

HAWKESDALE WIND FARM
BIODIVERSITY IMPACT ASSESSMENT ON
PROPOSED MODIFICATION

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1. INTRODUCTION

The Hawkesdale Wind Farm received planning approval on 12 August 2008 for the 'Use and development of land for a Wind Energy Facility – Permit No 200602211'. 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 78 metres, with an overall height of 121.5 metres above natural ground level. On 12th August 2010, the Minister for Planning approved a minor amendment to the specifications of the wind turbines for the wind farm to allow a tower height of 80 metres, with blade lengths of 46.25 metres and overall height of 126.3 metres and a lower minimum RSA of 33.75 metres.

Ryan Corner 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, except for three of the proposed turbines (namely A10, A13 and A17) which will have different specifications, namely a proposed upper RSA of 160 metres and a lower RSA height of 30m above the ground. In addition, it is proposed to microsite a number of turbines and realign access tracks and ultimately, reduce the number of turbines on the Hawkesdale Wind Farm site from the approved 31 to 26.

Planning Permit No PL06/319 was issued to the proponent by the Shire of Moyne to provide for the removal of native vegetation associated with the construction of the Hawkesdale Wind Farm and associated road access points. Under the permit, prior to construction a plan indicating all native vegetation to be removed must be prepared and submitted to the responsible authority. When approved this plan will be endorsed and will form part of this permit.

BL&A was engaged by Ryan Corner 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 impact on birds and avifuna

Section 4 presents the conclusions and recommendations.

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

2. DESKTOP FLORA ASSESSMENT

2.1. Introduction

BL&A was engaged by Ryan Corner Development Pty Ltd C/- Union Fenosa Wind Australia Pty Ltd to conduct an assessment of the impacts on native vegetation as a result of the proposed layout change. The assessment involved:

- Comparison of initial and revised layout for Hawkesdale Wind Farm;
- Collation and review of previous literature documenting flora and native vegetation within the Hawkesdale Wind Farm site; and
- Assessment of the potential impacts of the proposed layout change on flora and native vegetation.

BL&A did not complete the original flora and native vegetation assessment for the site. However existing data collected by Environmental Resources Management Australia (ERM) 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. This report considers the implications of these changes.

2.2. Scope of Work and Methodology

This current assessment involved the following:

- Existing information on native vegetation of the area was reviewed as follows:
 - Native Vegetation Information Management system (NVIM) (DELWP 2015a);
 - Biodiversity Interactive Map 2.0. (DELWP 2015b);
 - *Flora and Fauna Guarantee Act 1988 - Threatened List* (DELWP 2015c);
 - Victorian Biodiversity Atlas administered by the Department of Environment, Land, Water and Planning (DELWP 2015d);
 - The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (DoE 2015);
 - Hawkesdale Wind Farm Ecological Assessment (ERM 2006); and
 - Hawkesdale Wind Farm Net Gain Assessment Supplementary Report (TME 2007).

The sources of information listed above were reviewed to determine the ecological values within the Hawkesdale Wind Farm site. The modified proposal for the Hawkesdale 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 redevelopment layout was undertaken using GIS to overlay the proposed modified layout over the existing approved layout and recorded ecological values.

2.2.1. Limitations of assessment

As the primary purpose 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 aspect of the assessment.

This portion of the current assessment has been undertaken on a desk-top only basis, and as such the results and advice contained within this report rely on the accuracy of flora and fauna surveys undertaken by ERM in 2006 and 2007 along with an assessment undertaken by Galbraith & Associates in 2009. A peer review was undertaken by BL&A in 2006 of the initial ERM findings. No additional validation of the accuracy of these surveys and associated mapping has been undertaken as part of this current assessment.

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.

State provisions

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).

Before issuing a planning permit, Responsible Authorities are obligated to refer to Clause 12.01 (Biodiversity) in the Planning Scheme. This refers in turn to the following online tool and document:

- The Native Vegetation Information Management (NVIM) system (2015a); and
- *Permitted clearing of native vegetation – Biodiversity assessment guidelines* (DEPI 2013).

Biodiversity assessment guidelines

As set out in *Permitted clearing of native vegetation – Biodiversity assessment guidelines* ('the Guidelines') (DEPI 2013) the objective for permitted clearing of native

vegetation in Victoria is 'No net loss in the contribution made by native vegetation to Victoria's biodiversity'.

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.

EE Act

The "Ministerial Guidelines for Assessment of Environmental Effects under the *Environment Effects Act 1978*" (DSE 2006), identifies the following criteria related to flora and fauna which assist in determining whether a Referral to the State Minister for Planning is required:

- Potential clearing of ten hectares or more of native vegetation from an area that is of an EVC identified as endangered;
- Potential long-term loss of a significant proportion (1 to 5% depending upon conservation status of species concerned) of known remaining habitat or population of a threatened species in Victoria;
- Potential long-term change to a wetland's ecological character, where that wetland is Ramsar listed, or listed in 'A Directory of Important Wetlands in Australia';
- Potential major effects upon the biodiversity of aquatic ecosystems over the long term;
- Potential significant effects on matters listed under the *Flora and Fauna Guarantee Act 1988*.

One or a combination of these criteria may trigger a requirement for a Referral to the Victorian Minister for Planning who will determine if an EES is required.

2.4. Results

2.4.1. Existing information

Pre-European Environmental Vegetation Class (EVC) mapping (DELWP 2015b) indicated that the study area and surrounds would have supported five EVCs, including Basalt Shrubby Woodland (EVC 642); Swamp Scrub (EVC 53); Basalt Creekline Shrubby Woodland (EVC 705); Aquatic Herbland/Plains Sedgy Wetland Mosaic (EVC 691) and Plains Grassy Wetland (EVC 125) based on modelling factors including rainfall, aspect, soils and remaining vegetation.

ERM (2006) and TME (2007) mapped Basalt Shrubby Woodland (EVC 642) along the rail reserve and associated with the access points to the Wind Farm, and Basalt Creekline Shrubby Woodland (EVC 705) along Austins Creek. These surveys also recorded a number of treed shelterbelts within the proposed development area. Some species occurring in these shelterbelts are native to Victoria, while others are introduced, however all shelterbelts are considered planted vegetation.

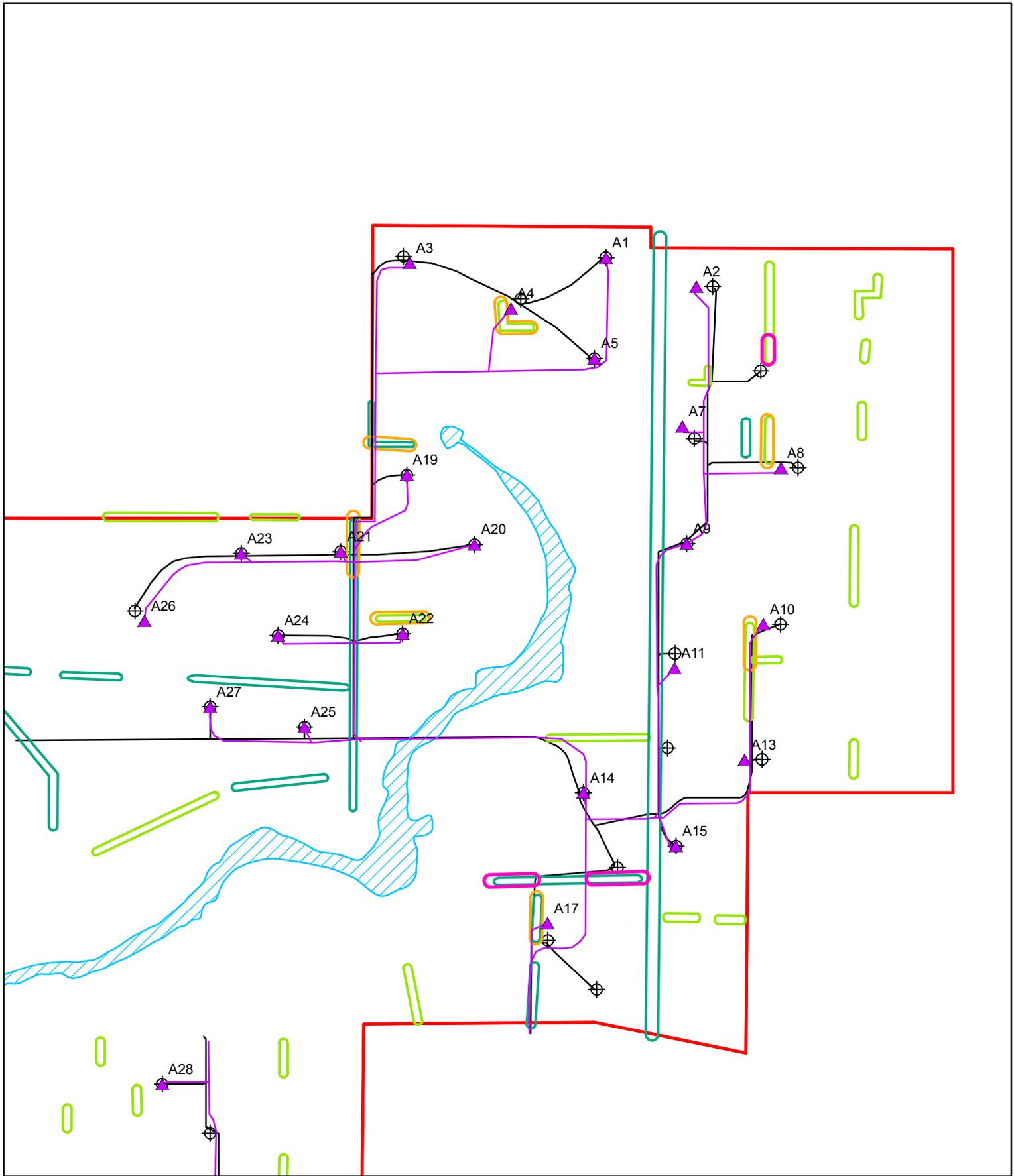
No rare or threatened flora species were detected during the field surveys and none were expected to occur within the development footprint (ERM 2006; TME 2007).

2.4.2. Impacts

The proposed layout changes involve a reduction in the number of turbines and an amendment in the location of access tracks. The location of some turbines will change slightly.

The Hawkesdale Wind Farm, as currently approved, involves the removal of remnant patches of native vegetation associated with access points to the wind farm site, and the removal of planted shelterbelts. No rare or threatened flora species are likely to be impacted.

The proposed layout changes include a reduction in the number of turbines and an amendment in the location of access tracks. It is understood that the location of access points to the Wind Farm will not be altered (although one has been removed from the plan), and that the location of the access track where it crosses the rail reserve will not be altered. As a result, the revised layout results in no change in impacts upon native flora and native vegetation when compared to the currently approved layout (Figure 1).



Legend

- | | | | |
|--|--|---|---------------------|
|  | Site boundary |  | Turbines - 2008 |
|  | Water body |  | Tracks - 2008 |
|  | Native vegetation (shelterbelt) |  | Turbine - June 2015 |
|  | Non-native vegetation (shelterbelt) |  | Tracks - June 2015 |
|  | Vegetation to be removed |  | Cadastre |
|  | Vegetation initially proposed for removal but is being retained due to layout change | | |



Figure 1: Wind farm layout changes and impacts on vegetation

Project: Hawkesdale Wind Farm

Client: Ryan Corner Development Pty Ltd

Project No.: 14144	Date: 4/02/2016	Created By: M. Ghasemi / B. O'Callaghan
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2.4.3. Implications

There is no change in the regulatory implications of the proposed layout change for the Hawkesdale Wind Farm when compared to the currently approved layout.

The implications are, and remain, as follows.

Planning controls

A permit to remove native vegetation associated with access tracks to the wind farm site is required under Clause 52.17 of the Moyne Planning Scheme. – which has been issued (Permit No. PL06/319) and requires updating together through the “Hawkesdale Wind Farm Net Gain Assessment”.

Native Vegetation Guidelines

Offsets for the removal of remnant native vegetation associated with access points to the wind farm were required under *Victoria's Native Vegetation Management: A Framework for Action*, and have been sourced. A referral to DELWP was triggered in relation to this matter.

As tree species native to Victoria within shelterbelts are considered planted vegetation, offsets are not required for the removal of this vegetation in accordance with Victorian Planning Provision 52.17.

As no additional native vegetation in the form of remnant patches and scattered trees are proposed to be removed to facilitate the modified development, the Biodiversity Assessment Guidelines (DEPI 2013) do not apply. No additional offsets are required under the Biodiversity Assessment Guidelines.

EPBC Act

There are no implications under the EPBC Act in relation to flora and associated communities.

FFG Act

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

EE Act

As the proposed revised layout is not having an additional impact on naïve vegetation and is reducing the number of turbines, no referral would be triggered under the EE Act in relation to flora and related communities.

2.4.4. Mitigation

Consideration should be given to including the mitigation measures described below in a construction and operational environmental management plan for the project.

- All environmental controls should be checked for compliance on a regular basis.

Construction phase:

- Tree Retention Zones (TRZs) are to be established and maintained around all retained trees for the duration of construction activities. Construction and construction-related activities are to be excluded from the TRZ. Encroachment into

the TRZ (including earthworks such as trenching for pipelines or cabling, etc. that disturb the root zone) must not affect more than 10% of the total area of the TRZ.

- Any tree pruning should be undertaken by an experienced arborist to prevent disease or unnecessary damage to the tree or disturbance to understorey vegetation during tree trimming.
- Any stockpiling should occur outside of environmentally sensitive areas.
- All machinery should enter and exit works sites along defined routes that do not impact on native vegetation to be retained or cause soil disturbance and weed spread.
- All machinery brought on site should be weed and pathogen free. This is important for environmental and agricultural protection. Soil borne pathogens such as Cinnamon Fungus and can be easily transported by machinery.
- All machinery wash down, lay down and personnel rest areas should be defined (fenced) and located in disturbed areas.
- All works must be undertaken in a manner that will minimise soil erosion and adhere to Construction Techniques for Sediment Pollution Control (EPAV 1991).

Post-construction phase:

- Weed control, by an experienced bush regenerator, is to be carried out along disturbed areas after construction to control any weed outbreaks that may invade retained remnant patch native vegetation.
- Areas disturbed by works should be rehabilitated to their former condition.

3. BIRD AND AVIFAUNA ASSESSMENT

The Hawkesdale Wind Farm received planning approval on 12 August 2008 for the 'Use and development of land for a Wind Energy Facility – Permit No 200602211'. 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 78 metres, with an overall height of 121.5 metres above natural ground level and lower minimum RSA height of 34.5 metres. On 12th August 2010, the Minister for Planning approved a minor amendment to the specifications of the wind turbines for the wind farm to allow a tower height of 80 meters, with blade lengths of 46.25 metres and overall height of 126.25 metres and a lower minimum RSA of 33.75 metres.

Ryan Corner 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, except for three of the proposed turbines (namely A10, A13 and A17) which will have different specifications, namely a proposed upper RSA of 160 metres and a lower RSA height of 30m above the ground. In addition, it is proposed to microsite a number of turbines and realign access tracks and ultimately, reduce the number of turbines on the Hawkesdale Wind Farm site from the approved 31 to 26.

This section of the report responds to a request to provide advice on the likely consequences for birds and bats at the proposed Hawkesdale Wind Farm of a proposed modification to the wind farm as outlined above.

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, 2010, 'Hawkesdale Wind Farm, Pre-construction Bird and Bat Surveys', Report No. 9067 [3.2], Consultants Report to Union Fenosa Wind Australia Pty Ltd); and
- Information from Union Fenosa Wind Australia Pty Ltd summarising the proposed changes in height of the wind turbines at the wind farm.

The bird utilisation surveys (BUS) for the wind farm was for turbines not exceeding 120 m in height (i.e. to the top of the highest point reached by the rotating turbine blades). The lowest height of the rotor swept area was 35metres above the ground for the BUS. Such heights were used in the original flora and fauna impact assessment (BL&A 2010) as a basis for understanding the bird and bat risks from operating turbines.

The new turbine envelope will encompass the measurements listed in Table 1 and impacts on birds and bats will be assessed using these maximum measurements.

	Max Tip RSA Height (m)	Min Lower RSA Height (m)
Generic Turbine – 23 turbines	180	40
Modified specifications – (Turbine A10, A13 and A17)	160	30

Table 1: The maximum measurements of new turbine models to be constructed at Hawkesdale Wind Farm.

The proposed change in turbine dimensions is as follows:

- The proposed minimum lower RSA height is 40 meters above ground, which is 5.5 meters above the original proposal and 6.25 metres above the secondary consent proposal.
- For three of the proposed turbines (namely A10, A13 and A17) a different dimension will be used with the proposed upper RSA of 160 metres and a lower minimum RSA height of 30m above the ground, or 5 metres closer to the ground than in the original application of 35 metres.

The increase in the rotor diameter from amended modification from 92.5 metres to 130 metres would also bring changes to the total extent of each RSA from 6,720 m² to 13,275 m², which will increase the total RSA area by approximately 197%. The majority of the change of this change (over 89%) is above 60 metres in height.

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

However, in line with increasing efficiency of wind turbines it is now proposed that the number of turbines be reduced from the approved 31 turbines to 26 turbines. Impacts on birds and bats from the proposed changes are discussed separately below.

3.1. Modification of impacts on Birds

During the bird utilisation study for the Hawkesdale wind farm, the height of flying birds was recorded and documented in BL&A (2010) in the following height zones:

- 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 split of birds between heights was:

- Below rotor swept area height: 91.4 percent;
- Within rotor swept area height: 7.8 percent; and
- Above rotor swept area height: 0.8 percent.

During bird utilisation surveys at Hawkesdale wind farm, more detailed records of bird flight heights were also made and recorded in BL&A records for future use. 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 that height.

The data has been analysed and presented in Table 2. Information from the bird utilisation surveys at another Union Fenosa wind farm (Berrybank) is also presented to show 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.

During the bird utilisation surveys for a range of wind farms in southern Australia (n = 11), BL & A (unpubl. data) has found that, on average, 5.5% of birds were recorded usually between 40 and 120 metres above the ground, typically considered as rotor swept area (RSA) height. On average, 0.3% percent of birds were observed flying above RSA height.

Table 2: Bird flight heights at Hawkesdale and Berrybank Wind Farms.

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

Based on the foregoing results, the proposed increase in the maximum height to 180 metres will have an insignificant incremental effect on birds at the Hawkesdale Wind Farm as few birds (0.8%) were recorded flying above 140 metres.

The change in the lower RSA height has the potential to impact birds. Birds below 20 metres above ground constituted 84.1 percent of all recorded birds (Table 2). Birds flying between 21 and 30 metres added another 6.2 percent to those at 20 metres (% below 30 metres - 90.3%) and those flying below 40 metres added another 3.8 percent (% below 40 metres - 94.1%).

The proposed RSA envelope will increase the lower RSA at a minimum of 40 metres compared to the original permitted minimum RSA of 34.5 metres and the approved secondary consent minimum RSA of 33.75 metres for 23 of the turbines. This will remove the RSA between 30 and 39 meters. This increase in height of the RSA combined with the reduction in turbines will remove the risk to those birds recorded flying between 30 and 39 meters.

The change in the blade length would also bring changes to the extent of the RSA. As height increases, so will the potential interaction with birds. The extent of RSA at between 40-59 meters will increase by 117% per turbine, This increase may put birds that fly at RSA height at a greater risk of collision. Overall, 6% of birds were recorded over 40 metres in height.

However, for three of the proposed turbines the lowest height of the rotor swept area will be a minimum of 30 metres above the ground, which might lead to a proportionate increase in the 3.8 % of birds recorded flying between 30 and 40 metres.

Based on the original bird utilisation surveys at the Hawkesdale Wind Farm, none of the species of birds found regularly 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 Hawkesdale Wind Farm were:

- Raven spp., mainly Little raven;
- Australian Magpie;
- Eurasian Skylark;
- Long-billed Corella; and
- Straw-necked Ibis.

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.

3.2. 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 Hawkesdale Wind Farm (November 2015). There are no major changes in Brolga distribution in the 10 Km range. There are no new records of solitary or pairs of Brolgas within the 10 km of the Hawkesdale Wind Farm.

It is noted that Brolga fly more frequently below 30 metres (BL&A unpublished data). Based on this, increasing the height of the lower level of the RSA from 33.75 metres to 40 metres above ground level for most of the turbines and setting a minimum 30 metres ground clearance for the three turbines A10, A13, and A17, while reducing the number of turbines from 36 to 31 is likely to reduce the overall collision risk to Brolgas.

3.3. Impacts on Bats

Greg Richards and Associates Pty Ltd, in association with BL&A, studied the bat fauna of the Hawkesdale Wind Farm and found eleven species of bats on the wind farm site. These species were mostly common and secure species, except for the Southern Bent-wing Bat (*Miniopterus schreibersii bassiana*), which is a threatened species in Victoria and nationally. This species was recorded at Hawkesdale Wind Farm and was recorded much less often compared with other species.

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 Hawkesdale involved recording bats at height. The number of bat calls recorded 50 metres above the ground was limited (less than 20 calls recorded and involved mostly White-striped Free-tail Bats, a species known to fly higher than most). One single Southern Bentwing Bat call (out of several hundred Southern Bentwing Bat calls) was recorded between 20 metres and 50 metres above the ground. The remaining Southern Bent-wing Bat call were recorded within 20-25 metres of the ground.

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. 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.

The proposed RSA envelope will increase the lower RSA to a minimum of 40 metres compared to the original permitted minimum RSA of 34.5 metres and the approved secondary consent minimum RSA of 33.75 metres. This decreases exposure of bats to the RSA between 30 and 40 meters. However, for three of the proposed turbines (namely A10, A13 and A17) a lower RSA height of 30m above the ground will slightly increase the risk to bat species. The decrease in the number of turbines from 31 turbines to 26 turbines is a 16% decrease in the number of turbines. Thus, overall there will be a reduction in the risk to most bat species as most are recorded below 30-40 metres.

However, the increase in area of RSA above 40 metres may have an impact on bat species such as White-striped Freetail Bats and other high-flying species of bats. However, these species are not listed as species of conservation concern.

At Hawkesdale Wind Farm, bat activity was moderate and included several hundred records of the state and nationally threatened Southern Bent-wing Bat, although all except for one call were below the proposed lower height of the RSA. The incremental effect of the overall increase in area of RSA will not vary significantly as a higher proportion of the bats and most bat activity is likely to remain below the lower RSA height and collisions, when they occur, almost certainly involving common, widespread species. These impacts would not lead to any significant decline in their populations.

3.4. Aviation Night Lighting

Due to the increase in turbine tip height the requirement for night lighting for aviation safety has been detailed in the letter of 30th June 2016 from CASA to DELWP in relation to lighting for this wind farm. This referral response from CASA for HDWF dated 30.6.16 recommends that the *'the wind farm is lit with steady red medium intensity lighting at night as per Section 9.4 of the CASA Manual of Standards Part 139.'*

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.

Although overall, the comparative level of bird and bat utilisation for the HDWF is relatively low, and there were no species of listed birds and only one record of an endangered bat at height, the preference remains for red lights in line with CASA recommendations. However, given the evidence from other sources, flashing red light would minimize the risk to bird and bat species.

4. SUMMARY

The Hawkesdale Wind Farm received planning approval on 12 August 2008 for the 'Use and development of land for a Wind Energy Facility – Permit No 200602211'. 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 78 metres, with an overall height of 121.5 metres above natural ground level. On 12th August 2010, the Minister for Planning approved a minor amendment to the specifications of the wind turbines for the wind farm to allow a tower height of 80 meters, with blade lengths of 46.25 metres and overall height of 126.25 metres and a lower minimum RSA of 33.75 metres.

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Planning Permit No PL06/319 was issued to the proponent by the Shire of Moyne to provide for the removal of native vegetation associated with the construction of the Hawkesdale Wind Farm and associated road access points. Under the permit, prior to construction a plan indicating all native vegetation to be removed must be prepared and submitted to the responsible authority. When approved this plan will be endorsed and will form part of this permit.

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

4.1. Impact on flora and native vegetation

The Hawkesdale Wind Farm, as currently approved, involves the removal of remnant patches of native vegetation associated with access points to the wind farm site, and the removal of planted shelterbelts. No rare or threatened flora species are likely to be impacted.

The proposed revised layout involves a reduction in the number of turbines and an amendment in the location of access tracks. This results in no change in impacts upon native flora and native vegetation when compared to the currently approved layout.

Implications

There is no change in the regulatory implications of the proposed layout change for the Hawkesdale Wind Farm when compared to the currently approved layout.

The implications are, and remain, as follows.

- A permit to remove native vegetation associated with access tracks to the wind farm site is required under Clause 52.17 of the Moyne Planning Scheme. – which has been issued (Permit No. PL06/319) and requires updating together through the "Hawkesdale Wind Farm Net Gain Assessment".

- Offsets for the removal of remnant native vegetation associated with access points to the wind farm were required under *Victoria's Native Vegetation Management: A Framework for Action*, and have been sourced. No additional offsets are required in relation to the proposed changes.
- There remain no implications under the EPBC Act in relation to flora and associated communities.
- There remain no implications under the FFG Act in relation to flora and associated communities.
- No referral would be triggered under the EE Act in relation to flora and associated communities.

4.2. Bat and avifauna assessment

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

In relation to birds:

- The proposed increase in height of the upper RSA of the turbines at Hawkesdale Wind Farm to 180 metres will have a small incremental effect on birds at the Hawkesdale Wind Farm as few birds (0.8%) were recorded flying above 120 metres.
- The turbine ground clearance has increased from 33.75 to 40 metres (for all turbine locations except A10, A13, and A17 that would have a 30 metres ground clearance). A change in turbine ground clearance from 34.5 metres to 40 metres equates to a reduction in risk to those birds recorded flying between 30-39 metres and it is noted that an estimated 94.1% of birds were observed flying less than 40 metres in height.
- The overall area of the RSA has increased due to the proposed increase in the length of the blade. The bird species most regularly flying at turbine RSA heights are common birds in farmland habitats across southeastern Australia. The majority of the increase in RSA will be above 60 metres in height (89%) and will potentially interact with 3.7% of birds recorded flying above 60 metres.
- For these reasons, no significant bird population effects are anticipated as a consequence of the proposed change in turbine size and associated RSA and heights.

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 the bat species inhabiting the site as most bats have been recorded flying below the proposed the increased lower RSA height.
- Most bats on the site were common, widespread bat species, the wider populations of which are large and will not be affected by the increased impacts.
- Only very limited numbers of Southern Bent-wing Bat calls were recorded at heights greater than 25 metres and impacts are not anticipated on this species.

In addition, the reduction of five turbines at Hawkesdale Wind Farm aims to further reduce the risk of bird and bat impacts.

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