

BERRYBANK WIND FARM
BIODIVERSITY IMPACT ASSESSMENT ON
PROPOSED MODIFICATIONS

Berrybank Development Pty Ltd

Suite 5 61–63 Camberwell Road, Hawthorn, VIC 3123
P.O. Box 337, Camberwell, VIC 3124
Ph. (03) 9815 2111
Fax. (03) 9815 2685

May 2017

Report No. 14143 (5.5)

CONTENTS

1. INTRODUCTION.....	3
2. DESKTOP FLORA ASSESSMENT.....	5
2.1. Introduction	5
2.2. Scope of Work and Methodology	5
2.3. Legislation and policy	6
2.4. Results.....	7
2.4.1. Existing information	7
2.4.2. Impacts of the revised layout.....	8
2.4.3. Implications	12
3. FLORA FIELD ASSESSMENT	13
3.1. Introduction	13
3.2. Scope of Work and Method.....	13
3.2.1. Site Assessment.....	14
3.2.2. Limitations of assessment	14
3.3. Results.....	15
3.3.1. Existing information	15
3.3.2. Site Assessment.....	18
3.3.3. Implications	23
3.3.4. Recommendations.....	25
4. BIRD AND AVIFAUNA ASSESSMENT	33
4.1. Introduction	33
4.2. Modification of impact on birds	35
4.2.1. Potential impacts of modification on Brolgas	37
4.3. Modification of impacts on Bats	37
4.4. Aviation Night Lighting.....	38
4.5. Summary of findings.....	38
5. SUMMARY.....	40
5.1. Impact on flora and native vegetation.....	40
5.2. Detailed focussed flora surveys.....	41
5.2.1. Recommendations.....	43
5.3. Bat and avifauna assessment	43
6. References	45

TABLES

Table 1: Areas of remnant native vegetation with potential impacts from revised layout .	9
Table 2: List of FFG Act and EPBC Act listed threatened plant species subject to potential impacts from revised layout.....	10
Table 3: List of FFG Act and EPBC Act listed threatened plant species subject to potential impacts from revised layout.....	16
Table 4: Summary of findings and recommendations	26
Table 5: The maximum measurements of new turbine models to be constructed at Berrybank Wind Farm.....	34
Table 6: Changes in Rotor Swept Area at various heights for 2 different turbines.....	34
Table 7: Bird flight heights at Berrybank and Hawkesdale Wind Farms.....	36
Table 8: Summary of field survey and recommendations	42

FIGURES

Figure 1: Berrybank Wind Farm proposed layout and native vegetation.....	11
Figure 2: Native vegetation Nov 2015 – Detailed	27
Figure 3: Native vegetation Nov 2015 - Detailed	28
Figure 4: Native vegetation Nov 2015 - Detailed	29
Figure 5: Native vegetation Nov 2015 - Detailed	30
Figure 6: Native vegetation Nov 2015 - Detailed	31
Figure 7: Native vegetation Nov 2015 - Detailed	32

1. INTRODUCTION

The Berrybank Wind Farm received its planning approval permits on 24 August 2010 for the 'Use and development of land for a Wind Energy Facility'. These are:

- Permit no 20092820 under the Golden Plains Planning Scheme and the Responsible Authority is the Golden Plains Shire Council; and
- Permit no 20092821 under the Corangamite Scheme and the Responsible Authority is the Corangamite Shire Council;

Condition 3 of the permits details the specifications of the wind farm, including the number and scale of the turbines. The permits originally specified the tower height of the wind turbines at 80 metres, with an overall height of 131 metres above natural ground level.

Condition 13 f) of both permits relates to the Native Vegetation Management Plan which requires the plan meeting a number of specific requirements to be endorsed by the responsible authority. The Flora and Fauna Management Plan (Report 7152 10.8) dated August 2013, which incorporates the Vegetation Management Plan has been endorsed by the Responsible Authorities.

Planning Permit No P09-134A was granted on the 24 August 2010 to the proponent by Minister under Division 6 of Part 4 of the Planning and Environment Act 1987. The Responsible Authority for administration and enforcement of the Planning permit is named as the Golden Plains Shire Council. The permit provides for the removal of native vegetation within the public road reserve associated with the construction footprint of the Berrybank Wind Farm. Under the permit, prior to the native vegetation removal commencing a Native Vegetation Management Plan to be prepared, submitted to and approved by the Minister for Planning.

Berrybank Development Pty Ltd is now seeking approval to vary the turbine specifications as detailed on the permits. It is proposed to increase the tower height and rotor diameter to achieve an overall tip height of up to 180 metres and a minimum rotor swept area (RSA) height of 40 metres. In addition, it is proposed to undertake micrositing of a number of turbines and realign access tracks and ultimately, reduce the number of turbines on the Berrybank wind farm site from the approved and endorsed 95 turbines to 79 turbines.

The Flora and Fauna Management Plan (Report 7152 10.8) dated August 2013, which incorporates the Native Vegetation Management Plan has been endorsed by the Responsible Authority. If there is additional vegetation to be removed from the Berrybank Wind Farm as a result of the modification this will need to be incorporated into a revised native vegetation management plan.

BL&A was engaged by Berrybank Development Pty Ltd C/- Union Fenosa Wind Australia Pty Ltd to conduct an assessment of the impacts of the proposed layout change on Biodiversity.

This report presents the findings of the assessment, identifies issues and provides recommendations and mitigation options. It is divided into the sections described below.

Section 2 presents the initial assessment of impact on flora

Section 3 presents the results of the field assessment on flora

Section 4 presents the impact on birds and avifuna

Section 5 presents the conclusions and recommendations.

These investigations were undertaken by Elinor Ebsworth (Botanist), Curtis Dougherty (Zoologist), Alan Brennan (Senior Ecologist & Project Manager), Bernard O'Callaghan (Senior Ecologist & Project Manager), Ned May (GIS Analyst), Mahsa Ghasemi (GIS Analyst) and Brett Lane (Principal).

2. DESKTOP FLORA ASSESSMENT

2.1. Introduction

BL&A was engaged by Berrybank Development Pty Ltd C/- Union Fenosa Wind Australia Pty Ltd to conduct a native vegetation impact assessment of the proposed layout change outlined in Section 1. The assessment involved:

- Comparison of initial and revised layout for Berrybank Wind Farm to support the layout change outlined in Section 1;
- Collation and review of previous literature documenting flora and native vegetation within the Berrybank Wind Farm site; and
- Assessment of the potential impacts of the proposed layout change on flora and native vegetation.

BL&A completed the original flora and native vegetation assessment (BL&A 2009). In addition, BL&A prepared a Flora and Fauna Management Plan for the Wind Farm that was endorsed (BL&A 2013). This data was used to compare the initial approved layout and the revised layout and identify any potential impacts on flora and native vegetation.

The regulatory framework for dealing with native vegetation removal has changed in Victoria since the initial permit was issued. The initial permit was issued and noted the Native Vegetation Management Framework. The current system for dealing with native vegetation under the Victorian Planning Scheme is the Biodiversity Assessment Guidelines. This report considers the implications of these changes.

2.2. Scope of Work and Methodology

This current assessment involved review of existing information on native vegetation of the area, including:

- Native Vegetation Information Management system (NVIM) (DELWP 2015a);
- Biodiversity Interactive Map 2.0. (DELWP 2015b);
- Flora and Fauna Guarantee Act 1988 - Threatened List (DELWP 2015d);
- Proposed Berrybank Wind Farm – Flora, Fauna and Targeted Brolga Assessment Report No. 7152 (7.3) (BL&A 2009); and
- Berrybank Wind Farm Project – Flora and Fauna Management Plan Report No. 7152 (10.8) (BL&A 2013).

The sources of information listed above were reviewed to determine the ecological values within the Berrybank Wind Farm site. The modified proposal for the Berrybank Wind Farm was then considered in light of these ecological values to determine potential impacts of the modified proposal. An assessment of the impacts of the amended development layout was undertaken using GIS to overlay the proposed modified layout over the existing approved layout and recorded ecological values.

Limitations of assessment

As the primary purpose of this portion of the investigation was to conduct a biodiversity impact assessment to determine differences (if any) in potential impacts of the proposed layout change on flora and native vegetation, the review of existing information, combined with the GIS analysis of the proposed and approved layouts were sufficient to complete this initial aspect of the assessment.

This portion of the assessment has been undertaken on a desk-top only basis. This report identified the need for additional surveys that were required and are described in Section 3.

2.3. Legislation and policy

Planning and Environment Act 1987

Victoria's planning schemes are constituted under the *Planning and Environment Act 1987*. The applicable planning provisions in the local planning scheme as discussed below.

Destruction, lopping or removal of native vegetation on land which, together with all contiguous land in-one-ownership, has an area of 0.4 hectares or more requires a planning permit under Clause 52.17 of all Victorian Planning Schemes. This includes the removal of dead trees with a DBH (diameter at breast height or 1.3 metres) of 40 centimetres or more and any individual scattered native plants.

In May 2013 the Victorian Government announced the outcome of a major review of Victoria's native vegetation permitted clearing regulations. On 20th December 2013 a planning scheme amendment was gazetted to implement a number of reforms to Victoria's native vegetation permitted clearing regulations, particularly Clauses 12.01 (Biodiversity), 52.16 (Native vegetation precinct plan) and 52.17 (Native vegetation). As part of these reforms the previously incorporated document *Victoria's Native Vegetation – a Framework for Action* was replaced by a new incorporated document, *Permitted clearing of native vegetation – Biodiversity assessment guidelines* (DEPI 2013).

EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* protects a number of threatened species and ecological communities that are considered to be of national conservation significance. Any significant impacts on these species require the approval of the Australian Minister for the Environment. If there is a possibility of a significant impact on nationally threatened species or communities or listed migratory species, a Referral under the EPBC Act should be considered.

FFG Act

The Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) lists threatened and protected species and ecological communities. Any removal of threatened flora species or communities (or protected flora) listed under the FFG Act from public land requires a Protected Flora Licence or Permit under the Act, obtained from DELWP. The FFG Act does not apply to development on private land.

However, prior to December 2013 the responsible authority was required to consider impacts to values listed under the FFG Act on private land. Since December 2013, consideration of such matters is no longer required.

2.4. Results

2.4.1. Existing information

Pre-European Environmental Vegetation Class (EVC) mapping (BL&A 2009; DELWP 2015b) indicated that the study area and surrounds would have supported Plains Grassland – Plains Grassy Woodland mosaic (EVC 897) prior to European settlement based on modelling factors including rainfall, aspect, soils and remaining vegetation.

BL&A (2009) recorded patches of the following EVCs during surveys:

- Plains Grassland/Plains Grassy Woodland mosaic (EVC 897);
- *Heavier-soils* Plains Grassland (EVC 132_63);
- Plains Grassy Wetland (EVC 125); and
- Aquatic Herbland (EVC 653).

These patches are shown in are described in Table 1 below. Recorded examples of these EVC's range in quality depending on the level of degradation caused by weed invasion, over-grazing and other agricultural activities.

The analysis of the likelihood of occurrence of state and nationally threatened species (listed under the FFG Act and EPBC Act) undertaken by BL&A in 2009 suggested that 11 threatened species may occur in intact remnant native vegetation in the area. These species are:

- Button Wrinklewort;
- Clover Glycine;
- Curly Sedge;
- Fragrant Leek-orchid;
- Hairy Tails;
- Large-fruit Fireweed;
- Small Milkwort;
- Spiny Rice-flower;
- Swamp Fireweed;
- Trailing Hop-bush; and
- White Sunray.

Net Gain assessments and targeted threatened species surveys for small areas of potential impact under the currently approved layout were conducted by BL&A in 2008 and 2009, and are documented in the *Berrybank Wind Farm Flora and Fauna Management Plan* (BL&A 2013). It is understood that the study area for these surveys did not include those areas described in the *Impacts* section below. No remnant native vegetation was mapped within the targeted survey areas during

these initial surveys. Two rare or threatened flora species were detected during these surveys, but were not expected to be impacted (BL&A 2011). These are the Spiny Rice-flower in vegetation site 1, and Trailing Hop-bush in vegetation site 6.

2.4.2. Impacts of the revised layout

The proposed layout changes involve a reduction in the number of turbines, amending the location of access tracks and the placement of site access/exits, crossings and emergency break barriers. Some turbines will be micro-sited.

The Berrybank Wind Farm, as currently approved, does not involve the removal of any remnant patch native vegetation, scattered trees or impacts to threatened flora species (BL&A 2011).

The proposed layout changes were considered to evaluate potential impacts to native vegetation (mapped for the Flora and Fauna Management Plan). These are included (from north-west to south-east) the following:

- An emergency break barrier that intersects with vegetation site 5;
- An access track that intersects with an unnumbered vegetation site;
- Two site access/exits that intersects with vegetation site 4;
- An emergency break barrier that intersects with vegetation site 6;
- A site access/exit that intersects with vegetation site 1;
- Crossing #1 that intersects with vegetation site 14;
- An emergency break barrier that intersects with vegetation site 14; and
- An emergency break barrier that intersects with vegetation site 16.

Vegetation site numbers are taken from the botanical assessment documented in BL&A 2009. A description of each vegetation site that would potentially be affected is included in Table 1 (adapted from BL&A 2009). Those threatened species which were considered to possibly occur in each vegetation site are included in Table 2 (adapted from BL&A 2009).

No other potential impacts to native vegetation arising from the proposed changes were determined.

Table 1: Areas of remnant native vegetation with potential impacts from revised layout

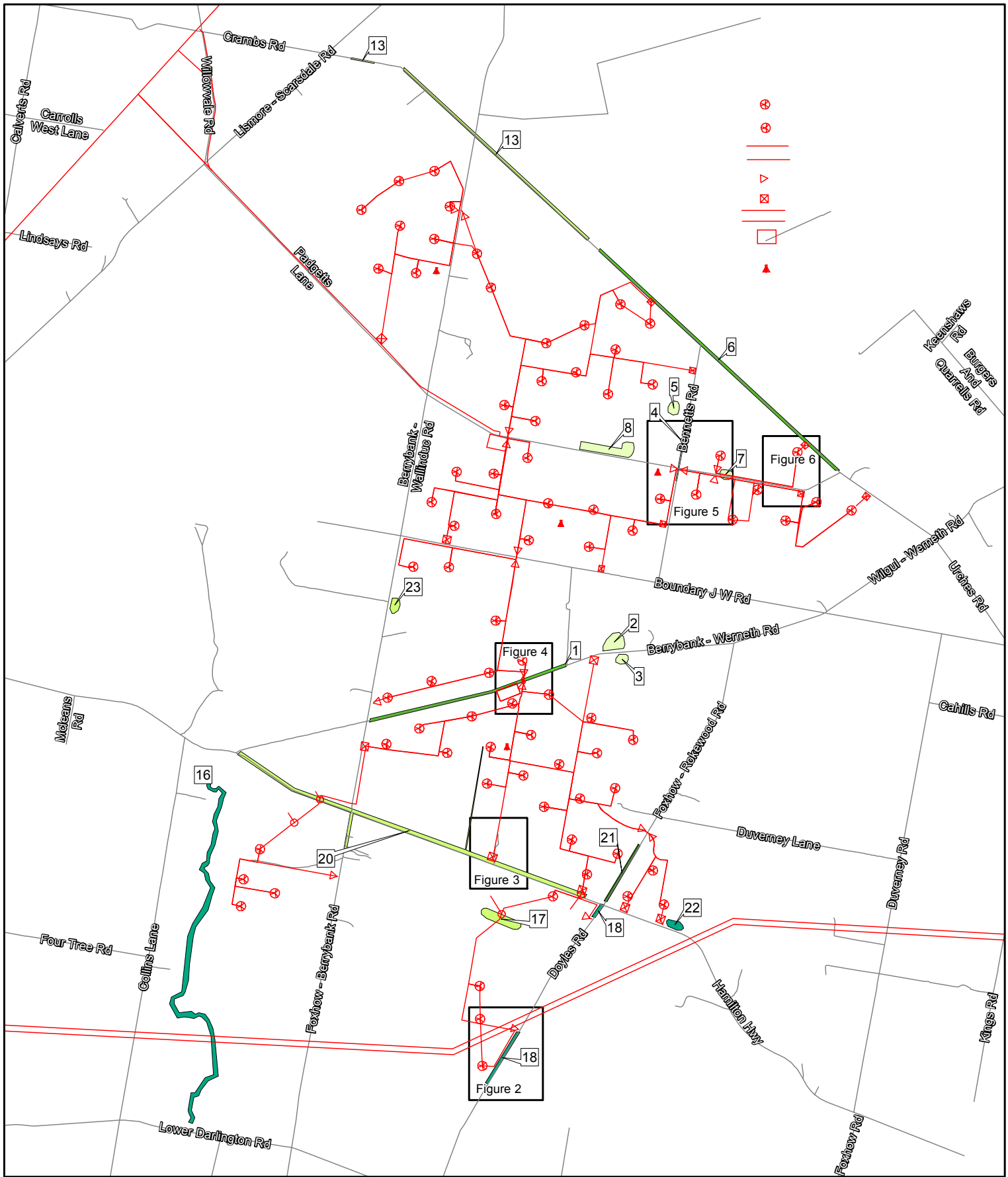
Adapted from BL&A 2009

Site (See Figure 1)	EVC	Quality	Location Notes	Vegetation Notes	Potential threatened species
1	Plains Grassland / Plains Grassy Woodland	Low-High	Roadside; northern part of windbreak on Hirth property northern boundary; and a small part of the south-western corner of the Glover property	Treeless. Extensive linear patch. Alternates from exotic vegetation to herb-rich areas dominated by either Kangaroo Grass or Common Tussock-grass. Some wet depressions were also recorded.	1,2,3,4,5,6,7,8,9, 10,11
4	Plains Grassland	Low-Med	Roadside	Small scattered patches possibly regarded as degraded treeless vegetation	1,2,4,5,6,7,8,10,11
5	Plains Grassland	Low-High	Southern Roadside	Extensive linear grassland reserve dominated by Kangaroo grass. Species rich. Weedy in areas.	1,2,4,5,6,7,8,10, 11
6	Plains Grassland / Plains Grassy Woodland	Low	Roadside and Rumler properties	Treeless. Area of Wallaby Grass under planted Sugar Gums	
14	Plains Grassland / Plains Grassy Woodland	Low-Med	Roadside (Hamilton Highway) and linear strip on Hirth property	Linear area containing patches (some extensive) with Blackwood and other native shrubs recorded in some portions. Kangaroo Grass dominated other areas that were divided by exotic vegetation.	1,2,4,5,6,7,8,10,11
16	Plains Grassland /Plains Grassy Woodland	Med	Roadside	Isolated patches with variety of herbs. Some small trees and shrubs present in areas. Some winter-wet areas.	2,4,5,7,8,14,10,11

Table 2: List of FFG Act and EPBC Act listed threatened plant species subject to potential impacts from revised layout

Adapted from BL&A 2009

No.	Common Name	Scientific Name	Conservation Status		Habitat	Likelihood of occurrence	Survey time
			FFG	EPBC			
1	Button Wrinklewort	<i>Rutidosia leptorhynchoides</i>	f	E	Basaltic grasslands (Jeanes, 1999)	Habitat present - Potential to occur	Oct-March
2	Clover Glycine	<i>Glycine latrobeana</i>	f	V	Grasslands and grassy woodlands (Jeanes, 1996)	Habitat present - Potential to occur	Sept-Dec
3	Curly Sedge	<i>Carex tasmanica</i>	f	V	Confined to seasonally wet, heavy clay soils north of Melbourne and far west Vic (Wilson, 1994)	Habitat present - Potential to occur	Spring
4	Fragrant Leek-orchid	<i>Prasophyllum suaveolens</i>	f	E	Fertile grassy plains (Bates, 1994)	Habitat present - Potential to occur	Sept-Oct
5	Hairy Tails	<i>Ptilotus erubescens</i>	f		Fertile soils with grassland and woodland communities (Walsh, 1996)	Habitat present - Potential to occur	Nov-Feb
6	Large-fruit Fireweed	<i>Senecio macrocarpus</i>	f	V	Themeda grasslands on basalt (Walsh, 1999)	Habitat present - Potential to occur	Aug-Oct
7	Small Milkwort	<i>Comesperma polygaloides</i>	f		Heavy soils supporting grasslands and grassy woodlands (Walsh, 1999)	Habitat present - Potential to occur	Nov-Jan
8	Spiny Rice-flower	<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	f	C	Grasslands on basalt derived soils (Entwisle, 1996)	Recorded during 2009 investigation	Apr-Aug
9	Swamp Fireweed	<i>Senecio psilocarpus</i>		V	Restricted to a few herb-rich winter-wet swamps on volcanic clays or peaty soils (Walsh, 1999)	Habitat present - Potential to occur	Nov-Mar
10	Trailing Hop-bush	<i>Dodonaea procumbens</i>		V	Grows in low lying often winter wet areas in woodland, low open-forest and grasslands on sands and clays (Duretto, 1999)	Occurs in the study area (local landowner pers.com.)	Summer
11	White Sunray	<i>Leucochrysum albicans</i> subsp. <i>albicans</i> var. <i>tricolor</i>		E	Very rare in Vic. Roadside verges (Short, 1999)	Habitat present - Potential to occur	Nov-Dec



Legend

— Development layout

Habitat zones quality

- Low
- Low to Medium
- Low to High
- Medium
- Medium to High

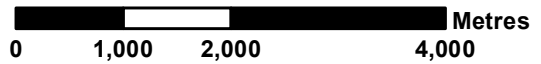


Figure 1: Study area and native vegetation		
Project: Berrybank Wind Farm		
Client: Berrybank Development Pty Ltd		
Project No.: 14143	Date: 24/03/2017	Created By: N. May / E. Ebsworth
Brett Lane & Associates Pty. Ltd. Ecological Research & Management		
<ul style="list-style-type: none"> Experience Knowledge Solutions 	Suite 5, 61 - 63 Camberwell Road Hawthorn East, VIC 3123 PO Box 337, Camberwell, VIC 3124, Australia	Ph (03) 9815 2111 / Fax (03) 9815 2685 enquiries@ecologicalresearch.com.au www.ecologicalresearch.com.au



2.4.3. Implications

Implications under the revised layout are as follows.

Condition 13 f) of both permits relates to the Native Vegetation Management Plan (which has been endorsed), which requires:

- (i) *'A report by a suitably qualified person after the completion of a target spring survey of native vegetation in the vicinity of access points where a Vegetation Protection Overlay exists. The report should set out the findings of the targeted spring survey and, if vegetation listed under the Flora and Fauna Guarantee Act 1988 or the Environment Protection and Biodiversity Conservation Act 1999 is identified, set out how impacts on that vegetation is to be avoided or minimised;*
- (ii) *Requirements for consultation with the Department of Sustainability and Environment the Corangamite Shire Council and Golden Plains Shire Council in the preparation of any offset plan;*
- (iii) *Identification of offsets prior to native vegetation removal*
- (iv) *Explanation of how vegetation removal has been minimised by project design.*
- (v) *A detailed and thorough description of how the native vegetation management framework's three-step approach has been applied.*
- (vi) *Protocols so that net gains will be undertaken if native vegetation disturbance and removal cannot be avoided for the construction, operation and decommissioning stages of the project; and*
- (vii) *A protocol for the protection of native vegetation on the wind farm site during the construction phase; procedures for the rehabilitation of construction zones with appropriate pasture species.'*

The Native Vegetation Management Plan is included in the Flora and Fauna Management Plan (Report 7152 10.8) dated August 2013, which has been endorsed by the Responsible Authorities. Thus, any amendments to the quantum of vegetation removal will need to be identified and incorporated into a revised native vegetation management plan.

Thus, changes to the development layout were considered as per the revised layout (Figure 1) and a survey undertaken of those areas of the footprint that coincide with areas mapped as native vegetation during Spring 2016 to cover most of the appropriate survey season(s) (Table 2). The aim of the survey in spring 2016 was to:

- Determine the presence and extent (if any) of native vegetation within the impact area;
- Determine the condition of native vegetation in accordance with the Habitat Hectares method; and
- Conduct a targeted survey for threatened flora species identified in Table 2.

The possibility for the development layout to be maintained in the original location (as per the currently approved layout), or can be re-located outside any areas mapped as native vegetation during the BL&A surveys (documented in BL&A 2011) is discussed in Section 3 of this report.

3. FLORA FIELD ASSESSMENT

3.1. Introduction

The flora field assessment followed the desktop assessment as outlined in Section 2 above that identified potential impacts to areas of previously mapped native vegetation arising from the proposed layout change. Subsequent layout changes and discussions with Union Fenosa identified five areas of potential impacts to previously mapped native vegetation under the revised layout. These were:

- A site entrance on Doyle's Road;
- An emergency break barrier adjacent to the Hamilton Highway;
- A crossing to the northern side of the Berrybank-Werneth Road (perpendicular to the existing entrance on the southern side), or alternatively a site entrance on the northern side of the Berrybank-Werneth Road);
- A crossing (both sides of the road) on Bennett's Lane; and
- A crossing (both sides of the road) on Padgett's Lane.

The current assessment involved a field survey of these five areas to:

- Determine the presence and extent of native vegetation;
- Determine the condition of native vegetation in accordance with the Habitat Hectares method; and
- Determine areas of non-native vegetation where infrastructure may be located to avoid impacts to native vegetation.

It is understood that Berrybank Development Pty Ltd intends to avoid and minimise any impacts on native vegetation or threatened flora species that are found as a result of these surveys.

3.2. Scope of Work and Method

This current assessment involved review of existing information and field survey on native vegetation within areas of potential impact, including:

- Confirmation of modified development layout;
- Confirmation of sites of potential impacts on native vegetation, based on:
 - Native Vegetation Information Management system (NVIM) (DELWP 2015a);
 - Biodiversity Interactive Map 2.0. (DELWP 2015b);
 - Proposed Berrybank Wind Farm – Flora, Fauna and Targeted Brolga Assessment, Report No. 7152 (7.3) (BL&A 2009); and
 - Berrybank Wind Farm Project – Flora and Fauna Management Plan, Report No. 7152 (10.3) (BL&A 2011).
- A field assessment to survey the site focussing on the points of potential impact;
- Provision of recommendations for avoidance of native vegetation; and

- In areas where vegetation removal cannot be avoided to conduct targeted surveys for EPBC listed communities, species and a habitat hectare assessment.

It is understood that the dimensions for the site components are as follows:

- Site entrances – approximately 50 meters at the existing road edge, and approximately 20 meters at the site boundary;
- Crossings and access tracks – up to 10 meter width; and
- Emergency break barrier – up to 10 meter width.

3.2.1. Site Assessment

The site assessment was undertaken on 11th November 2015. The geographic scope of this assessment was limited to those areas in which it was identified that potential impacts to native vegetation may arise from the revised layout (the investigation areas). The broader wind farm site is shown in 1, with the five investigation areas in Figures 2-5.

During this assessment, the investigation areas were surveyed initially by vehicle and areas where it was deemed that avoidance of native vegetation may not be possible were inspected in more detail on foot.

Sites in the investigation areas found to support native vegetation were mapped. Mapping was undertaken through a combination of aerial photograph interpretation and ground-truthing using a hand held GPS (accurate to approximately five metres). Species and ecological communities listed as threatened under the EPBC Act or FFG Act (where they occurred on public land) were also mapped using the same method.

In the one area where it was considered that avoidance of native vegetation may not be possible, additional surveyed were undertaken on 6th July and 27th October 2016. During these assessments, the study area was surveyed on foot. Species and ecological communities listed as threatened under the EPBC Act or FFG Act were also mapped using the same method. A targeted survey for Spiny Rice-flower was undertaken on 6th July 2016. A targeted survey for Button Wrinklewort, Clover Glycine, Curly Sedge, Fragrant Leek-orchid, Hairy Tails, Large-fruit Fireweed, Small Milkwort, Swamp Fireweed, Trailing Hop-bush and White Sunray was undertaken on 27th October 2016.

3.2.2. Limitations of assessment

The initial temporally constrained initial field assessments did not record all species and life-forms because of the seasonal absence of some species in the potential areas of impact. However, this limitation was not considered to undermine the current investigation, which was designed to provide an indicative, rather than exhaustive inventory of flora species in the study area.

For the site where impacts could not be avoided two surveys were completed in appropriate seasons. The timing of the survey and condition of vegetation was otherwise considered suitable to ascertain the extent and condition of native vegetation.

3.3. Results

3.3.1. Existing information

Pre-European Environmental Vegetation Class (EVC) mapping (BL&A 2009; DELWP 2015b) indicated that the study area and surrounds would have supported Plains Grassland – Plains Grassy Woodland mosaic (EVC 897) prior to European settlement based on modelling factors including rainfall, aspect, soils and remaining vegetation.

BL&A (2009) recorded patches of the following EVCs during surveys:

- Plains Grassland/Plains Grassy Woodland mosaic (EVC 897);
- *Heavier-soils* Plains Grassland (EVC 132_63);
- Plains Grassy Wetland (EVC 125); and
- Aquatic Herbland (EVC 653).

The analysis of the likelihood of occurrence of state and nationally threatened species (listed under the FFG Act and EPBC Act) undertaken by BL&A in 2009 suggested that 11 threatened species may occur in intact remnant native vegetation in the area. These species are:

- Button Wrinklewort;
- Clover Glycine;
- Curly Sedge;
- Fragrant Leek-orchid;
- Hairy Tails;
- Large-fruit Fireweed;
- Small Milkwort;
- Spiny Rice-flower;
- Swamp Fireweed;
- Trailing Hop-bush; and
- White Sunray.

Further details of the habitat requirements and survey period for each species, and the investigation areas in which they were considered to potentially occur (BL&A 2009) are included in Table 3, below.

Table 3: List of FFG Act and EPBC Act listed threatened plant species subject to potential impacts from revised layout

Adapted from BL&A 2009

Investigation areas	Common Name	Scientific Name	Conservation Status		Habitat	Survey time
			FFG	EPBC		
Hamilton Highway Berrybank-Werneth Road Bennett's Lane	Button Wrinklewort	<i>Rutidosia leptorhynchoides</i>	f	E	Basaltic grasslands (Jeanes 1999)	Oct-March
Doyle's Road Hamilton Highway Berrybank-Werneth Road Bennett's Lane	Clover Glycine	<i>Glycine latrobeana</i>	f	V	Grasslands and grassy woodlands (Jeanes 1996)	Sept-Dec
Berrybank-Werneth Road	Curly Sedge	<i>Carex tasmanica</i>	f	V	Confined to seasonally wet, heavy clay soils north of Melbourne and far west Vic (Wilson 1994)	Spring
Doyle's Road Hamilton Highway Berrybank-Werneth Road Bennett's Lane	Fragrant Leek-orchid	<i>Prasophyllum suaveolens</i>	f	E	Fertile grassy plains (Bates 1994)	Sept-Oct
Doyle's Road Berrybank-Werneth Road Bennett's Lane	Hairy Tails	<i>Ptilotus erubescens</i>	f		Fertile soils with grassland and woodland communities (Walsh 1996)	Nov-Feb
Hamilton Highway Berrybank-Werneth Road Bennett's Lane	Large-fruit Fireweed	<i>Senecio macrocarpus</i>	f	V	Themeda grasslands on basalt (Walsh 1999)	Aug-Oct

Investigation areas	Common Name	Scientific Name	Conservation Status		Habitat	Survey time
			FFG	EPBC		
Doyle's Road Berrybank-Werneth Road Bennett's Lane	Small Milkwort	<i>Comesperma polygaloides</i>	f		Heavy soils supporting grasslands and grassy woodlands (Walsh 1999)	Nov-Jan
Doyle's Road Hamilton Highway Berrybank-Werneth Road Bennett's Lane	Spiny Rice-flower	<i>Pimelea spinescens</i> subsp. <i>spinescens</i>	f	C	Grasslands on basalt derived soils (Entwisle 1996)	Apr-Aug
Berrybank-Werneth Road	Swamp Fireweed	<i>Senecio psilocarpus</i>		V	Restricted to a few herb-rich winter-wet swamps on volcanic clays or peaty soils (Walsh 1999)	Nov-Mar
Doyle's Road Hamilton Highway Berrybank-Werneth Road Bennett's Lane	Trailing Hop-bush	<i>Dodonaea procumbens</i>		V	Grows in low lying often winter wet areas in woodland, low open-forest and grasslands on sands and clays (Duretto 1999)	Summer
Doyle's Road Hamilton Highway Berrybank-Werneth Road Bennett's Lane	White Sunray	<i>Leucochrysum albicans</i> subsp. <i>albicans</i> var. <i>tricolor</i>		E	Very rare in Vic. Roadside verges (Short 1999)	Nov-Dec

3.3.2. Site Assessment

Assessment of the five areas of potential impacts to native vegetation was undertaken to:

- Determine the extent of native vegetation
- Identify alternatives where impacts to native vegetation would occur under the revised layout; and
- Undertake targeted surveys in areas where impacts could not be avoided.

The results of the site assessment for each of these areas are discussed below.

Doyle's Road

Extensive areas of native vegetation were recorded along the western road reserve of Doyle's Road, including the area of the proposed site access (Photograph 1; Figure 2). The vegetation condition in this area has been assessed in accordance with the habitat hectares method (Parkes *et al.* 2003; DSE 2004), and targeted surveys undertaken for those threatened species for which it was the appropriate season (see Table 4). None of these species were recorded, and they are therefore considered unlikely to occur.

We recommend that native vegetation could be avoided by relocating the crossing 30-50 metres to the north of the currently proposed location (as per Figure 2). We understand the proponent will proceed with this relocating and will avoid impact on native vegetation at this site.



Photograph 1: Native vegetation along Doyle's Road,

Hamilton Highway

Four small patches of native vegetation were recorded within private land along the Hamilton Highway, the site of a proposed access track and emergency break barrier (Photograph 2; Figure 3).

The vegetation condition in this area has been assessed in accordance with the habitat hectares method (Parkes *et al.* 2003; DSE 2004), and targeted surveys undertaken for those threatened species for which it was the appropriate season (see Table 4). None of these species were recorded, and they are therefore considered unlikely to occur. Targeted surveys for some species were not able to be undertaken due to the current assessment falling outside the survey period for these species. These species are identified in Table 4. If impacts to native vegetation are proposed at this site, targeted surveys for these species will be required.

We recommend that native vegetation removal could be avoided by relocating the track and emergency break barrier to the east by approximately 30 metres and restricting the track to 6 meters wide (Figure 3). We understand the proponent will proceed with this relocation and will avoid impact on native vegetation at this site.



Photograph 2: Native vegetation within private land along the Hamilton Highway

Berrybank-Werneth Road

Species and ecological communities listed as threatened under the EPBC Act or FFG Act were also mapped using the same method as above. In addition, a targeted survey for Spiny Rice-flower was undertaken on 6th July 2016. A targeted survey for Button Wrinklewort, Clover Glycine, Curly Sedge, Fragrant Leek-orchid, Hairy Tails, Large-fruit Fireweed, Small Milkwort, Swamp Fireweed, Trailing Hop-bush and White Sunray was undertaken on 27th October 2016.

Extensive areas of native vegetation were recorded along the northern road reserve of the Berrybank-Werneth Road, including the area of the proposed crossing (Photograph 3; Figure 4). This area cannot be avoided and there will be an impact from a 10 metre wide track in this area.

The vegetation in the impact area qualified as the EPBC Act listed community *Natural Temperate Grasslands of the Victorian Volcanic Plains* (NTGVVP) meeting key diagnostic and condition thresholds. The vegetation recorded in the impact area did not match the description of the FFG Act listed community *Western (Basalt) Plains Grassland* as the listed community is described as having an almost complete absence of introduced grasses and weeds (SAC 2015), while vegetation recorded had 30-40% weed cover.

In the impact area Spiny Rice-flower, listed under the EPBC Act and FFG Act, will be avoided. In addition, Pale Swamp Everlasting, protected under the FFG Act, will also be avoided.

The impact area will involve the removal of 0.0197 hectares of *Heavier-soils Plains Grassland* (EVC 132_61) that also qualifies as the EPBC Act listed community NTGVVP.



Photograph 3: Native vegetation along the Berrybank-Werneth Road

Bennett's Road

Extensive areas of native vegetation were recorded along the both road reserves of Bennett's Road, including the area of the proposed crossing (Photograph 4; Figure 5).

We recommend that native vegetation removal could be avoided by relocating the crossing between 30-70 metres to the south of centreline of Padgett's Lane and restricting the track to 6 meters wide (Figure 5). We understand the proponent will proceed with this relocation and will avoid impact on native vegetation at this site.



Photograph 4: Native vegetation along Bennett's Lane

Padgett's Lane

Extensive areas of native vegetation were recorded along both road reserves of Padgett's Lane, including the area of the proposed site access (Photograph 5, Figure 6).

We recommend that native vegetation could be avoided by relocating the crossing to the eastern end of Padgett's Lane, on the bend in the road (as per 7). We understand the proponent will proceed with this relocation and will avoid impact on native vegetation at this site.



Photograph 5: Native vegetation along Padgett's Lane

3.3.3. Implications

The implications for the wider project under the currently approved layout that remain are as follows:

Native Vegetation Management Plan

Condition 13 f) of both permits relates to the Native Vegetation Management Plan (which has been endorsed), which requires:

- (i) *'A report by a suitably qualified person after the completion of a target spring survey of native vegetation in the vicinity of access points where a Vegetation Protection Overlay exists. The report should set out the findings of the targeted spring survey and, if vegetation listed under the Flora and Fauna Guarantee Act 1988 or the Environment Protection and Biodiversity Conservation Act 1999 is identified, set out how impacts on that vegetation is to be avoided or minimised;*
- (ii) *Requirements for consultation with the Department of Sustainability and Environment the Corangamite Shire Council and Golden Plains Shire Council in the preparation of any offset plan;*
- (iii) *Identification of offsets prior to native vegetation removal*
- (iv) *Explanation of how vegetation removal has been minimised by project design.*
- (v) *A detailed and thorough description of how the native vegetation management framework's three-step approach has been applied.*
- (vi) *Protocols so that net gains will be undertaken if native vegetation disturbance and removal cannot be avoided for the construction, operation and decommissioning stages of the project; and*
- (vii) *A protocol for the protection of native vegetation on the wind farm site during the construction phase; procedures for the rehabilitation of construction zones with appropriate pasture species.'*

The Native Vegetation Management Plan is included in the Flora and Fauna Management Plan (Report 7152 10.8) dated August 2013, which has been endorsed by the Responsible Authorities.

Thus, the proposed removal of 197m² of native vegetation on the Berrybank – Werneth Road will need to be incorporated into an amended Native Vegetation Management Plan for endorsement by the Responsible Authorities.

We understand that the modification will request that the Native Vegetation Management Plan will be modified from utilising the native vegetation framework to utilise the Biodiversity Assessment Guidelines (DEPI 2013). In anticipation of this, the information to be included in the Native Vegetation Management Plan is outlined below.

Application for vegetation removal along Berrybank-Werneth Road under the Biodiversity Assessment Guidelines

A DELWP-generated Biodiversity Impacts and Offset Requirements (BIOR) report quantifying native vegetation removal is attached as Appendix 1. This report indicates that the proposed track crossing at the Berrybank-Werneth Road will impact on 0.020 hectares of native vegetation, and would be assessed under the **low** risk pathway of the Biodiversity Assessment Guidelines. Detail of the permit application requirements for the low risk pathway is included in the table below.

Number	Low risk assessment - Application requirements
1.	The location of the site of native vegetation to be removed is indicated in Figure 4.
2.	A description of the native vegetation to be removed is outlined in Section 3.3.2: Berrybank-Werneth Road, above.
3.	Maps or plans of planned potential native vegetation removal are outlined in Figure 4.
4.	Recent dated photograph of example of native vegetation under consideration is as shown in Photograph 3.
5.	The risk-based pathway is LOW risk – See Ensym Report – Appendix 1 .
6.	Creation of defensible space in BMO- N/A
7.	The wind farm native vegetation plan has been endorsed. A revised plan will be prepared incorporating this application.
8.	Past removal in last 5 years. We are not aware of any application for past removal associated with the Berrybank Wind Farm in the last 5 years.
9.	The strategic biodiversity score of the native vegetation to be removed is 0.116. See Appendix 1.
10.	The offset requirements should a permit be granted to remove native vegetation is 0.002 General Biodiversity Equivalence Units (GBEU) with a minimum strategic biodiversity score of 0.116 within the Corangamite Catchment Management Authority (CMA) or Corangamite Shire Council- see Ensym Report – Please find attached a quotation for the provision of these offsets – see Appendix 2.

It is noted that the Handbook issued by DELWP to inform decision-making under the Guidelines states for the low risk pathway (DELWP 2015c – pg 18): **Decision-point - Biodiversity considerations** - “do not object to (or refuse to grant) a permit based on biodiversity considerations in Clause 52.17“. This indicates that the extent of native vegetation removal proposed is not of conservation consequence and the requirements of the state’s native vegetation clearance controls will readily be achieved through the provision of an offset.

EPBC Act

On Berrybank-Werneth Road in the impact area vegetation qualified as the EPBC Act listed threatened community *Natural Temperate Grasslands of the Victorian Volcanic Plains* (NTGVVP). This development will result in the removal of 197m² of NTGVVP. This has been communicated to the federal Department of Environment and Energy (DoEE). DoEE has provided informal advice that this is likely not to be a significant impact. Confirmation is being sought from the DoEE on this matter and will be provided when available.

FFG Act

There are currently no implications under the FFG Act in relation to flora and communities.

If targeted surveys (where these surveys are necessary) indicate the presence of FFG Act listed species or communities in areas of proposed impacts, a Permit to remove flora protected under the FFG Act will be needed to be sought for these.

EE Act

Currently no referral would be triggered under the EE Act in relation to flora and communities.

In the event that remnant native vegetation and/or threatened flora species were to be impacted, it is still considered unlikely that a referral under the EE Act would be required.

3.3.4. Recommendations

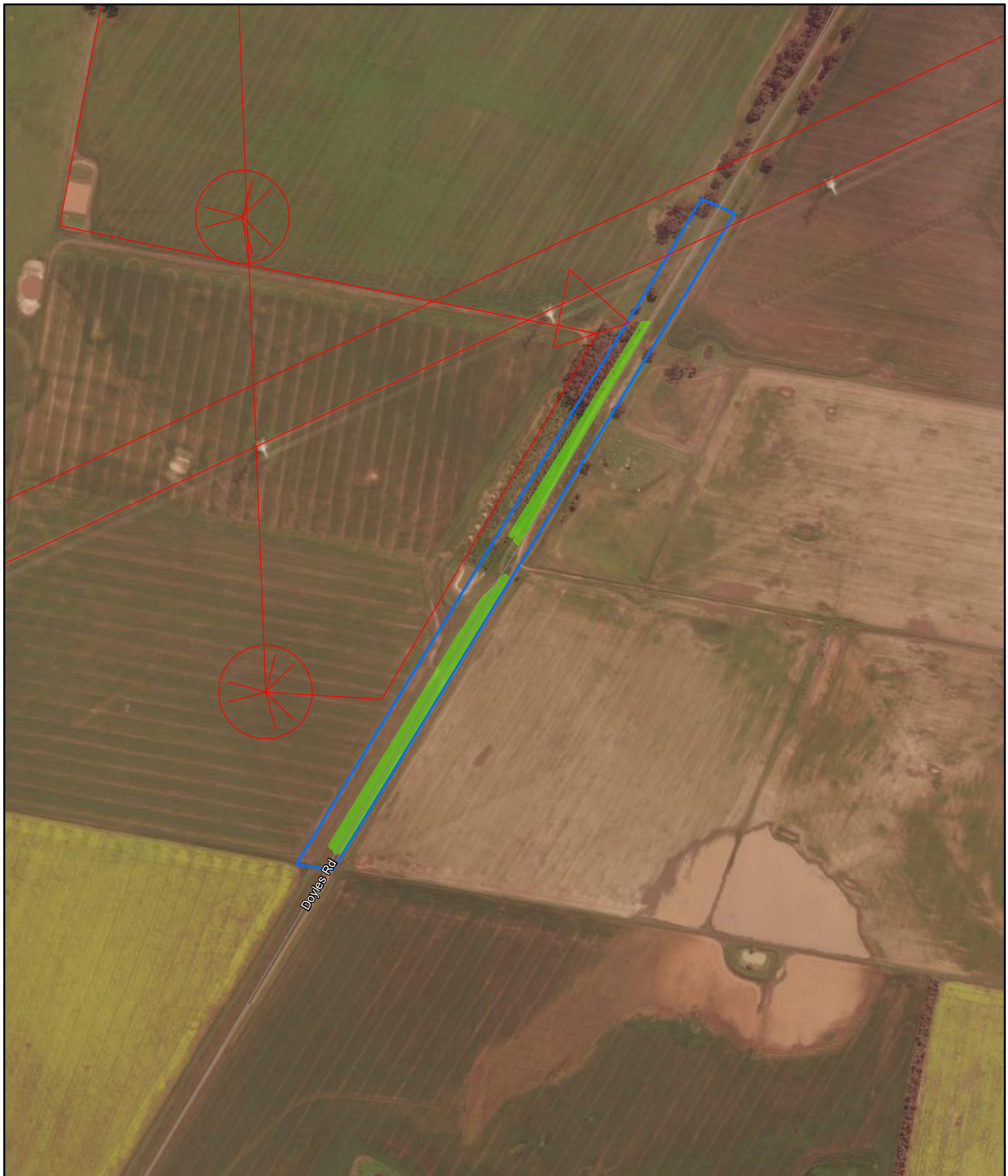
The current assessment indicated that in relation to the proposed layout changes:

- Most impacts on native vegetation can be avoided if the proponent proceeds with the proposed relocations outlined above to avoid impact on native vegetation;
- Thus, the proposed removal of 197m² of native vegetation on the Berrybank – Werneth Road will need to be incorporated into an amended Native Vegetation Management Plan for endorsement by the Responsible Authorities. An application for the removal of this vegetation under the Biodiversity Assessment Guidelines for incorporation into the Native Vegetation Management plan has been prepared and is presented above.
- A permit will be required to remove any listed species under the state Flora and Fauna Guarantee (FFG) Act 1988 on public lands; and
- Written confirmation be obtained from the DoEE on the removal of 197 m² of the EPBC listed NTGVVP community.

A summary of the assessments and recommendations for each of the five sites is provided in Table 4 below.

Table 4: Summary of findings and recommendations

Site name	Native vegetation impacts under revised layout?	Recommendation for avoidance of native vegetation	Habitat Hectare assessment undertaken?	EPBC listed NTGWVP?	FFG Act listed WBPG?	Targeted surveys completed	Targeted surveys required should native vegetation be impacted
Doyle's Road	Yes	Move site access point 30-50 metres to the north	Yes	Yes	No	Clover Glycine Hairy Tails Small Milkwort White Sunray	Fragrant Leek-Orchid Spiny Rice-flower Trailing Hop-bush
Private land adjacent to the Hamilton Highway	Yes	Move track east by 50 metres	Yes	No	No	Button Wrinklewort Clover Glycine White Sunray	Fragrant Leek-Orchid Spiny Rice-flower Trailing Hop-bush
Berrybank-Werneth Road	Yes	Cannot be avoided	yes	Yes	No	Button Wrinklewort Clover Glycine Curly Sedge Hairy Tails Small Milkwort White Sunray Swamp Fireweed Large-fruit Fireweed Fragrant Leek-Orchid Spiny Rice-flower Trailing Hop-bush	
Bennett's Road	Yes	Locate crossing south of the centreline of Padgett's lane by 30-70 metres	No	Possibly	Possibly		Button Wrinklewort Clover Glycine Hairy Tails Small Milkwort White Sunray Large-fruit Fireweed Fragrant Leek-Orchid Spiny Rice-flower Trailing Hop-bush
Padgett's Lane	Yes	Move crossing east to bend in Padgett's Lane	Yes	Yes	No	None required	



Legend

- Investigation area
- Native vegetation Sept 15
- Development layout

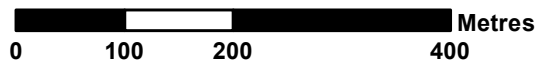


Figure 2: Study area and native vegetation		
Project: Berrybank Wind Farm		
Client: Berrybank Development Pty Ltd		
Project No.: 14143	Date: 24/03/2017	Created By: N. May / E. Ebsworth
Brett Lane & Associates Pty. Ltd. Ecological Research & Management		
<ul style="list-style-type: none"> ● Experience ● Knowledge ● Solutions 	Suite 5, 61 - 63 Camberwell Road Hawthorn East, VIC 3123 PO Box 337, Camberwell, VIC 3124, Australia	Ph (03) 9815 2111 / Fax (03) 9815 2685 enquiries@ecologicalresearch.com.au www.ecologicalresearch.com.au





Legend

- Investigation area
- Native vegetation Sept 15
- Development layout

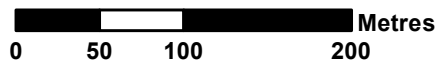







Figure 3: Study area and native vegetation		
Project: Berrybank Wind Farm		
Client: Berrybank Development Pty Ltd		
Project No.: 14143	Date: 24/03/2017	Created By: N. May / E. Ebsworth
Brett Lane & Associates Pty. Ltd. Ecological Research & Management		
<ul style="list-style-type: none"> ● Experience ● Knowledge ● Solutions 	Suite 5, 61 - 63 Camberwell Road Hawthorn East, VIC 3123 PO Box 337, Camberwell, VIC 3124, Australia	Ph (03) 9815 2111 / Fax (03) 9815 2685 enquiries@ecologicalresearch.com.au www.ecologicalresearch.com.au





Legend

-  Targeted survey investigation area
-  Investigation area
-  Development layout

- Native vegetation**
-  Heavier Soils Plains Grassland (EVC 132_61)
 -  Native vegetation to be removed

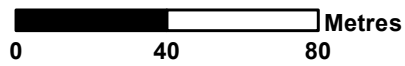



Figure 4: Study area and native vegetation		
Project: Berrybank Wind Farm		
Client: Berrybank Development Pty Ltd		
Project No.: 14143	Date: 4/05/2017	Created By: N. May / E. Ebsworth
 Brett Lane & Associates Pty. Ltd. Ecological Research & Management		
● Experience ● Knowledge ● Solutions	Suite 5, 61 - 63 Camberwell Road Hawthorn East, VIC 3123 PO Box 337, Camberwell, VIC 3124, Australia	Ph (03) 9815 2111 / Fax (03) 9815 2685 enquiries@ecologicalresearch.com.au www.ecologicalresearch.com.au





Legend

- Investigation area
- Native vegetation Sept 15
- Development layout



Figure 5: Study area and native vegetation		
Project: Berrybank Wind Farm		
Client: Berrybank Development Pty Ltd		
Project No.: 14143	Date: 24/03/2017	Created By: N. May / E. Ebsworth
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>BL&A Brett Lane & Associates Pty. Ltd. Ecological Research & Management</p> </div> <div style="font-size: 8px;"> <p>● Experience Suite 5, 61 - 63 Camberwell Road Ph (03) 9815 2111 / Fax (03) 9815 2685</p> <p>● Knowledge Hawthorn East, VIC 3123 enquiries@ecologicalresearch.com.au</p> <p>● Solutions PO Box 337, Camberwell, VIC 3124, Australia www.ecologicalresearch.com.au</p> </div> <div style="text-align: right;"> <p>N</p> </div> </div>		



Legend

- Investigation area
- Native vegetation Sept 15
- Development layout

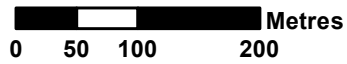


Figure 6: Study area and native vegetation		
Project: Berrybank Wind Farm		
Client: Berrybank Development Pty Ltd		
Project No.: 14143	Date: 24/03/2017	Created By: N. May / E. Ebsworth
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>BL&A Brett Lane & Associates Pty. Ltd. Ecological Research & Management</p> </div> <div style="text-align: right;"> <p>Ph (03) 9815 2111 / Fax (03) 9815 2685 enquiries@ecologicalresearch.com.au www.ecologicalresearch.com.au</p> </div> <div style="text-align: right;"> </div> </div>		
<ul style="list-style-type: none"> ● Experience ● Knowledge ● Solutions 	<ul style="list-style-type: none"> Suite 5, 61 - 63 Camberwell Road Hawthorn East, VIC 3123 PO Box 337, Camberwell, VIC 3124, Australia 	



Legend

- Investigation area
- Native vegetation Sept 15
- Development layout

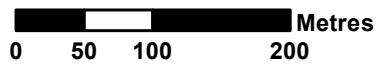


Figure 7: Study area and native vegetation		
Project: Berrybank Wind Farm		
Client: Berrybank Development Pty Ltd		
Project No.: 14143	Date: 24/03/2017	Created By: N. May / E. Ebsworth
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>BL&A Brett Lane & Associates Pty. Ltd. Ecological Research & Management</p> </div> <div style="text-align: center;"> <p>N</p> </div> </div>		
<ul style="list-style-type: none"> ● Experience ● Knowledge ● Solutions 	Suite 5, 61 - 63 Camberwell Road Hawthorn East, VIC 3123 PO Box 337, Camberwell, VIC 3124, Australia	Ph (03) 9815 2111 / Fax (03) 9815 2685 enquiries@ecologicalresearch.com.au www.ecologicalresearch.com.au

4. BIRD AND AVIFAUNA ASSESSMENT

4.1. Introduction

The Berrybank Wind Farm received its planning approval on 24 August 2010 for the 'Use and development of land for a Wind Energy Facility'. Condition 3 of the permit details the specifications of the wind farm, including the number and scale of the turbines. The permit originally specified the tower height of the wind turbines at 80 metres, with an overall height of 131 metres above natural ground level.

Berrybank Development Pty Ltd is now seeking approval to further vary the turbine specifications as detailed on the permit. It is proposed to increase the tower height and rotor diameter to achieve an overall tip height of up to 180 metres and a minimum RSA height of 40 metres. In addition, it is proposed to undertake micrositing of a number of turbines and realign access tracks and ultimately, will reduce the number of turbines on the Berrybank Wind Farm site from the original approval (99 turbines approved with 95 endorsed) to a proposed 79 turbines.

This section of the report responds to the request to evaluate the impact of the proposed modifications as outlined in Section 1 of this report on the likely consequences for birds and bats at the proposed Berrybank Wind Farm. It is noted that the proposed modification to the wind farm includes an increase in blade length and associated dimensions of the wind turbines proposed to be constructed.

In this report 'RSA' refers to 'rotor swept area', or the zone encompassing the area of an operating wind turbine within which the blades rotate, defined in terms of an upper and lower RSA height, and a total circular swept area of the RSA.

This advice is provided based on the information below:

- BL&A 2009 report on the results of bird and bat utilisation surveys of the Berrybank wind farm site (BL&A, 2009, 'Proposed Berrybank Wind Farm, Flora and Fauna assessment', Report No. 7152 [7.3], Consultants report to Union Fenosa Wind Australia Pty Ltd); and
- Information from Union Fenosa Wind Australia Pty Ltd summarising the proposed changes in height and layout of the wind turbines at the wind farm.

The original bird utilisation survey for the wind farm was based on a model being considered at the time of the surveys, i.e. turbines not exceeding 120 metres in height (i.e. from the ground to the top of the highest point reached by the rotating turbine blades) and a lower minimum RSA height of 35 metres above the ground. These two heights were used in the original flora and fauna impact assessment (BL&A 2009) as a basis for understanding the bird and bat risks from operating turbines. However, these were not the heights that were approved through the approval process.

The proposed modified turbine envelope will encompass the measurements listed in Table 5 and impacts on birds and bats will be assessed using these maximum measurements.

	Max Tip Height (m)	Minimum Lower RSA Height(m)
Generic Turbine	180	40

Table 5: The maximum measurements of new turbine models to be constructed at Berrybank Wind Farm.

The proposed change in turbine dimensions is as follows:

- The proposed minimum lower RSA height is 40 metres above ground, which is 10.5 metres above the current planning permit; and
- The maximum proposed RSA (blade tip height) is up to 180 metres, which is 49 metres higher than the height specified in the current planning permit for the Berrybank Wind Farm; and
- A change in rotor diameter from the permitted 101 metres to 130 metres.

A calculation of the changes in the RSA at various height band is outlined in Table 6 below.

Table 6: Changes in Rotor Swept Area at various heights for 2 different turbines

Height range (m)	Area of 101 m diam. turbine	Area of 130 m diam. Turbine^	Change in total RSA	% Change in total RSA
0-10				
10-20		-		
20-30	5		-5	
30-40	437		-437	-100%
40-50	724	469	-254	-35%
50-60	875	826	-49	-6%
60-70	963	1,022	60	6%
70-80	1,003	1,151	148	15%
80-90	1,003	1,235	232	23%
90-100	963	1,283	321	33%
100-119	1,599	2,582	983	62%
120-139	441	2,387	1,945	441%
140-160	-	1,848	1,848	
160+		469	469	
Total	8,012	13,273	5,261	66%

The impacts of the changes are outlined below:

- The increase in the rotor diameter from 101 metres to 130 metres will bring changes to the total extent of each RSA from 8,012 m² to 13,273 m², which will increase the total RSA area by approximately 66%;
- The total area of RSA between 20 to 60 metres will present an overall decrease in the RSA at these height bands;

- The majority of the change in RSA will be at heights above 100 metres above the ground

These larger turbines will be installed at the same locations as the turbines in the approved wind farm layout, although some may be micro-sited in accordance with provisions of the permit. The impacts on birds and bats of the proposed changes are discussed separately below.

Additionally, in line with increasing efficiency of wind turbines it is now proposed that the number of turbines be reduced from the approved approved and endorsed 95 turbines to 79 turbines representing a reduction of 17% in the number of turbines. Impacts on birds and bats from the proposed changes are discussed separately below.

4.2. Modification of impact on birds

During the bird utilisation study for the Berrybank Wind Farm, the height of flying birds was recorded and documented in BL&A (2009) in the height zones outlined in the table below:

- Below rotor swept area height: <35 m above the ground;
- At rotor swept area height (35 to 120 m above the ground); and
- Above rotor swept area height (>120 m).

The assignment of birds to height classes from the data collected was:

- Below rotor swept area height: 95.7 percent;
- Within rotor swept area height: 4.1 percent; and
- Above rotor swept area height: 0.2 percent.

Based on the original bird utilisation surveys and the overall flora and fauna assessment at the Berrybank Wind Farm, none of the species of birds found to regularly fly over the wind farm were rare or threatened and the site was found to be dominated by common farmland birds. The most commonly observed bird species at rotor swept area height at the Berrybank Wind Farm were:

- Australian Magpie;
- Australasian Pipit;
- House Sparrow;
- Yellow-rumped Thornbill;
- Willie Wagtail; and
- Common Starling.

These species are common and widespread in southeastern Australia in agricultural landscapes and any additional collisions as a consequence of the increased rotor swept area from the larger wind turbines is unlikely to have a significant effect on their populations.

However, additional analysis has been analyzed from detailed information recorded on bird flight heights during these surveys. For each bird observed flying during the formal

bird count a record was made of its flight height at intervals of 10 metres up to 40 metres and at intervals of 20 metres above 40 metres. The data has been analysed and is presented in Table 2. Information from the bird utilisation surveys at the Union Fenosa proposed Hawkesdale wind farm is also presented to indicate the observed height distribution of birds in a similar agricultural setting.

The table shows that bird height distribution was similar between the two wind farms with very small differences between the proportions of birds seen at the different heights.

Table 7: Bird flight heights at Berrybank and Hawkesdale Wind Farms.

Height class (m)	Berrybank (%)	Hawkesdale (%)
Ground	71.0	74.0
1 - 10	17.2	3.5
11 - 20	5.3	6.6
21 - 30	2.8	6.2
31 - 40	0.8	3.8
41 - 60	1.2	2.3
61 - 80	0.3	1.2
81 - 100	0.5	1.5
101 - 120	0.7	0.2
121 - 140	0.0	0.0
>140	0.2	0.8
Total birds counted	559	2,773

The impacts of the proposed modification are outlined below:

Increase in lower minimum RSA height

The proposed modified turbine increases the lower minimum RSA height for turbines by 10.5 metres (i.e. from 29.5 to 40 metres). This is a change will lift the lower minimum RSA by 10.5 metres will result in less risk to the 0.8% of all bird flights between 30 and 40 metres.

Change in extent of RSA at various heights

As a result of the proposed modifications:

- The total area of RSA per turbine between 20-30m, 30-40m, 40-50m and 50-60m actually decreases. This will have a corresponding decrease in risk to the 98% of birds recorded flying below 60 metres in the proposed modification;
- The incremental RSA area change at for the height range from 60 to 70 and 70-80 metres is 6% and 15% respectively. This is a relatively small increase in risk to the 0.3 % of birds recorded flying between 60 and 80 meters; and
- Above 80 metres there is an increase in the total area of RSA in bands to 170 metres. However, 1.4 % of birds were recorded flying at this height. This would present an increased risk to high flying species such as raptors.

This analysis demonstrates the increase in RSA area at heights above 80 metres is more likely to impact on higher flying species. These include raptors as a group, and specifically the Wedge-tailed Eagle, the White-throated Needletail *Hirundapus caudacutus* and other high flying raptor species. None of these species are listed as threatened species although the White-throated Needletail is listed as migratory under the EPBC Act.

Change in maximum tip height from 131 meters to 180 meters

The change in tip height from 131 meters to 180 meters occurs at the height where the fewest bird flights were recorded. This would present an increased risk to high flying species including the Wedge-tailed Eagle, the White-throated Needletail *Hirundapus caudacutus* and other high flying raptor species. None of these species are listed as threatened species although the White-throated Needletail is listed as migratory under the EPBC Act. Based on the foregoing results, the proposed increase in the maximum height to 180 metres will have a small incremental effect on birds at the Berrybank Wind Farm as few birds (0.2%) were recorded flying above 120 metres.

In addition, the decrease in the number of turbines from approved and endorsed 95 turbines to 79 turbines will result in a decrease of 17% in the number of turbines and will contribute to reducing overall risks.

4.2.1. Potential impacts of modification on Brolgas

A search of the Victorian VBA for Brolgas was completed to 10 km beyond the proposed boundaries of the Berrybank Wind Farm (January 2016). There are no major changes in Brolga distribution in the 10 km range. There were two records of pairs of Brolgas within the 10 km of the Berrybank Wind Farm.

It is noted that Brolga fly more frequently below 30 metres (BL&A unpublished data) than above 30 metres. Based on this, increasing the height of the lower level of the RSA from 29.5 to 40 metres above the ground would further decrease the small collision risk.

4.3. Modification of impacts on Bats

Greg Richards & Associates Pty Ltd in association with BL&A studied the bat avifauna of the proposed Berrybank Wind Farm. Nine species of bats were considered likely to utilise the wind farm site. These species are common and secure species. It was considered that the Southern Bent-wing Bat (*Miniopterus schreibersii bassiana*), which is a threatened species in Victoria and nationally, was unlikely to occur regularly at the Berrybank wind farm site as the site is too far from the usual range of this species. None were recorded during bat surveys of the wind farm site (BL&A 2009).

Records of bat calls above ground are achieved by lifting the call receiver of the detector to heights of up to 50 metres on a wind monitoring mast. In this way, the maximum height of bat calls recorded by the detector is approximately 75 metres above ground. The bat surveys at Berrybank did not involve recording bats at height. Notwithstanding this, recording at height elsewhere in south eastern Australia (BL&A, unpubl. records) shows that fewer species and many fewer calls are recorded 50 metres above the ground than at ground level. At 50 metres, the number of bat calls falls to less than 15% of the number recorded from the ground (i.e. up to a height of c. 25 metres). Between 25 and 50 metres above the ground, call numbers represent about 25% of those recorded at ground level. Based on this, increasing the RSA ground clearance from 29.5

metres to 40 metres would likely to decrease the number of bats exposed to potential collision risk. It can also be assumed that any increase in the extent of the RSA might lead to a proportionate increase in number of bats exposed to a risk of fatal collision with the rotating turbines.

The proposed RSA envelope will maintain the lower RSA at a minimum of 40 metres compared to the original permitted minimum RSA of 29.5 metres. Overall the level of risk of collision to most bat species that fly low to the ground will be reduced by this modification.

At the proposed Berrybank wind farm site, bat activity involved common, widespread bat species only, thus the effect of the changed RSA height range and extent are not considered to be significant as most bat activity is likely to remain below the increased lower RSA height. Collisions, when they occur, are almost certain to involve common, widespread species. These impacts would not lead to any significant decline in their populations.

4.4. Aviation Night Lighting

Due to the increase in turbine tip height the requirement for night lighting for aviation safety is highly likely. It is understood that CASA is requesting obstacle night lighting on turbines on 35 turbine from the 79. Several studies have shown a high-level of foraging activity by bats around artificial lights. Lights on turbines may attract moths and other nocturnal insects, thus increasing the probability of bat collisions since bats feed on insects at night.

Based on experience with lighting of wind farms and communication towers in the United States (Shire *et al.* 2000; Kerlinger and Kerns 2003) to minimize impacts on birds and bats, the shortest possible flash of light is preferable to a longer duration flash or constant illumination. For example, strobe (i.e. those that flash for a very short time) and LED red lights are more preferable than yellow or white lights that are illuminated constantly or for short periods of up to three seconds (Kerlinger *et al.* 2010). Similarly, Gehring *et al.* (2009) found that communication towers lit at night with only flashing red or flashing white lights had significantly fewer avian fatalities than towers lit with a combination of steady-burning and flashing lights.

Insects (which attract birds and bats) and other night-flying birds are less likely to be attracted to the wind farm by red lights that flash with very short duration such as those proposed for Crookwell Wind Farm which will flash at a rate of 20 to 60 flashes per minute as per CASA recommendations. Therefore it is preferred that wind turbines be equipped with only flashing red lights. However, if permanent lighting is required by aviation authorities, it is preferred that these are red in color.

4.5. Summary of findings

Based on the foregoing review of relevant information, the conclusions below have been made.

In relation to birds:

- The proposed modified turbine increases the lower minimum RSA height for turbines by 10.5 metres will lift the lower minimum RSA by 10.5 metres which moves the over RSA higher and out of the heights of most bird activity. This will result in less risk to the 0.8% of all bird flights between 30 and 40 metres.

- The decrease in RSA per height increment up to 60 meters between will have a corresponding decrease in risk to the 98% of birds recorded flying below 60 metres in the proposed modification;
- The incremental RSA area change at for the height range from 60 to 70 and 70-80 metres is 6% and 15% respectively. This is a relatively small increase in risk to the 0.3 % of birds recorded flying between 60 and 80 meters; and
- Above 80 metres there is an increase in the total area of RSA in bands to 170 metres and an increase in tip height has the potential to impact on higher flying species. These include raptors as a group, and specifically the Wedge-tailed Eagle, the White-throated Needletail *Hirundapus caudacutus* and other high flying raptor species.
- Overall there is a substantial decrease in risk to most bird species by this modification. However, there is an increased risk to high flying species including the Wedge-tailed Eagle, the White-throated Needletail *Hirundapus caudacutus* and other high flying raptor species. None of these species are listed as threatened species although the White-throated Needletail is listed as migratory under the EPBC Act.
- In addition, the decrease in the number of turbines from approved and endorsed 95 turbines to 79 turbines will result in a decrease of 17% % in the number of turbines and will contribute to reducing overall risks.
- Brolgas may be occasionally visit the wind farm site. As It is noted that Brolga fly more frequently below 30 metres (BL&A unpublished data) than above 30 metres. Based on this, increasing the height of the lower level of the RSA from 29.5 to 40 metres above the ground would further decrease the small collision risk.

In relation to bats:

- The increased rotor swept area and height of turbines at the wind farm is highly unlikely to lead to a significant impact on bat species inhabiting the site, as no threatened species have been recorded on the site and any impacts are likely to affect common, widespread bat species.
- In addition, the decrease in the number of turbines from approved and endorsed 95 turbines to 79 turbines will result in a decrease of 17% of the number of turbines and will contribute to reducing overall risks.

5. SUMMARY

The Berrybank Wind Farm received its planning approval permits on 24 August 2010 for the 'Use and development of land for a Wind Energy Facility'. These are:

- Permit no 20092820 under the Golden Plains Planning Scheme and the Responsible Authority is the Golden Plains Shire Council; and
- Permit no 20092821 under the Corangamite Scheme and the Responsible Authority is the Corangamite Shire Council;

Condition 3 of the permits details the specifications of the wind farm, including the number and scale of the turbines. The permits originally specified the tower height of the wind turbines at 80 metres, with an overall height of 131 metres above natural ground level.

Condition 13 f) of both permits relates to the native vegetation management plan which requires the plan meeting a number of specific requirements to be endorsed by the responsible authority. The Flora and Fauna Management Plan (Report 7152 10.8) dated August 2013, which incorporates the Vegetation Management Plan has been endorsed by the Responsible Authorities.

Berrybank Development Pty Ltd is now seeking approval to vary the turbine specifications as detailed on the permits. It is proposed to increase the tower height to 117 metres, the rotor diameter to 130 metres, and overall tip height to 180 metres. This would result in an overall increase in height of 49 metres from natural ground level. In addition, it is proposed to microsite a number of turbines and realign access tracks and ultimately, reduce the number of turbines on the Berrybank wind farm site from the endorsed 95 to 79.

BL&A was engaged by Berrybank Development Pty Ltd C/- Union Fenosa Wind Australia Pty Ltd to conduct an assessment of the impacts of the proposed layout change on Biodiversity.

The impacts of the modification as assessed in Sections 2-4 of this report are outlined below:

5.1. Impact on flora and native vegetation

The proposed layout changes involve a reduction in the number of turbines, amending the location of access tracks and the placement of site access/exits, crossings and emergency break barriers. Some turbines will be micro-sited.

The Berrybank Wind Farm, as currently approved, does not involve the removal of any remnant patch native vegetation, scattered trees or impacts to threatened flora species (BL&A 2011).

An initial assessment identified that the proposed layout changes could result in impacts to native vegetation (mapped for the Flora and Fauna Management Plan). These are included (from north-west to south-east) the following:

- An emergency break barrier that intersects with vegetation site 5;
- An access track that intersects with an unnumbered vegetation site;
- Two site access/exits that intersects with vegetation site 4;

- An emergency break barrier that intersects with vegetation site 6;
- A site access/exit that intersects with vegetation site 1;
- Crossing #1 that intersects with vegetation site 14;
- An emergency break barrier that intersects with vegetation site 14; and
- An emergency break barrier that intersects with vegetation site 16.

Vegetation site numbers are taken from the botanical assessment documented in BL&A 2009, and are shown in Figure 1. A description of each vegetation site that would potentially be affected is outlined in section 2.

After consultation with Berrybank Development Pty Ltd this list was refined into a list of 5 sites where the development footprint may impact on native vegetation (see 5.2 below).

5.2. Detailed focussed flora surveys

An initial flora field assessment (see section 3) followed the desktop assessment (Section 2) to determine potential impacts of the proposed modification.. Surveys were conducted of these areas to:

- Determine the presence and extent of native vegetation (including listed species and communities where possible);
- Determine the condition of native vegetation in accordance with the Habitat Hectares method; and
- Determine areas of non-native vegetation where infrastructure may be located to avoid impacts to native vegetation.

The areas surveyed to identify potential to impact on native vegetation were:

- A site entrance on Doyle's Road;
- An emergency break barrier adjacent to the Hamilton Highway;
- A crossing to the northern side of the Berrybank-Werneth Road (perpendicular to the existing entrance on the southern side);
- A crossing (both sides of the road) on Bennett's Road; and
- A crossing (both sides of the road) on Padgett's Lane.

The current assessment indicated that the proposed layout changes could impact native vegetation in the five investigation areas. When these impacts were identified, Berrybank Development Pty Ltd asked BL&A, where possible, to identify alternatives to avoid impacts native vegetation. This has been also been achieved in four of the five areas. This is summarised in the table below.

Table 8: Summary of field survey and recommendations

Site name	Native vegetation impacts under revised layout?	Recommendation for avoidance of native vegetation	Comment from proponent
Doyle's Road	Yes	Move site access point 30-50 metres to the north	Will avoid
Private land adjacent to the Hamilton Highway	Yes	Move track east by 50 metres	Will avoid
Berrybank-Werneth Road	Yes		Cannot be avoided
Bennett's Lane	Yes	Locate crossing south of the centreline of Padgett's lane by 30-70 metres	Will avoid
Padgett's Lane	Yes	Move crossing east to bend in Padgett's Lane	Will avoid

Avoidance of vegetation removal on one of the sites, on Berrybank-Werneth Road, was not possible. The implications in relation to native vegetation for the wider project under the currently approved layout that remain are as follows:

Native Vegetation Management Plan

Condition 13 f) of both permits relates to the Native Vegetation Management Plan (which has been endorsed), which requires:

- (viii) 'A report by a suitably qualified person after the completion of a target spring survey of native vegetation in the vicinity of access points where a Vegetation Protection Overlay exists. The report should set out the findings of the targeted spring survey and, if vegetation listed under the Flora and Fauna Guarantee Act 1988 or the Environment Protection and Biodiversity Conservation Act 1999 is identified, set out how impacts on that vegetation is to be avoided or minimised;
- (ix) Requirements for consultation with the Department of Sustainability and Environment the Corangamite Shire Council and Golden Plains Shire Council in the preparation of any offset plan;
- (iii) Identification of offsets prior to native vegetation removal
- (viii) Explanation of how vegetation removal has been minimised by project design.
- (ix) A detailed and thorough description of how the native vegetation management framework's three-step approach has been applied.
- (x) Protocols so that net gains will be undertaken if native vegetation disturbance and removal cannot be avoided for the construction, operation and decommissioning stages of the project; and
- (xi) A protocol for the protection of native vegetation on the wind farm site during the construction phase; procedures for the rehabilitation of construction zones with appropriate pasture species.'

The Native Vegetation Management Plan is included in the Flora and Fauna Management Plan (Report 7152 10.8) dated August 2013, which has been endorsed by the Responsible Authorities.

Thus, the proposed removal of 197m² of native vegetation on the Berrybank – Werneth Road will need to be incorporated into an amended Native Vegetation Management Plan for endorsement by the Responsible Authorities.

EPBC Act

On Berrybank-Werneth Road in the impact area vegetation qualified as the EPBC Act listed threatened community *Natural Temperate Grasslands of the Victorian Volcanic Plains* (NTGVVP). This development will result in the removal of 197m² of NTGVVP. This has been communicated to the federal Department of Environment and Energy (DoEE). DoEE has provided informal advice that this is likely not to be a significant impact. Confirmation is being sought from the DoEE on this matter and will be provided when available.

FFG Act

There are currently no implications under the FFG Act in relation to flora and communities.

If targeted surveys (where these surveys are necessary) indicate the presence of FFG Act listed species or communities in areas of proposed impacts, a Permit to remove flora protected under the FFG Act will be needed to be sought for these.

EE Act

Currently no referral would be triggered under the EE Act in relation to flora and communities.

In the event that remnant native vegetation and/or threatened flora species were to be impacted, it is still considered unlikely that a referral under the EE Act would be required.

5.2.1. Recommendations

The current assessment indicated that in relation to the proposed layout changes:

- Most impacts on native vegetation can be avoided if the proponent proceeds with the proposed relocations outlined above to avoid impact on native vegetation;
- Thus, the proposed removal of 197m² of native vegetation on the Berrybank – Werneth Road will need to be incorporated into an amended Native Vegetation Management Plan for endorsement by the Responsible Authorities.
- A permit will be required to remove any listed species under the state Flora and Fauna Guarantee (FFG) Act 1988 on public lands; and
- Written confirmation be obtained from the DoEE on the removal of 197 m² of the EPBC listed NTGVVP community.

5.3. Bat and avifauna assessment

In relation to birds:

- The proposed modified turbine increases the lower minimum RSA height for turbines by 10.5 metres will lift the lower minimum RSA by 10.5 metres which moves the over RSA higher and out of the heights of most bird activity. This will result in less risk to the 0.8% of all bird flights between 30 and 40 metres.
- The decrease in RSA per height increment up to 60 meters between will have a corresponding decrease in risk to the 98% of birds recorded flying below 60 metres in the proposed modification;

- The incremental RSA area change at for the height range from 60 to 70 and 70-80 metres is 6% and 15% respectively. This is a relatively small increase in risk to the 0.3 % of birds recorded flying between 60 and 80 meters; and
- Above 80 metres there is an increase in the total area of RSA in bands to 170 metres and an increase in tip height has the potential to impact on higher flying species. These include raptors as a group, and specifically the Wedge-tailed Eagle, the White-throated Needletail *Hirundapus caudacutus* and other high flying raptor species.
- Overall there is a substantial decrease in risk to most bird species by this modification. However, there is an increased risk to high flying species including the Wedge-tailed Eagle, the White-throated Needletail *Hirundapus caudacutus* and other high flying raptor species. None of these species are listed as threatened species although the White-throated Needletail is listed as migratory under the EPBC Act.
- In addition, the decrease in the number of approved and endorsed 95 turbines to 79 turbines will result in a decrease of 17% in the number of turbines and will contribute to reducing overall risks.
- Brolgas may be occasionally visit the wind farm site. As It is noted that Brolga fly more frequently below 30 metres (BL&A unpublished data) than above 30 metres. Based on this, increasing the height of the lower level of the RSA from 29.5 to 40 metres above the ground would further decrease the small collision risk.

In relation to bats:

- The increased rotor swept area and height of turbines at the wind farm is highly unlikely to lead to a significant impact on bat species inhabiting the site, as no threatened species have been recorded on the site and any impacts are likely to affect common, widespread bat species.
- In addition, the decrease in the number of turbines from approved and endorsed 95 turbines to 79 turbines will result in a decrease of 17% in the number of turbines and will contribute to reducing overall risks.

6. REFERENCES

- Brett Lane & Associates (BL&A) 2009, *Proposed Berrybank Wind Farm – Flora, Fauna and Targeted Brolga Assessment*, Report No. 7152 (7.3) prepared for Union Fenosa Australia Wind Pty Ltd.
- Brett Lane & Associates (BL&A) 2013, *Berrybank Wind Farm Project – Flora and Fauna Management Plan*, Report No. 7152 (10.8) prepared for Union Fenosa Australia Wind Pty Ltd.
- Curry & Kerlinger, LCC. 2004 A study of Bird and Bat Collision Fatalities at the Mountaineer Wind Energy Centre, Tucker country, West Virginia: Annual Report for 2003, Mountaineer Wind Energy Centre, West Virginia.
- DELWP 2015a, *Native Vegetation Information Management system*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, viewed 25th August 2015, <http://www.delwp.vic.gov.au>
- DELWP 2015b, *Biodiversity Interactive Map 2.0*. Department of Environment, Land, Water and Planning, East Melbourne, Victoria, viewed 25th August 2015, <http://www.delwp.vic.gov.au>
- DELWP 2015c Biodiversity Assessment Handbook - Permitted clearing of native vegetation - May 2015 – Version 1.0 © The State of Victoria Department of Environment, Land, Water and Planning <http://www.delwp.vic.gov.au>
- DELWP 2015d, *Flora and Fauna Guarantee Act 1988 - Threatened List*, Department of Environment, Land, Water and Planning, East Melbourne, Victoria, viewed 25th August 2015, <http://www.delwp.vic.gov.au>
- DEPI 2013, *Biodiversity assessment guidelines*, Department of Environment and Primary Industries, East Melbourne, Victoria.
- Department of Sustainability and Environment (DSE) 2004, *Native Vegetation: sustaining a living landscape, Vegetation Quality Assessment Manual – guidelines for applying the Habitat Hectare scoring method (Version 1.3)*. Department of Sustainability and Environment, now the Department of Environment, Land, Water and Planning, East Melbourne, Victoria.
- Johnson, G.D., Erickson, W.P., Strickland, M.D., Shepard, M.F., Shepard, D.A. and Sarappo, S.A. 2003. Mortality of bats at a large-scale wind power development at Buffalo Ridge, Minnesota, *The American Midland Naturalist* 150: 332-342.
- Kerlinger P & Kerns J 2003, 'FAA Lighting of wind turbines and bird collisions', Paper presented to National Wind Coordinating Committee, Wildlife Work Group Meeting, November 2003, Washington, USA.
- Kerlinger P, Gehring J.L., Erickson W.P., Curry R., Jain A., and Guarnaccia J. 2010, 'Night migrant fatalities and obstruction lighting at wind turbines in North America', *The Wilson Journal of Ornithology* 122 (4): 744-754.
- 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.

Shire GG, Brown K & Winegard G 2000, 'Communication Towers: A deadly hazard to birds', American Bird Conservancy.

Appendix 1: Ensym Report – calculation of offset

Biodiversity impact and offset requirements report

This report **does not represent an assessment by DELWP** of the proposed native vegetation removal. It provides biodiversity information for low risk-based pathway applications for permits to remove native vegetation under clause 52.16 or 52.17 of the planning schemes in Victoria.

Date of issue: 31/03/2017

DELWP ref: BLA_0469

Time of issue: 10:07 am

Project ID	BLA_14143_Berrybank
------------	---------------------

Summary of marked native vegetation

Risk-based pathway	Low
Total extent	0.020 ha
Remnant patches	0.020 ha
Scattered trees	0 trees
Location risk	A
Strategic biodiversity score of all marked native vegetation	0.145

Offset requirements if a permit is granted

If a permit is granted to remove the marked native vegetation, a requirement to obtain a native vegetation offset will be included in the permit conditions. The offset must meet the following requirements:

Offset type	General offset
General offset amount (general biodiversity equivalence units)	0.002 general units
General offset attributes	
Vicinity	Corangamite Catchment Management Authority (CMA) or Corangamite Shire Council
Minimum strategic biodiversity score	0.116 ¹

See Appendices 1 and 2 for details in how offset requirements were determined.

NB: values presented in tables throughout this document may not add to totals due to rounding

¹ Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

Biodiversity impact and offset requirements report

Next steps

This proposal to remove native vegetation must meet the application requirements of the low risk-based pathway and it will be assessed under the low risk-based pathway.

If you wish to remove the marked native vegetation you are required to apply for a permit from your local council. Council will then refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

The biodiversity assessment report from NVIM and this biodiversity impact and offset report should be submitted with your application for a permit to remove native vegetation you plan to remove, lop or destroy.

This report provides the following information to meet application requirements for a permit to remove native vegetation:

- Confirmation of the risk-based pathway of the application for a permit to remove native vegetation
- The area of the patch of native vegetation and/or the number of any scattered trees to be removed
- The strategic biodiversity score of the native vegetation to be removed
- The offset requirements should a permit be granted to remove native vegetation.

Refer to the *Permitted clearing of native vegetation – Biodiversity assessment guidelines* and for a full list and details of application requirements.

© The State of Victoria Department of Environment, Land, Water and Planning Melbourne 2017

This work is licensed under a Creative Commons Attribution 3.0 Australia licence. You are free to re-use the work under that licence, on the condition that you credit the State of Victoria as author. The licence does not apply to any images, photographs or branding, including the Victorian Coat of Arms, the Victorian Government logo and the Department of Environment, Land, Water and Planning logo. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/3.0/au/deed.en>

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DELWP Customer Service Centre 136 186

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Obtaining this publication does not guarantee that an application will meet the requirements of clauses 52.16 or 52.17 of the Victoria Planning Provisions or that a permit to remove native vegetation will be granted.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of clauses 52.16 or 52.17 of the Victoria Planning Provisions

Biodiversity impact and offset requirements report

Appendix 1 – Biodiversity impact of removal of native vegetation

Habitat hectares

Habitat hectares are calculated for each habitat zone within your proposal using the extent and condition scores in the GIS data you provided.

Habitat zone	Site assessed condition score	Extent (ha)	Habitat hectares
1-1-A	0.370	0.020	0.007
TOTAL			0.007

Clearing site biodiversity equivalence score(s)

The general biodiversity equivalence score for the habitat zone(s) is calculated by multiplying the habitat hectares by the strategic biodiversity score.

Habitat zone	Habitat hectares	Strategic biodiversity score	General biodiversity equivalence score (GBES)
1-1-A	0.007	0.145	0.001

Biodiversity impact and offset requirements report

Appendix 2 – Offset requirements detail

If a permit is granted to remove the marked native vegetation the permit condition will include the requirement to obtain a native vegetation offset.

To calculate the required offset amount required the biodiversity equivalence scores are aggregated to the proposal level and multiplied by the relevant risk multiplier.

Offsets also have required attributes:

- General offsets must be located in the same Catchment Management Authority (CMA) boundary or Local Municipal District (local council) as the clearing and must have a minimum strategic biodiversity score of 80 per cent of the clearing.²

The offset requirements for your proposal are as follows:

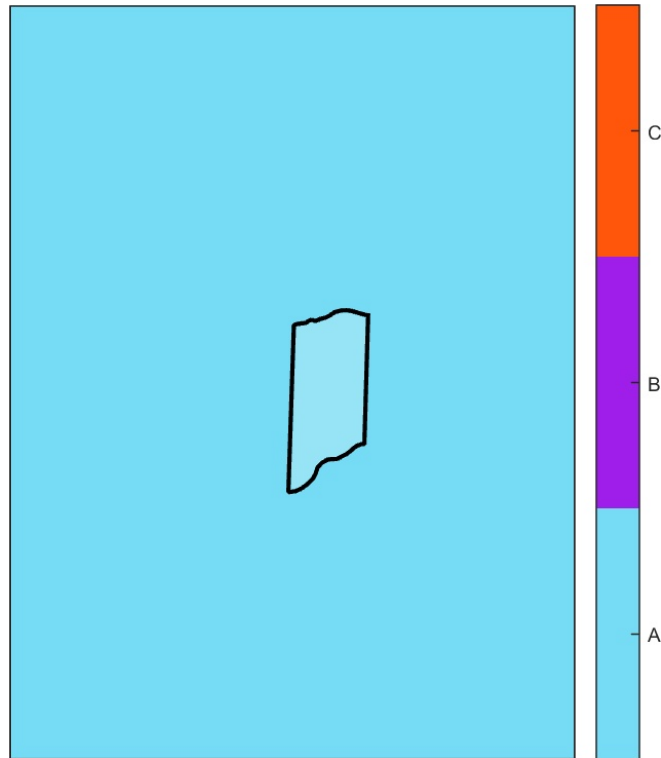
Offset type	Clearing site biodiversity equivalence score	Risk multiplier	Offset requirements	
			Offset amount (biodiversity equivalence units)	Offset attributes
General	0.001 GBES	1.5	0.002 general units	Offset must be within Corangamite CMA or Corangamite Shire Council Offset must have a minimum strategic biodiversity score of 0.116

² Strategic biodiversity score is a weighted average across habitat zones where a general offset is required

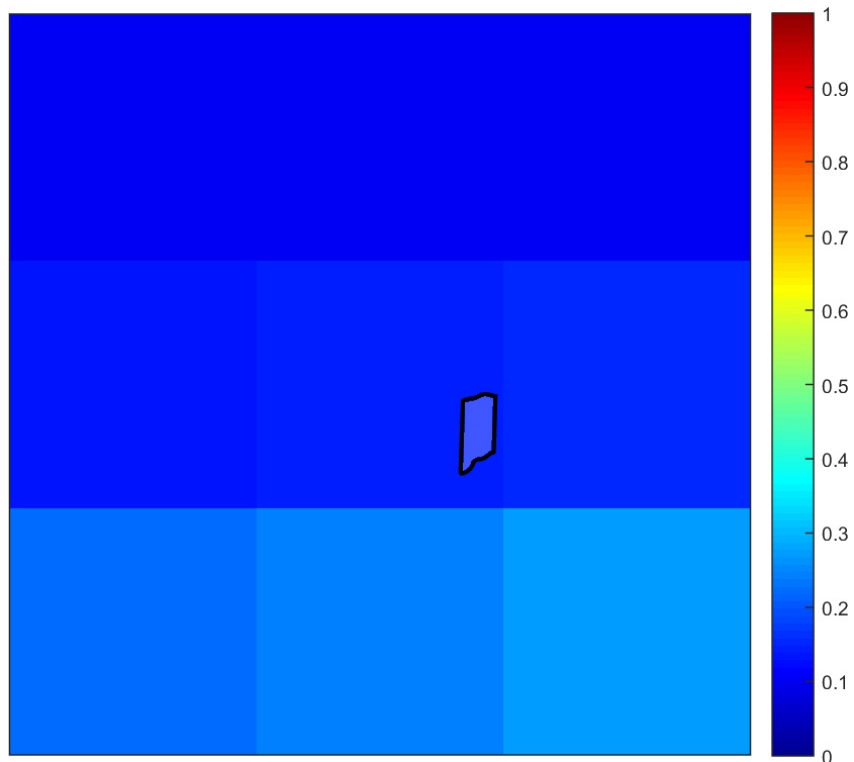
Biodiversity impact and offset requirements report

Appendix 3 – Images of marked native vegetation

1. Native vegetation location risk map



2. Strategic biodiversity score map



Biodiversity impact and offset requirements report

3. Aerial photograph showing marked native vegetation



Biodiversity impact and offset requirements report

Glossary

Condition score This is the site-assessed condition score for the native vegetation. Each habitat zone in the clearing proposal is assigned a condition score according to the habitat hectare assessment method. This information has been provided by or on behalf of the applicant in the GIS file.

Dispersed habitat A dispersed species habitat is a habitat for a rare or threatened species whose habitat is spread over a relatively broad geographic area greater than 2,000 hectares.

General biodiversity equivalence score The general biodiversity equivalence score quantifies the relative overall contribution that the native vegetation to be removed makes to Victoria's biodiversity. The general biodiversity equivalence score is calculated as follows:

$$\text{General biodiversity equivalence score} = \text{habitat hectares} \times \text{strategic biodiversity score}$$

General offset amount This is calculated by multiplying the general biodiversity equivalence score of the native vegetation to be removed by the risk factor for general offsets. This number is expressed in general biodiversity equivalence units and is the amount of offset that is required to be provided should the application be approved. This offset requirement will be a condition to the permit for the removal of native vegetation.

$$\text{Risk adjusted general biodiversity equivalence score} = \text{general biodiversity equivalence score clearing} \times 1.5$$

General offset attributes General offset must be located in the same Catchment Management Authority boundary or Municipal District (local council) as the clearing site. They must also have a strategic biodiversity score that is at least 80 per cent of the score of the clearing site.

Habitat hectares Habitat hectares is a site-based measure that combines extent and condition of native vegetation. The habitat hectares of native vegetation is equal to the current condition of the vegetation (condition score) multiplied by the extent of native vegetation. Habitat hectares can be calculated for a remnant patch or for scattered trees or a combination of these two vegetation types. This value is calculated for each habitat zone using the following formula:

$$\text{Habitat hectares} = \text{total extent (hectares)} \times \text{condition score}$$

Habitat importance score The habitat importance score is a measure of the importance of the habitat located on a site for a particular rare or threatened species. The habitat importance score for a species is a weighted average value calculated from the habitat importance map for that species. The habitat importance score is calculated for each habitat zone where the habitat importance map indicates that species habitat occurs.

Habitat zone Habitat zone is a discrete contiguous area of native vegetation that:

- is of a single Ecological Vegetation Class
- has the same measured condition.

Biodiversity impact and offset requirements report

Highly localised habitat	<p>A highly localised habitat is habitat for a rare or threatened species that is spread across a very restricted area (less than 2,000 hectares). This can also be applied to a similarly limited sub-habitat that is disproportionately important for a wide-ranging rare or threatened species. Highly localised habitats have the highest habitat importance score (1) for all locations where they are present.</p>
Minimum strategic biodiversity score	<p>The minimum strategic biodiversity score is an attribute for a general offset.</p> <p>The strategic biodiversity score of the offset site must be at least 80 per cent of the strategic biodiversity score of the native vegetation to be removed. This is to ensure offsets are located in areas with a strategic value that is comparable to, or better than, the native vegetation to be removed. Where a specific and general offset is required, the minimum strategic biodiversity score relates only to the habitat zones that require the general offset.</p>
Offset risk factor	<p>There is a risk that the gain from undertaking the offset will not adequately compensate for the loss from the removal of native vegetation. If this were to occur, despite obtaining an offset, the overall impact from removing native vegetation would result in a loss in the contribution that native vegetation makes to Victoria's biodiversity.</p> <p>To address the risk of offsets failing, an offset risk factor is applied to the calculated loss to biodiversity value from removing native vegetation.</p> <p style="text-align: center;"><i>Risk factor for general offsets = 1.5</i></p> <p style="text-align: center;"><i>Risk factor for specific offset = 2</i></p>
Offset type	<p>The specific-general offset test determines the offset type required.</p> <p>When the specific-general offset test determines that the native vegetation removal will have an impact on one or more rare or threatened species habitat above the set threshold of 0.005 per cent, a specific offset is required. This test is done at the permit application level.</p> <p>A general offset is required when a proposal to remove native vegetation is not deemed, by application of the specific-general offset test, to have an impact on any habitat for any rare or threatened species above the set threshold of 0.005 per cent. All habitat zones that do not require a specific offset will require a general offset.</p>
Proportional impact on species	<p>This is the outcome of the specific-general offset test. The specific-general offset test is calculated across the entire proposal for each species on the native vegetation permitted clearing species list. If the proportional impact on a species is above the set threshold of 0.005 per cent then a specific offset is required for that species.</p>
Specific offset amount	<p>The specific offset amount is calculated by multiplying the specific biodiversity equivalence score of the native vegetation to be removed by the risk factor for specific offsets. This number is expressed in specific biodiversity equivalence units and is the amount of offset that is required to be provided should the application be approved. This offset requirement will be a condition to the permit for the removal of native vegetation.</p> <p style="text-align: center;"><i>Risk adjusted specific biodiversity equivalence score</i> <i>= specific biodiversity equivalence score clearing × 2</i></p>

Biodiversity impact and offset requirements report

Specific offset attributes Specific offsets must be located in the modelled habitat for the species that has triggered the specific offset requirement.

Specific biodiversity equivalence score The specific biodiversity equivalence score quantifies the relative overall contribution that the native vegetation to be removed makes to the habitat of the relevant rare or threatened species. It is calculated for each habitat zone where one or more species habitats require a specific offset as a result of the specific-general offset test as follows:

$$\begin{aligned} & \textit{Specific biodiversity equivalence score} \\ & = \textit{habitat hectares} \times \textit{habitat importance score} \end{aligned}$$

Strategic biodiversity score This is the weighted average strategic biodiversity score of the marked native vegetation. The strategic biodiversity score has been calculated from the *Strategic biodiversity map* for each habitat zone.

The strategic biodiversity score of native vegetation is a measure of the native vegetation's importance for Victoria's biodiversity, relative to other locations across the landscape. The *Strategic biodiversity map* is a modelled layer that prioritises locations on the basis of rarity and level of depletion of the types of vegetation, species habitats, and condition and connectivity of native vegetation.

Total extent (hectares) for calculating habitat hectares This is the total area of the marked native vegetation in hectares. The total extent of native vegetation is an input to calculating the habitat hectares of a site and in calculating the general biodiversity equivalence score. Where the marked native vegetation includes scattered trees, each tree is converted to hectares using a standard area calculation of 0.071 hectares per tree. This information has been provided by or on behalf of the applicant in the GIS file.

Vicinity The vicinity is an attribute for a general offset. The offset site must be located within the same Catchment Management Authority boundary or Local Municipal District as the native vegetation to be removed.

Appendix 2: Quotation for provision of offset

30 March 2017

Our Reference: ESLS-2183
Your Reference: TBC

Bernard O'Callaghan
Brett Lane & Associates

By Email: BOCallaghan@ecologicalresearch.com.au

Dear Bernard,

RE: Quotation for the supply of Native Vegetation Credits

Thank you for your request for a fee proposal to provide native vegetation credits in accordance with *Permitted Clearance of Native Vegetation: Biodiversity Assessment Guidelines*. We are an accredited organisation with the Department of Environment, Land, Water & Planning (DELWP).

Based upon the information provided, I understand you require the following native vegetation offset:

Table 1 – Offset Targets

Offset Type	Attributes	Biodiversity Equivalence Units (BEU)	Minimum Strategic Biodiversity Score (SBS)
General	Corangamite CMA	0.002	0.116

To make available credits to offset vegetation clearance, landowners are required to:

- Enter into a Landowner Agreement for the specified area. A landowner agreement:
 - Is in perpetuity and is binding upon the landowner and the landowners successors in title;
 - Permanently restricts use of the site, including but not limited to preventing agricultural use, vegetation clearance and the erection of a structure or dwelling; and,
 - Requires fencing to be erected and effectively maintained to protect the site.
- Implement a detailed 10-year Management Plan endorsed by the DELWP Native Vegetation Credit Register.

The landowner provides the following quotation based upon the 10-year Management Plan prepared for the site. The quotation represents a one off lump sum for all management costs associated with the offset, which is paid into a Trust for Nature trust account. It is subsequently paid to the landowner in instalments (over 10 years), subject to the satisfactory implementation of the management actions. The credit owner's price is inclusive of:

1. Landowner agreement and monitoring fees;
2. Legal & Accounting Costs;
3. Brokerage Fees;

4. Land depreciation and lost opportunity cost arising from the permanent restrictive covenant;
5. Contractor costs for pest plant & animal suppression works over ten years;
6. Fencing establishment &/or maintenance;
7. Environmental risk – especially that which arises from fire, flood or drought;
8. Insurance, rates & taxes;
9. Monitoring and compliance costs;
10. Inflation over ten years; and,
11. An allowance to cover management and compliance costs associated with the Landowner Agreement in perpetuity.

Quotation

Credits equal to a gain of 0.002 BEUs with an SBS>0.116, including Trust for Nature service fees	\$550.00
Vegetation Link Transaction Fees^	\$600.00
Total (ex GST)	\$1,150.00
Total (Inc. GST)	\$1,265.00

^Includes DELWP NVCR transfer and allocation fees introduced in July 2016. Note, if credits are not allocated to a planning permit at the time of purchase, a further \$50 DELWP NVCR fee applies

For "Trust for Nature" credits, Allocated Credit Extracts can typically be obtained in approximately 6-8 weeks


The quotation is valid for 14 days, subject to credit availability.

Upon receipt of written acceptance of this quotation, we will immediately reserve the credits before proceeding to prepare a Credit Agreement to enable the transfer of the credits to you or your nominee.

We will then lodge the agreement with Trust for Nature who will raise an invoice for the Credits, Once payment is made, you will receive an Allocated Credit Extract from the Native Vegetation Credit Register as evidence of meeting your offset requirement.

Should you have any queries, please do not hesitate in contacting us on (03) 5470 5232 or email offsets@vegetationlink.com.au.

Sincerely



Jenni Thomas
Biodiversity Offset Coordinator