;
- *Security Gain* – This is gain resulting from actions to enhance the security of the on-going management and protection of native vegetation. This gain usually attracts between 10 and 40% of the current habitat score of the offset site, depending on the security agreement reached and land tenure of the offset site;
- *Maintenance Gain* – This is gain from commitments that contribute to the maintenance of current vegetation quality over time (i.e. avoiding any decline); and,
- *Improvement Gain* – This is gain resulting from management commitments beyond existing obligations under legislation to improve the current vegetation quality.

The amount of gain achieved also depends on the land tenure of the offset site. Gain scores must be consistent with the Vegetation Gain Approach – Technical basis for calculating gains through improved native vegetation management and revegetation (DSE 2006a) and the Native Vegetation: Scoring Gain from an offset – DSE Gain Calculator user instructions (DSE 2006b).

Gain scores for managing existing vegetation and revegetation works are to be achieved over a ten year management period. The vegetation quality achieved from these activities at year ten of management must be protected and maintained in similar condition in perpetuity (DNRE 2002).

Gain scoring was assessed using the (former) Department of Sustainability and Environment (DSE) Gain Calculator (DSE 2010). The calculator allocates maintenance and improvement gain, prior management gain and security gain scores based on the habitat hectare measures and vegetation management actions used to maintain or improve vegetation quality over the mandatory 10 year management period (DSE 2006b).

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4 PART A - OFFSET SUITABILITY

4.1 Clearing Site Details

The clearing site details are provided in Table 2. A detailed description of ecological values within the study area is provided in the Impact Assessment Report (Ecology and Heritage Partners Pty Ltd 2012).

Table 2. Clearing Site Details

Clearing Site Details	
Landowner of clearing site	VicRoads
Location and address of clearing site	Western Highway, Section 2 (Beaufort to Ararat)
Local Government Area	Western section: City of Ararat Eastern section: Shire of Pyrenees
Catchment Management Authority	Glenelg-Hopkins Catchment Management Authority
Responsible Authority	DEPI
Applicant	VicRoads
Planning Permit Number (ID)	TBC
Date approved	TBC

4.1.1 Significant Species and Communities

A total of 227 plant taxa (151 indigenous, 76 exotic) were recorded within the study area (Ecology and Heritage Partners Pty Ltd 2012). One nationally significant flora species (Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens*), two nationally significant ecological communities (Natural Temperate Grassland of the Victorian Volcanic Plain [NTGVVP] and Grassy Eucalypt Woodland of the Victorian Volcanic Plain [GEWVVP]), three State significant flora species (Yarra Gum *Eucalyptus yarraensis*, Emerald-lip Greenhood *Pterostylis smaragdina* and Golden Cowslips *Diuris behrii*), two State significant ecological communities (Western (Basalt) Plains Grassland and Victorian Temperate Woodland Bird Community) and numerous species of regional significance were identified.

A total of 76 fauna species (67 indigenous, 9 exotic) were recorded within the study area (Ecology and Heritage Partners Pty Ltd 2012). Two nationally significant fauna species (Dwarf Galaxias *Galaxiella pusilla* and Golden Sun Moth *Synemon plana*), two State significant species (Brown Toadlet *Pseudophryne bibronii* and Brown Treecreeper *Climacteris picumnus*) and one regionally significant species (Baillon's Crake *Porzana pusilla*) were identified. In addition, the State significant Powerful Owl *Ninox strenua* and Brush-tailed Phascogale *Phascogale tapoatafa* were reported to be present within the study area by a local landholder whose property lies south of the intersection of Martins Lane and Western Highway.

Based on the EPBC Act Significant Impact Guidelines (DEWHA 1999; 2009), the Project will have a significant impact on Golden Sun Moth and the NTGVVP/ GEWVVP ecological communities.

4.1.2 Ecological Vegetation Classes

The alignment footprint intersects ten Ecological Vegetation Classes (EVC)s with varying quality and extent including Alluvial Terraces Herb-rich Woodland, Creekline Grassy Woodland, Grassy Dry Forest, Grassy Woodland, Heathy Dry Forest, Hills Herb-rich Woodland, Heathy Woodland, Plains Grassland, Plains Grassy Woodland and Plains Grassy Wetland.

The Plains Grassland, Plains Grassy Woodland, Alluvial Terraces Herb-rich Woodland, Creekline Grassy Woodland and Plains Grassy Wetland EVCs are considered endangered within the Victorian Volcanic Plain bioregion. Within the Central Victorian Uplands bioregion, the Grassy Woodland, Creekline Grassy Woodland and Alluvial Terraces Herb-rich Woodland EVCs are listed as endangered, the Hills Herb-rich Woodland EVC is listed as vulnerable, the Grassy Dry Forest and Heathy Woodland EVCs are listed as depleted and the Heathy Dry Forest EVC is listed as least concern.

4.2 Summary of Losses and Net Gain targets

4.2.1 State (Victoria)

Offset requirements and multipliers are specified in accordance with Appendix 4, Table 6, pp. 54-55 of the Framework (DNRE 2002) and Table 5 of the Glenelg Hopkins Native Vegetation Plan (GHCMA 2006). A detailed description of vegetation losses is provided in the Flora and Fauna Impact Assessment Report (Ecology and Heritage Partners Pty Ltd 2012).

4.2.1.1 *Vegetation Patches and Large Old Trees*

Total losses and Net Gain targets for remnant native vegetation and Large Old Trees associated with the clearing site are outlined in Table 4.

4.2.1.2 *Scattered Trees*

Total losses and Net Gain targets for scattered trees associated with the clearing site are outlined in Table 5.

4.2.2 Federal

Losses associated with Matters of National Environmental Significance (NES) are summarised in Table 3. Offset targets were determined through discussions with the federal DoE and in accordance with the EPBC Act Offsets Policy (October 2012).

Table 3. Losses associated with Matters of NES

Matter of NES	Losses	Offset Target
Spiny Rice-flower	1 plant	N/A (Plant to be translocated)
Golden Sun Moth	31.56 hectares	79.2 hectares
Dwarf Galaxias	Losses to be avoided	N/A
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	11.14 hectares	23.5 hectares
Natural Temperate Grassland of the Victorian Volcanic Plain	5.25 hectares	21.10 hectares

Table 4. Vegetation losses and Net Gain targets

Bioregion	Target EVC	Conservation significance	Vegetation				Large Old Trees				
			Total Losses (Ha)	Total Losses (HabHa)	Net Gain Multiplier*	Net Gain Target (HabHa)	Total Losses	Protection Multiplier	Total to be Protected	Recruitment Multiplier	Total to be Recruited
CVU	ATHrW	V. High	7.36	3.48	2	6.96	40	8	320	40	1,600
	CGW	V. High	0.01	0	2	0	8	8	64	40	320
	GDF	High	9.69	5.1	1.5	7.65	6	4	24	20	120
		Low	3.2	0.7	1	0.7	0	0	0	0	0
		Medium	4.09	1.57	1	1.57	5	2	10	10	50
	GW	V. High	1.38	0.8	2	1.6	2	8	16	40	80
	HDF	High	2.99	1.76	1.5	2.64	6	4	24	20	120
		Low	0.35	0.2	1	0.2	5	0	0	0	0
	HHRW	High	7.44	3.13	1.5	4.7	5	4	20	20	100
		V. High	4.88	2.93	2	5.86	29	8	232	40	1,160
HW	High	1.58	0.94	1.5	1.41	10	4	40	20	200	
VVP	ATHrW	V. High	4.14	1.82	2	3.64	36	8	288	40	1,440
	CGW	High	0.87	0.25	1.5	0.38	10	4	40	20	200
		V. High	5.71	1.82	2	3.64	16	8	128	40	640
	GW	V. High	0.96	0.54	2	1.08	1	8	8	40	40
	PG(HS)	High	6.93	2.08	1.5	3.12	0	4	0	20	0
		V. High	3.93	1.16	2	2.32	0	8	0	40	0
	PGW	High	26.36	8.21	1.5	12.32	34	4	136	20	680
		V. High	5.77	2.82	2	5.64	8	8	64	40	320
	PGWe	High	0.21	0.06	1.5	0.09	0	4	0	20	0
V. High		0.05	0.01	2	0.02	0	8	0	40	0	
Total			97.9	39.38		65.54	221		1,414		7,070

Notes: CVU = Central Victorian Uplands, VVP = Victorian Volcanic Plain, GDF = Grassy Dry Forest, PG (HS) = Heavier-soils Plains Grassland, HHRW = Hills Herb-rich Woodland, PGWe = Plains Grassy Wetland, CGW = Creekline Grassy Woodland, GW = Grassy Woodland, ATHrW = Alluvial Terraces Herb-rich Woodland, PGW = Plains Grassy Woodland, HDF = Heathy Dry Forest, HW = Heathy Woodland. Alignment area has not been fully assessed for Net Gain (i.e. indicative Due Diligence assessment undertaken in some areas). As such Net Gain targets may vary marginally following

detailed assessment. Large Old Tree targets are based on estimates of trees present and potential losses within each patch, further assessment is required to determine the number of Large Old Trees within all patches within the study area.

Table 5. Scattered Tree losses and Net Gain targets

Study Area	Conservation Significance	Size	Losses	Protect		Recruit		Recruit Only	
				Multiplier*	Target	Multiplier*	Target	Multiplier*	Target
VVP	High	LOT	41	2	82	10	410	100	4,100
		MOT	5	1	5	5	25	50	250
		ST	22	0	0	0	0	0	0
		VLOT	45	4	180	20	900	200	9,000
CVU	High	LOT	24	2	48	10	240	100	2,400
		MOT	4	1	4	5	20	50	200
		VLOT	3	4	12	20	60	200	600
	Low	LOT	7	0	0	5	35	50	350
		MOT	4	0	0	5	20	50	200
		ST	2	0	0	0	0	0	0
		VLOT	5	1	5	5	25	50	250
	Medium	LOT	4	1	4	5	20	50	200
		MOT	3	1	3	5	15	50	150
		VLOT	1	2	2	10	10	100	100

Notes: CVU = Central Victorian Uplands, VVP = Victorian Volcanic Plain, VLOT = Very Large Old Tree, LOT = Large Old Tree, MOT = Medium Old Tree, ST = Small Tree.

4.3 Offset Management Strategy

Several offset sites have been identified to meet State and federal offset requirements. Sites include:

- Dunkeld property: s47F .
 - Offset Management Plan located within current document.
- Darlington property: s47F .
 - Offset Management Plan completed by Ecology and Heritage Partners Pty Ltd (2014).

The following summarises offset requirements for the clearing site and indicates how State and federal offset requirements will be met.

4.3.1 State (Victoria)

4.3.1.1 Vegetation Patches

Table 6 summarises the quantity and location of offsets identified to compensate for losses associated with Large Old Trees and Scattered Trees.

Table 6. Offsets associated with loss of patches of native vegetation

Bioregion	Target EVC	Conservation significance	Total Losses (HabHa)	Net Gain Target (HabHa)	Offsets identified (HabHa); Location	Offsets to be sourced (HabHa)
CVU	ATHrW	V. High	3.48	6.96	-	6.96
	CGW	V. High	0	0	-	0
	GDF	High	5.1	7.65	-	7.65
		Low	0.7	0.7	-	0.7
		Medium	1.57	1.57	-	1.57
	GW	V. High	0.8	1.6	-	1.6
	HDF	High	1.76	2.64	-	2.64
		Low	0.2	0.2	-	0.2
	HHrW	High	3.13	4.7	-	4.7
		V. High	2.93	5.86	-	5.86
HW	High	0.94	1.41	-	1.41	
VVP	ATHrW	V. High	1.82	3.64	-	3.64
	CGW	High	0.25	0.38	0.38; Darlington	0
		V. High	1.82	3.64	-	3.64
	GW	V. High	0.54	1.08	-	1.08
	PG(HS)	High	2.08	3.12	3.12; Darlington	0
		V. High	1.16	2.32	2.32; Darlington	0
	PGW	High	8.21	12.32	1.82; Dunkeld	10.5
		V. High	2.82	5.64	5.64; Dunkeld	0
PGWe	High	0.06	0.09	0.09; Darlington	0	
	V. High	0.01	0.02	-	0.02	

4.3.1.2 Trees

Table 7 summarises the quantity and location of offsets identified to compensate for losses associated with Large Old Trees and Scattered Trees.

Table 7. Offsets associated with loss of Large Old Trees and Scattered Trees

Bioregion	Trees	Scattered	LOT	Total	Offsets identified (no. trees); Location	Offsets to be sourced (no. trees)
CVU	Total Losses	57	116	173	N/A	N/A
	To be Protected	78	750	828	-	828
	To be Recruited	445	3750	4195	-	4195
	Recruit Only	4450	N/A	4450	N/A	N/A
VVP	Total Losses	113	105	218	N/A	N/A
	To be Protected	267	664	931	53; Dunkeld	878
	To be Recruited	1335	3320	4655	265; Dunkeld	4390
	Recruit Only	13350	N/A	13350	N/A	N/A

Notes: Offsets sourced must be either “protect and recruit” or “recruit only”. Under “protect and recruit” five (5) trees are assumed recruited for every one (1) tree that is protected.

4.3.2 Federal

Table 8 summarises the quantity and location of offsets identified to compensate for losses associated with Matters of NES.

Table 8. Offsets associated with Matters of NES

Matter of NES	Losses	Offset Target	Offsets identified (Ha); Location
Spiny Rice-flower	1 plant	N/A	N/A (plant to be translocated)
Golden Sun Moth	31.56 hectares	79.2 hectares	79.2 hectares; Darlington
Dwarf Galaxias	None proposed	N/A	N/A
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	11.14 hectares	23.5 hectares	23.5 hectares; Dunkeld
Natural Temperate Grassland of the Victorian Volcanic Plain	5.25 hectares	21.10 hectares	21.10 hectares; Darlington

4.3.2.1 *Environment Protection and Biodiversity Conservation Act 1999 Offsets Policy*

Offset targets were determined through discussions with DoE and in accordance with the EPBC Act Offsets Policy (October 2012). The EPBC Act Offsets calculator (Excel spreadsheet) was used to determine appropriate offset targets to compensate for the loss of Matters of NES. The calculator spreadsheets are provided in Appendix 1, and the assumptions used to populate the calculator are presented below.

Golden Sun Moth

- *Offset location*: Darlington property.
- *Habitat to be removed* = 31.56 hectares.
- *Habitat quality* = 4/10. The majority of Golden Sun Moth habitat to be removed comprises grassland areas that do not qualify as a remnant patch due to a native species cover of less than 25%, and with a high cover of weed species. These areas do, however, support scattered tussocks of wallaby grass *Rytidosperma* spp., a preferred food source for Golden Sun Moth.
- *Time over which loss is averted* = 10 years. The land will be managed in perpetuity for conservation purposes for Golden Sun Moth.
- *Time until ecological benefit* = 2 years. Native vegetation is expected to improve in extent, species diversity and density within 2 years through applied weed and biomass control regimes.
- *Start area and quality* = 79.2 hectares and 6/10. The offset site supports native grassland habitat of moderate quality. Cover of indigenous grass and herb species is high, however, the diversity of species is low and there is little inter-tussock space particularly in areas of dense Kangaroo Grass *Themeda triandra*.
- *Risk of loss without offset* = 10%. Without protection as an offset site there is uncertainty regarding the future use of the land. Most likely the property would continue to be managed under the current regime, however there remains potential that the property will be cropped or grazing intensity will be increased, as is the case with surrounding properties.
- *Future quality without offset* = 6/10. Assumes management proceeds in accordance with the current regime and quality remains at 6/10.
- *Risk of loss with offset* = 0%. The land will be managed in perpetuity for conservation purposes for Golden Sun Moth.
- *Future quality with offset* = 8/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a vegetation management plan incorporating weed control and regular monitoring, aiming to maintain and enhance native biodiversity.
- *Confidence in result* = 80%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing habitats and landscape context.

Natural Temperate Grassland of the Victorian Volcanic Plain

- *Offset location*: Darlington property.
- *Habitat to be removed* = 5.25 hectares.

- *Habitat quality* = 6/10. The majority of NTGVVP to be removed is located along the existing Western Highway and comprises of a high cover of indigenous grass, herb and shrub species. These areas are modified due to previous disturbance from road and rail construction, farming and their close proximity to the road with high levels of weed infestations particularly along the road verge.
- *Risk-related time horizon* = 10 years. The land will be managed in perpetuity for conservation purposes for NTGVVP.
- *Time until ecological benefit* = 2 years. Native vegetation is expected to improve in extent, species diversity and density within 2 years through applied weed and biomass control regimes.
- *Start area and quality* = 20.3 hectares and 5/10. The offset site supports native grassland habitat of moderate quality. Cover of indigenous grass and herb species is high, however, the diversity of species is low and the opportunity for further recruitment of indigenous species is also low.
- *Risk of loss without offset* = 10%. Without protection as an offset site there is uncertainty regarding the future use of the land. Most likely the property would continue to be managed under the current regime, however there remains potential that the property will be cropped or grazing intensity will be increased, as is the case with surrounding properties.
- *Future quality without offset* = 5/10. Assumes management proceeds in accordance with the current regime and quality remains at 5/10.
- *Risk of loss with offset* = 0%. The land will be managed in perpetuity for conservation purposes for NTGVVP.
- *Future quality with offset* = 7/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a vegetation management plan incorporating weed control and regular monitoring, aiming to maintain and enhance native biodiversity.
- *Confidence in result* = 80%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing habitats and landscape context.

Grassy Eucalypt Woodland of the Victorian Volcanic Plain

- *Offset location*: Dunkeld property.
- *Habitat to be removed* = 11.14 hectares.
- *Habitat quality* = 4/10. The majority of GEVVVP persists within road reserves along the Western Highway and other adjoining roads. These areas comprised of an intact overstorey of River Red-gum *Eucalyptus camaldulensis* with a modified grassy understorey and very few shrub species.
- *Risk-related time horizon* = 10 years. The land will be managed in perpetuity for conservation purposes for GEVVVP.
- *Time until ecological benefit* = 5 years. Native vegetation is expected to improve in extent, species diversity and density within 5 years through applied weed and biomass control regimes.
- *Start area and quality* = 23.5 hectares and 4/10. The offset site supports native woodland habitat in moderate condition. Scattered River Red-gums are present throughout the site with a predominantly indigenous grass understorey, however shrubs and many herbs species are absent.

- *Risk of loss without offset* = 15%. Without protection as an offset site there is uncertainty regarding the future use of the land. Most likely the property would continue to be managed under the current regime, and it is likely that further degradation of indigenous grass cover due to the spread of exotic pasture grasses and the loss of remnant trees with little or no chance of regeneration will occur over time.
- *Future quality without offset* = 4/10. Assumes management proceeds in accordance with the current regime and quality remains at 4/10.
- *Risk of loss with offset* = 0%. The land will be managed in perpetuity for conservation purposes for GEWVVP.
- *Future quality with offset* = 7/10. The offset site is to be secured and managed for conservation purposes in perpetuity, with implementation of a vegetation management plan incorporating weed control and regular monitoring, aiming to maintain and enhance native biodiversity.
- *Confidence in result* = 80%. Confidence in applied scores is relatively high due to careful consideration of the offset site, existing habitats and landscape context.

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5 DESCRIPTION OF THE OFFSET SITE

The study area supports one broad vegetation and habitat types: grassy woodland. Vegetation condition and habitat quality are discussed in further detail below.

5.1 Vegetation Condition

Vegetation within the study area is dominated by grassy woodland, located throughout the property. Based on the field assessment, grassy woodland within the study area is consistent with Plains Grassy Woodland EVCs. This is broadly consistent with extant DEPI mapping which shows these areas are dominated by Plains Grassy Woodland (EVC 175) (DEPI 2014b).

Plains Grassy Woodland is described as an open, eucalypt woodland to 15 metres with an understorey consisting of a few sparse shrubs over a species-rich grassy and herbaceous ground layer (DEPI 2014a).

Remnant vegetation within the site consisted of a scattered River Red-gum overstorey with a grassy understorey dominated by indigenous grasses including wallaby grasses *Rytidosperma* spp., Common Tussock-grass *Poa labillardierei*, Common Wheat-grass *Elymus scaber* subsp. *scaber*, Weeping Grass *Microlaena stipoides* var. *stipoides* and spear grass *Austrostipa* spp. During the time of the assessment, few herb species were present due to the sub-optimal timing of the survey (late summer), however, previous assessments undertaken in spring have recorded a diversity of herb species and lilies including Yellow Star *Hypoxis vaginata*, Kidney Weed *Dichondra repens*, Pale Sundew *Drosera peltata* and Grassland Wood-sorrel *Oxalis perennans* (pers. comm. s47F [redacted], landholder). Shrub species were absent from the site and there was no regeneration of River Red-gums occurring within the site.

The site is currently grazed by sheep at a low rate with other stock also present. Some internal fences are present however the stock has access to all areas of the property. Weed infestations were largely restricted to areas beneath the River Red-gum tree canopies where sheep are likely to congregate. These areas were typically dominated by the noxious weeds Horehound *Marrubium vulgare* and Spear Thistle *Cirsium vulgare* as well as other exotic grass species. There was a large infestation of Brown-top Bent-grass *Agrostis capillaris* present in the north western corner of the property and along the southern boundary adjacent to the Glenelg Highway. Other weed species present within the site included Paspalum *Paspalum dilatatum*, Squirrel-tail Fescue *Vulpia bromoides*, Flatweed *Hypochoeris radicata* and Onion-grass *Romulea rosea*.

5.1.1 Grassy Eucalypt Woodland of the Victorian Volcanic Plain

One nationally listed vegetation community, GEVVVP listed as critically endangered under the EPBC Act, was recorded within the offset area.

The key diagnostic criteria and condition thresholds present within the study area, as outlined in listing advice for this community (Threatened Species Scientific Committee 2008) include:

- Must be a minimum size of 0.5 hectares; AND

- One or more of the following native grass genera accounts for at least 50% of the perennial ground layer cover: Themeda (Kangaroo-grass), Austroanthonia (Wallaby-grass), Austrostipa (Spear-grass), Microlaena (Weeping Grass) and/or Poa (Tussock-grass); OR
- If native grasses account for less than 50% of the perennial ground layer cover, then the patch is either:
 - A valuable wildflower site where at least 50% of the ground layer vegetative cover is represented by native dryland forbs during spring-summer; OR
 - Not heavily invaded by perennial weeds such that the perennial weeds comprise less than 70% of the ground layer vegetative cover; OR
 - If perennial weeds comprise more than 70% of the ground vegetative cover, then that patch must have more than ten native perennial species per 100m² AND a density of at least three big trees per hectare (i.e. DBH >70cm for Eucalypts).

Remnant Plains Grassy Woodland (Habitat Zones 1 and 2) meets the condition thresholds outlined above and is considered to be representative of the GEWVVP vegetation community (Figure 2). Remnant vegetation within Habitat Zone 3 does not meet the condition thresholds outlined above and is not considered to correspond with this community.

There is 25.6 hectares of GEWVVP available for offset within the study area.

5.2 Fauna Habitat

Grassy woodland within the study area provides moderate to high quality habitat for native fauna, with native birds and mammals using River Red-gums for refuge, roosting, nesting and foraging purposes. River Red Gums recorded in this area are very large (DBH ranging from 107cm to 238cm), with a variety of bird species likely to utilise these areas for perching, foraging and nesting, including Australian Magpie *Gymnorhina tibicen*, Magpie-lark *Grallina cyanoleuca*, Sulphur-crested Cockatoo *Cacatua galerita*, Galah *Eolophus roseicapilla*, Red Wattlebird *Anthochaera carunculata* and Noisy Miner *Manorina melanocephala*. When flowering, the canopy trees provide fruitful nectar yields that would provide important foraging habitat for migratory nectivores such as Rainbow Lorikeet *Trichoglossus haematodus*, Musk Lorikeet *Glossopsitta concinna* and White-plumed Honeyeater *Lichenostomus penicillatus*.

The numerous hollows and fissures within River Red-gums provide roosting, nesting and refuge habitat for birds, arboreal mammals and microbats, for example Common Brushtail Possum *Trichosurus vulpecula*, Common Ringtail Possum *Pseudocheirus peregrinus*, Gould's Wattled Bat *Chalinolobus gouldii* and Lesser Long-eared Bat *Nictophilus geoffroyi*. These trees also have value for birds of prey as perches for scanning, roosting and nesting, and fallen branches beneath River Red-gums may provide refuge habitat for a variety of reptile species.

5.2.1 Golden Sun Moth *Synemon plana*

Golden Sun Moth has been identified in and around Dunkeld on numerous occasions, with the majority of records taken in 2009 and 2011 (VBA 2014; Plate 1). The study area supports remnant grassland vegetation with a high cover of wallaby grasses, a preferred food source for Golden Sun Moth. Targeted surveys have not been undertaken within the property; as such the presence of Golden Sun Moth cannot be confirmed. However, based on habitat present within the study area, landscape context and the proximity of previous records, Golden Sun Moth is considered likely to occur within the study area.

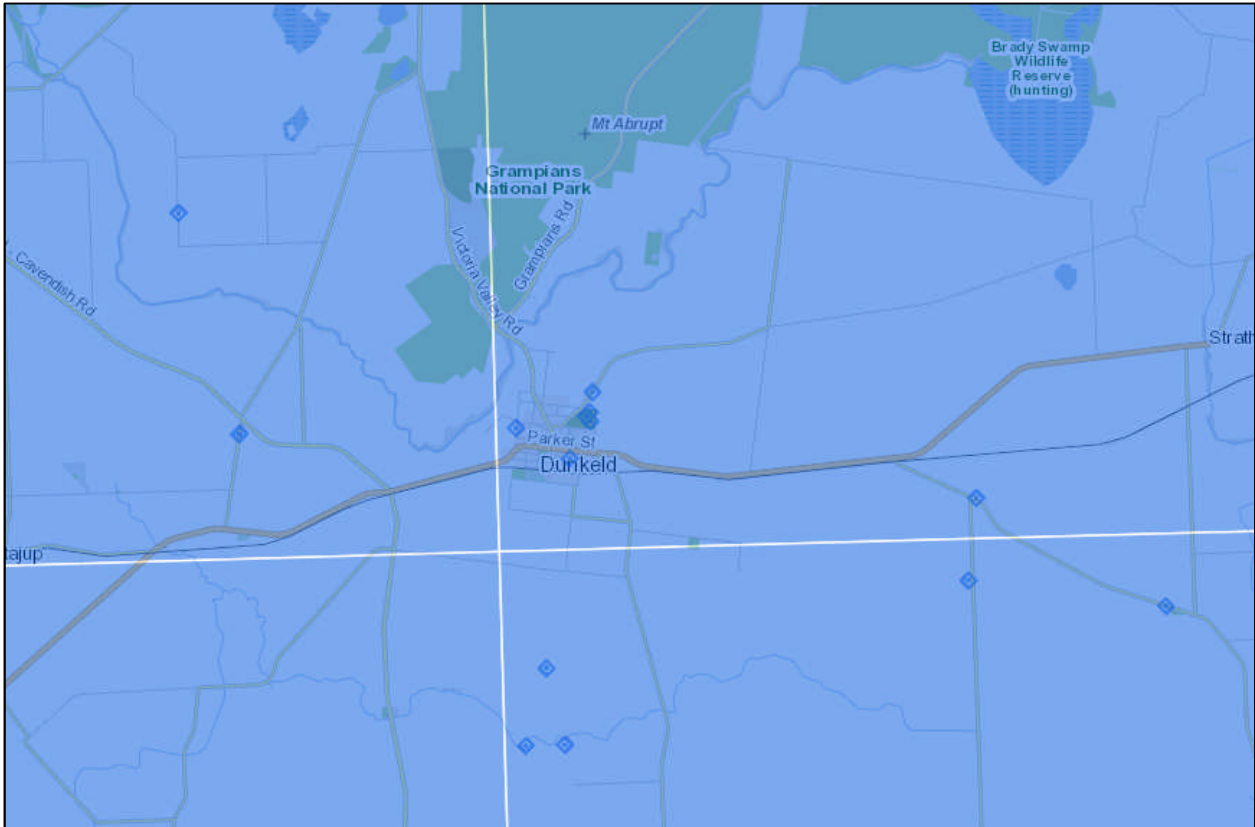


Plate 1: Golden Sun Moth records in Dunkeld area. Screenshot taken from online Victorian Biodiversity Atlas (VBA 2014)

6 LIKE-FOR-LIKE CRITERIA

In determining the appropriate offset responses for permitted vegetation clearance, the Framework sets out several like-for-like criteria, which must be met for any offset site (DNRE 2002). Relevant like-for-like criteria are shown in Table 9.

Based on the criteria in Table 9, the quality objectives have been met for all vegetation losses.

Table 9. Summary of offset site requirements to meet Net Gain criteria

Offset Attributes	Conservation Significance			
	Very High	High	Medium	Low
Vegetation or habitat type	The same vegetation / habitat type	The same vegetation / habitat type OR a Very High significance vegetation / habitat in the same Bioregion	Any EVC in the Bioregion OR a Very High or High significance vegetation / habitat in an adjacent Bioregion	
Landscape role	Similar or more effective ecological function AND land protection function as impacted by the loss	Similar or more effective ecological function OR land protection function as impacted by the loss	Similar or more effective land protection function as impacted by the loss	
Quality	90% of the quality being lost	75% of the quality being lost	50% of the quality being lost	
Revegetation	10%	25%	50%	100%
'Trading up'	Where gains are achieved in vegetation / habitat of a higher significance than the vegetation lost, then the amount of the offset will be proportionally reduced. E.g. offsetting losses in Medium conservation significance with Very High conservation significance gains will reduce the amount of the offsets by half, i.e. the Medium multiplier (1) divided by the Very High multiplier (2).			

6.1 Gains Available in Proposed Offset Site

Quantification of the available gains at the offset site is shown in Table 10. The gains available at the offset site are based on several commitments, such as managing existing remnant vegetation (i.e. by retaining and protecting vegetation, all fallen coarse woody debris within all zones and controlling high-threat weeds) and increasing security (through an on-title agreement, such as a Section 173 agreement or Trust-for-Nature covenant). The offset site is private land for the purposes of calculating gain as per DEPI guidelines (DSE 2010a). Therefore prior management, security, maintenance and improvement gains are available (DSE 2006a, Table 2a. p.7; DSE 2010a).

The gains achievable from the "proposed offsets" from remnant vegetation and large old trees are presented within this section.

6.1.1 Remnant vegetation gains available

A habitat hectare assessment was conducted on remnant patches of Plains Grassy Woodland vegetation within the offset site (Table 11). In total, three habitat zones were recorded with a combined area of 35.55 hectares, comprising 15.74 habitat hectares of Very High conservation significance Plains Grassy Woodland. This vegetation is considered of Very High conservation significance, as Plains Grassy Woodland vegetation is endangered in the Victorian Volcanic Plain bioregion (DSE 2013b).

The native vegetation Gains available in the study area have been calculated using the habitat scores for each Plains Grassy Woodland habitat zone recorded above, DSE's Gains Calculator and Vegetation Gain Approach (DSE 2006) (Table 11). A total gain of 7.0 habitat hectares of Very High conservation significance Plains Grassy Woodland is available in the three habitat zones recorded in the study area.

These Gains are available on the basis that the site will be secured with an on-title agreement (e.g. Section 173 or equivalent) and contains an approved 10-year Offset Management Plan outlining the management actions required to maintain and improve the current condition of native vegetation recorded.

6.1.2 Remnant trees gains available

A total of 50 VLOT and 3 LOTs were recorded within remnant patches throughout the property.

The use of the relevant trees to satisfy the offset requirements associated with the proposed vegetation losses will require their permanent protection through an on-title agreement with an approved 10-year Offset Management Plan outlining the management actions required to protect these trees, and promote the recruitment of additional trees. Appropriate Tree Protection Zones (TPZ), in accordance with DEPI guidelines (DSE 2007; 2011c) (2x the canopy diameter), should be applied to trees within the proposed offset sites.

Table 10. Meeting Like-for-Like criteria for clearing remnant patches

Target #	Clearing site						Offset site						
	Habitat Zones	Bioregion	EVC	Conservation Significance	Min. Habitat Score for Target	Other Like-for-Like Requirements	Trading up	Offset Zones	Bioregion	EVC	Conservation Significance	Habitat Score	Other Like-for-Like Attributes
H1	PGW	VVP	Plains Grassy Woodland	Very High	0.39	Best 50% of habitat for GSM	No	PGW1	VVP	Plains Grassy Woodland	Very High	0.49	GSM habitat to be confirmed
H2	PGW	VVP	Plains Grassy Woodland	High	0.39	N/A	Yes	PGW1	VVP	Plains Grassy Woodland	Very High	0.49	N/A
								PGW2	VVP	Plains Grassy Woodland	Very High	0.45	N/A

Table 11. Native vegetation gains available

EOI Code / land manager name	s47F		
Site code (number) / Habitat Zone ID (letter)	PGW1	PGW2	PGW3
Land tenure	freehold	freehold	freehold
Property Size	>=10 Ha	>=10 Ha	>=10 Ha
Patch Size	>=20Ha	>=20Ha	>=20Ha
Zone type	Offset (Stat Planning)	Offset (Stat Planning)	Offset (Stat Planning)
Proposal type	Remnant patch	Remnant patch	Remnant patch
Security arrangement	Registered on-title agreement or crown land equivalent	Registered on-title agreement or crown land equivalent	Registered on-title agreement or crown land equivalent

Bioregion		Victorian Volcanic Plain			Victorian Volcanic Plain			Victorian Volcanic Plain			
EVC name		Plains Grassy Woodland			Plains Grassy Woodland			Plains Grassy Woodland			
BCS		E			E			E			
EVC standardiser		1			1			1			
		Max	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha
Scores	Large Trees	10	3	na		3	na		3	na	
	Tree Canopy Cover	5	3	na	0.4	3	na	0.4	3	na	0.4
	Understorey	25	15	1.5	5	15	1.5	2.5	15	1.5	2.5
	Lack of Weeds	15	9		4	6		2	2		2
	Recruitment	10	0	0	4	0	0	2	0	0	2
	Organic Litter	5	5	0.5	0	4	0.4	1	4	0.4	1
	Logs	5	0	0.4	0	0	0.4	0	0	0.4	0
	Standardised Site Condition	75	35			31			27		
	Landscape Context	25	14			14			14		
	HabHa Score	100	49			45			41		
Subtotal of gains				2.4	13.4		2.3	7.9		2.3	7.9
Standardised Sum Main + Impr Gain/Ha		15.8			10.2			10.2			
Prior Mgt Gain/Ha		4.9			4.5			4.1			
Security Gain/Ha		4.9			4.5			4.1			
Total Gain/Ha		25.6			19.2			18.4			
Size of habitat zone (Ha)		4.09			21.5			9.9			
TOTAL GAIN (HHa)		1.05			4.13			1.82			

6.2 Summary of Available Gains

The gains available within the proposed offset site were calculated based on the quality and condition of the remnant native vegetation as well as applicable management actions and objectives. The following gains are available within the offset site (Table 11, Figure 2):

- 7.0 habitat hectares of Very High conservation significance Plains Grassy Woodland (EVC 55).

All remnant vegetation within the offset site is proposed to be protected as part of this OMP, except for an area of approximately 4.8 hectares for a potential dwelling site and approximately one hectare in the north east corner to provide access to a farm dam (Figure 2).

6.3 Allocation of Native Vegetation Gains

Based upon the retained vegetation and the potential gains available within the offset site, Table 12 documents how the Net Gain targets can be partially met via the retention, protection and management of the offset site. The total gains available within the offset site (7.0 habitat hectares) form part of the offset strategy for the total gain targets required. As such, additional gains must be secured at other offset sites to meet total gain targets for the proposed losses.

Table 12. Allocation of native vegetation gains for clearing a remnant patch

Gain Target				Trading Up	Gain Target	Source of gains to meet targets		Outcome	
Target #	EVC	Conservation significance	Target (Hha)	Discount	Gain Target	Offset Zone	Gain (Hha)	Total Gains from designated offset area (Hha)	Surplus/Deficit (Hha)
1	PGW	Very High	5.64	0	5.64	PGW1	1.05	1.05	-4.59
						PGW2	4.13	4.13	-0.46
						PGW3	1.82	0.46	+1.36
2	PGW	High	12.32	0.75	9.24	PGW3	(+1.36)^	1.36	-7.88 (10.50*)
Total			17.96		14.88		7.0	7.0	-7.88 (10.50*)

Notes: ^Carry over from previous line, indicates surplus from PGW3. * Remaining deficit without Trading-up applied.

7 PART B – OFFSET IMPLEMENTATION

This section presents the actions required to implement the OMP. The plan details methods for the management and conservation of native vegetation at the offset site over the requisite ten year management period and in perpetuity.

It is anticipated that the offset management works will begin prior to the clearing of native vegetation associated with the proposed development. It is envisaged that all works would be conducted by a suitably qualified and experienced contractor.

The plan aims to achieve vegetation gains through on-ground actions and therefore is required to be simple and practical. However, the management actions must be measurable against the commitments made in the calculation of habitat gain scoring (i.e. measures to achieve the Net Gain target).

7.1 Details of Offset Site

Table 13 provides details of the offset site.

Table 13. Offset Site Details

Offset Site Details	
Landowner of offset site	s47F
Type of offset (onsite, 3rd party)	3rd Party
Location and address of offset site	s47F
Area of offset site (ha)	35.49 hectares in total
Offset site number (if applicable)	N/A
Volume	-
Folio	-
Parish	Dunkeld
Allotment	Lot 3 PS428763
Local Government Area	Southern Grampians Shire Council
Responsible Authority	DEPI
Bioregion	Victorian Volcanic Plain

7.2 Strategy for Offset Site

The offset site is to be secured and managed for conservation purposes in perpetuity. The management strategy for the proposed offset site consists of implementing a vegetation management plan incorporating weed control and regular monitoring. Details of security and management responsibility are shown in Table 14.

Table 14. Security and Management Responsibility

Offset Security and Management Responsibility	
Who is liable/responsible for meeting offset requirements?	VicRoads
Type of security i.e. Planning Permit Condition, Section 69 of the <i>Conservation, Forest and Lands Act 1987 (Vic)</i> , Section 173 of the <i>Planning and Environment Act 1987 (Vic)</i> Covenant under the <i>Victorian Conservation Trust Act 1972 (Vic)</i>	TBC
Agreement or Planning Permit Number (ID)	TBC
Date 10-year offset management to commence	03/2014
Date 10-year offset management expires	03/2024
Registered on title? (Yes/No)	Yes
Offset site management responsibility (i.e. Landowner, Authority Name)	VicRoads
Offset Monitoring Responsibility (i.e. Responsible Authority, DEPI)	DEPI

7.3 Management Objectives

The offset site will be managed for the purposes of conservation. Management of these sites will involve physical protection of the proposed offset site, the control of pest animals and a number of high threat environmental weeds, biomass reduction and general maintenance of the character and quality of the native vegetation, consistent with its occurrence in an area of remnant grassy woodland. Where appropriate, the offset management plan and specified management actions should form part of a broader strategy for long-term management of ecological values within contiguous land.

7.4 Management Actions

This section presents the actions required to implement the management strategy for remnant grassy woodland within the offset site. The site is to be secured and managed for conservation purposes in perpetuity. Management actions described below are to be implemented for a period of 10 years. The landowners will continue to manage the offset site after the completion of year 10 as specified in this plan, such that:

- weed cover is managed in perpetuity to ensure it does not increase beyond the level attained at year 10 of management;
- pest animals are controlled in perpetuity to the level attained at year 10 of the management; and,
- the health and condition of large old trees is maintained or improved.

Any proposed uses or development of the site which conflict with the landowners commitments are not permitted under this plan.

7.4.1 Security Arrangements

The offset site will have on-title legal agreements put in place (conservation covenant [*Victorian Conservation Trust Act 1972*], Section 173 [*Planning and Environment Act 1987*] or a Section 69 [*Conservation, Forests and Lands Act 1987*] in accordance with the relevant Responsible Authority) to ensure it is secured and managed appropriately in perpetuity. The agreement will be implemented and the offset site secured prior to clearing of vegetation associated with the development.

7.4.2 Access Control

Without active management and appropriate fencing, unrestricted access into the offset site may result in loss of native vegetation cover, soil disturbance and compaction, and weed facilitation. The perimeter of the property is currently enclosed by permanent post-and-wire fencing, with several internal fences that have been severed and require maintenance or removal. Access control will proceed in accordance with the following:

- Maintain permanent fences surrounding the offset site and repair or remove severed internal fencing. Any new fencing should be constructed with minimal impact to the offset site (i.e. no materials or soil stock piling);and,
- Fence condition will be monitored on an annual basis with any gaps or holes repaired immediately.

7.4.3 Biomass Control

The current biomass reduction method applied throughout the site consists of low-intensity grazing by sheep. However, this method is not considered appropriate as the grazing regime does not allow for the recruitment of any new trees or regeneration of any shrub layer/midstorey. If stock is to continue grazing the site, a stock grazing regime with appropriate frequency and density must be implemented to maintain and enhance native biodiversity, ensuring that livestock grazing that does not detrimentally affect the remnant woodland, allowing for suitable biomass reduction while permitting the regeneration of key vegetation components. Crash grazing for short periods, particularly during summer to reduce biomass, may be acceptable, however, it is important to minimise stock 'camping' during grazing periods and enable sufficient recruitment. Recruitment of woody species, particularly River Red-gum, is essential for this site so it is also important to allow adequate 'rest' between grazing periods to ensure seedlings are able to become established and survive future grazing pressure.

Alternatively, low intensity mosaic burns can be used to maintain biomass levels as well as aid in the recruitment of indigenous species. Given the presence of suitable habitat for Golden Sun Moth, these activities should be conducted outside of the normal activity period for the species (e.g. employing cool autumn burns). Biomass reduction via ecological burning will be implemented on an as-needed basis, with consideration of the success of stock grazing and based on recommendations presented in vegetation monitoring reports (see Section 7.5).

7.4.4 Pest Control

7.4.4.1 Weed Control

The control of weed species is a key management action within the offset area and is critical to achieving a Net Gain. Effective weed control should promote the regeneration of existing populations of indigenous species and encourage recruitment from soil stored seed. Care should therefore be taken to ensure this ultimate objective is not compromised by excessive treatment. Weed control work should be carried out by a suitably qualified contractor.

Whilst all weeds should be treated, emphasis is placed on priority weeds within the offset site and adjacent land. Priority weeds include woody weeds, all noxious weeds listed under the *Catchment and Land Protection Act 1994* (CaLP), species listed as Weeds of National Significance (WONS) or those high threat species that compete with native flora. High priority weeds that require immediate attention within the offset site and surrounds are listed in Table 15. The control of high threat weed species is a key management action within the offset site and must be adequately addressed if Net Gain is to be achieved.

The following general guidelines should be taken as basic management principles in regards to weed control:

- Weed control methodology for eradicating graminoid and herbaceous weeds will consist of manual removal and/or spot spraying weeds with an appropriate herbicide. Care should be taken when spraying herbicide to ensure that the poison does not affect native vegetation in the local application area. Weed species should be treated before seed is set, which may involve localised slashing if spot-spraying proves ineffective. A dye should be used in the spray to mark where the spraying has occurred;
- Selective herbicide application is preferable to broad area application but clearly the loss of non-target species needs to be balanced with the threat of incomplete control of the existing weed population;
- Eliminate high threat environmental weeds (cover reduced to <1%) within higher quality vegetation with low weed cover and controlling high threat environmental weeds within vegetation with medium cover of weeds (cover reduced to <5%);
- Control all other weeds within all habitat zones (cover reduced to <5%);
- Weed control to be conducted outside of the normal active period for Golden Sun Moth (November to February) and activities will be conducted in a mosaic fashion to avoid any unexpected impacts affecting the entire population at the same time, and consideration to the application of herbicides as the effects of such chemicals on Golden Sun Moth larvae remain unknown;
- Any weed control should be done in a manner that minimises soil disturbance;
- Where herbicide application is employed, waterway sensitive products and non-residual herbicides are to be employed;
- Pest plants that reproduce sexually (by seed) are best controlled before seed set. ; and,
- To reduce the amounts of herbicide used, the target biomass should be reduced (e.g. slashed) before application so the herbicide can also be absorbed by the actively regrowing plants. Herbicides are only effective when plants are actively growing; and,

- Weed control works should be monitored regularly to assess their effectiveness, perform follow up works and evaluate the feasibility of management objectives.

Table 15. Weeds to be controlled

Common Name	Scientific Name	Control Method	Timing	Current Cover	Goal
Herbaceous Weeds					
Thistles*	<i>Cirsium spp.</i>	SS, CH	All Year	1%	Eliminate (<1%)
Horehound*	<i>Marrubium vulgare</i>	SS, CH	All Year	1%	Eliminate (<1%)
Ox-tongue	<i>Helminthotheca echioides</i>	SS, CH	Winter-Spring	1%	Eliminate (<1%)
Grassy Weeds					
Annual Grasses – Various species	<i>Vulpia, Hordeum spp.</i>	M, SS	Mid-winter to late spring	5%	Maintain low cover (<5%)
Perennial Grasses – Various species	<i>Agrostis, Holcus, Paspalum, Phalaris, spp.</i>	MR, SS, M	All year	15%	Control (<5%)

Notes: CP = Cut and Paint; RB = Ringbark; WB = Weed Burner; SS = Spot-spray; M = Frequent Mowing; DF = Drill and Fill; MR = Manual removal; CH = Chip Out or Hand Pull.

Weed Status: * = Declared Noxious Weed (DPI 2008)

7.4.4.2 Pest Animal Control

There is currently no evidence of any large populations of pest animals such as European Rabbit within the offset site, nevertheless, the occurrence of pest animals and potential habitat should be monitored during management works. Rabbits remain a threat for the regeneration/recruitment of native species throughout western Victoria. All vermin harbour (i.e. burrows) should be removed, without disturbance to native vegetation or significant soil disturbance. The land owner/contractor is to monitor pest animal use of the offset site whilst undertaking vegetation management works. Any changes in the influences of pest animals may require a change in the management actions.

The following key management actions will be undertaken to ensure success of the pest animal program:

- Identify potential harbour and burrows, and destroy if soil disturbance can be minimised and all native vegetation retained;
- Undertake a pest animal control program (e.g. baiting, trapping and shooting of foxes, hares, rabbits or feral cats); and,
- Monitor the population of pest animals during weed control works and adapt management as considered appropriate.

7.4.5 Supplementary Planting

It is anticipated that natural regeneration of remnant native vegetation and implementation of weed control measures are likely to improve the overall cover and diversity of indigenous flora within the offset site and hence contribute to Net Gain targets. As such, direct seeding and supplementary planting is not essential at this stage of proceeding and has not been included as a required management action as part of this plan.

However, through discussions with the landholder, there may be opportunity to re-introduce shrub layer species in to the landscape through appropriate revegetation. Any proposed revegetation should be undertaken using seed of local provenance appropriate to the Plains Grassy Woodland EVC and with reference to DEPI's planting guidelines (DSE 2006c).

Any requirement for direct seeding and supplementary planting should be reviewed at the end of each year of management works.

7.4.6 Native Vegetation, Logs and Coarse Woody Debris

Native vegetation, logs and coarse woody debris contribute to the ecological value and character of the offset site, including providing habitat for native fauna species. Management actions for the site will include the following:

- Ensure all native vegetation, both dead or alive, is retained including standing dead trees, fallen logs, branches and leaf litter;
- Harvesting or collecting of timber for fire wood or other uses is not permitted. Removal of exotic trees and shrubs for weed control is permitted by a suitably qualified contractor;
- Ecological thinning of regenerated canopy trees, or recruits from other species of native vegetation is recommended should the survival of existing individuals be negatively impacted, or if the fire risk within the site is significantly increased from current levels.
- Installation of logs is permitted to increase habitat value for fauna, and achieve gains targets specified;
- Fire risk within the site is not increased;
- Only weeds or out of balance native species are removed; and,
- All management actions within the offset site to be considerate of the conservation values.

7.5 Monitoring and Reporting

Monitoring of native vegetation should be undertaken by a suitably qualified ecologist to ensure key performance targets are met and the responsible authorities notified of the successes and failures of works through regular progress reports. Progress reports will be provided to the responsible authority at the end of year 2, 5 and 10 of the program (Table 16).

7.5.1 Monitoring

7.5.1.1 Native vegetation

Monitoring is required to assess the positive and negative impacts of management actions on the integrity of the offset site, and to implement change if required. Vegetation monitoring will be conducted annually, with progress reports provided to the responsible authority at the end of year 2, 5 and 10 of the program.

This monitoring will be undertaken by a suitably qualified ecologist, with some input from the landowners. However, the frequency of monitoring may need to vary to allow for seasonal variations and to target

periods of active weed growth. Similarly, pest animal monitoring should be undertaken at a time of year when these animals are most active so that an accurate assessment of population sizes can be made.

It is recommended that monitoring be undertaken by qualified ecological consultants familiar with the methodology as well as any offset and EPBC Act referral requirements. Monitoring and progress reports should include the following:

- Collection of baseline data to be used as a reference point to assess the impacts of management actions;
- Overall condition and composition of vegetation as well as consideration of Net Gain measurable outcomes;
- Condition and health of scattered trees;
- Biomass levels;
- The extent, severity, trend and presence of current weed species and any new and emerging weed species; and,
- Implementation of permanent photo points. Photographs must be taken at the same location and during the same time of each year. Photo points will allow monitoring of weed populations and maintenance of the current condition of native vegetation within the offset site. Details of photo points and photographs will be provided to DEPI where required as evidence of progress.

7.5.1.2 *Other Monitoring*

Information relating to fencing and signage, weed control and pest animal control will be provided by landowners and the relevant contractors, with a landowner monitoring form completed on an annual basis (see below). This information will be included in the progress report, discussed below.

7.5.2 **Reporting**

Progress reports will be provided to the responsible authority at the end of year 2, 5 and 10 of the program. Information to be provided in the progress report includes:

- A copy of the Management Actions Table (Table 16) detailing actions completed during the reporting period;
- Landowner monitoring and reporting forms;
- A description of the specific monitoring results from ecological surveys undertaken;
- Results 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,
- Photographs showing evidence of works.

In order to meet EPBC Act referral conditions, all records/evidence of management actions must be maintained, and be submitted to DoE upon request, and any proposed management changes must be submitted to DoE prior to the changes being undertaken.

If any agreed management actions or commitments are incomplete or have not been undertaken in the times specified, the contractor is to document the justification and the actions that will be undertaken to implement the requirement.

7.5.2.1 *Landowner Monitoring and Reporting Form*

Information relating to fencing and signage, weed control and pest animal control will be provided by landowners and the relevant contractors, with a landowner monitoring form completed on an annual basis (see below). The template for a landowner monitoring and reporting form is shown in Table 17.

If any agreed management actions or commitments are incomplete or have not been undertaken in the times specified, the responsible party must explain the reasons why and what program of action/s will be undertaken to implement the action. If no action has been undertaken please explain the reason(s) and how the targets specified will be met.

7.6 Management Actions Table

Management actions are summarised in Table 16. The actions constitute the minimum management requirements for the offset site over the mandatory 10 year management period.

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Table 16. Management Actions Table

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
0	0.1	Implement on-title legal agreements for offset site	Liaise between the landowner, DEPI and Council.	Prior to clearing of native vegetation	Section 7.4.1	
0	0.3	Acquire baseline monitoring data	Suitably qualified ecological specialist	Prior to clearing of native vegetation	Section 7.5.1	
1	1.1	Maintain permanent fences surrounding the offset site and construct internal fencing of offset site, as required.	Landowner	Prior to clearing of native vegetation	Section 7.4.2	
1	1.2	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	
1	1.3	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
1	1.4	Conduct monitoring of vegetation	Suitably qualified ecological specialist	One year after commencement of OMP	Section 7.5.1	
1	1.5	Monitor biomass density and implement stock grazing regime or develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
2	2.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	
2	2.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
2	2.3	Conduct monitoring for vegetation including natural regeneration and review opportunity for supplementary planting	Landowner/Suitably qualified ecological specialist	Two years after commencement of OMP	Section 7.5.1 and 7.4.5	
2	2.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
2	2.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
2	2.6	Monitor and assess works, and prepare progress report	Suitably qualified ecological specialist	Two years after commencement of OMP	Section 7.5.2	
3	3.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
3	3.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
3	3.3	Conduct monitoring of vegetation including natural regeneration and review opportunity for supplementary planting	Landowner/Suitably qualified ecological specialist	Three years after commencement of OMP	Section 7.5.1 and 7.4.5	
3	3.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
3	3.5	Monitor biomass density and implement stock grazing regime or develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
4	4.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	
4	4.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
4	4.3	Conduct monitoring of vegetation including natural regeneration and review opportunity for supplementary planting	Landowner/Suitably qualified ecological specialist	Four years after commencement of OMP	Section 7.5.1 and 7.4.5	
4	4.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
4	4.5	Monitor biomass density and implement stock grazing regime or develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
5	5.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	
5	5.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
5	5.3	Conduct monitoring of vegetation including natural regeneration and review opportunity for supplementary planting	Landowner/Suitably qualified ecological specialist	Five years after commencement of OMP	Section 7.5.1 and 7.4.5	
5	5.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
5	5.5	Monitor biomass density and implement stock grazing regime or develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
5	5.6	Monitor and assess works, and prepare	Suitably qualified ecological specialist	Five years after commencement of	Section 7.5.2	

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
		progress report		OMP		
6	6.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	
6	6.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
6	6.3	Conduct monitoring of vegetation including natural regeneration and review opportunity for supplementary planting	Landowner/Suitably qualified ecological specialist	Six years after commencement of OMP	Section 7.5.1 and 7.4.5	
6	6.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
6	6.5	Monitor biomass density and implement stock grazing regime or develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
7	7.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	
7	7.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
7	7.3	Conduct monitoring of vegetation including natural regeneration and review opportunity for supplementary planting	Landowner/Suitably qualified ecological specialist	Seven years after commencement of OMP	Section 7.5.1 and 7.4.5	
7	7.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
7	7.5	Monitor biomass density and implement stock grazing regime or develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
8	8.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	
8	8.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
8	8.3	Conduct monitoring of vegetation including natural regeneration and review opportunity for supplementary planting	Landowner/Suitably qualified ecological specialist	Eight years after commencement of OMP	Section 7.5.1 and 7.4.5	
8	8.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
8	8.5	Monitor biomass density and implement	Landowner/Bushland Management Contractor	Summer/Autumn	Section 7.4.3	

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed
		stock grazing regime or develop ecological burn or fuel reduction plan if appropriate	Contractor/CFA			
9	9.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	
9	9.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
9	9.3	Conduct monitoring of vegetation including natural regeneration and review opportunity for supplementary planting	Landowner/Suitably qualified ecological specialist	Nine years after commencement of OMP	Section 7.5.1 and 7.4.5	
9	9.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
9	9.5	Monitor biomass density and implement stock grazing regime or develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
10	10.1	Conduct weed control	Landowner/Bushland Management Contractor	Refer to Table 15	Section 7.4.4.1	
10	10.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	Section 7.4.4.2	
10	10.3	Conduct monitoring of vegetation including natural regeneration and review opportunity for supplementary planting	Landowner/Suitably qualified ecological specialist	Ten years after commencement of OMP	Section 7.5.1 and 7.4.5	
10	10.4	Maintain fences	Landowner/Fencing Contractor	As required	Section 7.4.2	
10	10.5	Monitor biomass density and implement stock grazing regime or develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Summer/Autumn	Section 7.4.3	
10	10.6	Monitor and assess works, and prepare final report	Suitably qualified ecological specialist	Ten years after commencement of OMP	Section 7.5.2	

Table 17. Landowner Monitoring and Reporting Form

Landowner of offset site		
Location and address of offset site		
Offset site number (if applicable)		
Offset plan reference number (if applicable)		
Responsible Authority		
Report #		
Actions completed within the offset site (since commencement)	Date and details of action	Key performance target met (Y/N)
Signature		
Date		

8 REFERENCES

- DEPI 2014a. EVC Benchmarks, www.depi.vic.gov.au. Accessed 28 February 2014. Department of Environment and Primary Industries, Melbourne, Victoria.
- DEPI 2014b. Biodiversity Interactive Map 3.1., available from URL: www.dse.vic.gov.au/about-dse/interactive-maps. Department of Sustainability and Environment, Melbourne, Victoria.
- DNRE 2002. Victoria's Native Vegetation Management: A Framework for Action. Department of Natural Resources and Environment, Victoria.
- DPI 2008. Declared Noxious Weeds – Listed by Common Name. Landcare Notes. Department of Primary Industries.
- DSE 2004. Vegetation Quality Assessment Manual: Guidelines for Applying the Habitat Hectares Scoring Method, Biodiversity and Natural Resources Division, Department of Sustainability & Environment, East Melbourne, Victoria.
- DSE 2006a. Vegetation Gain Approach – Technical basis for calculating gains through improved native vegetation management and revegetation. Victorian Government, Department of Sustainability and Environment, East Melbourne.
- DSE 2006b. Native Vegetation: Scoring Gain from an offset – DSE Gain Calculator user instructions. Victorian Government, Department of Sustainability and Environment, East Melbourne.
- DSE 2006c. Native Vegetation Revegetation planting standards – Guidelines for establishing native vegetation for net gain accounting. Victorian Government, Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE 2007. Native Vegetation: Guide for Assessment of Referred Planning Permit Applications, Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE 2010. Net Gain Calculator, Version 1.2.5., Department of Sustainability and Environment, East Melbourne.
- DSE 2011a. Victorian Biodiversity Atlas (VBA). Sourced from: 'VBA_FLORA25' and 'VBA_FLORA100', Department of Sustainability and Environment, Victoria.
- DSE 2011b. Victorian Biodiversity Atlas (VBA). Sourced from: 'VBA_FAUNA25' and 'VBA_FAUNA100', Department of Sustainability and Environment, Victoria.
- DSE 2011c. Native Vegetation – Technical Information Sheet September 2011: Defining an acceptable distance for tree retention during construction works. Department of Sustainability and Environment, 8 Nicholson Street, East Melbourne.
- Ecology and Heritage Partners Pty Ltd 2012. Western Highway Project: Section 2, Beaufort to Ararat, Victoria. Impact Assessment Report – Flora, Fauna and Ecological Communities. Report prepared for VicRoads.

GHCMA 2006. Glenelg Hopkins Catchment Management Authority Native Vegetation Plan. Glenelg Hopkins Catchment Management Authority, Victoria.

Threatened Species Scientific Committee 2008. Commonwealth listing advice on Grassy Eucalypt Woodland of the Victorian Volcanic Plain. Threatened Species Scientific Committee, Canberra

VBA 2014. Victorian Biodiversity Atlas (VBA). Available online: <https://vba.dse.vic.gov.au/vba/>. Department Environment and Primary Industries, Victoria. Date accessed: 28/02/2014.

Viridans 2012a. Flora Information System (FIS), Viridians Biological Databases Pty Ltd, Department of Sustainability and Environment, East Melbourne, Victoria.

Viridans 2012b. Victorian Fauna Database (VFD), Viridians Biological Databases Pty Ltd, Department of Sustainability and Environment, East Melbourne, Victoria.

FIGURES



Legend

Vegetation

- Plains Grassy Woodland
- Very Large Old Tree
- Large Old Tree
- Grassy Eucalypt Woodland of the VVP offset area
- Additional Net Gain offset area
- Study Area

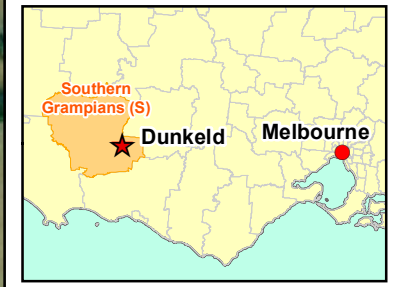
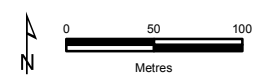


Figure 2
Location of the study area
 Lot 3 PS428763,
 Glenelg Highway, Dunkeld



VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

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APPENDIX 1 – EPBC ACT OFFSET CALCULATORS

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	GEWVVP
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
<i>Ecological communities</i>						
Area of community	Yes	11.14 hectares of GEWVVP	Area	11.14	Hectares	Site assessments and EES report
			Quality	4	Scale 0-10	
			Total quantum of impact	4.46	Adjusted hectares	
<i>Threatened species habitat</i>						
Area of habitat	No		Area			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
<i>Threatened species</i>						
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									
<i>Ecological Communities</i>																									
Area of community	Yes	4.46	Adjusted hectares	23.5 hectares GEWVVP	Risk-related time horizon (max. 20 years)	10	Start area (hectares)	23.5	Risk of loss (% without offset)	15%	Risk of loss (% with offset)	0%	Raw gain	3.53	Confidence in result (%)	80%	Adjusted gain	2.82	Net present value (adjusted hectares)	1.46	4.47	100.37%	Yes	\$1,175,000.00	Cost estimated at \$50,000 per hectare. Based on current market value
					Future area without offset (adjusted hectares)	20.0	Future area with offset (adjusted hectares)	23.5																	
					Time until ecological benefit	5	Start quality (scale of 0-10)	4	Future quality without offset (scale of 0-10)	4	Future quality with offset (scale of 0-10)	7	Raw gain	3.00	Confidence in result (%)	80%	Adjusted gain	2.40	Net present value (adjusted hectares)	1.73					
<i>Threatened species habitat</i>																									
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)		Raw gain		Confidence in result (%)		Adjusted gain		Net present value (adjusted hectares)						
					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)		Raw gain		Confidence in result (%)		Adjusted gain		Net present value (adjusted hectares)						
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																								
<i>Threatened species</i>																									
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	4.456	4.47	100.37%	Yes	\$1,175,000.00	N/A	\$1,175,000.00
					\$1,175,000.00	\$0.00	\$1,175,000.00

Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Golden Sun Moth
EPBC Act status	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
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes	31.56 hectares of Golden Sun Moth habitat	Area	31.56	Hectares	Site assessments and EES report
			Quality	4	Scale 0-10	
			Total quantum of impact	12.62	Adjusted hectares	
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
<i>Threatened species</i>						
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		
<i>Ecological Communities</i>																		
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (%) without offset	Risk of loss (%) with offset										
					0.0	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)										
<i>Threatened species habitat</i>																		
Area of habitat	Yes	12.62	Adjusted hectares	79.2 hectares of confirmed GSM habitat	Time over which loss is averted (max. 20 years)	10	Start area (hectares)	79.2	Risk of loss (%) without offset	10%	Risk of loss (%) with offset	0%	7.92	80%	6.34	3.28		
					71.3	79.2												
					2	6	6	8	2.00	80%	1.60	1.40						
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																	
<i>Threatened species</i>																		
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	12.624	12.62	100.00%	Yes	\$3,960,000.00	N/A	\$3,960,000.00
Area of community	0				\$0.00		\$0.00
					\$3,960,000.00	\$0.00	\$3,960,000.00

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
<i>Ecological communities</i>						
Area of community	Yes	5.25 hectares of NTGVVP	Area	5.25	Hectares	Site assessments and EES report
			Quality	6	Scale 0-10	
			Total quantum of impact	3.15	Adjusted hectares	
<i>Threatened species habitat</i>						
Area of habitat	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species</i>						
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					
<i>Ecological Communities</i>																					
Area of community	Yes	3.15	Adjusted hectares	20.3 hectares NTGVVP	Risk-related time horizon (max. 20 years)	10	Start area (hectares)	20.3	Risk of loss (% without offset)	10%	Risk of loss (% with offset)	0%	2.03	80%	1.62	0.84	3.15	100.05%	Yes	\$1,015,000.00	Cost estimated at \$50,000 per hectare. Based on current market value
					Future area without offset (adjusted hectares)	18.3	Future area with offset (adjusted hectares)	20.3	2.00	80%	1.60	1.40									
					Time until ecological benefit	2	Start quality (scale of 0-10)	5	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	7									
<i>Threatened species habitat</i>																					
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)										
<i>Threatened species</i>																					
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	
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	3.15	3.15	100.05%	Yes	\$1,015,000.00	N/A	\$1,015,000.00
					\$1,015,000.00	\$0.00	\$1,015,000.00

s22 a

Subject: FW: WHP Section 2 - EPBC Act communities additional information
[SEC=UNCLASSIFIED]
Attachments: 2625_Fig03_Eco_Features.pdf

From: s47F [mailto:s47F@ehpartners.com.au]
Sent: Tuesday, 11 March 2014 4:02 PM
To: s22
Cc: s47F; s22 @roads.vic.gov.au
Subject: FW: WHP Section 2 - EPBC Act communities additional information

Hi s22

Thanks for your call earlier, this is good news.
Please see below- amended as requested.
There was not a specific map prepared showing the areas surveyed for GSM so I have attached the map set which includes all the vegetation layers - all areas of Plains Grassland and Degraded Treeless Vegetation were assessed during the GSM surveys as well as some additional considered to have potential habitat.
Let me know if you need any additional information.

Thanks s47F

Senior Botanist | s47F

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 Adelaide P (08) 8372 7829 Brisbane P (07) 3221 3352 Melbourne P (03) 9377 0100

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From: s47F
Sent: Friday, 7 March 2014 4:31 PM
To: s22 @environment.gov.au
Cc: s47F
Subject: WHP Section 2 - EPBC Act communities additional information

Hi s22

Please see below regarding the additional information required in relation to the EPBC Act listed communities and GSM habitat present within the WHP Section 2 – Beaufort to Ararat. I have included the vegetation descriptions from our report regarding Plains Grassland and Plains Grassy Woodland and a table, as discussed, providing additional information and justification on the presence of the EPBC Act communities. There is also a blurb about the methodology for GSM surveys and the habitat area determination.

Hopefully this provides you with the information that you require to progress the project, please let me know if you require anything additional or would like to discuss this information further.

Cheers,
s47F

Vegetation Condition Descriptions

Plains Grassland

Plains Grassland occurs between the road and rail reserve at the western end of the study area (Figures 3A-C). Remnant vegetation was generally in moderate condition with some poorer areas consisting of a higher weed cover. Remnant patches of this EVC typically supported a diverse array of grasses and herbs including Kangaroo Grass *Themeda triandra*, Wattle Mat-rush *Lomandra filiformis*, Black-anther Flax-lily *Dianella admixta*, Curved Rice-flower *Pimelea curviflora*, Sheep's Burr, Milkmaids *Burchardia umbellata* and Lemon Beauty-heads *Calocephalus citreus*. Large populations of Spiny Rice-flower *Pimelea spinescens* subsp. *spinescens* were also recorded within this EVC. Introduced species including Ribwort *Plantago lanceolata*, Bearded Oat *Avena barbata*, Onion Grass *Romulea rosea*, Cape Weed *Arctotheca calendula* and Spear Thistle *Cirsium vulgare* were also present in varying densities within remnant patches of this EVC.

Plains Grassy Woodland

Both moderate condition to highly modified patches of Plains Grassy Woodland occur within the study area. The tree canopy was dominated by River Red-gum *Eucalyptus camaldulensis* with a sparse understorey comprising shrub species such as Black Wattle *Acacia mearnsii* and Hedge Wattle *Acacia paradoxa*. The ground layer was typically dominated by introduced species including Bearded Oat, Large Quaking-grass *Briza maxima*, Toowoomba Canary-grass and Barley-grass *Hordeum murinum*.

Native grasses, herbs and lilies present within the understorey included Black-anther Flax-lily, Grey Tussock-grass *Poa sieberiana*, Common Wheat-grass *Elymus scaber* var. *scaber*, Spear-grass *Austrostipa* spp., Chocolate Lily *Arthropodium strictum*, Bulbine Lily *Bulbine bulbosa*, Common Everlasting *Chrysocephalum apiculatum* and Spur Velleia *Velleia paradoxa*.

Ecological Communities Assessment

Patch	Area (ha)	Condition Score	Quality	EPBC Act listed community	Total	Notes
PG*	4.64	0.3	Mod	Y	5.25	Vegetation was consistent with the condition thresholds for NTGVVP as: <ul style="list-style-type: none"> Greater than 0.05 hectares in size, Non-grass weeds comprised less than 30% of ground cover, OR The dominant native species represent at least 50% of the native species and the perennial tussock cover.
PG1	0.03	0.27	Mod	Y		
PG2	0.21	0.27	Mod	Y		
PG3	0.08	0.27	Mod	Y		
PG6	0.30	0.54	High	Y		
PG*, PG4, PG5	-	0.3, 0.27, 0.28	Mod	N	-	Other mapped patches of PG did not meet the condition thresholds that define NTGVVP. I.e. vegetation was: <ul style="list-style-type: none"> Less than 0.05 hectares in size, Non-grass weeds comprised greater than 30% of ground cover, OR The dominant native species did not represent at least 50% of the native species and the perennial tussock cover.
PGW1	5.78	0.35	Mod	Y	11.14	Vegetation was consistent with the condition thresholds for GEWVVP as: <ul style="list-style-type: none"> Greater than 0.5 hectares in size, More than 10 native perennial species
PGW5	5.35	0.49	High	Y		

and three big trees per hectare were present.

Other mapped patches of PGW did not meet the condition thresholds that define GEVVVP. I.e. vegetation was:

- Less than 0.5 hectares in size,
- Less than 10 native perennial species and three big trees per hectare were present.

PGW#	0.35			
PGW2,	0.22,			
PGW3,	0.27,	Mod	N	
PGW4,	0.24,			
PGW6,	0.3,			
PGW7	0.38			

Notes: * Denotes areas assessed during due diligence assessment, condition scores have been generated based on an average of all habitat zones from that EVC.

Golden Sun Moth Habitat Assessment

Targeted Golden Sun Moth surveys were undertaken on four occasions, on 16, 22, 29 December 2011 and 13 January 2012. Sites surveyed included all remnant patches of Plains Grassland, areas of Degraded Treeless Vegetation (MTV) that supported >25% cover of wallaby-grasses (*Austrodanthonia* spp.) and other areas identified during the preliminary assessment which were considered to be suitable Golden Sun Moth habitat.

Qualified personnel walked in transects through each site in search of flying males and cryptic females. Surveys were undertaken between the hours of 10.00am and 3.30pm, during suitable climatic conditions (i.e. a warm to hot day with temperatures greater than 20°C; clear or mostly cloudless sky; still to moderate wind conditions).

Golden Sun Moth habitat was determined based on the following: where a Golden Sun Moth record fell inside a native vegetation patch, the entire patch was considered to be 'confirmed' habitat. Where a Golden Sun Moth record fell outside areas considered to be a native vegetation patch, a 100 metre buffer was established around each record, with areas inside the buffer considered 'confirmed' habitat. Where the buffer intersected vegetation mapped as a patch, that patch was also mapped as 'confirmed'.

s47F | Senior Botanist | s47F



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- Threatened Fauna Species**
- Brown Toadlet
 - Brown Treecreeper
 - Dwarf Galaxias
 - Golden Sun Moth
 - Aquatic Survey Locations
 - Scattered Trees
 - Due Diligence
 - ▲ Very Large Old Trees
 - ▲ Large Old Trees
 - ▲ Medium Old Trees
 - ▲ Small Trees
 - ★ Button Wrinklewort
 - ★ Emerald-lip Greenhood
 - ★ Golden Cowslips
 - ★ Spiny Rice-flower
 - ★ Yarra Gum
 - ★ Hollow Bearing Trees
- Threatened Flora Species**
- ★ Button Wrinklewort
 - ★ Emerald-lip Greenhood
 - ★ Golden Cowslips
 - ★ Spiny Rice-flower
 - ★ Yarra Gum
 - ★ Hollow Bearing Trees
- EVCs**
- Alluvial Terraces
 - Herb-rich Woodland
 - Creepline
 - Grassy Woodland
 - Grassy Dry Forest
 - Grassy Woodland
 - Heathy Dry Forest
 - Heathy Woodland
 - Hills Herb-rich Woodland
 - Plains Grassland
 - Plains Grassy Wetland
 - Plains Grassy Woodland
 - Plains Sedgy Wetland
 - Degraded
 - Treeless Vegetation
 - Revegetation
 - Option 1
 - Option 2
 - Option 3
- EPBC Vegetation Communities**
- Grassy Eucalypt Woodland of the VVP
 - Natural Temperate Grassland of the VVP

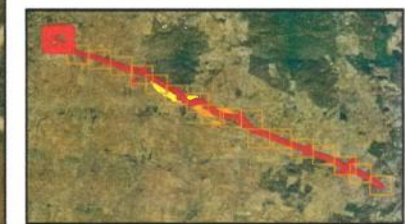
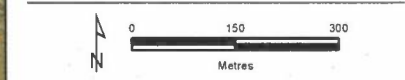


Figure 3A
Ecological features and targeted surveys within the study area
 Western Highway, Beaufort to Ararat



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- | | |
|--|--------------------------------|
| Threatened Fauna Species | EVCs |
| ■ Brown Toadlet | ■ Alluvial Terraces |
| ■ Brown Treecreeper | ■ Herb-rich Woodland |
| ■ Dwarf Galaxias | ■ Creekline |
| ■ Golden Sun Moth | ■ Grassy Woodland |
| ■ Aquatic Survey Locations | ■ Grassy Dry Forest |
| ■ Scattered Trees | ■ Grassy Woodland |
| ● Due Diligence | ■ Heathy Dry Forest |
| ▲ Very Large Old Trees | ■ Heathy Woodland |
| ▲ Large Old Trees | ■ Hills Herb-rich Woodland |
| ▲ Medium Old Trees | ■ Plains Grassland |
| ▲ Small Trees | ■ Plains Grassy Wetland |
| ■ Threatened Flora Species | ■ Plains Grassy Woodland |
| ★ Button Wrinklewort | ■ Plains Sedgy Wetland |
| ★ Emerald-lip Greenhood | ■ Degraded Treeless Vegetation |
| ★ Golden Cowslips | ■ Revegetation |
| ★ Spiny Rice-flower | ■ Option 1 |
| ★ Yarra Gum | ■ Option 2 |
| ★ Hollow Bearing Trees | ■ Option 3 |
| EPBC Vegetation Communities | |
| ■ Grassy Eucalypt Woodland of the VVP | |
| ■ Natural Temperate Grassland of the VVP | |

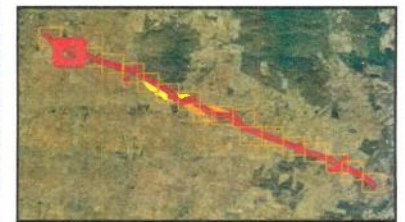


Figure 3B
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



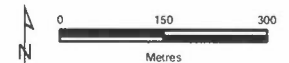
Vegetation Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any persons using or relying upon such information does so on the basis that the State of Victoria shall have no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.



- | | |
|--|---|
| <p>Threatened Fauna Species</p> <ul style="list-style-type: none"> ■ Brown Toadlet ■ Brown Treecreeper ■ Dwarf Galaxias ■ Golden Sun Moth ⊕ Aquatic Survey Locations ● Due Diligence ▲ Very Large Old Trees ▲ Large Old Trees ▲ Medium Old Trees ▲ Small Trees ★ Button Wrinklewort ★ Emerald-lip Greenhood ★ Golden Cowslips ★ Spiny Rice-flower ★ Yarra Gum ✿ Hollow Bearing Trees <p>Threatened Flora Species</p> <ul style="list-style-type: none"> ★ Button Wrinklewort ★ Emerald-lip Greenhood ★ Golden Cowslips ★ Spiny Rice-flower ★ Yarra Gum ✿ Hollow Bearing Trees <p>EPBC Vegetation Communities</p> <ul style="list-style-type: none"> ⊠ Grassy Eucalypt ⊠ Woodland of the VVP ⊠ Natural Temperate Grassland of the VVP | <p>EVCs</p> <ul style="list-style-type: none"> ■ Alluvial Terraces ■ Herb-rich Woodland ■ Creepline ■ Grassy Woodland ■ Grassy Dry Forest ■ Grassy Woodland ■ Heathy Dry Forest ■ Heathy Woodland ■ Hills Herb-rich Woodland ■ Plains Grassland ■ Plains Grassy Wetland ■ Plains Grassy Woodland ■ Plains Sedgy Wetland ■ Degraded Treeless Vegetation ■ Revegetation ■ Option 1 ■ Option 2 ■ Option 3 |
|--|---|



Figure 3C
 Ecological features and targeted surveys within the study area
 Western Highway, Beaufort to Ararat



Vegetation Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.



- Threatened Fauna Species**
- Brown Toadlet
 - Brown Treecreeper
 - Dwarf Galaxias
 - Golden Sun Moth
 - Aquatic Survey Locations
 - Due Diligence
 - ▲ Very Large Old Trees
 - ▲ Large Old Trees
 - ▲ Medium Old Trees
 - ▲ Small Trees
- Threatened Flora Species**
- ★ Button Wrinklewort
 - ★ Emerald-lip Greenhood
 - ★ Golden Cowslips
 - ★ Spiny Rice-flower
 - ★ Yarra Gum
 - ★ Hollow Bearing Trees
- EVCs**
- Alluvial Terraces
 - Herb-rich Woodland
 - Creepline
 - Grassy Woodland
 - Grassy Dry Forest
 - Grassy Woodland
 - Heathy Dry Forest
 - Heathy Woodland
 - Hills Herb-rich Woodland
 - Plains Grassland
 - Plains Grassy Wetland
 - Plains Grassy Woodland
 - Plains Sedgy Wetland
 - Degraded Treeless Vegetation
 - Revegetation
 - Option 1
 - Option 2
 - Option 3
- EPBC Vegetation Communities**
- Grassy Eucalypt Woodland of the VVP
 - Natural Temperate Grassland of the VVP

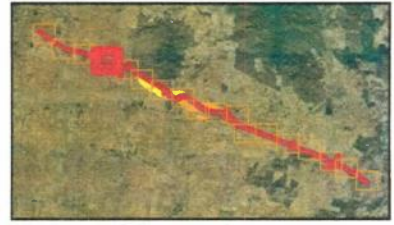
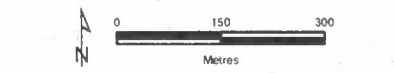
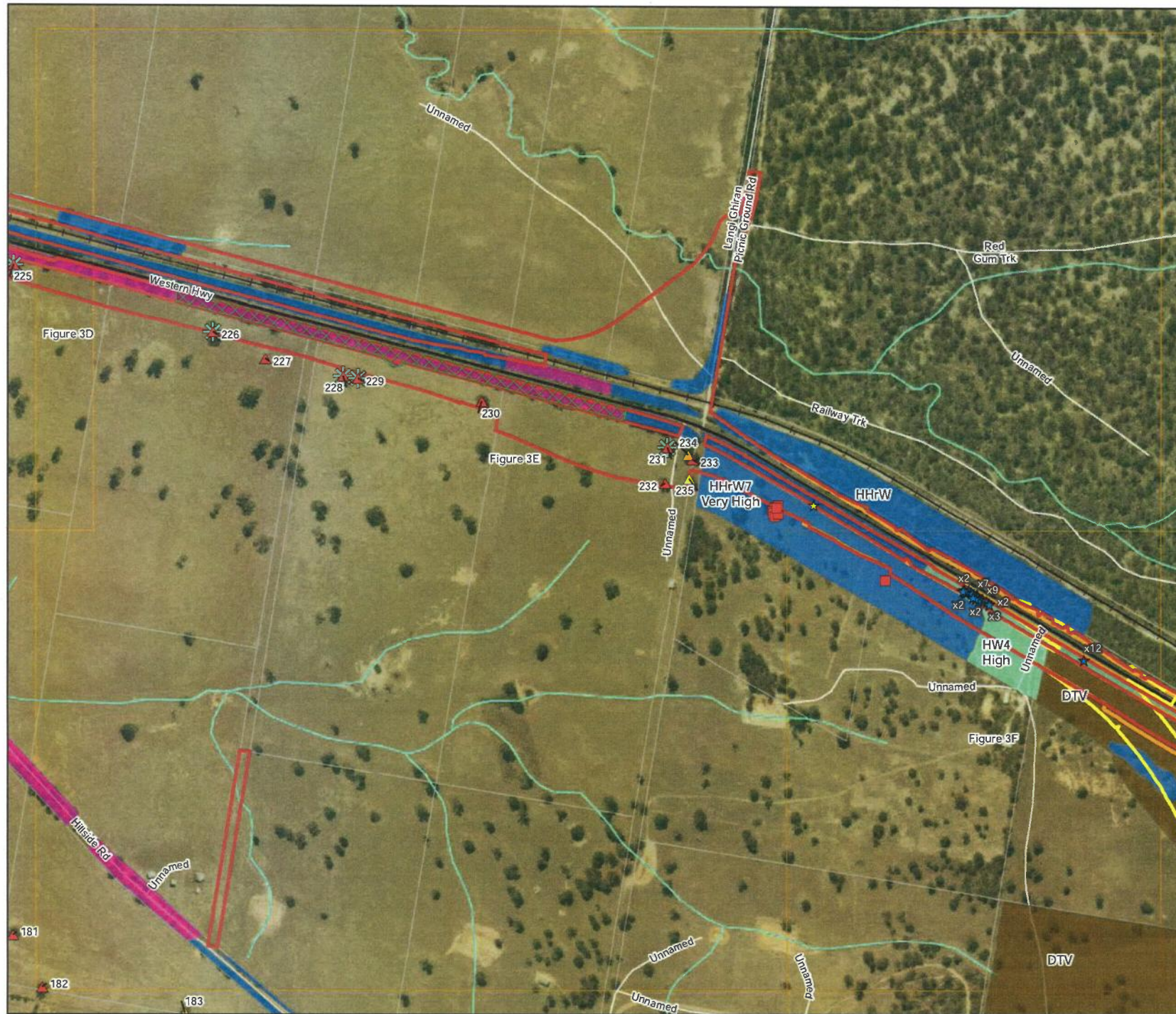


Figure 3D
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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- | | |
|---|--|
| <p>Threatened Fauna Species</p> <ul style="list-style-type: none"> ■ Brown Toadlet ■ Brown Treecreeper ■ Dwarf Galaxias ■ Golden Sun Moth + Aquatic Survey Locations <p>Scattered Trees</p> <ul style="list-style-type: none"> ● Due Diligence ▲ Very Large Old Trees ▲ Large Old Trees ▲ Medium Old Trees ▲ Small Trees <p>Threatened Flora Species</p> <ul style="list-style-type: none"> ★ Button Wrinklewort ★ Emerald-lip Greenhood ★ Golden Cowslips ★ Spiny Rice-flower ★ Yarra Gum ✿ Hollow Bearing Trees <p>EPBC Vegetation Communities</p> <ul style="list-style-type: none"> ▭ Grassy Eucalypt ▭ Woodland of the VVP ▭ Natural Temperate ▭ Grassland of the VVP | <p>EVCs</p> <ul style="list-style-type: none"> ▭ Alluvial Terraces ▭ Herb-rich Woodland ▭ Creepline ▭ Grassy Woodland ▭ Grassy Dry Forest ▭ Grassy Woodland ▭ Heathy Dry Forest ▭ Heathy Woodland ▭ Hills Herb-rich Woodland ▭ Plains Grassland ▭ Plains Grassy Wetland ▭ Plains Grassy Woodland ▭ Plains Sedgy Wetland ▭ Degraded Treeless Vegetation ▭ Revegetation ▭ Option 1 ▭ Option 2 ▭ Option 3 |
|---|--|

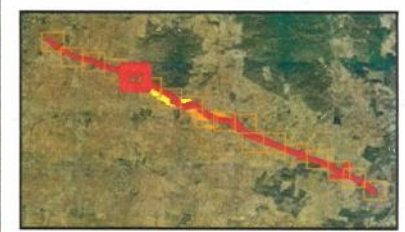
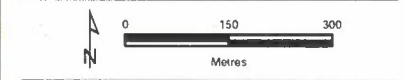
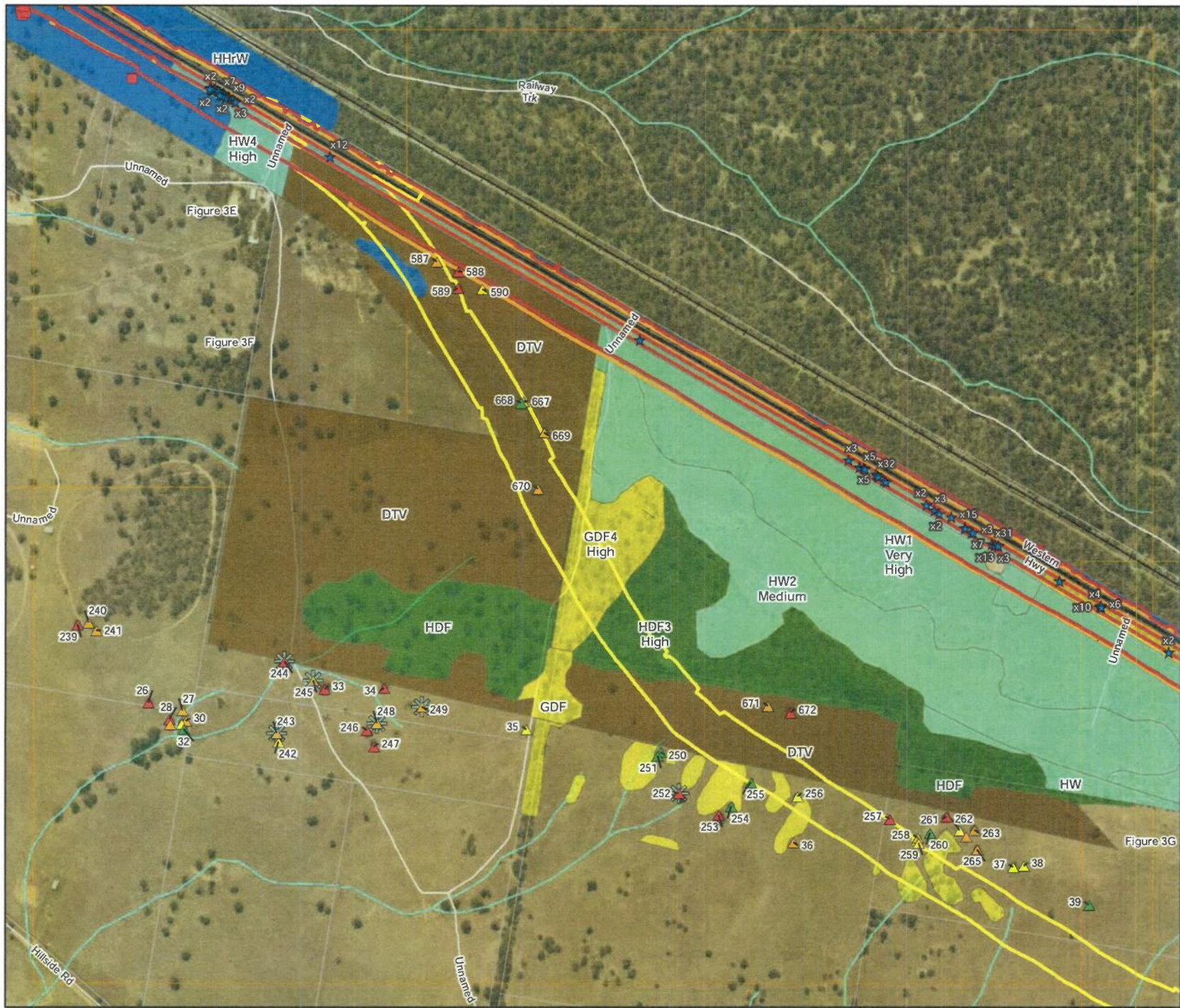


Figure 3E
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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2625_Ecology Partners Map 30/04/2012_A1F



- Threatened Fauna Species**
- Brown Toadlet
 - Brown Treecreeper
 - Dwarf Galaxias
 - Golden Sun Moth
 - Aquatic Survey Locations
- Scattered Trees**
- Due Diligence
 - Very Large Old Trees
 - Large Old Trees
 - Medium Old Trees
 - Small Trees
- Threatened Flora Species**
- Button Wrinklewort
 - Emerald-lip Greenhood
 - Golden Cowslips
 - Spiny Rice-flower
 - Yarra Gum
 - Hollow Bearing Trees
- EVCs**
- Alluvial Terraces
 - Herb-rich Woodland
 - Creekline
 - Grassy Woodland
 - Grassy Dry Forest
 - Grassy Woodland
 - Heathy Dry Forest
 - Heathy Woodland
 - Hills Herb-rich Woodland
 - Plains Grassland
 - Plains Grassy Wetland
 - Plains Grassy Woodland
 - Plains Sedgy Wetland
 - Degraded Treeless Vegetation
 - Revegetation
 - Option 1
 - Option 2
 - Option 3
- EPBC Vegetation Communities**
- Grassy Eucalypt Woodland of the VVP
 - Natural Temperate Grassland of the VVP

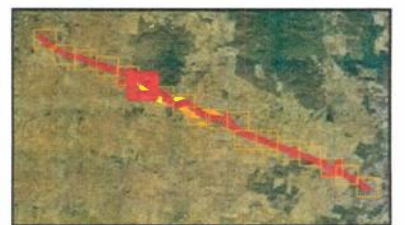
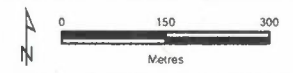
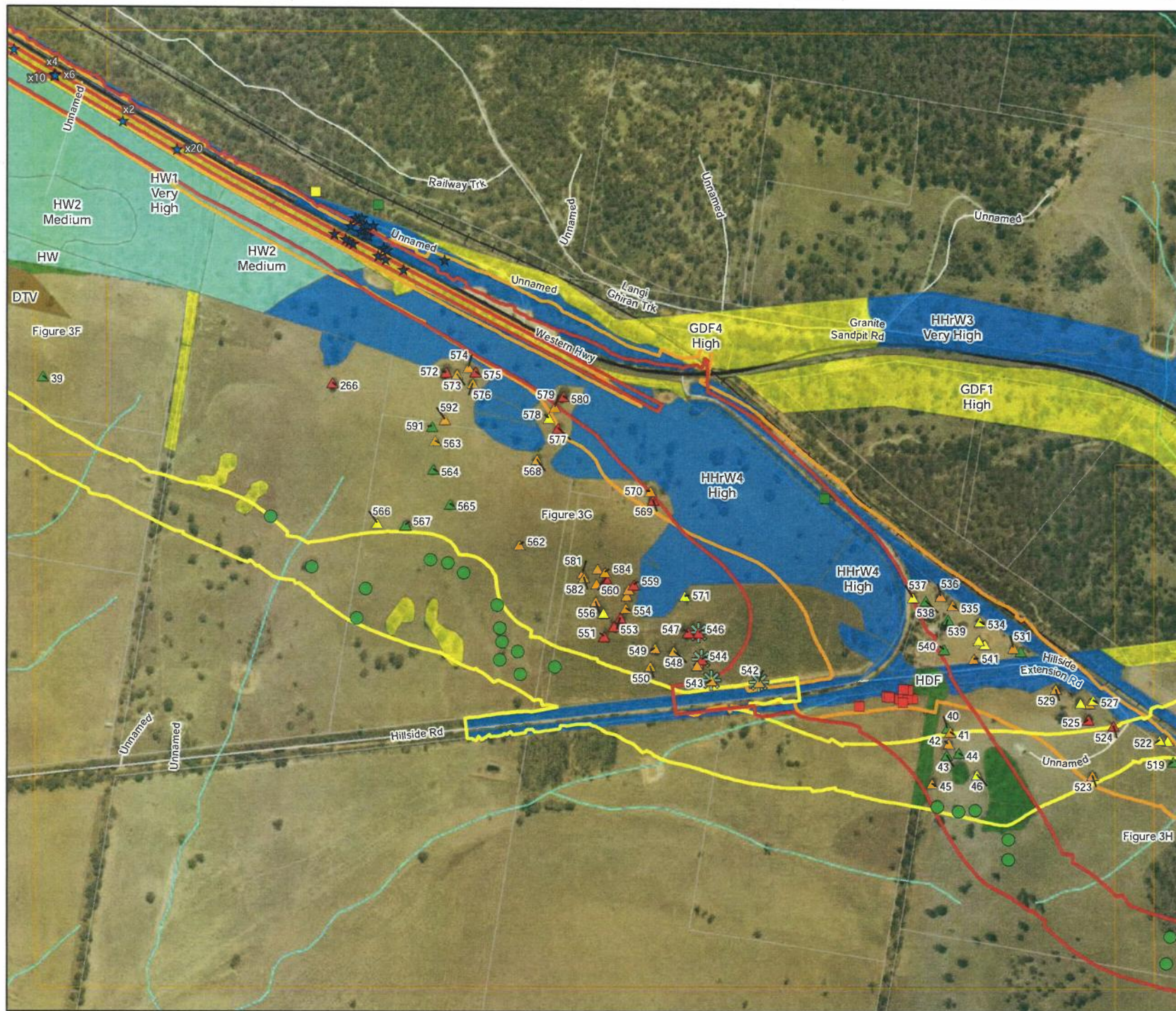


Figure 3F
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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- | | |
|---|---|
| Threatened Fauna Species
■ Brown Toadlet
■ Brown Treecreeper
■ Dwarf Galaxias
■ Golden Sun Moth
+ Aquatic Survey Locations
Scattered Trees
● Due Diligence
▲ Very Large Old Trees
▲ Large Old Trees
▲ Medium Old Trees
▲ Small Trees
Threatened Flora Species
★ Button Wrinklewort
★ Emerald-lip Greenhood
☆ Golden Cowslips
★ Spiny Rice-flower
★ Yarra Gum
🌳 Hollow Bearing Trees
EPBC Vegetation Communities
🌿 Grassy Eucalypt
🌿 Woodland of the VVP
🌿 Natural Temperate
🌿 Grassland of the VVP | EVCs
■ Alluvial Terraces
■ Herb-rich Woodland
■ Creepline
■ Grassy Woodland
■ Grassy Dry Forest
■ Grassy Woodland
■ Heathy Dry Forest
■ Heathy Woodland
■ Hills Herb-rich Woodland
■ Plains Grassland
■ Plains Grassy Wetland
■ Plains Grassy Woodland
■ Plains Sedgy Wetland
■ Degraded Treeless Vegetation
■ Revegetation
■ Option 1
■ Option 2
■ Option 3 |
|---|---|

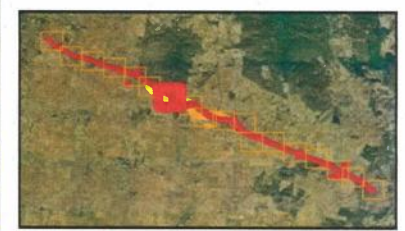
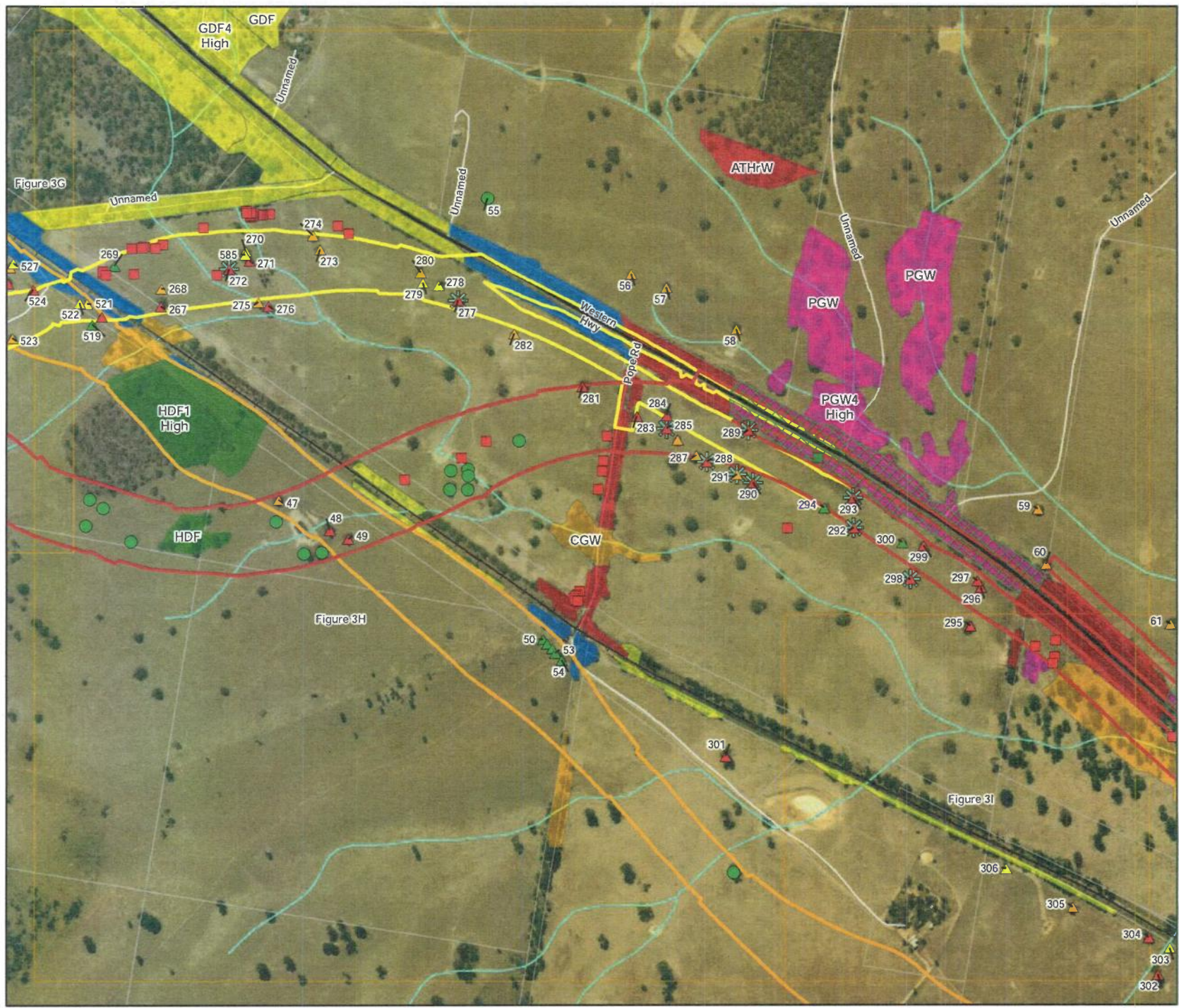


Figure 3G
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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- | | |
|--|--------------------------------|
| Threatened Fauna Species | EVCs |
| ■ Brown Toadlet | ■ Alluvial Terraces |
| ■ Brown Treecreeper | ■ Herb-rich Woodland |
| ■ Dwarf Galaxias | ■ Creekline |
| ■ Golden Sun Moth | ■ Grassy Woodland |
| ■ Aquatic Survey Locations | ■ Grassy Dry Forest |
| ■ Scattered Trees | ■ Grassy Woodland |
| ● Due Diligence | ■ Heathy Dry Forest |
| ▲ Very Large Old Trees | ■ Heathy Woodland |
| ▲ Large Old Trees | ■ Hills Herb-rich Woodland |
| ▲ Medium Old Trees | ■ Plains Grassland |
| ▲ Small Trees | ■ Plains Grassy Wetland |
| ★ Threatened Flora Species | ■ Plains Grassy Woodland |
| ★ Button Wrinklewort | ■ Plains Sedgy Wetland |
| ★ Emerald-lip Greenhood | ■ Degraded Treeless Vegetation |
| ★ Golden Cowslips | ■ Revegetation |
| ★ Spiny Rice-flower | ■ Option 1 |
| ★ Yarra Gum | ■ Option 2 |
| ★ Hollow Bearing Trees | ■ Option 3 |
| EPBC Vegetation Communities | |
| ■ Grassy Eucalypt Woodland of the VVP | |
| ■ Natural Temperate Grassland of the VVP | |

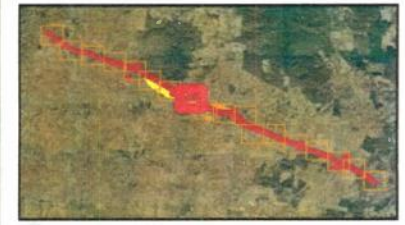
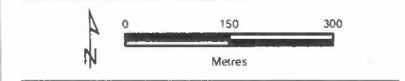
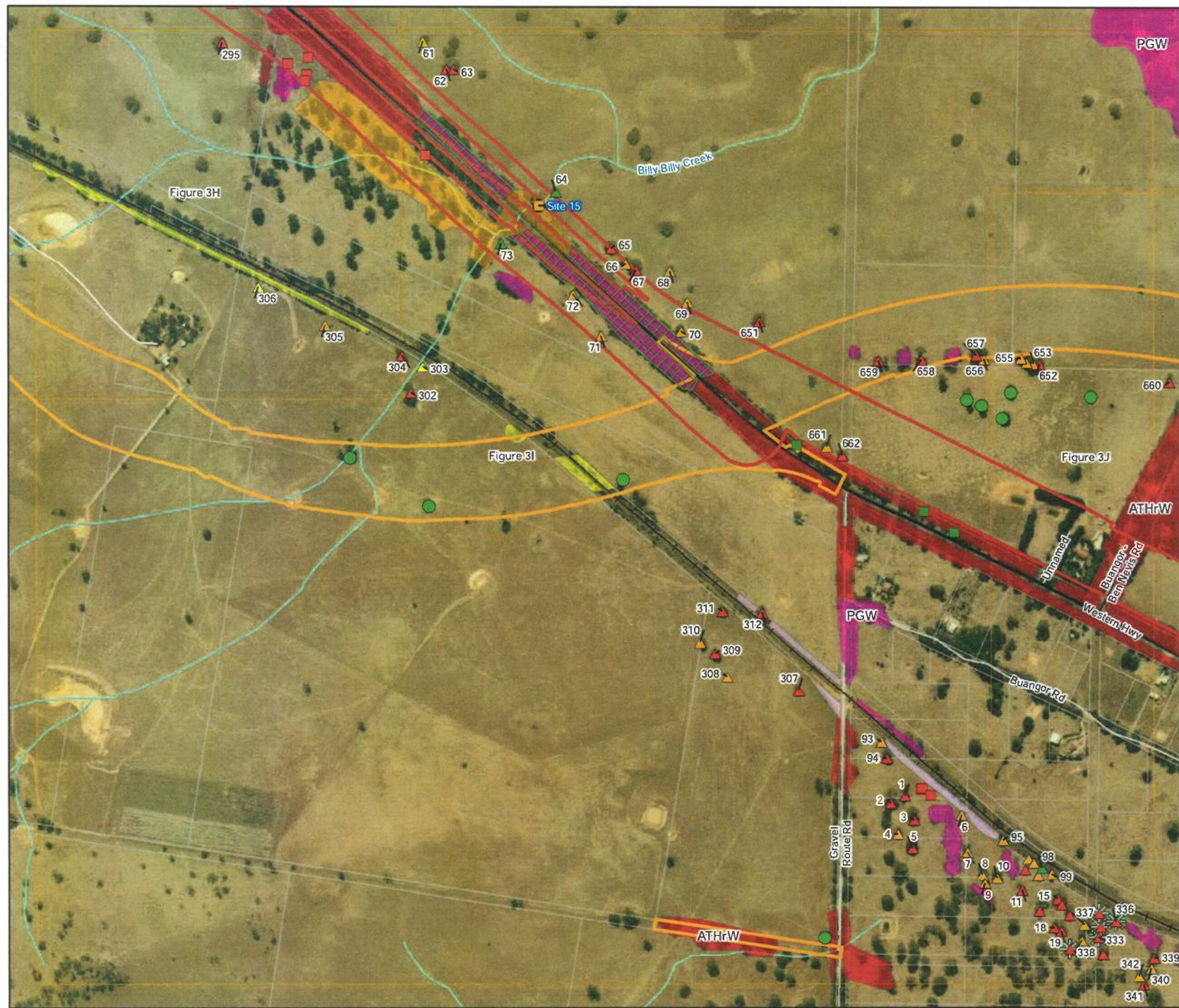


Figure 3H
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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2623 - Figure 3H - Features.mxd 20/04/2010 ALJ



- | | |
|--|--------------------------------|
| Threatened Fauna Species | EVCs |
| ■ Brown Toadlet | ■ Alluvial Terraces |
| ■ Brown Treecreeper | ■ Herb-rich Woodland |
| ■ Dwarf Galaxias | ■ Creepline |
| ■ Golden Sun Moth | ■ Grassy Woodland |
| ■ Aquatic Survey Locations | ■ Grassy Dry Forest |
| ● Scattered Trees | ■ Grassy Woodland |
| ● Due Diligence | ■ Grassy Woodland |
| ▲ Very Large Old Trees | ■ Heathy Dry Forest |
| ▲ Large Old Trees | ■ Heathy Woodland |
| ▲ Medium Old Trees | ■ Hills Herb-rich Woodland |
| ▲ Small Trees | ■ Plains Grassland |
| ★ Threatened Flora Species | ■ Plains Grassy Wetland |
| ★ Button Wrinklewort | ■ Plains Grassy Woodland |
| ★ Emerald-lip Greenhood | ■ Plains Sedgy Wetland |
| ★ Golden Cowslips | ■ Degraded Treeless Vegetation |
| ★ Spiny Rice-flower | ■ Revegetation |
| ★ Yarra Gum | ■ Option 1 |
| ★ Hollow Bearing Trees | ■ Option 2 |
| | ■ Option 3 |
| EPBC Vegetation Communities | |
| ■ Grassy Eucalypt Woodland of the VVP | |
| ■ Natural Temperate Grassland of the VVP | |

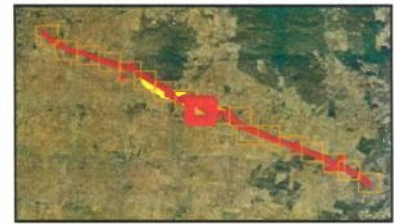
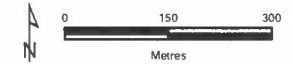
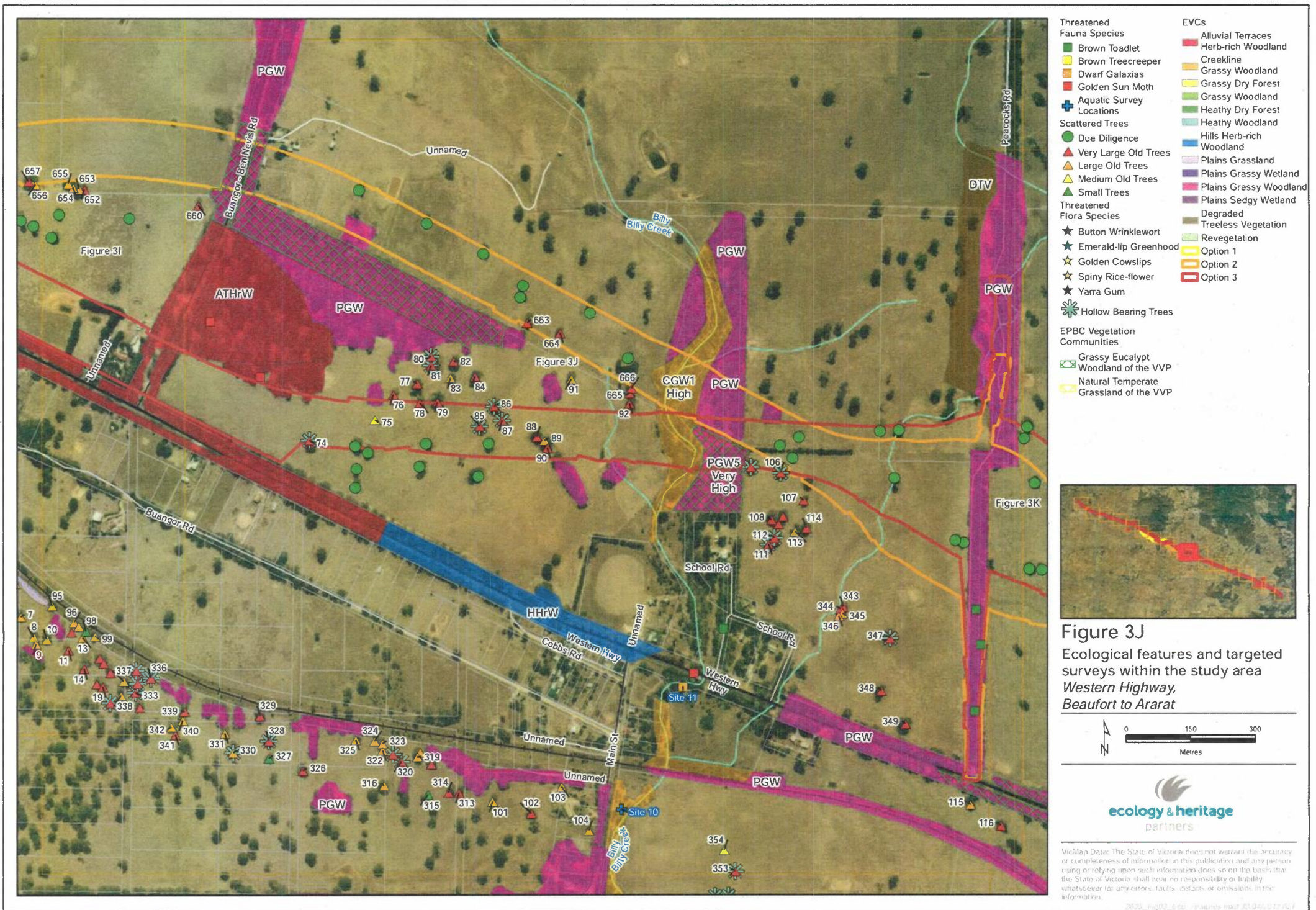


Figure 31
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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- Threatened Fauna Species**
- Brown Toadlet
 - Brown Treecreeper
 - Dwarf Galaxias
 - Golden Sun Moth
 - Aquatic Survey Locations
- Scattered Trees**
- Due Diligence
 - ▲ Very Large Old Trees
 - ▲ Large Old Trees
 - ▲ Medium Old Trees
 - ▲ Small Trees
- Threatened Flora Species**
- ★ Button Wrinklewort
 - ★ Emerald-lip Greenhood
 - ★ Golden Cowslips
 - ★ Spiny Rice-flower
 - ★ Yarra Gum
 - ✿ Hollow Bearing Trees
- EPBC Vegetation Communities**
- Grassy Eucalypt
 - Woodland of the VVP
 - Natural Temperate
 - Grassland of the VVP
- EVCs**
- Alluvial Terraces
 - Herb-rich Woodland
 - Creekline
 - Grassy Woodland
 - Grassy Dry Forest
 - Grassy Woodland
 - Heathy Dry Forest
 - Heathy Woodland
 - Hills Herb-rich Woodland
 - Plains Grassland
 - Plains Grassy Wetland
 - Plains Grassy Woodland
 - Plains Sedgy Wetland
 - Degraded Treeless Vegetation
 - Revegetation
 - Option 1
 - Option 2
 - Option 3

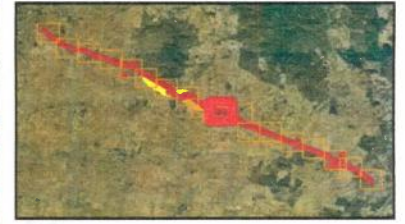
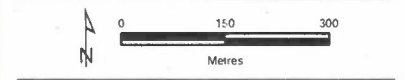
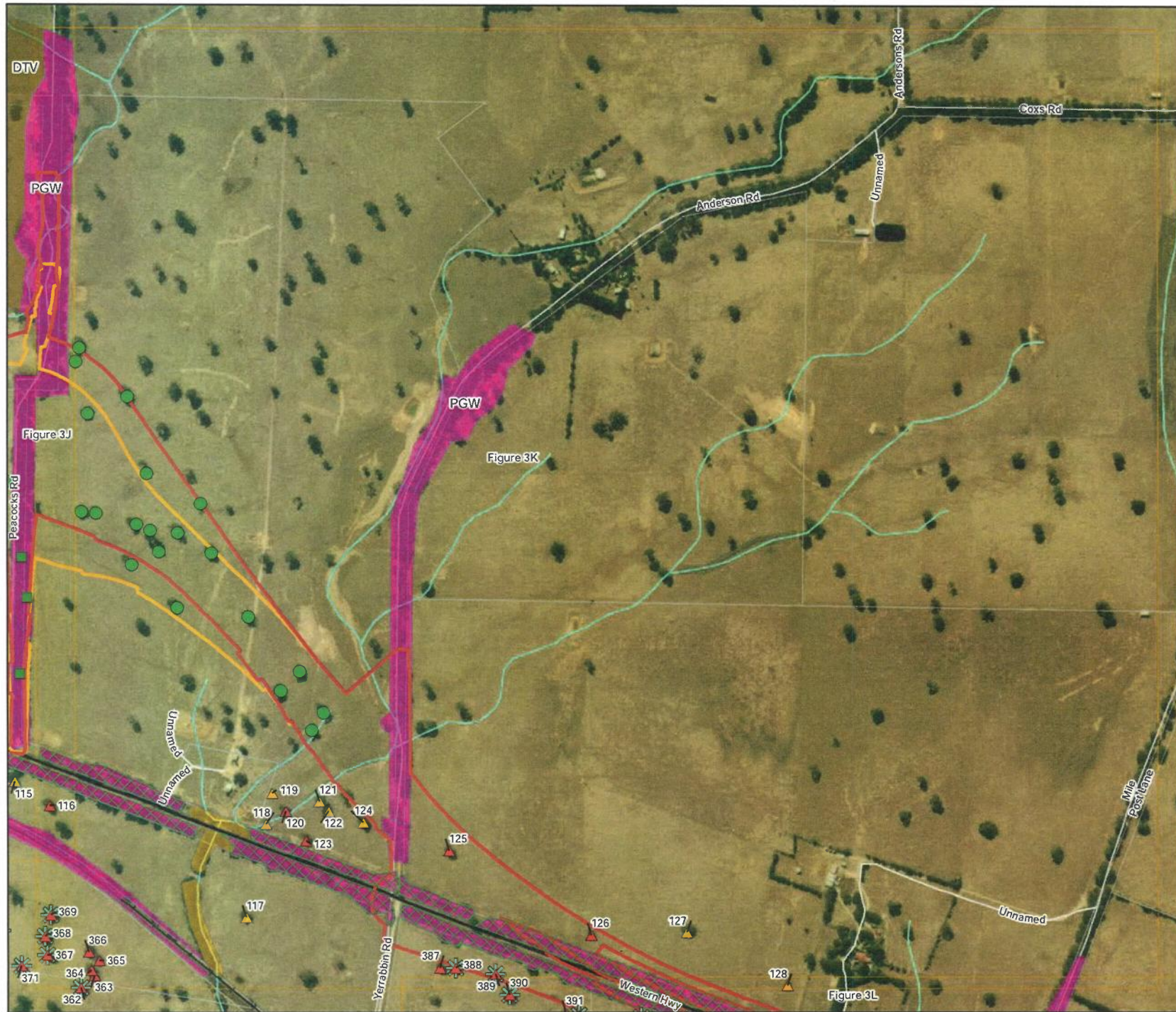


Figure 3J
 Ecological features and targeted surveys within the study area *Western Highway, Beaufort to Ararat*



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2025, Page 92, Ecopartners map 202406121201



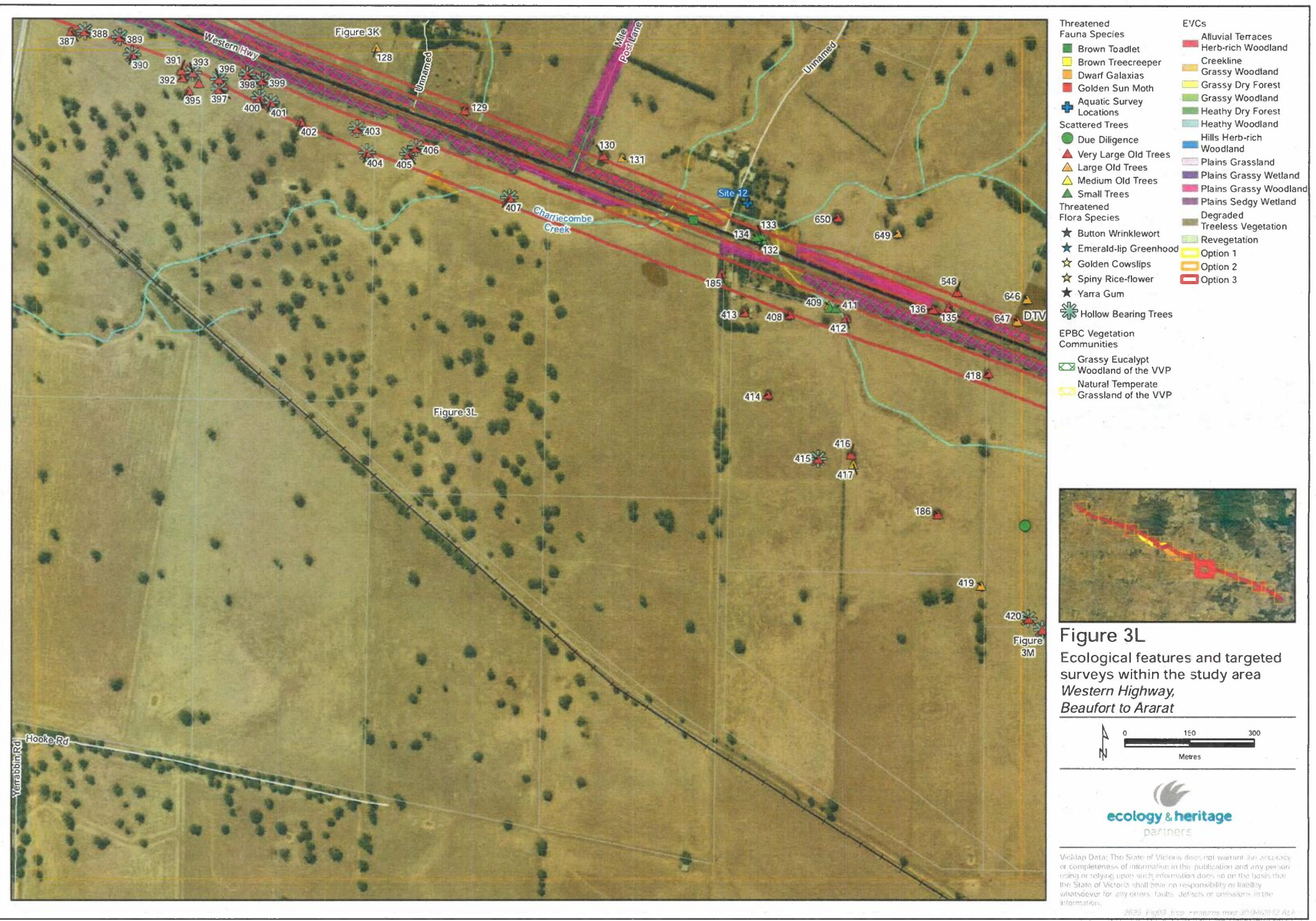
- | | |
|--|--------------------------------|
| Threatened Fauna Species | EVCs |
| ■ Brown Toadlet | ■ Alluvial Terraces |
| ■ Brown Treecreeper | ■ Creekline |
| ■ Dwarf Galaxias | ■ Grassy Woodland |
| ■ Golden Sun Moth | ■ Grassy Dry Forest |
| ■ Aquatic Survey Locations | ■ Grassy Woodland |
| ● Scattered Trees | ■ Heathy Dry Forest |
| ● Due Diligence | ■ Heathy Woodland |
| ▲ Very Large Old Trees | ■ Hills Herb-rich Woodland |
| ▲ Large Old Trees | ■ Plains Grassland |
| ▲ Medium Old Trees | ■ Plains Grassy Wetland |
| ▲ Small Trees | ■ Plains Grassy Woodland |
| Threatened Flora Species | ■ Plains Sedge Wetland |
| ★ Button Wrinklewort | ■ Degraded Treeless Vegetation |
| ★ Emerald-lip Greenhood | ■ Revegetation |
| ★ Golden Cowslips | ■ Option 1 |
| ★ Spiny Rice-flower | ■ Option 2 |
| ★ Yarra Gum | ■ Option 3 |
| ☼ Hollow Bearing Trees | |
| EPBC Vegetation Communities | |
| ■ Grassy Eucalypt Woodland of the VVP | |
| ■ Natural Temperate Grassland of the VVP | |



Figure 3K
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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- | | |
|------------------------------------|--------------------------------|
| Threatened Fauna Species | EVCs |
| ■ Brown Toadlet | ■ Alluvial Terraces |
| ■ Brown Treecreeper | ■ Herb-rich Woodland |
| ■ Dwarf Galaxias | ■ Creekline |
| ■ Golden Sun Moth | ■ Grassy Woodland |
| ■ Aquatic Survey Locations | ■ Grassy Dry Forest |
| ■ Scattered Trees | ■ Grassy Woodland |
| ● Due Diligence | ■ Heathy Dry Forest |
| ▲ Very Large Old Trees | ■ Heathy Woodland |
| ▲ Large Old Trees | ■ Hills Herb-rich Woodland |
| ▲ Medium Old Trees | ■ Plains Grassland |
| ▲ Small Trees | ■ Plains Grassy Wetland |
| ★ Threatened Flora Species | ■ Plains Grassy Woodland |
| ★ Button Wrinklewort | ■ Plains Sedgy Wetland |
| ★ Emerald-lip Greenhood | ■ Degraded Treeless Vegetation |
| ★ Golden Cowslips | ■ Revegetation |
| ★ Spiny Rice-flower | ■ Option 1 |
| ★ Yarra Gum | ■ Option 2 |
| ■ Hollow Bearing Trees | ■ Option 3 |
| EPBC Vegetation Communities | |
| ■ Grassy Eucalypt | |
| ■ Woodland of the VVP | |
| ■ Natural Temperate | |
| ■ Grassland of the VVP | |

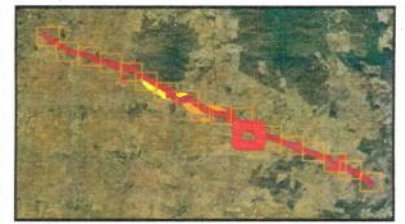


Figure 3L
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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- | | |
|------------------------------------|--------------------------------|
| Threatened Fauna Species | EVCs |
| ■ Brown Toadlet | ■ Alluvial Terraces |
| ■ Brown Treecreeper | ■ Herb-rich Woodland |
| ■ Dwarf Galaxias | ■ Creekline |
| ■ Golden Sun Moth | ■ Grassy Woodland |
| ■ Aquatic Survey Locations | ■ Grassy Dry Forest |
| ● Scattered Trees | ■ Grassy Woodland |
| ● Due Diligence | ■ Heathy Dry Forest |
| ▲ Very Large Old Trees | ■ Heathy Woodland |
| ▲ Large Old Trees | ■ Hills Herb-rich Woodland |
| ▲ Medium Old Trees | ■ Plains Grassland |
| ▲ Small Trees | ■ Plains Grassy Wetland |
| ★ Threatened Flora Species | ■ Plains Grassy Woodland |
| ★ Button Wrinklewort | ■ Plains Sedge Wetland |
| ★ Emerald-lip Greenhood | ■ Degraded Treeless Vegetation |
| ★ Golden Cowslips | ■ Revegetation |
| ★ Spiny Rice-flower | ■ Option 1 |
| ★ Yarra Gum | ■ Option 2 |
| ★ Hollow Bearing Trees | ■ Option 3 |
| EPBC Vegetation Communities | |
| ■ Grassy Eucalypt | |
| ■ Woodland of the VVP | |
| ■ Natural Temperate | |
| ■ Grassland of the VVP | |

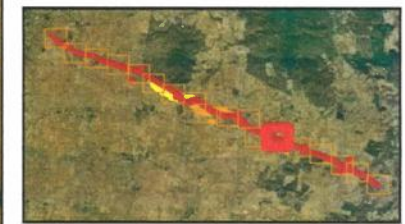


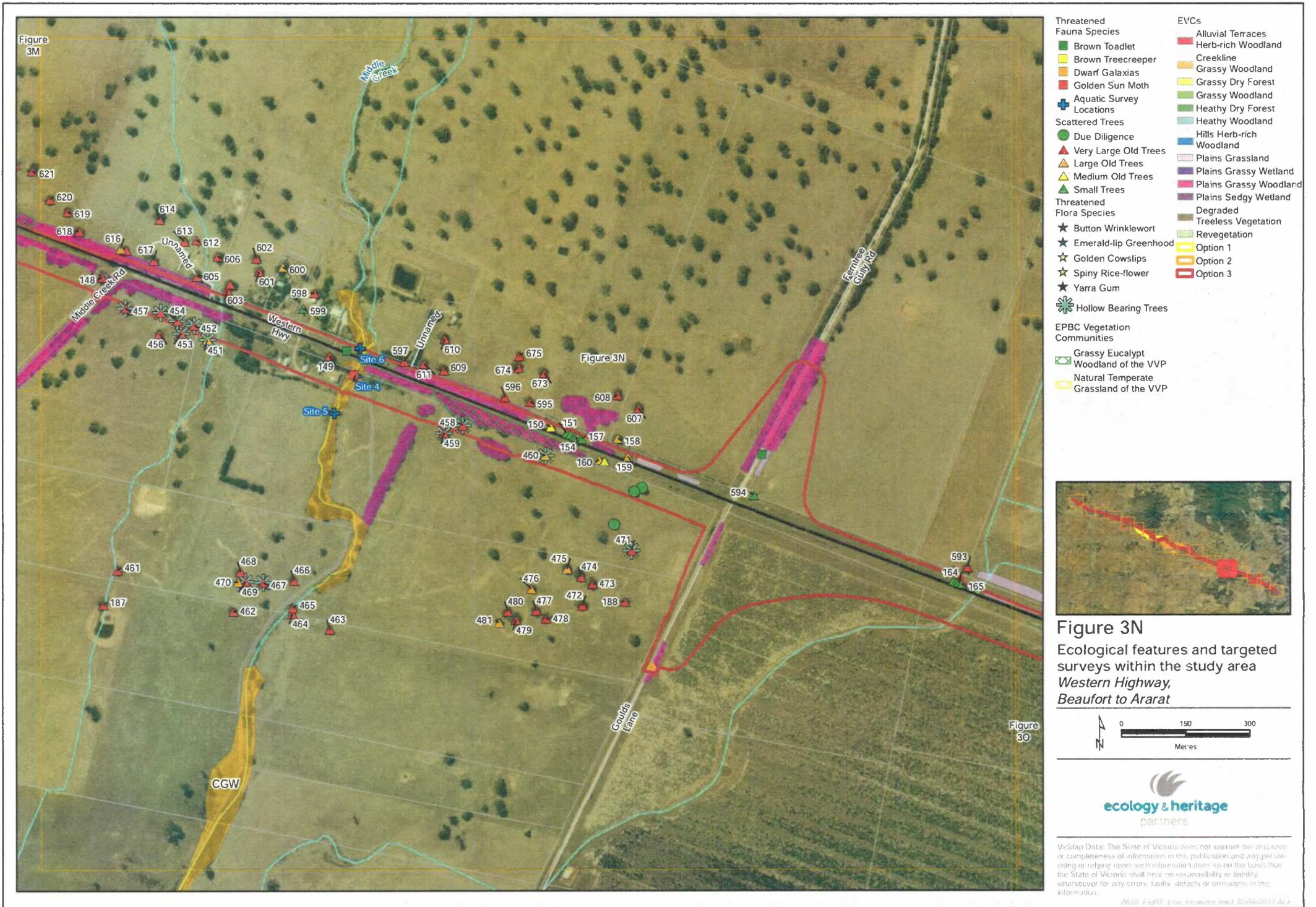
Figure 3M
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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Figure 3L

Figure 3N

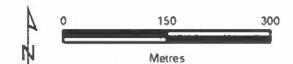




- Threatened Fauna Species**
- Brown Toadlet
 - Brown Treecreeper
 - Dwarf Galaxias
 - Golden Sun Moth
 - ⊕ Aquatic Survey Locations
 - Due Diligence
 - ▲ Very Large Old Trees
 - ▲ Large Old Trees
 - ▲ Medium Old Trees
 - ▲ Small Trees
 - ★ Button Wrinklewort
 - ★ Emerald-lip Greenhood
 - ★ Golden Cowslips
 - ★ Spiny Rice-flower
 - ★ Yarra Gum
 - 🌳 Hollow Bearing Trees
- Scattered Trees**
- Hills Herb-rich Woodland
 - Plains Grassland
 - Plains Grassy Wetland
 - Plains Grassy Woodland
 - Plains Sedy Wetland
- Threatened Flora Species**
- ★ Degraded Treeless Vegetation
 - ★ Revegetation Option 1
 - ★ Revegetation Option 2
 - ★ Revegetation Option 3
- EPBC Vegetation Communities**
- Grassy Eucalypt Woodland of the VVP
 - Natural Temperate Grassland of the VVP
- EVCs**
- Alluvial Terraces
 - Herb-rich Woodland
 - Creepline
 - Grassy Woodland
 - Grassy Dry Forest
 - Grassy Woodland
 - Heathy Dry Forest
 - Heathy Woodland
 - Hills Herb-rich Woodland
 - Plains Grassland
 - Plains Grassy Wetland
 - Plains Grassy Woodland
 - Plains Sedy Wetland
 - Degraded Treeless Vegetation
 - Revegetation Option 1
 - Revegetation Option 2
 - Revegetation Option 3

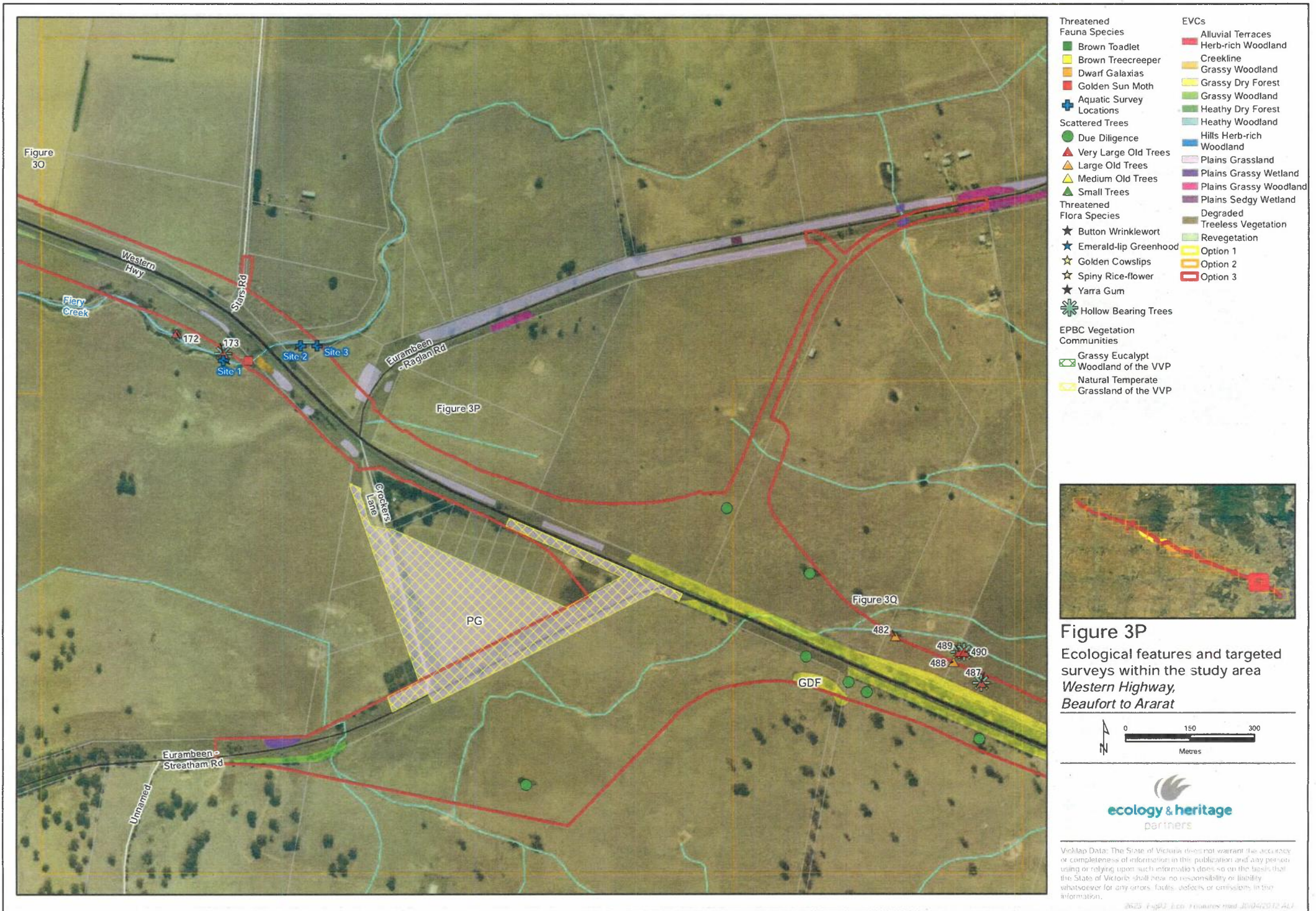


Figure 30
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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|---|--|
| Threatened Fauna Species
■ Brown Toadlet
■ Brown Treecreeper
■ Dwarf Galaxias
■ Golden Sun Moth
+ Aquatic Survey Locations
Scattered Trees
● Due Diligence
▲ Very Large Old Trees
▲ Large Old Trees
▲ Medium Old Trees
▲ Small Trees
Threatened Flora Species
★ Button Wrinklewort
★ Emerald-lip Greenhood
★ Golden Cowslips
★ Spiny Rice-flower
★ Yarra Gum
🌳 Hollow Bearing Trees
EPBC Vegetation Communities
🌿 Grassy Eucalypt
🌿 Woodland of the VVP
🌿 Natural Temperate
🌿 Grassland of the VVP | EVCs
■ Alluvial Terraces
■ Herb-rich Woodland
■ Creepline
■ Grassy Woodland
■ Grassy Dry Forest
■ Grassy Woodland
■ Heathy Dry Forest
■ Heathy Woodland
■ Hills Herb-rich Woodland
■ Plains Grassland
■ Plains Grassy Wetland
■ Plains Grassy Woodland
■ Plains Sedgy Wetland
■ Degraded
■ Treeless Vegetation
■ Revegetation
■ Option 1
■ Option 2
■ Option 3 |
|---|--|

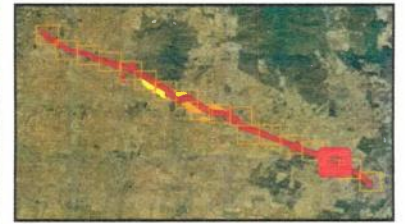
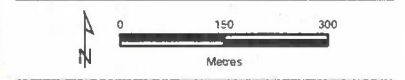
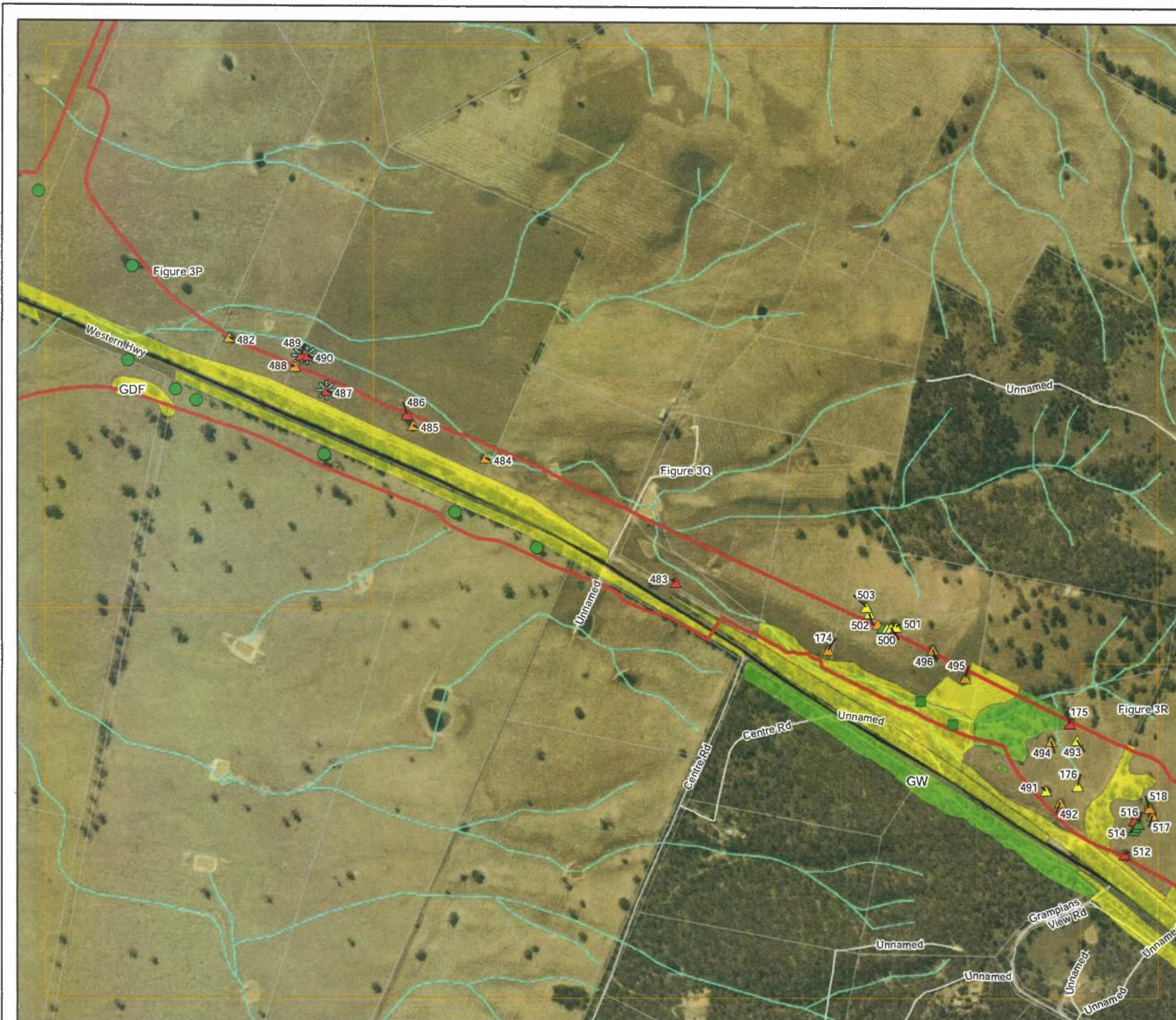


Figure 3P
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



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- Threatened Fauna Species**
- Brown Toadlet
 - Brown Treecreeper
 - Dwarf Galaxias
 - Golden Sun Moth
 - Aquatic Survey Locations
- Scattered Trees**
- Due Diligence
 - ▲ Very Large Old Trees
 - ▲ Large Old Trees
 - ▲ Medium Old Trees
 - ▲ Small Trees
- Threatened Flora Species**
- ★ Button Wrinklewort
 - ★ Emerald-lip Greenhood
 - ★ Golden Cowslips
 - ★ Spiny Rice-flower
 - ★ Yarra Gum
 - ✿ Hollow Bearing Trees
- EPBC Vegetation Communities**
- Grassy Eucalypt
 - Woodland of the VVP
 - Natural Temperate
 - Grassland of the VVP
- EVCS**
- Alluvial Terraces
 - Herb-rich Woodland
 - Creekline
 - Grassy Woodland
 - Grassy Dry Forest
 - Grassy Woodland
 - Heathy Dry Forest
 - Heathy Woodland
 - Hills Herb-rich Woodland
 - Plains Grassland
 - Plains Grassy Wetland
 - Plains Grassy Woodland
 - Plains Sedgy Wetland
 - Degraded
 - Treeless Vegetation
 - Revegetation
- Option 1** (Yellow)
- Option 2** (Orange)
- Option 3** (Red)

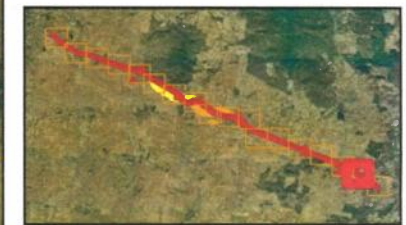
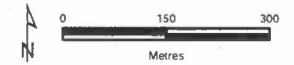
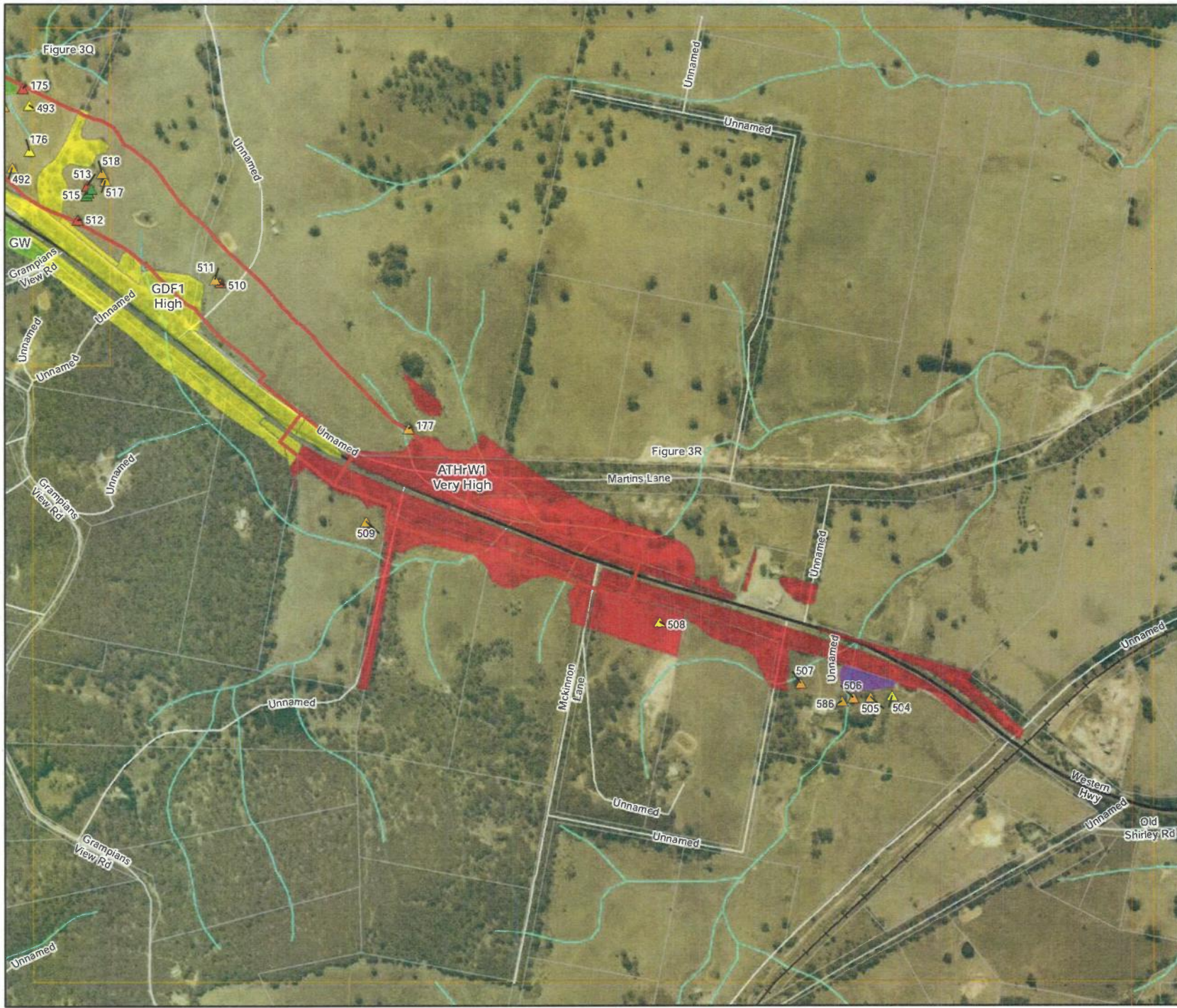


Figure 3Q
 Ecological features and targeted surveys within the study area
 Western Highway, Beaufort to Ararat



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|------------------------------------|----------------------------|
| Threatened Fauna Species | EVCs |
| ■ Brown Toadlet | ■ Alluvial Terraces |
| ■ Brown Treecreeper | ■ Herb-rich Woodland |
| ■ Dwarf Galaxias | ■ Creekline |
| ■ Golden Sun Moth | ■ Grassy Woodland |
| ■ Aquatic Survey Locations | ■ Grassy Dry Forest |
| ■ Scattered Trees | ■ Grassy Woodland |
| ● Due Diligence | ■ Heathy Dry Forest |
| ▲ Very Large Old Trees | ■ Heathy Woodland |
| ▲ Large Old Trees | ■ Hills Herb-rich Woodland |
| ▲ Medium Old Trees | ■ Woodland |
| ▲ Small Trees | ■ Plains Grassland |
| ★ Button Wrinklewort | ■ Plains Grassy Wetland |
| ★ Emerald-lip Greenhood | ■ Plains Grassy Woodland |
| ★ Golden Cowslips | ■ Plains Sedge Wetland |
| ★ Spiny Rice-flower | ■ Degraded |
| ★ Yarra Gum | ■ Treeless Vegetation |
| ★ Hollow Bearing Trees | ■ Revegetation |
| | ■ Option 1 |
| | ■ Option 2 |
| | ■ Option 3 |
| EPBC Vegetation Communities | |
| ■ Grassy Eucalypt | |
| ■ Woodland of the VVP | |
| ■ Natural Temperate | |
| ■ Grassland of the VVP | |

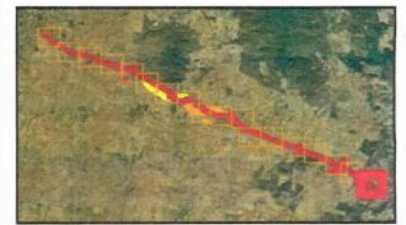


Figure 3R
 Ecological features and targeted surveys within the study area
 Western Highway,
 Beaufort to Ararat



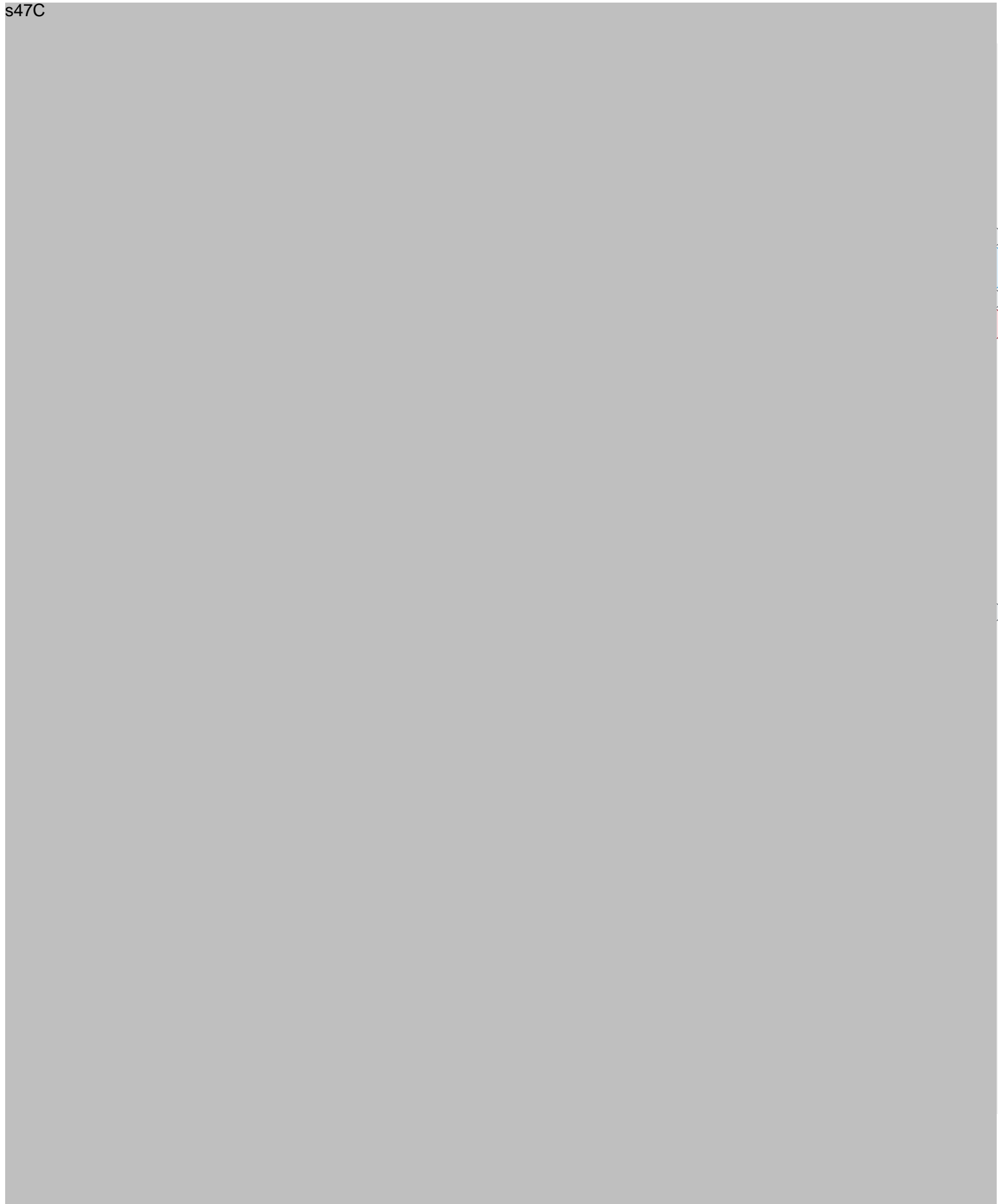
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