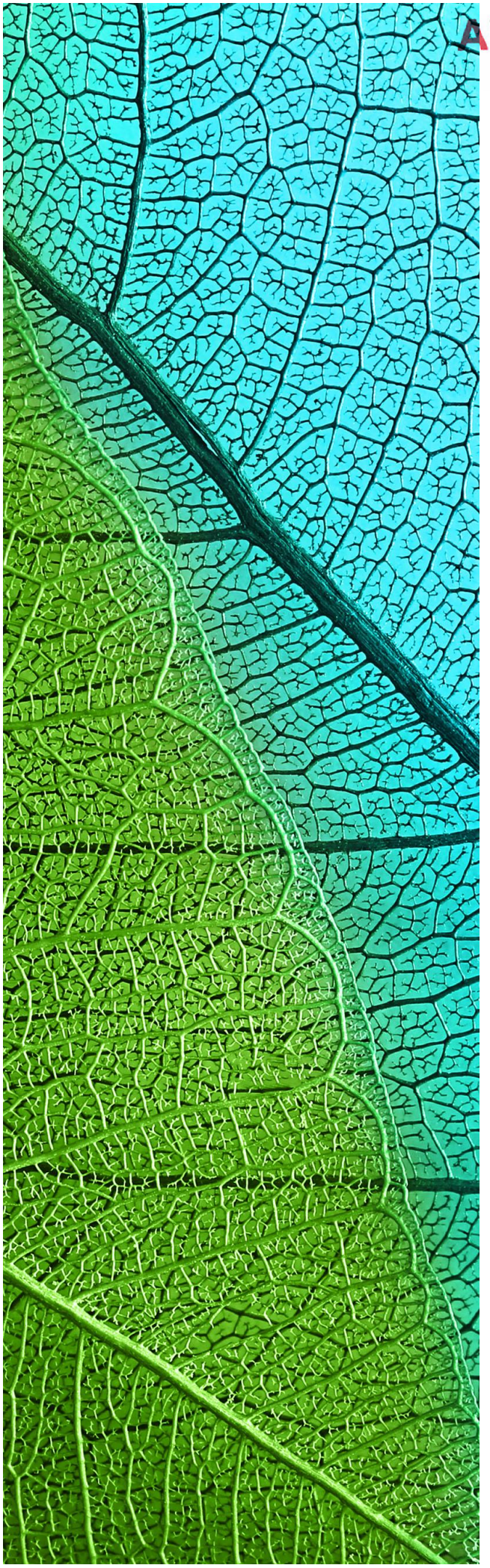


Cosgrove Solar Farm

Native Vegetation Assessment

Prepared for Bison Energy Australia Pty Ltd

December 2019
Report No. 19243 (2.0)

Nature Advisory

(Formerly Brett Lane & Associates Pty Ltd)

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

(03) 9815 2111
www.natureadvisory.com.au

Contents

1. Introduction 1

2. Definitions, methods and assessment process 2

2.1. Definitions 2

2.1.1. Study area 2

2.1.2. Native vegetation 2

2.2. Field methods 3

2.3. Planning permit and application requirements 3

2.3.1. Exemptions 3

2.3.2. Application requirements 4

2.3.3. Referral to DELWP 4

3. Existing information and methods 5

3.1. Site description, zoning and overlays 5

3.2. Native vegetation 5

3.2.1. Species recorded 5

3.2.2. Patches of native vegetation 5

3.2.3. Scattered trees 6

4. Proposed Development and Implications 8

4.1. Proposed development 8

4.2. Design recommendations 8

4.3. Implications 8

4.3.1. Permit requirements under the Guidelines 8

4.3.2. EPBC Act 8

5. References 9

Tables

Table 1: Description of habitat zones in the study area 6

Table 2: Summary of habitat hectare assessment results 6

Figures

Figure 1: Study area and native vegetation 7

Appendices

Appendix 1: Details of the assessment process in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017a) 10

Appendix 2: Detailed habitat hectare assessment results 14

Appendix 3: Scattered trees recorded in the study area 15

Appendix 4: Flora species recorded in the study area 16

Appendix 5: Photographs of native vegetation recorded on site 17

Appendix 6: EVC benchmarks 20

1. Introduction

Bison Energy Australia engaged Nature Advisory Pty Ltd to conduct a native vegetation assessment of a 15-hectare area of private land at 290 Cosgrove-Caniambo Road, Cosgrove and the adjoining roadsides. It is a property proposed for a solar farm.

This investigation was commissioned to provide information on the extent and condition of native vegetation in the study area according to Victoria's *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017), herein referred to as 'the Guidelines'. Potential impacts on flora and fauna matters listed under the Victorian *Flora and Fauna Guarantee Act 1988* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* have been considered as part of a review of existing information and field investigation; no relevant implications were identified under either Act.

The following native vegetation was recorded in the study area:

- 4 patches of native vegetation in the roadside, totalling 0.03 hectares; and
- 3 scattered trees (namely 1 large scattered tree in the property and 2 small scattered trees in the road reserve).

The site lies within Location Category 2 under the Guidelines (see Appendix 1). As such, if this vegetation was proposed to be removed it would be assessed under the Intermediate assessment pathway. This would not trigger a referral to DELWP.

No EPBC or FFG Act listed matters were recorded within the study area including within the roadside.

This investigation was undertaken by a team from Nature Advisory comprising Chris Armstrong (Botanist) and Inga Kulik (Senior Ecologist & Project Manager).

2. Definitions, methods and assessment process

2.1. Definitions

2.1.1. Study area

The study area for this investigation is defined as a 15-hectare area of private land at 290 Cosgrove-Caniambo Road, Cosgrove and the adjoining roadsides to the east and south.

2.1.2. Native vegetation

Native vegetation is currently defined in Clause 73.01 of all Victorian planning schemes as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses'. The Guidelines (DELWP 2017) further classify native vegetation as belonging to two categories:

- Patch; or
- Scattered tree.

The definitions of these categories are provided below, along with the prescribed DELWP methods to assess them. Further details on definitions of patches and scattered trees are provided in Appendix 1.

Patch

A patch of native vegetation is either:

- An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native; or
- Any area with three or more native canopy trees[1] where the drip line[2] of each tree touches the drip line of at least one other tree, forming a continuous canopy; or
- Any mapped wetland included in the *Current wetlands map*, available from *MapShareVic* (DELWP 2019a).

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

The *Native Vegetation Information Management* (NVIM) system (DELWP 2019b) provides modelled condition scores for native vegetation to be used in certain circumstances.

[1] A native canopy tree is a mature tree (i.e. it is able to flower) that is greater than 3 metres in height and is normally found in the upper layer of the relevant vegetation type.
[2] The drip line is the outermost boundary of a tree canopy (leaves and/or branches) where the water drips on to the ground.

Scattered tree

A scattered tree is:

- A native canopy tree[2] that does not form part of a patch.

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

2.2. Field methods

The field assessment was conducted on the 28th November 2019. During this assessment, the study area was surveyed on foot.

Sites in the study area found to support native vegetation were mapped through a combination of aerial photograph interpretation and ground-truthing using a hand-held GPS (accurate to approximately five metres).

Whilst this assessment was not designed to provide an exhaustive inventory of flora species in the study area, all efforts were made to schedule the site assessment at a time of year when the majority of native vegetation life forms are likely to be present. The late spring timing of the survey and condition of vegetation was considered suitable to ascertain the extent and condition of native vegetation.

2.3. Planning permit and application requirements

State planning provisions are established under the *Victorian Planning and Environment Act 1987*. Clause 52.17 of all Victorian Planning Schemes states that:

A permit is required to remove, destroy or lop native vegetation, including dead native vegetation.

A permit is not required if:

- If an exemption in Table 52.17-7 specifically states that that a permit is not required.
- If a native vegetation precinct plan corresponding to the land is incorporated into the planning scheme and listed in the schedule to Clause 52.16.
- If the native vegetation is specified in a schedule to Clause 52.17.

2.3.1. Exemptions

Exemptions listed in Table 52.17-7 relevant to the study area include:

- Dead native vegetation: Native vegetation that is dead is exempt and does not require a planning permit. This does not apply to a standing dead tree with a trunk diameter of 40 centimetres or more at a height of 1.3 metres above ground level. As such, any dead trees with DBH of 40 centimetres or more have been included in the tree data collected for this investigation.
- Planted vegetation: Native vegetation that is to be removed, destroyed or lopped that was either planted or grown as a result of direct seeding. This exemption does not apply to native vegetation

planted or managed with public funding for the purpose of land protection or enhancing biodiversity.

2.3.2. Application requirements

Any application to remove, destroy or lop native vegetation must comply with the application requirements specified in the Guidelines (DELWP 2017a).

When assessing an application, Responsible Authorities are also obligated to refer to Clause 12.01-2 (Native vegetation management) in the Planning Scheme which in addition to the Guidelines, refers to the following:

- *Assessor's handbook – applications to remove, destroy or lop native vegetation* (DELWP 2018a).
- Statewide biodiversity information maintained by DELWP.

The application of the Guidelines (DELWP 2017a) are explained further in Appendix 1.

2.3.3. Referral to DELWP

Clause 66.02-2 of the Planning Scheme determines the role of DELWP in the assessment of native vegetation removal permit applications. If an application is referred, DELWP may make certain recommendations to the responsible authority in relation to the permit application.

Any application to remove, destroy or lop native vegetation must be referred to DELWP if:

- The impacts to native vegetation are in the *Detailed* assessment pathway;
- A property vegetation plan applies to the site; or
- The native vegetation is on Crown land which is occupied or managed by the responsible authority.

3. Existing information and methods

3.1. Site description, zoning and overlays

The study area for this investigation (Figure 1) was approximately 15-hectare area of private land at Cosgrove and the adjoining roadsides, which is located 30 kilometres east of Shepparton and 215 kilometres north of Melbourne.

The study area supported silty loam soils on a flat landscape.

The study area was primarily devoid of vegetation given a canola crop had been recently harvested, with the exception of a large remnant River Red Gum towards the south-east corner of the property. A thicket of planted Peppercorn Trees was recorded adjacent to a dam in the north-west corner of the study area. Pasture grasses such as Toowoomba Canary-grass and Wild Oat occurred along the fringes of the study area and into the adjoining roadsides and properties. Native patches of vegetation were recorded within the roadside to the east and south, which were predominantly stands of Lightwoods as well as a patch of native grassland and two small scattered River Red Gums. No listed matters (threatened species or communities) were recorded in the study area.

Neighbouring properties also supported agricultural practises.

The study area lies on the border of the Victorian Riverina and Northern Inland Slopes bioregion, given the flat topography and soil type, the entire study area was classified as Victorian Riverina. The property falls within the Goulburn Broken CMA and Greater Shepparton local government area. It is currently zoned Farming Zone and no overlays apply in the Shepparton Planning Scheme.

The study area is within a Designated Bushfire Prone Area.

3.2. Native vegetation

3.2.1. Species recorded

During the field assessment nine plant species were recorded. Of these, four (44%) were indigenous and five (56%) were introduced or non-indigenous native in origin (Appendix 4).

3.2.2. Patches of native vegetation

Pre–European EVC mapping (DELWP 2019b) indicated that the study area and surrounds would have supported Plains Woodland (EVC 803) and Grassy Woodland (EVC 175) 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 Plains Woodland (EVC 803) was present within the study area (Figure 1). A description of this EVC is provided within the EVC benchmark in Appendix 6.

Four patches (referred to herein as habitat zones) comprising the abovementioned EVC, were identified in the study area (Figure 1). This totalled an area of 0.03 hectares of native vegetation in patches and included no large trees.

The vegetation type was determined to be Plains Woodland rather than Grassy Woodland based on the landscape context which lends itself to fall within the Victorian Riverina rather than the Northern Inland Slopes.

Table 1: Description of habitat zones in the study area

Habitat Zone	EVC	Description
A, C	Plains Woodland (EVC 803)	Thicket of immature Lightwoods, with an understory dominated by introduced pasture grasses such as Toowoomba Canary Grass and Wild Oat.
B	Plains Woodland (EVC 803)	Spear Grass dominant patch of native vegetation, Wallaby Grass and Sheep's Burr were also sporadically recorded in this patch.
D	Plains Woodland (EVC 803)	Thicket of mature and immature Lightwoods with an understory dominated by introduced pasture grasses such as Toowoomba Canary Grass and Wild Oat. Patch was adjoining to a larger continuous patch of roadside vegetation abutting the neighboring property.

The habitat hectare assessment results for these habitat zones are provided in Table 2. More detailed habitat scoring results are presented in Appendix 2.

Table 2: Summary of habitat hectare assessment results

Habitat Zone	EVC	Area (ha)	Condition score (out of 100)	No. of Large Trees in HZ
A	Plains Woodland (EVC 803)	0.012	19	0
B	Plains Woodland (EVC 803)	0.006	15	0
C	Plains Woodland (EVC 803)	0.007	16	0
D	Plains Woodland (EVC 803)	0.005	31	0
Total		**0.031**		**0**

3.2.3. Scattered trees

Scattered trees recorded in the study area would have once comprised the canopy component of Plains Woodland (EVC 803).

Thee scattered trees occurred in the study area (Figure 1), including:

- 1 large River Red Gum (≥ 70 centimetres DBH); and
- 2 small River Red Gums (< 70 centimetres DBH).

Details of all scattered trees recorded are listed in Appendix 3.

Figure 1: Study area and native vegetation

Project: Cosgrove Solar Wind Farm **Client**: Bison Energy Australia Pty Ltd **Date**: 03/12/2019

Study area
Large Scattered Tree
Small Scattered Tree
Plains Woodland (EVC 803)

N

Metres
0 40

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

4. Proposed Development and Implications

4.1. Proposed development

The current proposal will involve the construction of a solar farm at 290 Cosgrove-Caniambo Road, Cosgrove and include the construction of access tracks to and from the property.

To determine impacts to native vegetation, the proposed plan will be overlaid with the native vegetation mapped as part of this investigation, but it is anticipated that the native vegetation found at the site can be easily avoided.

Impacts to trees

In accordance with the Assessors Handbook (DELWP 2018a), a tree is deemed lost when earthworks encroach on more than 10% of its Tree Protection Zone (TPZ). A TPZ is defined as an area around the trunk of the tree which has a radius of 12 × the DBH (to a maximum of 15 metres but no less than 2 metres). Dead trees are treated in the same manner.

4.2. Design recommendations

In accordance with the Guidelines, all applications to remove native vegetation must provide an avoid and minimise statement which details any efforts undertaken to avoid the removal of, and minimise the impacts on biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value. Design recommendations to avoid and minimise impacts to native vegetation in the current application are presented as follows:

- Retain the large tree towards the south east corner of the property. Given it is the only large tree in the local vicinity, it provides a refuge for a range of fauna moving throughout the landscape. The tree did not appear to be hollow bearing but it is at an age and significant size (106 cm DBH) that it will likely develop key nesting and roosting sites for fauna in the future.
- Design access tracks to and from the site to avoid impacting on mapped native vegetation (Figure 1). It is recommended that the current access to the site is utilised. Native vegetation of the greatest significance in the roadsides would be Habitat Zone D which consisted of mature Lightwoods adjoining neighbouring roadside vegetation.

4.3. Implications

4.3.1. Permit requirements under the Guidelines

A planning permit under Clause 52.17 of the Greater Shepparton Planning Scheme is required for the removal of any of the mapped native vegetation.

4.3.2. EPBC Act

No matters listed under the EPBC Act were recorded during the assessment and none are considered to have the potential to occur, due to the highly modified and degraded nature of the site.

5. References

Department of Environment and Primary Industries (DEPI) 2013, *Permitted clearing of native vegetation*: Biodiversity assessment guidelines (dated September 2013), Department of Environment and Primary Industries, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of Environment, Land, Water and Planning (DELWP) 2017a, *Guidelines for the removal, destruction or lopping of native vegetation* (dated December 2017), Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of Environment, Land, Water and Planning (DELWP) 2018a, *Assessor's Handbook – Applications to remove, destroy or lop native vegetation* (Version 1.1, dated October 2018), Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of Environment, Land, Water and Planning (DELWP) 2018b, *Flora and Fauna Guarantee Act 1988 – Threatened List, April 2018*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, <http://www.depi.vic.gov.au>

Department of Environment, Land, Water and Planning (DELWP) 2019a, *MapShareVic*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, viewed 3rd December 2019, https://www2.delwp.vic.gov.au/maps/maps-and-services/interactive-maps

Department of Environment, Land, Water and Planning (DELWP) 2019b, *Native Vegetation Information Management system*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, viewed 3rd December 2019, https://nvim.delwp.vic.gov.au/

Department of Environment, Land, Water and Planning (DELWP) 2019c, *NatureKit*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, viewed 3rd December 2019, http://maps.biodiversity.vic.gov.au.

Department of Sustainability and Environment (DSE) 2004a, *Ecological Vegetation Class (EVC) Benchmarks by Bioregion*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, <http://www.depi.vic.gov.au>.

Department of Sustainability and Environment (DSE) 2004b, 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, now Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

Department of the Environment and Energy (DEE) 2019a, *EPBC Act Protected Matters Search Tool*, Department of the Environment, Canberra, viewed 3rd December 2019.

Parkes D, Newell G, & Cheal D 2003, 'Assessing the Quality of Native Vegetation: The 'habitat hectares' approach', *Ecological Management and Restoration* 4:29–38.

Appendix 1: Details of the assessment process in accordance with the Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017a)

Purpose and objective

Policies and strategies relating to the protection and management of native vegetation in Victoria are defined in the State Planning Policy Framework (SPPF). The objective identified in Clause 12.01 of all Victorian Planning Schemes is 'To ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation'.

This is to be achieved through the following three-step approach, as detailed in the Guidelines:

1. Avoid the removal, destruction or lopping of native vegetation.
2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
3. Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation.

Note: While a planning permit may still be required, if native vegetation does not meet the definition of either a patch or a scattered tree, an offset under the Guidelines is not required.

Assessment pathways

The first step in determining the type of assessment required for any site in Victoria is to determine the assessment pathway for the proposed native vegetation removal. The three possible assessment pathways for applications to remove native vegetation in Victoria are:

- Basic;
- Intermediate; or
- Detailed.

This assessment pathway is determined by two factors:

- **Location Category**, as determined using the states' Location Map. The location category indicates the potential risk to biodiversity from removing a small amount of native vegetation. The three location categories are defined as:
    - Location 1 – shown in light blue-green on the Location Map; occurring over most of Victoria.
    - Location 2 – shown in dark blue-green on the Location Map; includes areas mapped as endangered EVCs and/or sensitive wetlands and coastal areas.
    - Location 3 – shown in brown on the Location Map; includes areas where the removal of less than 0.5 hectares of native vegetation could have a significant impact on habitat for rare and threatened species.
- **Extent of native vegetation** – the extent of any patches and scattered trees proposed to be removed (as well as the extent of any past native vegetation removal), with consideration as to whether the proposed removal includes any large trees. Extent of native vegetation is determined as follows:

- **Patch** – the area of the patch in hectares.
- **Scattered Tree** – the extent of a scattered tree is dependent on whether the scattered tree is small or large. A tree is considered to be a large tree if it is greater or equal to the large tree benchmark diameter at breast height (DBH) for the relevant bioregional EVC. Any scattered tree that is not a large tree is a small scattered tree. The extent of large and small scattered trees is determined as follows:
  - **Large scattered tree** – the area of a circle with a 15-metre radius, with the trunk of the tree at the centre.
  - **Small scattered tree** – the area of a circle with a ten-metre radius, with the trunk of the tree at the centre.

The assessment pathway for assessing an application to remove native vegetation is then determined as detailed in the following matrix table:

Extent of native vegetation	Location Category		
	Location 1	Location 2	Location 3
< 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed
< 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed
≥ 0.5 hectares	Detailed	Detailed	Detailed

Note: If the native vegetation to be removed includes more than one location category, the higher location category is used to determine the assessment pathway.

Landscape scale information – strategic biodiversity value

The strategic biodiversity value (SBV) is a measure of a location's importance to Victoria's biodiversity, relative to other locations across the state. It is represented as a score between 0 and 1 and determined from the Strategic biodiversity value map, available from NVIM (DELWP 2019c).

Landscape scale information – habitat for rare or threatened species

Habitat importance for rare or threatened species is a measure of the importance of a location in the landscape as habitat for a particular rare or threatened species, in relation to other habitat available for that species. It is represented as a score between 0 and 1 and is determined from the Habitat importance maps, administered by DELWP.

This includes two groups of habitat:

- **Highly localised habitats** – limited in area and considered to be equally important, therefore having the same habitat importance score.
- **Dispersed habitats** – less limited in are and based on habitat distribution models.

Habitat for rare or threatened species is used to determine the type of offset required in the detailed assessment pathway.

Biodiversity value

A combination of site-based and landscape scale information is used to calculate the biodiversity value of native vegetation to be removed. Biodiversity value is represented by a general or species habitat score, detailed as follows.

Firstly, the extent and condition of native vegetation to be removed are combined to determine the habitat hectares as follows:

Habitat hectares = extent of native vegetation x condition score

Secondly, the habitat hectare score is combined with a landscape factor to obtain an overall measure of biodiversity value. Two landscape factors exist as follows:

- **General landscape factor** – determined using an adjusted strategic biodiversity score, and relevant when no habitat importance scores are applicable;
- **Species landscape factor** – determined using an adjusted habitat importance score for each rare or threatened species habitat mapped at a site in the Habitat importance map.

These factors are then used as follows to determine the biodiversity value of a site:

General habitat score = habitat hectares x general landscape factor

Species habitat score = habitat hectares x species landscape factor

Offset requirements

A native vegetation offset is required for the approved removal of native vegetation. Offsets conform to one of two types and each type incorporates a multiplier to address the risk of offset:

- A **general offset** is required when the removal of native vegetation does not have a significant impact on any habitat for rare or threatened species (i.e. the proportional impact is below the species offset threshold). In this case a multiplier of 1.5 applies to determine the general offset amount.

  General offset (amount of general habitat units) = general habitat score x 1.5

- A **species offset** is required when the removal of native vegetation has a significant impact on habitat for a rare or threatened species (i.e. the proportional impact is above the species offset threshold). In this case a multiplier of 2 applies to determine the species offset amount.

Species offset **(amount of species habitat units) = Species habitat score x 2**

Note: if native vegetation does not meet the definition of either a patch or scattered tree an offset is not required.

Offset attributes

Offsets must meet the following attribute requirements, as relevant:

- General offsets
  - **Offset amount** – general offset = general habitat score x 1.5
  - **Strategic biodiversity value (SBV)** – the offset has at least 80% of the SBV of the native vegetation removed
  - **Vicinity** – the offset is in the same CMA boundary or municipal district as the native vegetation removed
  - Habitat for rare and threatened species: N/A
  - **Large trees** – the offset include the protection of at least one large tree for every large tree to be removed
- Species offsets
  - **Offset amount** – species offset = species habitat score x 2
  - Strategic biodiversity value (SBV) – N/A
  - Vicinity – N/A
  - **Habitat for rare and threatened species** – the offset comprises mapped habitat according to the Habitat importance map for the relevant species
  - **Large trees** – the offset include the protection of at least one large tree for every large tree to be removed.

Appendix 2: Detailed habitat hectare assessment results

Habitat Zone			A	B	C	D
Bioregion			VRiv	VRiv	VRiv	VRiv
EVC Number			803	803	803	803
Total area of Habitat Zone (ha)			0.012	0.006	0.007	0.005
Site Condition	Large Old Trees	/10	0	0	0	0
	Tree Canopy Cover	/5	3	0	0	5
	Lack of Weeds	/15	0	4	0	4
	Understorey	/25	5	5	5	5
	Recruitment	/10	5	0	5	5
	Organic Matter	/5	2	2	2	3
	Logs	/5	0	0	0	4
	Site condition standardising multiplier*		1.00	1.00	1.00	1.00
	Site Condition subtotal		*15*	*11*	*12*	*26*
Landscape Context	Patch Size	/10	1	1	1	1
	Neighbourhood	/10	0	0	0	1
	Distance to Core	/5	3	3	3	3
Total Condition Score		**/100**	**19**	**15**	**16**	**31**
Condition score out of 1			0.19	0.15	0.16	0.31
Habitat Hectares in Habitat Zone#			**0.002**	**0.001**	**0.001**	**0.002**

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

Appendix 3: Scattered trees recorded in the study area

Tree no.	Common Name	Scientific Name	DBH (cm)	Habitat Category	Radius of TPZ (m)
1	River Red Gum	*Eucalyptus camaldulensis*	106	LST	12.72
2	River Red Gum	*Eucalyptus camaldulensis*	33	SST	3.6
3	River Red Gum	*Eucalyptus camaldulensis*	30	SST	3.96

Notes: DBH = Diameter at breast height (130 centimetres from the ground); **TPZ** = Tree Protection Zone; **LST** = Large Scattered Tree; **SST** = Small Scattered Tree

Appendix 4: Flora species recorded in the study area

Origin	Common name	Scientific name
	River Red-gum	Eucalyptus camaldulensis
	Spear Grass	Austrostipa spp.
	Wallaby Grass	Rytidosperma spp.
*	Sheep's Burr	Acaena echinata
*	Hare's-foot Clover	Trifolium arvense var. arvense
*	Oat	Avena spp.
*	Toowoomba Canary-grass	Phalaris aquatica
*	Ribwort	Plantago lanceolata
	Lightwood	Acacia implexa

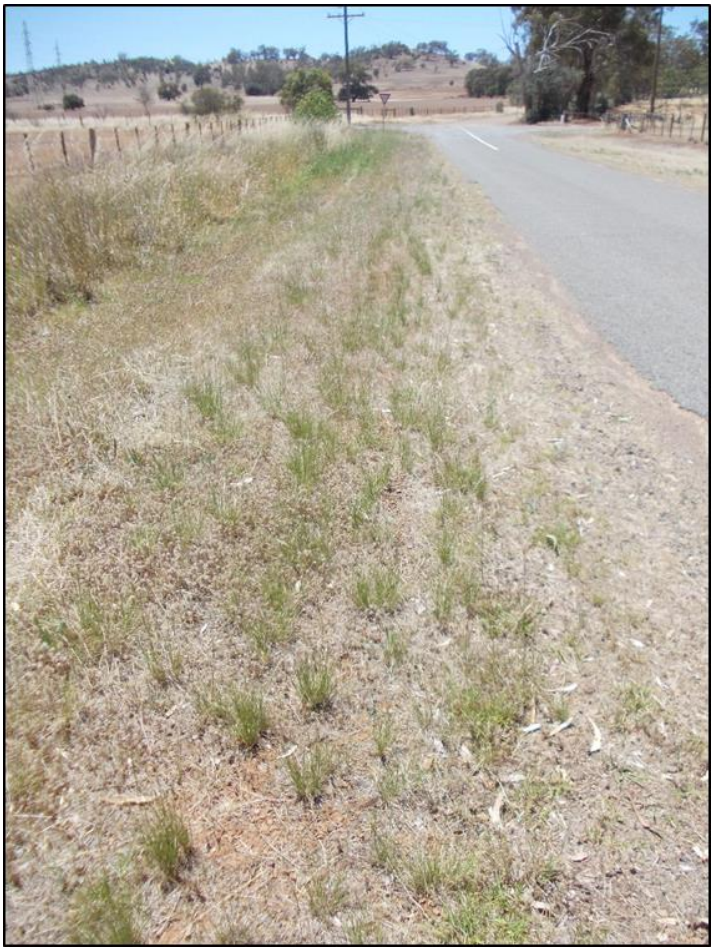
Notes: * = introduced to Victoria

Appendix 5: Photographs of native vegetation recorded on site

Large remnant River Red-gum in the south eastern corner of the property

Small scattered trees in road reserve along Cosgrove-Caniambo Road

Habitat Zone A: Patch of immature Lightwoods along Cosgrove-Caniambo Road



Habitat Zone B: Patch of Spear Grass in the road reserve along Shepparton-Dookie College Road

Habitat Zone C: Patch of immature Lightwoods along Shepparton-Dookie College Road

Habitat Zone D: Patch of mature Lightwoods along Shepparton-Dookie College Road

Appendix 6: EVC benchmarks

Plains Woodland (EVC 803) - VRiv

Department of Sustainability and Environment

EVC/Bioregion Benchmark for Vegetation Quality Assessment

Victorian Riverina bioregion

EVC 803: Plains Woodland (*syn. Riverina* Plains Grassy Woodland)

Description:
An open, eucalypt woodland to 15 m tall occurring on a number of geologies and soil types. Occupies fertile clays and clay loam soils on flat or gently undulating plains at low elevations in areas with <600 mm annual rainfall. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer and chenopods are often present.

Large trees:

Species	DBH(cm)	#/ha
Eucalyptus spp.	70 cm	15 / ha
Eucalyptus largiflorens	50 cm	
Allocasuarina spp.	40 cm	

Tree Canopy Cover:

%cover	Character Species	Common Name
15%	*Eucalyptus microcarpa*	Grey Box
	Eucalyptus melliodora	Yellow Box
	Eucalyptus camaldulensis	River Red Gum
	Eucalyptus largiflorens	Black Box
	Eucalyptus leucoxylon	Yellow Gum
	Allocasuarina luehmannii	Buloke

Understorey:

Life form	#Spp	%Cover	LF code
Immature Canopy Tree		5%	IT
Medium Shrub	2	1%	MS
Small Shrub	1	1%	SS
Large Herb	1	5%	LH
Medium Herb	11	25%	MH
Small or Prostrate Herb	2	5%	SH
Large Tufted Graminoid	1	5%	LTG
Medium to Small Tufted Graminoid	15	45%	MTG
Medium to Tiny Non-tufted Graminoid	2	5%	MNG
Bryophytes/Lichens	na	10%	BL

LF Code	Species typical of at least part of EVC range	Common Name
MS	*Acacia montana*	Mallee Wattle
MS	*Acacia acinacea* s.l.	Gold-dust Wattle
MS	*Acacia pycnantha*	Golden Wattle
MS	*Pittosporum angustifolium*	Weeping Pittosporum
SS	*Pimelea curviflora* s.l.	Curved Rice-flower
SS	*Eutaxia microphylla var. microphylla*	Common Eutaxia
SS	*Enchylaena tomentosa* var. *tomentosa*	Ruby Saltbush
SS	*Sclerolaena diacantha*	Grey Copperburr
LH	*Ajuga australis*	Austral Bugle
LH	*Senecio quadridentatus*	Cotton Fireweed
MH	*Calocephalus citreus*	Lemon Beauty-heads
MH	*Maireana enchylaenoides*	Wingless Bluebush
MH	*Einadia hastata*	Saloop
MH	*Einadia nutans* ssp. *nutans*	Nodding Saltbush
SH	*Crassula sieberiana*	Sieber Crassula
SH	*Actinobole uliginosum*	Flannel Cudweed
SH	*Oxalis perennans*	Grassland Wood-sorrel
SH	*Calotis hispidula*	Hairy Burr-daisy
LTG	*Austrostipa aristiglumis*	Plump Spear-grass
MTG	*Austrodanthonia caespitosa*	Common Wallaby-grass
MTG	*Dianella revoluta* s.l.	Black-anther Flax-lily
MTG	*Austrostipa scabra*	Rough Spear-grass
MTG	*Enteropogon acicularis*	Spider Grass

Recruitment:
Continuous

Organic Litter:
10 % cover

Logs:
10 m/0.1 ha.

Weediness:

LF Code	Typical Weed Species	Common Name	Invasive	Impact
MS	*Lycium ferocissimum*	Boxthorn	low	high
LH	*Brassica tournefortii*	Mediterranean Turnip	high	high
LH	*Sonchus oleraceus*	Common Sow-thistle	high	low
LH	*Opuntia* spp	Prickly Pear	low	high
MH	*Gazania linearis*	Gazania	high	high
MH	*Spergularia rubra* s.l.	Red Sand-spurrey	high	low
MH	*Silene apetala* var. *apetala*	Sand Catchfly	high	low
MH	*Silene longicaulis*	Portuguese Catchfly	high	low
MH	*Hypochoeris radicata*	Cat's Ear	high	low
MH	*Trifolium angustifolium* var. *angustifolium*	Narrow-leaf Clover	high	low
MH	*Arctotheca calendula*	Cape Weed	high	low
MH	*Trifolium campestre* var. *campestre*	Hop Clover	high	low
MH	*Trifolium arvense* var. *arvense*	Hare's-foot Clover	high	low
MH	*Trifolium subterraneum*	Subterranean Clover	high	low
MH	*Hypochoeris glabra*	Smooth Cat's-ear	high	low
MH	*Trifolium dubium*	Suckling Clover	high	low
SH	*Trifolium glomeratum*	Cluster Clover	low	low
SH	*Medicago minima*	Little Medic	high	low
LTG	*Phalaris aquatica*	Toowoomba Canary-grass	high	high
MTG	*Lolium rigidum*	Wimmera Rye-grass	low	low
MTG	*Schismus barbatus*	Arabian Grass	high	low
MTG	*Poa bulbosa*	Bulbous Meadow-grass	high	high
MTG	*Pentaschistis airoides* subsp. *airoides*	False Hair-grass	high	high
MTG	*Romulea rosea*	Onion Grass	high	high
MNG	*Bromus rubens*	Red Brome	high	high
MNG	*Vulpia myuros*	Rat's-tail Fescue	high	low
MNG	*Romulea rosea*	Onion Grass	high	low
MNG	*Briza minor*	Lesser Quaking-grass	high	low
MNG	*Briza maxima*	Large Quaking-grass	high	low
MNG	*Vulpia bromoides*	Squirrel-tail Fescue	high	low
MNG	*Aira elegantissima*	Delicate Hair-grass	high	low
MNG	*Juncus capitatus*	Capitate Rush	high	low
SC	*Asparagus asparagoides*	Bridal Creeper	high	high

Published by the Victorian Government Department of Sustainability and Environment May 2004