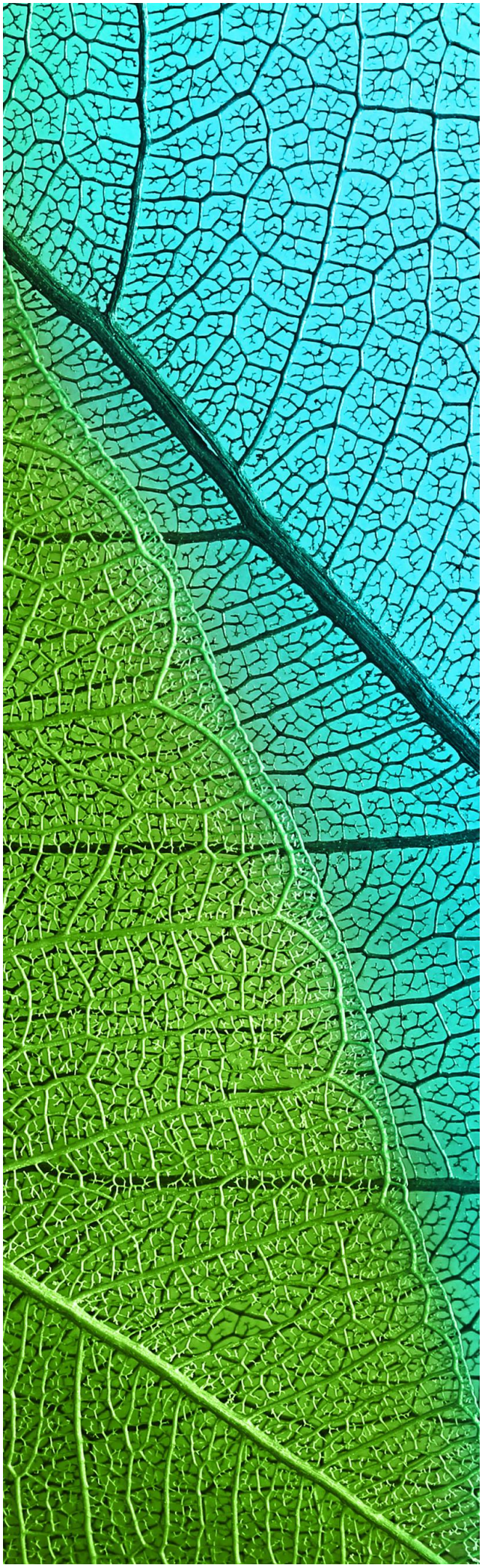

Woolsthorpe Wind Farm

EPBC Act Self-Assessment

Prepared for Elecnor Australia Pty Ltd

June 2022
Report No. 18273.4 (6.3)

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1. Executive summary

Nature Advisory Pty Ltd undertook a flora and fauna assessment of the planned infrastructure footprint for the Woolsthorpe Wind Farm. The Woolsthorpe Wind Farm will include the following infrastructure:

- Turbine locations;
- Access tracks;
- Internal underground power cables;
- Construction compound;
- Batching plant; and
- Substation.

The purpose of this self-assessment report is to assess whether the finalised Woolsthorpe Wind Farm layout will pose significant impacts on Matters of National Environmental Significance (MNES) protected under the EPBC Act.

1.1. Background to the self-assessment and sources of information

Initial flora and native vegetation surveys were undertaken on 9th January and 12th April 2019 and updated on 25th and 26th October 2021.

Bat activity at the wind farm was assessed during 2017-18. The first survey was undertaken over a 16-night period between 15th to 30th November 2017. The second survey was undertaken over a 28-night period from 13th February to 13th March 2018.

The following reports have been prepared:

- Brett Lane & Associates (BL&A) 2004, *Proposed Woolsthorpe Wind Farm – Bird Utilisation Survey,* BL&A Report No. 4087 (1.0), report for Windfarm Development Pty. Ltd.

  This report presented the results of the bird utilisation survey of the site and an initial assessment of the impacts on birds.

- Brett Lane & Associates (BL&A) *2018, Woolsthorpe Wind Farm – Bat utilisation survey and turbine modification,* Consultants letter prepared for Windfarm Developments Pty Ltd.

  This letter summarised the results of bat utilisation surveys in spring 2017 and late summer 2018 on the site.

- Nature Advisory 2019, *Woolsthorpe Wind Farm: Impacts on Matters of National Environmental Significance, Report number 18273 (2.3),* report for Woolsthorpe Wind Farm Pty. Ltd.

  This report identified MNES that may be affected by the proposed wind farm.

- Nature Advisory 2021, *Woolsthorpe Wind Farm – Flora survey of updated layout,* Report number 18273.4 (4.6), Nature Advisory Letter to Elecnor Pty. Ltd.

  This letter presented the results of updated flora assessments to address a revised and updated design layout, and included an assessment of the impacts on flora.

- Nature Advisory (2022) *Woolsthorpe Wind Farm: EPBC Act self-assessment – Impacts of revised turbine specifications on the Southern Bent-wing Bat*. In litt. To J. Taylor, Enerfin Energy Services Pty Ltd (Attached)

  This letter updates the impact assessment for the EPBC Act listed Southern Bent-wing Bat having regard to recent findings from detailed research on the species and the revised 66 metre minimum turbine blade height.

1.2. Purpose and scope of the self-assessment

This self-assessment provides an assessment of the risks to MNES from the proposed development. The specific purpose of the self-assessment is to assess if a significant impact is likely to occur.

1.3. Approach for the self-assessment

This EPBC self-assessment involved evaluating the potential impacts of the proposed works based on the following:

- Consideration of Commonwealth Department of the Environment Guidelines (Policy Statement 1.1);
- Review of information in national and state databases (Victorian Biodiversity Atlas, EPBC Act Protected Matters Search Tool), and the prepared ecological reports to identify Matters of National Environmental Significance within the study area; and
- Assessment of the risks to Matters of National Environmental Significance (MNES).

1.4. Relevant Matters of National Environmental Significance (MNES)

As a result of Nature Advisory's review, the Matters of National Environmental Significance (MNES) deemed relevant to the study area are summarised below in Table 1.

Table 1: Relevant matters of national environmental significance

MNES	Protected Matter Search Tool Results	Number considered to potentially occur or known to occur
Threatened Fauna	37	4
Threatened Flora	18	0
Ecological Communities	4	2

1.5. Outcomes from the self-assessment

Table 2 summarises the significant impact assessment outcomes.

Based on the outcomes of the significant impact tests, it is considered that the proposed development will not having a significant impact on Matters of National Environmental Significance.

Therefore, it is considered that the action does not require a referral to the Commonwealth Minister for the Environment.

Table 2: Conclusions about significant impacts on matters of national environmental significance at Woolsthorpe Wind Farm

MNES	Significant Impact Conclusion
Listed Threatened Ecological Community	One threatened ecological community is present within the site: *Natural Temperate Grassland of the Victorian Volcanic Plains* (NTGVVP) – listed as critically endangered under the EPBC Act. A total of 0.032 hectares will be removed by the development of the site; however, given the occurrence of this

MNES	Significant Impact Conclusion
	community is small, degraded, fragmented and isolated, it is considered that its removal would not constitute a significant impact. One further threatened ecological community potentially occurs within the site: *Seasonal Herbaceous Wetland of the Temperate Lowland Plain* (SHWTLP) – listed as critically endangered under the EPBC Act. None of this potential listed community will be impacted by the development.
Listed Threatened species (Flora)	No listed flora species were considered to occur on the site.
Listed Threatened species (Fauna)	Three threatened fauna species were considered to have suitable habitat or have been recorded within 10km of the site: White-throated Needletail (listed as vulnerable under the EPBC Act), Grey-headed Flying Fox (listed as vulnerable under the EPBC Act) and Southern Bent-wing Bat (listed as critically endangered under the EPBC Act). It is considered that the proposed development will not have a significant impact on any of these species, given that they are all highly mobile, are likely to only occasionally visit the site, and any impacts to listed fauna species arising from the wind farm will not lead to a long-term decline in the population.
Listed Migratory Species	One listed migratory species was considered to potentially to occur on the site: Latham's Snipe. It is considered that the proposed development will not have a significant impact on this species, given that suitable habitat on site is not considered to be important habitat for the species, and suitable habitat on site will be retained.

2. Introduction

2.1. Purpose

Nature Advisory Pty Ltd have undertaken a number a flora and fauna assessments of the proposed Woolsthorpe Wind farm development.

The purpose of this self-assessment report is to assess whether the Woolsthorpe Wind Farm will pose significant impacts on Matters of National Environmental Significance (MNES) protected under the EPBC Act (i.e. EPBC Act listed flora and fauna species as well as ecological communities).

This EPBC self-assessment involved the review of existing ecological reports as well as consideration of Department of the Environment guidelines (DoE 2013).

2.2. Project description

The proposed Woolsthorpe Wind Farm Project is located in Western Victoria, approximately 22 km north-northwest of Warrnambool.

The terrain within the Project site boundary can be characterised as relatively simple grazing farm land with small interspersed patches of trees. The elevations on site range from approximately 90 m to 130 m above mean sea level and the most elevated areas are to the north.

An amendment to Planning Permit 2006/0220/B is proposed to alter the turbine type, as the proponent is no longer able to source the previously approved turbines. Through advances in technology, a more efficient turbine is now proposed. The proposed turbine is higher than that which has previously been approved and offers a substantially greater ground clearance. The increase in height is also offset by a significant reduction in the number of turbines on the land.

Broadly, the amendment proposes the following changes:

- increase the overall turbine height from 168 metres to 230 metres
- ground level clearance of blades is increased from 35 metres to 66 metres
- overall reduction in the number of turbines from 20 to 13
- subsequent alterations to the siting of the turbines as a result of the above changes.

3. The 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. The Minister will decide after 20 business days whether the project will be a 'controlled action' under the EPBC Act, in which case it cannot be undertaken without the approval of the Minister. This approval depends on a further assessment and approval process (lasting between three and nine months, depending on the level of assessment).

The current nine MNES are:

- World Heritage Properties
- National Heritage Places
- Wetlands of International Importance (often called 'Ramsar' wetlands after the international treaty under the wetlands are listed)
- Nationally Threatened Species and Ecological Communities
- Migratory Species
- Commonwealth Marine Areas
- The Great Barrier Reef Marine Park
- Nuclear Actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development.

It is considered that the MNES relevant to the Woolsthorpe Wind Farm are limited to:

- Nationally threatened species and ecological communities.

The key objectives of the EPBC Act are to:

- Provide for the protection of the environment, especially matters of national environmental significance
- Conserve Australia's biodiversity
- Protect biodiversity internationally by controlling the international movement of wildlife
- Provide a streamlined environmental assessment and approvals process where matters of national environmental significance are involved
- Protect our world and national heritage
- Promote ecologically sustainable development

It is considered that the key relevant objectives for this self-assessment are:

- Provide for the protection of the environment, especially matters of national environmental significance.

- Conserve Australia's biodiversity

The next section describes the MNES that are potentially affected and the application of key documents prepared by the Commonwealth under the Act, followed by a description of the proposed approach to responding to the EPBC Act's requirements.

4. Matters of National Environmental Significance

To determine the likelihood of listed flora species occurring on site, existing flora species records and information about the potential occurrence of listed flora species was obtained from an area termed the 'search region', defined here as an area with a radius of ten kilometres from the wind farm boundary.

A list of the flora species recorded in the search region was obtained from the Victorian Biodiversity Atlas (VBA), a database administered by DELWP (2021).

The online EPBC Act Protected Matters Search Tool (PMST) (DAWE 2021a) was consulted to determine whether nationally listed species or communities potentially occurred in the search region based on habitat modelling.

4.1. Site description

The Woolsthorpe Wind Farm occurs across one large farming property, approximately four kilometres west of the township of Woolsthorpe. The site supports a working cattle and sheep grazing property that has been subject to extensive modification for pasture improvement leading to the historical removal of most native vegetation and the establishment of introduced pasture grass species and associated farmland weeds. The property is largely dominated by introduced grasses, namely Sweet Vernal Grass, Brown-top Bent, Rye Grass, Toowoomba Canary-grass and Soft Brome. Several planted rows of Monterey Cypress occur across the property.

Numerous remnant scattered canopy trees, namely Manna Gum and Swamp Gum, exist in the east and south of the property. These are the only remaining elements of the original native vegetation on the site. As a consequence of past agricultural development of the property, no indigenous understorey or ground cover species remain, apart from very limited areas of Plains Grassy Wetland in damp areas that will not be affected by the project.

Fauna habitat within the study area comprised grazing paddocks, scattered paddock trees, two areas of wetland vegetation, and native grassland and Basalt Shrubby Woodland along the Woolsthorpe-Heywood Road.

The study area lies within the Victorian Volcanic Plain bioregion and falls within the Glenelg Hopkins Catchment Management Area.

4.2. Listed ecological communities

The EPBC Protected Matters Search Tool (DAWE 2021a) indicated that four ecological communities listed under the EPBC Act had the potential to occur in the study area (Table 3).

Table 3: EPBC Act listed ecological communities and likelihood of occurrence in the study area

Ecological Community	EPBC	Occurrence in the study area
Grassy Eucalypt Woodland of the Victorian Volcanic Plain	CR	None of the patches of Basalt Shrubby Woodland along the Woolsthorpe-Heywood Road, or any areas of scattered trees, met the condition thresholds for this community (TSSC 2009). **This Listed Community does not occur**

Ecological Community	EPBC	Occurrence in the study area
Natural Temperate Grassland of the Victorian Volcanic Plain	CR	Does occur in Habitat Zones E, F, G, I and K
Seasonal Herbaceous Wetlands of the Temperate Lowland Plains	CR	Potential to occur in Habitat Zones B and C.
White Box – Yellow Box – Blakely's Red-gum Grassy Woodland and Derived Native Grassland	CR	No White Box, Yellow Box or Blakely's Red Gum recorded on site; therefore, **this Listed Community does not occur** (TSSC 2006).

Notes: EPBC = status under the EPBC Act (CR = Critically Endangered).

4.2.1. Natural Temperate Grassland of the Victorian Volcanic Plain

The study area supports five patches of *Natural Temperate Grassland of the Victorian Volcanic Plain* – listed as critically endangered under the EPBC Act (Habitat Zones E, F, G, I and K), totalling 0.68 hectares. The other two habitat zones of Plains Grassland recorded in the study area (L and O) did not classify as the listed community as they do not meet the minimum size threshold (TSSC 2008). Figure 1 shows the location of NTGVVP on the roadside affected by the wind farm entrance track.

4.2.2. Seasonal Herbaceous Wetland of the Temperate Lowland Plain

Two patches of native vegetation within the study area, Habitat Zones B and C, have the potential to qualify as *Seasonal Herbaceous Wetland of the Temperate Lowland Plain* – listed as critically endangered under the EPBC Act, due to their EVC (Plains Grassy Wetland (EVC 125) and size (TSSC 2012). These total 1.47 hectares in area.

4.3. Listed flora species

VBA records (DELWP 2021) and the EPBC Protected Matters Search Tool (DAWE 2021a) indicated that within the search region there were records of, or there occurred potential suitable habitat for, 18 species listed under the Commonwealth EPBC Act. No flora species listed under the EPBC Act were recorded during the field surveys.

The likelihood of occurrence in the study area of species listed under the EPBC Act is addressed in Table 1. Species considered 'likely to occur' are those that have a very high chance of being in the study area based on numerous records in the search region and suitable habitat in the study area. Species considered to have the 'potential to occur' are those for which suitable habitat exists, but recent records are scarce.

This analysis indicates that following targeted surveys undertaken in October and December 2021, no listed flora species are likely to occur within areas proposed to be impacted.

Figure 1: Impacts to Natural Temperate Grassland

Project: Woolsthorpe Wind Farm **Client**: Elecnor Australia Pty Ltd **Date**: 2/06/2022

- Roadside study area
- Wind farm boundary
- Roads
- Construction compound office
- Temporary batching plant
- Swept path
- Swept path buffer (2m)
- Proposed construction site entrace roaworks
- Permanent site entrance

Native vegetation

- Plains Grassland (EVC 132)
- Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP)
- Impacts to NTGVVP

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Table 4: EPBC Act listed flora species and likelihood of occurrence

Common Name	Scientific name	EPBC	Habitat	Number of records	Date of last record	Likelihood of occurrence
River Swamp Wallaby-grass	*Amphibromus fluitans*	VU	River Swamp Wallaby-grass grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches. The species requires moderately fertile soils with some bare ground; conditions that are caused by seasonally-fluctuating water levels (DAWE 2021b).	None	N/A	No suitable habitat. **Unlikely to occur.**
Matted Flax-lily	*Dianella amoena*	EN	Lowland grassland and grassy woodlands on well-drained to seasonally waterlogged fertile sandy loams to heavy cracking soils derived from sedimentary or volcanic Geology. It is widely distributed from eastern to south-western Victoria (DAWE 2021b).	1	29/10/2007	Potential to occur in areas of Plains Grassland. Not recorded during targeted surveys, therefore now considered **Unlikely to occur.**
Bell-flower Hyacinth-orchid	*Dipodium campanulatum*	EN	Reported from only a few scattered localities west of Melbourne to Portland (Entwisle 1994). The bell-flower hyacinth orchid is typically found on deep grey sands or limestone in woodland (DAWE 2021b).	None	N/A	No suitable habitat. **Unlikely to occur.**
Clover Glycine	*Glycine latrobeana*	VU	Found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer. In Victoria, populations occur in lowland grasslands, grassy woodlands and sometimes in grassy heath (DAWE 2021b).	5	13/11/2019	Potential to occur in areas of Plains Grassland. Not recorded during targeted surveys, therefore now considered **Unlikely to occur.**
Adamson's Blown-grass	*Lachnagrostis adamsonii*	EN	Confined to slow moving creeks, swamps, flats, depressions or drainage lines that are seasonally inundated or waterlogged and usually moderately to highly saline. Appear to favour sites that have some shelter from the wind (DAWE 2021b).	None	N/A	No suitable habitat. **Unlikely to occur.**

Common Name	Scientific name	EPBC	Habitat	Number of records	Date of last record	Likelihood of occurrence
Basalt Peppercress	*Lepidium hyssopifolium s.s.*	EN	Known to establish on open, bare ground with limited competition from other plants. Previously recorded from Eucalypt woodland with a grassy ground cover, low open Casuarina woodland with a grassy ground cover and tussock grassland. Now generally found amongst exotic pasture grasses and beneath exotic trees (DAWE 2021b).	2	05/12/1893	No suitable habitat. **Unlikely to occur.**
Gorae Leek-orchid	*Prasophyllum diversiflorum*	EN	Wet grasslands or inundated swamps among tussocks (Jones 2006).	None	N/A	Potential to occur in areas of Plains Grassy Wetland, although no records within 10 km. As these areas will not be impacted, there is **no threat to this species.**
Maroon Leek-orchid	*Prasophyllum frenchii*	EN	Grows mainly in open sedge swampland or in wet grassland and wet heathland generally bordering swampy regions. Sites are generally low altitude, flat and moist. Soils are generally moderately rich damp sandy or black clay loams. Climate is mild, with an annual rainfall of 600–1100 mm, occurring predominantly in winter and spring (DAWE 2021b).	3	13/11/2005	Potential to occur in areas of Plains Grassy Wetland. As these areas will not be impacted, there is **no threat to this species.**
Dense Leek-orchid	*Prasophyllum spicatum*	VU	Occurs in coastal and near-coastal heathland and heathy woodland. Soils are generally sandy, with some sites seasonally waterlogged (Duncan 2010).	1	01/12/1893	No suitable habitat. **Unlikely to occur.**
Green-striped Greenhood	*Pterostylis chlorogramma*	VU	Occurs in mixed Box-Stringybark Forest with a shrubby understorey, often with Pteridium esculentum as a major component on sandy or clay loam soils (Duncan et al. 2009).	None	N/A	No suitable habitat. **Unlikely to occur.**

Common Name	Scientific name	EPBC	Habitat	Number of records	Date of last record	Likelihood of occurrence
Leafy Greenhood	*Pterostylis cucullata*	VU	Tea-tree scrubs on tall sandy and calcareous dunes, in moist, open or even deep shaded locations (Jones 1994).	None	N/A	No suitable habitat. **Unlikely to occur.**
Button Wrinklewort	*Rutidosis leptorhynchoides*	EN	In Victoria restricted to open stands of plains grassland and grassy woodlands, on fertile clays to clay loams, usually in areas where the grass cover is more open, either as a result of recurrent fires or grazing by native macropods or stock. It also occurs on low rises with shallow, stony soils at less than 100 m above sea level.	None	N/A	Potential to occur in areas of Plains Grassland, although no records within 10 km. Not recorded during targeted surveys, therefore now considered **Unlikely to occur.**
Large-headed Fireweed	*Senecio macrocarpus*	VU	In Victoria, Large-fruit Fireweed occurs most commonly in grasslands on red-brown earth soils. It may also occur in grassy woodlands and open woodlands predominantly in the Western (Basalt) Plains grassland on red brown earth soils found on recent Quaternary (basalt) deposits (DAWE 2021b).	None	N/A	Potential to occur in areas of Plains Grassland, although no records within 10 km. Not recorded during targeted surveys, therefore now considered **Unlikely to occur.**
Swamp Fireweed	*Senecio psilocarpus*	VU	Herb-rich winter-wet swamps on volcanic clays or peaty soils (Walsh 1999). Known from approximately 10 sites between Wallan, about 45 km north of Melbourne, and Honans Scrub in south-eastern South Australia (TSSC 2008).	1	3/09/1995	Potential to occur in areas of Plains Grassy Wetland. As these areas will not be impacted, there is **no threat to this species.**
Coast Dandelion	*Taraxacum cygnorum*	VU	Woodland and scrub on limestone (Scarlett 1999).	None	N/A	No suitable habitat. **Unlikely to occur.**

Common Name	Scientific name	EPBC	Habitat	Number of records	Date of last record	Likelihood of occurrence
Metallic Sun-orchid	*Thelymitra epipactoides*	EN	Grows primarily in mesic coastal heathlands, grasslands and woodlands, but is also found in drier inland heathlands, open forests and woodlands. Substrates may be moist or dry sandy loams or loamy sands. Critical habitat has not been determined but the species is likely to require open conditions, which may be created by soil disturbance or fire, for recruitment (DAWE 2021b).	None	N/A	No suitable habitat. **Unlikely to occur.**
Spiral Sun-orchid	*Thelymitra matthewsii*	VU	Slightly elevated sites to 300m in well-drained soils (sandy loams to gravelly limestone soils) in light to dense forest; sometimes in coastal sandy flats (Weber & Entwisle 1994).	None	N/A	No suitable habitat. **Unlikely to occur.**
Swamp Everlasting	*Xerochrysum palustre*	VU	Grows in wetlands including sedge-swamps and shallow freshwater marshes, often on heavy black clay soils. Commonly associated genera include Amphibromus, Baumea, Carex, Chorizandra, Craspedia, Eleocharis, Isolepis, Lachnagrostis, Lepidosperma, Myriophyllum, Phragmites australis, Themeda triandra and Villarsia (DAWE 2021b).	None	N/A	Potential to occur in areas of Plains Grassy Wetland, although no records within 10 km. As these areas will not be impacted, there is **no threat to this species.**

EPBC Act status:

CR = critically endangered

EN = endangered

VU = vulnerable

4.4. Listed fauna species

The review of existing information (including VBA records and the results of the EPBC Protected Matters Search Tool) indicated that within the search region there were records of, or there occurred potential suitable habitat for, 34 fauna species listed under the Commonwealth EPBC Act. The likelihood of occurrence of these species in the study area was assessed and the results are presented in Table 5.

This analysis of potential occurrence of listed fauna species excludes:

- Marine fauna given that the study area is inland
- Migratory oceanic bird species (such as albatrosses and petrels) and migratory shorebirds given that the study area is inland.
- Fish and waterbirds given that there are no aquatic habitats in the study area.

Species considered 'likely to occur' are those that have a very high chance of being in the study area given the existence of numerous records in the search region and suitable habitat in the study area. Using the precautionary approach, species considered to have the 'potential to occur' are those for which suitable habitat exists, but recent records are scarce. This analysis indicates that four listed fauna species are likely to occur or have the potential to occur in the study area. These species are listed below.

- Latham's Snipe
- White-throated Needletail
- Southern Bent-wing Bat
- Grey-headed Flying-Fox.

Table 5: Listed fauna species from the search region and likelihood of occurrence in the study area

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Birds							
Australasian Bittern	*Botaurus poiciloptilus*	EN		Terrestrial wetlands, including a range of wetland types but prefers permanent water bodies with tall dense vegetation, particularly those dominated by sedges, rush, reeds or cutting grass (Marchant & Higgins 1990).	10	1/09/1980	No suitable habitat - **unlikely to occur.**
Australian Painted-snipe	*Rostratula australis*	EN		Generally inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum Muehlenbeckia or canegrass or sometimes tea-tree (Melaleuca). Sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (DAWE 2020).	None	N/A	No suitable habitat - **unlikely to occur.**
Common Greenshank	*Tringa nebularia*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	1	2/03/2006	No suitable habitat - **unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Common Sandpiper	*Actitis hypoleucos*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	Inhabits a wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands. In Victoria, mostly found Westernport and Port Phillip Bay (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur.**
Curlew Sandpiper	*Calidris ferruginea*	CR	M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	Inhabits wide range of coastal or inland wetlands with varying levels of salinity; mainly muddy margins or rocky shores of wetlands (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur.**
Eastern Curlew	*Numenius madagascariensis*	CR	M (Bonn A1, ROKAMBA, JAMBA, CAMBA)	Inhabits sheltered coasts, especially estuaries, embayment, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats, often with beds of sea grass (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur.**
Fairy Tern	*Sternula nereis*	VU		Generally restricted to sheltered coasts both on the mainland, and inshore and offshore islands. Occurs in embayment, such as harbours, inlets, bays, estuaries, lagoons, and ocean beaches. Also found on lakes and salt ponds (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur.**
Glossy Ibis	*Plegadis falcinellus*		M (Bonn A2S)	Prefer freshwater inland wetlands, in particular, permanent or ephemeral water bodies and swamps with abundant vegetation (Marchant & Higgins 1990).	3	1/11/2011	No suitable habitat - **unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Grey Falcon	*Falco hypoleucos*	VU		Inhabits arid and semi-arid zones; mainly on sandy and stony plains of inland drainage systems, lightly timbered with acacia. Hunt far into open areas, over spinifex, tussock grasslands and low shrublands. In Victoria, few records mostly in north and northwestern regions (Marchant & Higgins 1993).	None	N/A	No suitable habitat - **unlikely to occur.**
Hooded Plover	*Thinornis cucullatus*	VU		Inhabits sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding. Widespread and scattered across coastal Victoria. Numbers reduced due to disturbance by recreational activities on beaches (Marchant & Higgins 1993).	None	N/A	No suitable habitat - **unlikely to occur.**
Latham's Snipe	*Gallinago hardwickii*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	Occurs in wide variety of permanent and ephemeral wetlands; it prefers open freshwater wetlands with dense cover nearby, such as the edges of rivers and creeks, bogs, swamps, waterholes. The species is wide spread in southeast Australia and most of its population occurs in Victoria, except in the northwest of the state (Naarding 1983; Higgins & Davies 1996).	4	1/09/1980	Suitable habitat in grassy wetland habitats - **potential to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Osprey	*Pandion cristatus*		M (Bonn A2S)	Rare vagrant to Victoria (Marchant & Higgins 1993). Littoral and coastal habitats and terrestrial wetlands. They are mostly found in coastal areas but occasionally travel inland along major rivers (Johnstone & Storr 1998; Marchant & Higgins 1993; Olsen 1995). They require extensive areas of open fresh, brackish or saline water for foraging (Marchant & Higgins 1993).	None	N/A	No suitable habitat - **unlikely to occur.**
Pacific Golden Plover	*Pluvialis fulva*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	Inhabits sandy, muddy or rocky shores, usually coastal, rarely far inland. Often on beaches and mudflats, sandflats and occasionally rock shelves (Marchant & Higgins 1993).	1	1/12/1977	No suitable habitat - **unlikely to occur.**
Painted Honeyeater	*Grantiella picta*	VU		Inhabits box-ironbark forests and woodlands and mainly feeds on the fruits of mistletoe. Strongly associated with mistletoe around the margins of open forests and woodlands. Can also be found in farmland containing remnant treed vegetation. Occurs at few localities. Uncommon breeding migrant from further north, arriving in October and leaving in February (Higgins et al. 2001; Tzaros 2005).	None	N/A	No suitable habitat - **unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Pectoral Sandpiper	*Calidris melanotos*		M (Bonn A2H, ROKAMBA, JAMBA)	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	None	N/A	No suitable habitat - **unlikely to occur.**
Plains-wanderer	*Pedionomus torquatus*	CR		This species is highly sensitive to changes in grassland cover and density. Typically inhabits treeless native grasslands with sparse cover, with a preference for grasslands composed of wallaby grass and spear grass (Marchant & Higgins 1993). Habitat becomes unsuitable when grassland becomes dense (CA 2016). Evidence suggests it avoids areas of tree cover, with no records of the species within 300m of trees (>10m high) in their strongholds in New South Wales or Victoria (CA 2016).	None	N/A	Small area of suitable habitat along the road reserve though this species has no recent or regular records and is considered **unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Red Knot	*Calidris canutus*	EN	M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	In Australasia, the Red Knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps (DAWE 2020).	None	N/A	No suitable habitat - **unlikely to occur.**
Rufous Fantail	*Rhipidura rufifrons*		M (Bonn A2H)	In east and south-east Australia, mainly inhabits tall wet sclerophyll forests, often in gullies. When on passage in warmer months, they are sometimes recorded in drier sclerophyll forests and woodlands, as well as parks and gardens (Higgins et al. 2006). Virtually absent from south-eastern Australia during winter (Higgins et al. 2006).	4	7/12/1978	No suitable habitat - **unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Satin Flycatcher	*Myiagra cyanoleuca*		M (Bonn A2H)	Mostly found in eucalypt forest, particularly tall wet forests and woodland within gullies (Higgins et al. 2006). Also inhabits eucalypt woodland comprising an open understorey and a grassy ground layer (Higgins et al. 2006). Generally absent from rainforest (Higgins et al. 2006).	2	1/01/1980	No suitable habitat - **unlikely to occur.**
Sharp-tailed Sandpiper	*Calidris acuminata*		M (Bonn A2H, ROKAMBA, JAMBA, CAMBA)	Inhabit shallow fresh to saline wetlands, usually coastal to near-coastal, but occasionally farther inland. Wetlands often have open fringing mudflats and low emergent or fringing vegetation (Higgins & Davies 1996).	1	6/01/1980	No suitable habitat - **unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Swift Parrot	*Lathamus discolor*	CR		Prefers a select range of eucalypts in Victoria, including Yellow Gum, Grey Box, White Box, Red Ironbark and Yellow Box, as well as River Red-gum when this species supports abundant 'lerp' (Saunders & Tzaros 2011). The species is also known to forage within planted stands of Spotted Gum and Sugar Gum (Nature Advisory; unpublished data). Breeds in Tasmania and migrates to the mainland of Australia for the autumn, winter and early spring months. It lives mostly north of the Great Dividing Range, passing through two areas of Victoria on migration: the Port Phillip district and Gippsland (Emison et al. 1987; Higgins 1999; Kennedy & Tzaros 2005). Though it is also not uncommonly sighted in urban areas (Nature Advisory; unpublished data).	None	N/A	No suitable habitat - **unlikely to occur.**
White-throated Needletail	*Hirundapus caudacutus*	VU	M (CAMBA, ROKAMBA, JAMBA)	Aerial, over all habitats, but probably more over wooded areas, including open forest and rainforest. Often over heathland and less often above treeless areas such as grassland and swamps or farmland (Higgins 1999).	3	15/03/1981	This species has the potential to fly over the study area - **likely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Yellow Wagtail	*Motacilla flava*		M (CAMBA, JAMBA, ROKAMBA)	Regular non-breeding visitor in northern Australia mainly spring-summer, vagrant to the south. Occupies a wide range of habitats, usually open areas with low vegetation such as crop, grassland and even parkland. Often recorded near water (Higgins, Peter & Cowling 1999)	None	N/A	Rare vagrant to Victoria. No records in search region. **Unlikely to occur.**
Fish							
Australian Grayling	*Prototroctes maraena*	VU		Large and small coastal streams and rivers with cool, clear waters with a gravel substrate and altering pools and riffles (Cadwallader & Backhouse 1983).	None	N/A	No suitable habitat - **unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Dwarf Galaxias	*Galaxiella pusilla*	VU		Ranges from the far west of the state through to the Mitchell River basin in central Gippsland. Vegetated margins of still water, ditches, swamps and backwaters of creeks, both ephemeral and permanent (Allen et al. 2002). Some wetlands where it occurs may partially or completely dry up during summer, with such wetlands reliant on seasonal flooding plus linkages to other sites where the species occurs, for habitat and population replenishment (Saddlier, Jackson & Hammer 2010). Also found in association with burrowing freshwater crayfish (Engaeus spp.), with the crayfish burrows reportedly providing refuge from predators and dry conditions for the species (Saddlier, Jackson & Hammer 2010).	None	N/A	No suitable habitat - **unlikely to occur.**
Yarra Pygmy Perch	*Nannoperca obscura*	VU		Streams and small lakes, prefers flowing water with abundant aquatic vegetation (Allen et al. 2002).	25	2/12/2015	No suitable habitat - **unlikely to occur.**
Frogs							

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Growling Grass Frog	*Litoria raniformis*	VU		Permanent, still or slow flowing water with fringing and emergent vegetation in streams, swamps, lagoons and artificial wetlands such as farm dams and abandoned quarries (Clemann & Gillespie 2004).	None	N/A	No suitable habitat - **unlikely to occur.**
Invertebrates							
Golden Sun Moth	*Synemon plana*	CR		Areas that are, or have been native grasslands or grassy woodlands. It is known to inhabit degraded grasslands with introduced grasses being dominant, with a preference for the native wallaby grass being present (DEWHA 2009). Also known to be closely associated with exotic grass species, with populations found in grassland almost entirely composed of Chilean needlegrass (Richter et al. 2013).	None	N/A	No suitable habitat due to low cover of wallaby grasses and high density of grassland vegetation. No records within search region. **Unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Glenelg Spiny Crayfish	*Euastacus bispinosus*	EN		Glenelg Spiny Freshwater Crayfish is considered a specialist species with typically low tolerance to environmental conditions (namely dissolved oxygen concentrations), ensuring that species requires specific habitat requirements. As with other Euastacus species, Glenelg Spiny Freshwater Crayfish have a preference for permanently-flowing, cool (and shaded) and well-oxygenated water (Morgan 1986; Morgan 1997). Other habitat requirements vary across Victorian and South Australian populations.	None	N/A	No suitable habitat - **unlikely to occur.**
Mammals							
Grey-headed Flying-fox	*Pteropus poliocephalus*	VU		Brisbane, Newcastle, Sydney and Melbourne are occupied continuously. Elsewhere, during spring, they are uncommon south of Nowra and widespread in other areas of their range. Roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of Melaleuca, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas (DAWE 2020).	1	27/04/2020	Highly mobile species expanding its natural distribution range - **potential to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Eastern Barred Bandicoot	*Perameles gunnii*	VU		The habitat of the Eastern Barred Bandicoot (mainland) is perennial tussock grassland and eucalypt woodland with a grassy ground layer (Dufty 1994b; Seebeck 1995a, 2001). Drainage lines and areas of high vegetative cover have been identified as prime habitat. The key determining factor for persistence of this species appears to be high structural complexity and heterogeneity within the environment, reflected in its absence from agricultural areas but persistence in rubbish dumps and other variable habitats.	1	01/01/1840	This species is locally extinct on the mainland of Australia - **unlikely to occur.**
Eastern Quoll	*Dasyurus viverrinus*	EN		Probably extinct in mainland Australia. Inhabits a range of of open forest, scrubland and heath (Menkhorst 1995).	1	01/01/1840	Regionally extinct - **unlikely to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Long-nosed Potoroo	*Potorous tridactylus trisulcatus*	VU		In Victoria, the species occupies a wide variety of wet forest and wet scrub, usually occuring on sandy loam soils where rainfall exceeds 750mm annually (Menkhorst 1995); In Tasmania, moist forest with dense shrub layer; in the north edge of rainforest (Menkhorst 1995). Dense understorey vegetation is an essential component for the species persistence, which can consist of grass trees, sedges, ferns, heath, tea-tree or melaleucas (Menkhorst 1995).	None	N/A	No suitable habitat - **unlikely to occur.**
Southern Bent-wing Bat	*Miniopterus orianae bassanii*	CR		Roosts in caves during the day, dispersing over a range of habitats at night. Its feeding areas tend to be associated with major drainage systems (Menkhorst 1995).	None	N/A	Has potential to fly over the study area though has not been confirmed as occurring during bat surveys - **potential to occur.**

Common Name	Scientific name	EPBC-T	EPBC-M	Habitat	Number of records	Date of last record	Likelihood of occurrence
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	EN		Suitable habitat for Southern Brown Bandicootis defined to be any patches of native or exotic vegetation, within their distribution, which contains understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range. In areas where native habitats have been degraded or diminished, exotic vegetation, such as Blackberry, can and does provide important habitat (DAWE 2020).	None	N/A	No suitable habitat - **unlikely to occur.**
Spot-tailed Quoll	*Dasyurus maculatus maculatus*	EN		Rainforest, wet and dry forest, coastal heath and scrub and River Red-gum woodlands along inland rivers (Menkhorst 1995).	1	01/01/1840	No suitable habitat - **unlikely to occur.**
Swamp Antechinus	*Antechinus minimus maritimus*	VU		Dense wet heath, tussock grassland, sedgeland heathy woodland and coastal heath and scrub (Menkhorst 1995). Requires mature, dense vegetation with thick ground cover (DAWE 2020). Shelters in short burrows or underneath dense leaf litter. Rarely occurs more than 200m above sea level (Nature Advisory; unpublished data).	None	N/A	No suitable habitat - **unlikely to occur.**

Notes: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; M = Listed migratory species; (JAMBA) = Japan-Australia Migratory Bird Agreement; (CAMBA) = China-Australia Migratory Bird Agreement; (ROKAMBA) = Republic of Korea- Australia Migratory Bird Agreement; (Bonn) = Bonn Convention

4.4.1. White-throated Needletail (EPBC Act: vulnerable and migratory)

The White–throated Needletail is a summer visitor to south-east Australia and spends the majority of its life on the wing. It comes to Australia in the non-breeding season where it is often observed flying ahead of storm fronts feeding on insects. It is highly mobile and will move large distances on a daily basis

4.4.2. Latham's Snipe (EPBC Act: migratory)

The Latham's Snipe is a migratory species that visits south-east Australia in the spring, summer and early autumn. It occurs in a wide variety of permanent and ephemeral wetlands and prefers freshwater wetlands with a dense cover of vegetation. There are two small wetlands within the study area that have the potential to provide suitable habitat for this species when they hold water in spring. The Latham's Snipe was not recorded during any surveys at the study area. Furthermore, the limited extent of wetland habitat on and near the study area makes it unlikely that an important population of this species would occur regularly in the area.

4.4.3. Grey–headed Flying–Fox (EPBC Act: vulnerable)

The Grey–headed Flying–Fox is a highly mobile species that is expanding its range. It moves in response to food resources. It roosts in permanent or temporary camps in trees usually along watercourses. The closest known camp is in Warrnambool where up to 3,500 individuals have been recorded. This species' range is expanding in NSW and Victoria, where smaller temporary camps are occurring in areas in which they haven't roosted previously. Although there is only one record of this species in the search region (from Kirkstall in 2020), more recently it has been recorded in the region, including additional camps, such as near the Tarrone Terminal Station. There is potential for it to occur in the area, for example, when trees in the Woolsthorpe Nature Conservation Reserve are flowering and may become a food resource. Impacts on this species are explored further in section 6.

4.4.4. Southern Bent–wing Bat (EPBC Act: critically endangered)

In early spring this species migrates to one of two maternity caves, one located in Naracoorte in South Australia and the other, known as Starlight Cave, in Warrnambool Victoria, utilising caves along the way (Churchill 2008). Within these caves, females give birth to and rear young that are then weaned and become independent by February-March. The majority of adults and young will then leave the cave and disperse to non-breeding caves in south western Victoria and coastal south eastern South Australia.

The wind farm is within the 35-kilometre nightly flight range (Lumsden and Jemison 2015) of the main maternity cave in Victoria, Starlight Cave, 8km east of Warrnambool (30km south-south-east) and two known winter roost caves at Grassmere (17 km south-east) and Panmure (32 km south-east). The other known wintering caves are beyond the usual foraging distance of the SBWB of 35 kilometres.

Bat surveys were undertaken in spring 2017 and summer/autumn 2018 and the Southern Bent–wing Bat was not confirmed as occurring at the study area.

An updated assessment of the impact of the revised project on this species is provided as Attachment 1.

5. Referral, Assessment and Approval Process Overview

An assessment under the *Environmental Protection and Biodiversity Act 1999* (EPBC Act) is required for actions that may impact on MNES. An 'Action' can include, but is not limited to; construction and expansion of infrastructure or facilities, industrial processes, earthworks; impoundment, extraction and diversion of water, agricultural activities, research, vegetation clearance and culling of animals.

Actions can encompass site preparation, construction, operation and maintenance, closure and completion of stages of a project, and alterations and / or modifications to existing infrastructure. An action may have beneficial or adverse impacts on the environment, however only adverse impacts on MNES are relevant when determining whether approval is required.

An 'Action' or 'Actions' that are 'likely' to have a 'significant impact' on a MNES must be referred to the Commonwealth Minister for the Environment for determination as to whether assessment and approval is required under the EPBC Act.

A 'significant impact' is defined as an impact that is important, notable, or of consequence in regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment to be impacted, and the intensity, duration, magnitude and geographic extent of the impacts (DSEWPaC 2009a). Based on the information provided in the Referral, the Department of Agriculture, Water and the Environment (DAWE) will then determine if the action is deemed a 'controlled action' or a 'not controlled action'. A 'controlled action' is defined as *"the Action is subject to the assessment and approval process under the EPBC Act"*. A 'not controlled action' is defined as *"approval is not required if the action is taken in accordance with the manner specified and / or in accordance with the referral"*.

The Referral process also allows proponents to undertake a 'self-assessment' to determine if a significant impact is likely to occur and if a referral is required under the EPBC Act. Alternatively, proponents may by-pass the self-assessment process and submit a referral directly to DAWE for the Minister to make a determination.

The purpose of this self-assessment is to determine if a significant impact may occur from the proposed works development of the study area.

Elecnor Pty Ltd commissioned Nature Advisory (formerly Brett Lane & Associates) to prepare technical reports on the flora and fauna of the Woolsthorpe Windfarm, presenting the results of a desktop review of the ecological attributes, field surveys and values of the study area focusing on MNES. This information has been used to inform the self-assessment.

6. Impacts on Matters of National Environmental Significance (MNES)

One listed ecological community known to occur within the site and four listed fauna species referred to in the Protected Matters Search Tool with the potential to occur within the study area were considered in the assessment: *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP), Latham's Snipe, White-throated Needletail, Southern Bent-wing Bat and Grey-headed Flying-Fox.

NTGVVP has been recorded within the site and is therefore the subject of a significant impact assessment. One other listed ecological community, *Seasonal Herbaceous Wetlands of the Temperate Lowland Plains* (SHWTLP) has the potential to occur on site in Habitat Zones B and C; however, as no impacts will occur to these zones, this community has not been considered further. All other listed ecological communities noted in the Protected Matters Search Tool were considered not likely to be present due to a lack of suitable habitat (see Table 3 for a detailed review).

The four listed fauna species have been recorded within close proximity to the study site or suitable habitat exists. They are therefore the subject of a significant impact assessment. All other species noted in the Protected Matters Search Tool were considered not likely to be present due to a lack of suitable habitat, the lack of historical records or the species not being recorded during targeted surveys (see Table 4 (flora) and Table 5 (fauna) for detailed review).

6.1. Natural Temperate Grassland of the Victorian Volcanic Plain

Impacts to the threatened ecological community *Natural Temperate Grassland of the Victorian Volcanic Plain* (NTGVVP) are assessed against the relevant EPBC Act significant impact criteria, below in Table 6. The location and impacts on this community are shown in Figure 1.

Table 6: Assessment of the impact to NTGVVP against the EPBC Act significant impact criteria (DEWHA 2013)

Significant impact criteria	Response
Reduce the extent of an ecological community	NTGVVP occurs within the proposed development footprint, within Habitat Zones E and G. A total of 0.032 ha of low quality NTGVVP will be removed from the study area. The project will result in a slight reduction in the extent of NTGVVP at this location; however, previous Referral decisions by the Commonwealth Department of Agriculture, Water and the Environment (DAWE) have indicated that they do not consider impacts to small patches of low quality NTGVVP to be a significant impact. It is therefore considered that the extent of the community will not be significantly reduced.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The NTGVVP within the study area is already fragmented by existing property entrances, firebreaks, livestock underpasses and safety barriers. Therefore, it is considered that impacts to 0.032 ha of NTGVVP associated with the footprint will not fragment or increase fragmentation of the ecological community beyond that which already exists in this location.
Adversely affect habitat critical to the survival of an ecological community	Given the small, degraded and isolated occurrence of the community within the study area, the development of the site will not adversely affect habitat critical to NTGVVP.

Significant impact criteria	Response
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Abiotic factors necessary for the community's survival (i.e. in areas away from the study area) will not be impacted by the development of the site, as construction mitigation measures (such as sediment fencing, stormwater management and dust suppression) will be put in place to protect abiotic factors beyond the development area.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	There will be no loss of species from the remaining areas of the community as a consequence of the proposed works.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: ▪ assisting invasive species, that are harmful to the listed ecological community, to become established; or ▪ causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Construction mitigation measures will be put in place to ensure development of the site does not facilitate the spread of invasive species or pollutants, including undertaking weed monitoring and control and sediment fencing.
Interfere with the recovery of an ecological community	The sites where the works are proposed are not an considered an important element in the recovery of the community given their small, isolated, fragmented and degraded nature.

6.2. Latham's Snipe

The Latham's Snipe is a listed migratory species under the EPBC Act. Identification of important habitat for migratory shorebirds is a key concept for determining the likelihood of a significant impact (DEE 2017). Important habitat for Latham's Snipe is that is described as areas that have previously been identified as internationally important for the species, or areas that support at least 18 individuals of the species (DEE 2017).

The study area has not previously been identified as internationally important and the Latham's Snipe has not been confirmed as occurring at the site. Therefore, suitable habitat on site is not considered to be important habitat for the species. Suitable habitat on site will be retained. Any impacts on the Latham's Snipe from the wind farm development are considered to be negligible.

Having regard to the foregoing findings and current knowledge of the behaviour of Latham's Snipe and their use of habitat, it is highly unlikely that the proposed Woolsthorpe Wind Farm will result in a significant impact on this species.

6.3. White–throated Needletail and Grey–headed Flying–Fox

The White–throated Needletail and Grey-headed Flying–Fox are listed as vulnerable under the EPBC Act.

The White-throated Needletail is known to fly at or above rotor swept area (RSA) heights, which does put it at risk of collision. Occasional mortality has been reported at other wind farms where the species occurs. There are only three records from the VBA of this species in the search region and it is considered to occur in the region rarely. The wind farm lies in an area that also has few records in the Birdlife Australia Atlas of Australian Birds (www.birddata.com.au, viewed 12th August 2019). Although wind farms within more frequented parts of the species' range, such as Gippsland and the southern highlands of New South Wales do affect a small number of individuals of this species each year, it is less likely to be affected in western Victoria, where there are fewer needletails that in the rest of its range in eastern Australia. At the Macarthur Wind Farm to the north-west of the study area, two years of monthly carcass searches failed to detect a needletail (Wood 2014, 2015).

Although there is only one record of the Grey-headed Flying-fox in the search region (from Kirkstall in 2020), there is potential for it to occur, for example when trees in the Woolsthorpe Nature Conservation Reserve are flowering and may become a food resource. If the species were to forage in the area or fly over the site between a daytime camp and night foraging areas, a few individuals may collide with turbines, a situation that has occurred recently at the Salt Creek Wind Farm nearby (Biosis 2020). However, the loss of a few individuals will not be a significant risk to the population, which was estimated to be 680,000 individuals in 2015 (SWIFFT 2019). The increase in minimum turbine blade height to 66 metres will significantly reduce collision risk compared with the lower minimum height at Salt Creek wind farm of 24 metres.

An assessment of the impact of the project against the guidelines on significance published by the Department of the Environment (2013) is provide below in Table 7. For vulnerable species, these guidelines state:

"An action has, will have, or is likely to have a significant impact on a vulnerable species if it does, will, or is likely to:

- lead to a long-term decrease in the size of an important population of a species, or
- reduce the area of occupancy of an important population, or
- fragment an existing important population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of an important population, or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful a vulnerable species becoming established in the vulnerable species' habitat, or
- interferes substantially with the recovery of the species.

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal

- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

Table 7: Assessment of project impacts against the criteria for significant impact of a vulnerable species under the EPBC Act (DEWHA 2013)

Criterion	White-throated Needletail	Grey-headed Flying-Fox
Lead to a long-term decrease in the size of an important population of a species.	No important populations of this species have been identified in the region and none are considered likely to occur.	Important populations of this species in Victoria have previously been identified as occurring at Melbourne, Geelong and Bairnsdale. Occasional camps of several thousand occasionally occur in south-western Victoria but the height of the turbines and the limited treed habitat on the site itself makes regular collision of important numbers highly unlikely.
Reduce the area of occupancy of an important population.	An important population is not expected to occur at the wind farm site.	An important population is not expected to occur at the wind farm site so the extent of the species' area of occupancy will not be affected.
Fragment an existing important population into two or more populations.	This species traverses over many different habitats as it moves across the landscape. Wind turbines in the project will be well spaced and will not represent a barrier to movement of the species if it moves across the site.	Much of the habitat in the species' range has been fragmented. The wind farm will not remove additional habitat leading to more fragmentation. Wind turbines in the project will be well spaced, with their minimum turbine blade height increased to 66 metres. The turbines will not represent a barrier to movement of the species if it moves across the site.
Adversely affect habitat critical to the survival of a species.	There is no habitat critical to the survival of the species on the wind farm site and none will be affected by the project	There is no habitat critical to the survival of the species on the wind farm site and none will be affected by the project
Disrupt the breeding cycle of an important population.	This species does not breed in Australia and the wind farm will not disrupt the breeding cycle of an important population.	There are no breeding sites located within 20 kilometres of the wind farm site. The wind farm will not disrupt the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that	No suitable habitat of this species will be affected.	No suitable habitat of this species will be affected.

Criterion	White-throated Needletail	Grey-headed Flying-Fox
the species is likely to decline.		
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	The site does not represent significant habitat for the species so any minor weed or pest animal invasion would not affect it. Importantly, the project will be constructed in line with modern, best-practice construction methods, which will include an environmental management plan that will ensure weed invasion of the construction area is monitored and, where required, controlled.	The site does not represent significant habitat for the species so any minor weed or pest animal invasion would not affect it. Importantly, the project will be constructed in line with modern, best-practice construction methods, which will include an environmental management plan that will ensure weed invasion of the construction area is monitored and, where required, controlled.
Interferes substantially with the recovery of the species.	The site is unlikely to become significant for the species in the future given the continuation of current agricultural land uses. The advent of the wind farm will not change this.	The site is unlikely to become significant for the species in the future given the continuation of current agricultural land uses. The advent of the wind farm will not change this.

Having regard to the foregoing findings and current knowledge of the behaviour of White-throated Needletail and Grey–headed Flying–Fox and their use of habitat, it is highly unlikely that the proposed Woolsthorpe Wind Farm will result in a significant impact on these species.

6.4. Southern Bent–wing Bat

Attachment 1 provides an updated assessment of the impacts of the revised project on the Southern Bent-wing Bat.

Considering site-specific bat surveys, observations at the nearby Macarthur Wind Farm, and current knowledge of the behaviour of the SBWB and its use of habitat, after increasing the minimum RSA height from 35 metres above the ground to 66 m this letter concluded that it was highly unlikely that the revised Woolsthorpe Wind Farm will result in a significant impact on this critically endangered species.

7. EPBC Self-Assessment Conclusion

The EPBC self-assessment process has involved:

- Consideration of Department of the Environment guidelines.
- A review of information in national and state databases and relevant site ecological reports to identify Matters of National Environmental Significance within the study area.
- Evaluation of the impact of the proposed works on Matters of National Environmental Significance.

The Matters of National Environmental Significance at the investigated site include:

- Nationally threatened species and ecological communities.

It is considered that the proposed Woolsthorpe Wind Farm development will not have a significant impact on relevant Matters of National Environmental Significance, given that:

- The NTGVVP that occurs within the site is small, degraded, fragmented and isolated;
- Listed fauna species are likely to visit the wind farm only occasionally;
- Any impacts to listed fauna species arising from the wind farm will not lead to a long-term decline in the population; and
- Construction mitigation measures will be implemented to ensure the impacts of the development are contained within the site.

Therefore, it is considered that the proposed development will not require a Referral to the Commonwealth Minister for the Environment as it is unlikely to affect listed threatened species or ecological communities significantly.

8. References

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Attachment 1: Updated assessment of revised project impacts on the Southern Bent-wing Bat.

20th June 2022

Enerfin Energy Services Pty Ltd
Level 19, 90 Collins Street
Melbourne 3000, Australia

Attention: James Taylor (Development Manager)
By email — jtaylor@elecnor.com (phone 0427 475 530)

Dear James,

RE: WOOLSTHORPE WIND FARM
EPBC ACT SELF ASSESSMENT – IMPACTS OF REVISED TURBINE SPECIFICATIONS ON THE SOUTHERN BENT-WING BAT (SBWB)
REPORT 18273.4 (7.1)

This letter responds to a request for advice in relation to the impacts of the Woolsthorpe Wind Farm on matters protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Specifically, it addresses the question whether the modified turbine specifications for the project approved by Planning Permit of Moyne Shire Council (No. 2006/0220/A), has any greater or lesser impact on matters of national environmental significance protected by the EPBC Act than the project layout and design originally referred under this Act in 2004.

The ecology of the Southern Bent-wing Bat (*Miniopterus orianae bassanii*) is described first. The differences between the current-approved and originally referred project are then considered in relation to risks posed to the Southern Bent-wing Bat.

SOUTHERN BENT-WING BAT ECOLOGY

The Southern Bent-wing Bat (*Miniopterus orianae bassanii*) is an insectivorous, cave-roosting bat species with a restricted distribution in south-eastern Australia. It is recognised as a subspecies distinct from the Northern (*Miniopterus orianae orianae*) and Eastern (*Miniopterus orianae oceanensis*) Bent-wing Bats (Cardinal and Christidis 2000). The distribution of the SBWB spans an area in south-east South Australia from Robe, Naracoorte and Port MacDonnell, extending eastwards to Lorne and Pomborneit in south-west Victoria (Churchill 2008). There is a small area of overlap in the distribution of the SBWB and Eastern Bent-wing Bat in western Victoria, where individuals of each subspecies may roost together in some non-maternity caves (Threatened Species Scientific Committee 2021).

SBWB is a nocturnal, aerial hawking species with a fast, direct flight pattern that typically forages in open spaces (Dwyer 1965). SBWBs also require access to free water and visit farm dams and wetlands at night to drink on-the-wing. Where there are trees, SBWBs typically forage above the canopy, but can fly closer to the ground in more open areas (Lumsden and Jemison 2015). Limited radio-tracking studies have shown that SBWBs hunt in a range of habitat types, including wetlands, forested areas, native remnant vegetation, and over cleared agricultural and grazing land (Grant 2004; Lumsden and Jemison 2015, Threatened Species Scientific Committee 2021). Preliminary

analysis of GPS tracking data from 20 individual SBWBs monitored over four consecutive nights in south-west Victoria showed that foraging locations were associated with both native and exotic paddock trees, plus planted linear strips within a heavily cleared agricultural landscape (Bush et al. 2022).

Only one detailed study has investigated the diet of SBWBs. Using arthropod DNA metabarcoding of guano collected from caves, Khune et al. (2022) found that moths (Lepidoptera) comprised the main component of the SBWB diet. These included moth species associated with agricultural landscapes, such as Pasture Webworm (*Hednota pedionoma*) and Armyworm (*Persectania dyscrita*).

MOVEMENTS BETWEEN CAVES

SBWBs gather in the summer months at maternity caves to give birth and raise their young. They then disperse in autumn to use non-breeding caves throughout the cooler parts of the year (Churchill 2008). There are two major SBWB maternity caves with long histories of use: 'Bat Cave', located in the limestone cave system at Naracoorte in South Australia, and 'Starlight Cave', a sea cliff cave located near Warrnambool in Victoria. A third, smaller maternity cave was discovered in 2015 near Portland, Victoria (Lumsden and Jemison 2015). During the breeding season, virtually the entire SBWB population is thought to roost in the two main maternity caves (Dwyer and Hamilton-Smith 1965; Lumsden and Jemison 2015).

The SBWB maternity caves have specific structural characteristics that allow heat and humidity to build up, creating conditions suitable for rearing and development of dependent young (Dwyer 1965; Baudinette et al. 1994). The caves used in winter are cooler, allowing the bats to lower their body temperature to facilitate torpor, i.e. reduced metabolic rate (Hall 1982; Crichton et al. 1989) to conserve energy at a time of food shortage. In Victoria, there are 18 caves used as roosting sites, spread throughout the south-west of the state, and in South Australia 52 caves are known to be used (DELWP 2020).

Recent studies have collected data on patterns of movement between caves that challenge previously held concepts of roost fidelity and temporal patterns of movement between and use of caves. The recently published *Conservation Advice: Miniopterus orianae bassanii* (Threatened Species Scientific Committee in 2021) summarises the current state of knowledge as follows:

"*While caves that are consistently used by large numbers of Southern Bent-wing Bats may be considered critical sites, the availability of a large number of sites, even those used infrequently, may be equally important for the subspecies' survival.*

Recent research has provided new insights on movement patterns, seasonal migration, and torpor/hibernation (A. Bush and E. van Harten pers. comm. 2020). The traditional view, based on the work of Dwyer (1963), had assumed there were two seasonal migrations, with all bats leaving overwintering caves in spring and taking several weeks to return to the maternity caves via stopovers at transition caves. In autumn, bats were thought to disperse from the maternity sites to overwintering caves, where they would enter extensive periods of torpor. Individuals were assumed to remain at these overwintering caves for the duration of winter. However, the new research, which tracks PIT-tagged Southern Bent-wing Bats in South Australia, has revealed far more complex movement patterns. Tracking data has shown that so-called 'overwintering caves' can be used at any time of year, leading to discontinuation of the term 'overwintering cave' in favour of 'non-maternity cave'.

The use of non-maternity caves is now understood to be highly dynamic. For example, bats leaving the Naracoorte maternity cave in early autumn may visit many non-maternity caves over the course of a few weeks before returning to the maternity cave (E. van Harten pers comm. 2020). Large distances can be flown in short periods of time. There are numerous examples of individuals flying between the Naracoorte maternity cave and a non-maternity cave 70 km away (this cave also has a PIT-tag reader) over the period of just a few hours, and sometimes returning to the maternity cave on the same night – a total distance of 140 km in 24 hours. Periods of torpor also appear to be shorter than previously thought, with some activity during winter, including movement between caves."

In another recent study, Bush et al. (2022) used GPS tracking devices (attached to 20 individual SBWB captured in south-west Victoria) to monitor nightly foraging flights. Over four consecutive nights, bats moved between day roosts frequently, including between caves about 60 km apart. The average 'straight-line' distance travelled from a day-roosting cave was 35 km, with a range of 3-85 km (Bush et al. 2022). In combination with findings from recent monitoring of cave-use by PIT tagged bats (van Harten et al. 2022b), these data suggest that the expected distance that SBWBs may travel from night-to-night to access foraging sites and commute between caves should be updated to incorporate both the average (35 km) and maximum (85 km) nightly distances recorded by Bush et al. (2022).

Figure 1 shows the location of the Woolsthorpe Wind Farm site in relation to the SBWB maternity and non-breeding caves in the region. The main maternity cave in Victoria, Starlight Cave, located 32 km south-east from the Woolsthorpe Wind Farm, is within the average (35 km) nightly travel distance. Three non-breeding caves also lie within the average nightly travel distance from the wind farm site: Grassmere (14 km south-east), Yambuk/Deen Maar (31 km south-west), and Panmure (34 km south-east of the site). The smaller maternity cave at Portland (Bats Ridge, 77 km south-west of the site) and six other non-breeding caves (Mt Eccles 40 km west; Byaduk/Mt Napier 43 km north-west; Timboon 60 km south-east; Pomborneit 80 km south-east; Porndon Arch 79 km south-east) are all located within the maximum (85 km) nightly travel distance. The other known non-breeding caves in the region are beyond the maximum nightly travel distance of the SBWB (Figure 1).

Figure 1: Southern Bent-wing Bat roosts and maternity caves

Project: Woolsthorpe Wind Farm
Client: Elecnor Australia Pty Ltd
Date: 20/05/2022

- Wind farm boundary
- Average nightly distance (35km)
- Maximum nightly distance (85km)
- SBWB caves

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POPULATION STATUS

The SBWB has undergone serious population decline since the 1960s (DELWP 2020). Consequently, in 2007 the SBWB was listed as Critically Endangered under the Australian Government *Environment Protection and Biodiversity Act 1999* (EPBC Act). In Victoria, the species is listed as Critically Endangered under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act). A draft national recovery plan for the SBWB was issued in 2015 (Lumsden and Jemison 2015). Current estimates of abundance are summarised in the progress update issued by the SBWB National Recovery Team in November 2021 as follows (SBWB National Recovery Team 2021):

"In 2020, the total SBWB population was estimated to be 44,260 reproductively mature individuals. At Naracoorte, a November 2020 count estimated 30,500 (including individuals not reproductively mature). However, PIT-tag data suggests that this count was undertaken prior to peak occupancy. It was estimated that the population range was between 30,000–35,000. The 2020 population estimate (including juveniles) for Warrnambool was 16,000–18,000, and for Portland was 1000–1500 individuals."

Population Viability Analysis models developed recently by the SBWB Recovery Team predict that there will be further significant declines in population numbers from 2020 to 2056 (van Harten et al. 2022b). Consequently, in 2021 the conservation trajectory for SBWB was assessed as 'Deteriorating', and the State 'Very poor' (SBWB National Recovery Team 2021). The cause of the ongoing decline is uncertain, however drought and loss of foraging habitat due to the conversion of wetlands and native vegetation for agricultural purposes are believed to be key factors (van Harten et al. 2020, 2022a). Collision with wind turbines (discussed below) is also considered a threat to the SBWB population (SBWB National Recovery Team 2021; van Harten et al. 2022b).

FLIGHT HEIGHTS

Based on information provided by the Victorian Department of Environment, Land, Water and Planning (DELWP), SBWB have been recorded by radar flying about 200 m above the ground when leaving roosting caves. However, it is not known if they remain at this height when commuting between caves. To further investigate flight heights of SBWBs, DELWP undertook a GPS tracking study in Victoria in summer-autumn 2021 (following a pilot study in 2020). Data is currently being analysed and DELWP intend to use the results to assess risk of SBWB collisions with wind turbines (SBWB National Recovery Team 2021). This research also includes confirming/calibrating the accuracy of the flight height data recorded by the GPS trackers through use of drones, which will be undertaken in 2022 (A. Bush, pers comm., May 2022). The intention is that this study will provide quantitative data on the heights that SBWBs fly when commuting between caves and foraging over different habitat features within the landscape, for example wetlands, forest and woodland patches, and open farmland.

In the meantime, data from wind farms elsewhere within the SBWBs range (Nature Advisory data) indicate that bat activity varies with height. For example, at the nearby Hawkesdale Wind Farm, data collected from paired bat detector microphones placed at ground level, 25 m and 50 m above the ground indicated that bat activity levels (i.e. number of calls detected) was 25% and 15% respectively of ground level activity. This was for all bat species and was in cleared, agricultural land. Species composition also varied with height, with White-striped Free-tailed Bat (*Austronomus australis*) and Gould's Wattled Bat (*Chalinolobus gouldii*) representing a higher proportion of bat calls at the 50 m recording height. In the Hawkesdale study, all SBWB calls (of several hundred

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recorded) were from the detector placed at ground level, with the exception of a single call recorded 25 m above the ground; none were recorded by the 50 m detector.

A similar study investigating bat activity at different heights was conducted at the proposed Kentbruck Wind Farm, 330 km west of Melbourne. Bat detectors were placed at ground level, and attached to met masts at 28 m, 56 m and 84 m above ground level (Biosis 2020). During a 12-month survey period, the majority of SBWB calls were recorded on the ground-level detector (1.5 m above the ground), with a small number of calls at the lower detector (28 m) and single recordings from the middle (56 m) and upper (84 m) detectors (Biosis 2020).

WOOLSTHORPE WIND FARM

The Woolsthorpe Wind Farm site is located in south-western Victoria, 4 km west of Woolsthorpe, 7.5 km south-east of Hawkesdale, and about 20 km north of Warrnambool. The site is dominated by introduced pasture species and has been subject to intensive agricultural modification and production for at least 70 years. It is situated within the Victorian Volcanic Plain bioregion. The catchment management authority is the Glenelg Hopkins CMA and the local planning authority is the Moyne Shire Council.

The original Referred project involved up to 30 smaller, shorter turbines, whereas the new, revised project involves 13 larger, higher turbines.

Table 1 summarises the differences in turbine specifications and airspace occupied by the larger turbine model to be constructed for the approved project. A key change relevant to the risk of impacts to SBWB is raising the minimum Rotor Swept Area (RSA) from 35 metres above the ground to a height 66 m above the ground and an increase in overall blade length.

Table 1: Differences between the 2004 referred project and the revised project [data provided by Elecnor, on 17/05/2022].

Comparative RSA	Approval limits (2004)	Proposed new turbines (2017)
No of WTGs	20	13
Upper RSA Height (m)	168	230
Lower RSA height (m)	35	66
Diameter (m)	132	164
Radius (m)	66	82
RSA (m^2)	13684.8	21124.1
Total WF RSA (m^2)	*273695.6*	*274612.9*

BAT STUDIES AT THE WOOLSTHORPE WIND FARM

Since the 2004 Referral, two bat investigations have been undertaken on the Woolsthorpe Wind Farm site. Both investigations, undertaken by Rob Gration (EcoAerial) have been described in detail in a stand-alone report prepared for the modification planning permit application in 2018 (BL&A 2018).

In January and February 2007, five Anabat ultrasonic bat detectors were deployed on the site for seven nights each (a total of 35 detector-nights). Four sites were surveyed (including two detectors at the wind monitoring mast, one at ground level and one 20 m up the tower).

No confirmed SBWB calls were detected. The detectors recorded the calls of two species complexes 26 times at site 3 (a dam since filled in), once at site 4 and six times at site 5 that include the SBWB. The total of 33 calls represents about 4.6% of the total number of bat calls identifiable to species or species complex levels recorded during that survey.

In 2017-18 more detailed studies involved the following work:

"***Spring 2017 survey***: *The bat survey was conducted from 15th – 30th November 2017. The recording of bat calls was undertaken for 16 consecutive nights utilising five ultrasonic bat detectors recording concurrently at four sites, one of which had recorders at two different heights: ground-level and 30 m above the ground. This represented a total of 80 detector-detector-nights.*

Summer/autumn 2018 survey: *The bat survey was conducted from 13th February to 13th March 2018. The recording of bat calls was undertaken for 29 consecutive nights utilising bat detectors recording from four sites, one of which had recorders at two different heights: ground-level and 30 m above the ground. This represented a total of 144 detector-nights.* (BL&A 2018)

Bat recording for the spring and summer/autumn surveys combined totalled approximately 2700 hours over 224 detector-nights from 4 sites and 5 recorders [note: two recorders were co-located at the wind monitoring mast to record calls at ground level and 50 m above the ground]*"*.

The surveys coincided with a season of known migration of the SBWB. These were:

- *"Spring seasonal migration to the Starlight Cave (near Allansford, the only known maternity cave in south-west Victoria); and*
- Summer/autumn dispersal from the Starlight Cave when the recorders were in the field for 29 nights to identify any migration across the site." (BL&A 2018).

The results of this work are summarised as follows:

- No confirmed SBWB calls were detected.
- In spring 2017, three calls (<0.5% out of 657 calls in total) were referable to a species complex that included SBWB, Little Forest Bat (*Vespadelus vulturnus*) and Chocolate Wattled Bat (*Chalinolobus morio*).
- During the autumn 2017-2018 surveys, no calls were detected that could be attributed to SBWB or its call complex. Note that the total number of bat calls of all species was not determined for the autumn survey.

WIND FARM IMPACTS TO SBWB IN VICTORIA

Few studies have investigated impacts to bats from collisions with wind turbines in Australia. Results from carcass searches at eight wind farms across south-eastern Australia and two wind farms in Tasmania found that high-flying, open air foraging species, such as the White-striped Free-tailed bats (*Austronomus australis*), are at greatest risk (Smales 2012; Hull and Cawthen 2013).

Following on from preliminary work done by DELWP (Moloney et al. 2019), a publicly funded research project was conducted to produce cumulative statistics and quantify the collision rates of different species at wind farms in Victoria (Symbolix 2020). This project used data from carcass search surveys at 10 Victorian wind farms conducted from 2014-2019. The total search area covered was 147 km^2 and a total of 428 bats were detected. Of these, eight SBWB carcasses were found from <3 wind farm sites. In comparison, the two most common bat species found were the White-striped Free-tailed Bat (229 carcasses at 10 sites) and the Gould's Wattled Bat (77 carcasses at 8 sites).

Carcass search results from the nearby Macarthur Wind Farm provide a relevant comparison for potential impacts to SBWB at Woolsthorpe Wind Farm. Since the commencement of operations at the 140-turbine Macarthur Wind Farm in 2012, two years of monthly carcass searching were conducted (Wood 2015). Out of six carcasses found during year 1 (2013-2014) and ten in year 2 (2014-2015), a single SBWB carcass was found. The rate of bat mortality at the Macarthur Wind Farm was estimated to be between 1.41 (2013) and 3.08 (2014) bats per turbine per year, an average of 2.25. For a 13-turbine wind farm (i.e. Woolsthorpe, see below) this would equate to between 15 and 40 bats per year. If one sixteenth of these were SBWB (i.e. the ratio among bat carcasses found at Macarthur) then between three and seven SBWB per year may be affected at Woolsthorpe Wind Farm. This calculation almost certainly overestimates the predicted number of SBWB collisions at Woolsthorpe as the turbines at Macarthur have a lower minimum RSA height of 28 metres. compared with the 66 metres proposed now. Considering the flight height data available and the significant increase in turbine height above the ground, impacts are more likely to be noticeably lower than at Macarthur Wind Farm.

CHANGE IN RISK PROFILE

Given the uncertainty around flight heights, it is possible that SBWB may fly over the Woolsthorpe Wind Farm at heights recorded during fly-outs from Bat Cave (~200 m). However, because Woolsthorpe Wind Farm is located 30 km from the nearest maternity cave (Starlight Cave), and 14 km from the nearest non-breeding cave (Grassmere Cave) (Figure 1), most bats are likely to have descended to their usual foraging heights by the time they reach the site. As described above, the best available evidence from surveys employing vertical stratification of bat detectors at wind farms in south-west Victoria shows that, when flying over cleared agricultural landscapes, SBWB activity greatly decreases at heights above 30 m, with little-to-no activity recorded above 66 m (Nature Advisory data; Biosis 2020).

Studies at wind farms in NSW where minimum turbine blade height is 60 metres (Nature Advisory data) shows that the number of bats that collide with turbines is very low and significantly lower than from other, including nearby, wind farms with a lower minimum turbine blade height (e.g. 30 metres).

Therefore, in combination with the low level of SBWB activity recorded to date at the Woolsthorpe Wind Farm site (BL&A 2018), raising the minimum blade height from 35 m to 66 m is likely to decrease the probability of SBWB flying within the RSA, thereby reducing the risk of turbine collisions by SBWB substantially compared with the original approved project.

EPBC ACT 1999 – SELF ASSESSMENT

An assessment of the impact of the project against the guidelines on significance published by the Commonwealth Department of the Environment (2013) is provide in Table 2 For the critically endangered species, such as the SBWB, these guidelines state:

"An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of a population*
- *reduce the area of occupancy of the species*
- *fragment an existing population into two or more populations*

- *adversely affect habitat critical to the survival of a species*
- *disrupt the breeding cycle of a population*
- *modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*
- *result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*
- *introduce disease that may cause the species to decline, or*
- *interfere with the recovery of the species."*

Table 2. Assessment of project impacts against the criteria for significant impact of a critically endangered species under the EPBC Act (DEWHA 2013)

Criterion	Southern Bent-wing Bat
Lead to a long-term decrease in the size of a population.	As of 2020, the estimated total population of the SBWB across it's entire range was 44,260 (SWBW Recovery Team 2021). Estimates for populations using the two known breeding caves in Victoria were 16,000–18,000 individuals at the Warrnambool cave, and 1000–1500 individuals for the Portland cave (SWBW Recovery Team 2021). The increase in the minimum height of the turbine from 35 metres to 66 metres is likely to decrease the overall relative risk to this species.
Reduce the area of occupancy of the species.	The wind farm represents a very small proportion of the species' range and no habitat suitable for it near the site will be affected (e.g. maternity or non-breeding caves, wetlands). There is no evidence that turbine operations deter bats from wind farms and bat activity surveys indicate comparable levels of activity before and after turbine operations commence (Nature Advisory data). The extent of available habitat will not be reduced; therefore, the project will not reduce the area of occupancy of the species.
Fragment an existing population into two or more populations.	Much of the habitat in the species' range has been fragmented. The wind farm will not remove additional habitat leading to further fragmentation. There is no evidence that wind turbines deter bats and the wind turbines in the project will be well spaced and will not represent a barrier to movement of the species if it moves across the site.
Adversely affect habitat critical to the survival of a species.	There is no habitat critical to the survival of the species on the wind farm site (e.g. maternity or non-breeding caves, wetlands) and none will be affected by the project.

Criterion	Southern Bent-wing Bat
Disrupt the breeding cycle of a population.	The species breeds in three known maternity caves that are distant from the wind farm. The Starlight maternity cave near Warrnambool is about 30 km from the project at the far end of their average nightly commuting distance from caves (35 km). Being further from the cave, bats will arrive later at the project site and spend less time there compared with areas closer to that cave. This, combined with the low number of bats likely to collide with the higher turbine blades (minimum height = 66 m) indicate a low risk of impacts on the breeding cycle of the Starlight Cave breeding population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	No habitat suitable for the species will b removed by the project so it will not lead to a decline in the species.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat.	The site does not represent significant habitat for the species, so any minor weed or pest animal invasion would not affect it. Importantly, the project will be constructed in line with modern, best-practice construction methods, which will include both construction and operational environmental management plans that will ensure weed invasion of the project area is monitored and, where required, controlled.
Introduce disease that may cause the species to decline.	The project will not introduce a disease that will case the species to decline.
Interfere with the recovery of the species.	The site is unlikely to become significant for the species in the future given the continuation of current agricultural land uses. The advent of the wind farm will not change this.

Having regard to the foregoing findings of investigations undertaken since 2004, including site-specific bat surveys and observations at the nearby Macarthur Wind Farm, and current knowledge of the behaviour of the SBWB and its use of habitat, after increasing the minimum RSA height from 35 metres above the ground to 66 m it is highly unlikely that the proposed Woolsthorpe Wind Farm will result in a significant impact on this critically endangered species.

Yours sincerely,

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