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Meering West Wind Farm

Bat and Avifauna Management Plan

Draft Report

Prepared for Virya Energy Pty Ltd

15 June 2026

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Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work.

We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.

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1 Introduction

Biosis Pty Ltd was commissioned by Meering West Wind Farm as trustee for the Meering West Wind Farm Trust (the Proponent) to prepare a Bat and Avifauna Management Plan (BAMP) for the proposed Meering West Wind Farm. Biosis has undertaken a range of environmental studies to support an assessment of the project against the Gannawarra and Loddon Planning Schemes and assist the Proponent to plan, construct and operate the proposed Meering West Wind Farm development in a manner that is consistent with current environmental legislation and policy.

Under the *Planning Guidelines for Development of Wind Energy Facilities* (DELWP 2021), impacts of a proposed development should be minimised through appropriate measures incorporated at both the planning and design stages. Where necessary, adaptive management measures must also be implemented. This includes the preparation of a BAMP, as outlined in the *Handbook for the Development of Renewable Energy in Victoria* (DEECA 2025).

While the terminology differs from the Bird and Bat Management Plan (BBAMP) required by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW), both plans share the same core objective: to provide a framework for managing risks to bird and bat species. This includes requirements for baseline surveys, operational monitoring, adaptive measures, and reporting (see Section 1.2).

For clarity and consistency, the term *Bat and Avifauna Management Plan (BAMP)* will be used throughout this document.

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1.1 Project background

The assessment of ecological values relevant to Meering West Wind Farm has occurred over multiple stages and across multiple seasons. These assessments have been iterative in nature and have fed into the wind farm design and layout to produce a proposal that seeks to avoid and mitigate impacts to native vegetation and species habitats.

Biosis has produced standalone Matter of National Environmental Significance and Flora and Fauna Assessment reports to aid the Proponent to prepare and lodge a referral of the project under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and state *Flora and Fauna Guarantee Act 1988* (FFG Act), respectively. An EPBC Act referral was prepared and submitted, and the project was declared to be a controlled action on 7 January 2026. The controlling provisions are listed threatened species and ecological communities and listed migratory species.

The proposed Meering West Wind Farm is within the Loddon Mallee region of north-west Victoria, within the Gannawarra Shire and the Loddon Shire, approximately 25 kilometres (to the centre of the project) south-west of Kerang. It is within the proposed north-west Renewable Energy Zone, which has been identified by the Victorian Government as the best place to host wind and solar projects and batteries for storage. The wind farm has been designed and located on cropped farmland so as to avoid impacts to native vegetation and species habitat. Ecological assessments have occurred over several stages and seasons allowing for ongoing modifications to the project design and subsequent impact footprint, with the aim to further reduce the project's ecological impacts.

The Victoria Department of Energy, Environment and Climate Action (DEECA) released the *Handbook for the development of renewable energy in Victoria* in May 2025 (DEECA 2025). This handbook provides guidance to

renewable energy developers on how to avoid, minimise, mitigate and compensate for impacts on threatened bird and bat species. Section 4.6 of the Handbook outlines transitional arrangements available to renewable energy developers. The environmental approval processes for Meering West Wind Farm are significantly advanced, and permit applications have been lodged. As such, the transitional arrangements apply to the project, and the Handbook will not be strictly applied. Assessments that relate to bird and bat species have been carried out using the best practice and guidance available at the time of assessment.

1.2 Purpose and objectives of this BAMP

The overall objectives of the BAMP are to provide an effective monitoring program and strategy to manage and mitigate operational issues relating to bird and bat impacts for Meering West Wind Farm, to monitor and assess for impacts considered uncertain at the time of approval, and prescribe additional compensatory measures for residual prescribed impacts, if required. Additionally, the framework aims to provide certainty to the consent authority and stakeholders prior to approval that measures for minimising biodiversity impacts during operation have been clearly defined and address potential prescribed impacts that cannot be quantified prior to approval.

The BAMP includes the following key objectives:

- Detail the methodology and results of baseline, site-specific data relevant to threatened and at-risk bird and bat species.
- Detail the measures that would be implemented on site for minimising bird and bat strike during operation of the development.
- Define trigger levels for further investigation of the potential impacts of the project on particular bird or bat species.
- Detail the trigger action response plan to monitor and report on the effectiveness of these measures, and any bird and bat strikes on the site.
- Provision of an adaptive management program that would be implemented if the development is found to be having an adverse impact on a particular threatened or at-risk bird and/or bat species.
- Provisions for the reporting of data to regulatory agencies.

1.3 Roles and responsibilities

Meeting the objectives of this BAMP is ultimately the responsibility of the Proponent and future operators of the wind farm. Ensuring implementation of this BAMP will require ongoing involvement from regulatory bodies including DEECA and DCCEEW to ensure compliance with the performance criteria set out in this BAMP.

A suitably qualified ecologist should be engaged by the Proponent to ensure the bird and bat survey methodology outlined in the BAMP is followed and implemented adequately. The ecologist would also be required to review the BAMP and prepare reports relevant to the bird and bat monitoring program.

Implementation of novel technological approaches to reduce collision risk will require ongoing collaboration between the equipment manufacturers, engineers and ecologists to be successful. It is the responsibility of the Proponent to engage with relevant experts to implement the proposed strategies.

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1.4 Sources of information

Sources of information used in the BAMP include relevant databases, spatial data, literature and previous site reports, including:

- DEECA's Victorian Biodiversity Atlas (VBA), including the 'VBA_FAUNA25, FAUNA100 & FAUNA Restricted' datasets (DSE 2009a).
- DCCEEW's Protected Matters Search Tool for matters protected by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Environment Protection and Biodiversity Conservation Act 1999).

Other sources of biodiversity information were examined including:

- DEECA's NatureKit mapping tool.
- DEECA's Habitat Importance maps.
- Planning Scheme zones including any precinct structure plans, overlays and particular provisions relevant to biodiversity based on <http://planningschemes.dpcd.vic.gov.au>.

The following reports were also reviewed:

- Meering West Wind Farm: Matters of National Environment Significance (Biosis 2025a)
- Meering West Wind Farm: Flora and Fauna Assessment (Biosis 2026a)
- Meering West Wind Farm: Bird and bat utilisation surveys - study design and Year 1 results (Biosis 2025b).
- Meering West Wind Farm – BBUS and Collision Risk Assessment (Biosis 2026b)
- Meering West Wind Farm - Level One and Two Brolga Assessments (Biosis 2026c)
- Meering West Wind Farm - Migratory Shorebirds Targeted Surveys (Biosis 2026d)
- Meering West Wind Farm - Black Falcon Targeted Surveys (Biosis 2026e)
- Meering West Wind Farm - Latham's Snipe Targeted Surveys (Biosis 2026f)
- Meering West Wind Farm - White-throated Needletail Targeted Surveys (Biosis 2026g)

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2 Pre-construction Utilisation Survey

This section presents a summary of relevant investigations conducted by Biosis between August 2024 and April 2026. These surveys gathered baseline (pre-construction) data to inform future monitoring.

2.1 Landscape context and overview of the fauna habitat

The proposed Meering West Wind Farm is bounded by Meering West, Kerang, Oakvale and Quambatook and occurs within a landscape that is largely utilised for dryland crop cultivation and some grazing. Broad-scale historical vegetation clearance has occurred throughout the landscape to support these agricultural land uses and native vegetation predominantly remains as small, isolated fragments in paddocks and linear strips along roadsides. Some of the patches of native vegetation that remain within paddocks are large and are likely to provide important refuges for flora and fauna species. The linear strips of vegetation that occur along the roadsides provide some connectivity between these fragmented patches and larger reserves, lakes and wetlands across the landscape. Scattered trees also occur throughout otherwise cleared agricultural paddocks. These trees are likely to provide additional opportunities for fauna connectivity and may provide nesting or breeding resources for some fauna species.

Leaghur State Park, Lake Meran and Lake Leaghur occur close to the eastern border of the study area and are examples of some of the large remnant patches of vegetation that are still present in the landscape. The Loddon River and the Avoca River occur approximately 8 kilometres to the east and west of the study area (respectively). The wetlands and lakes within the Kerang Wetlands Ramsar site occur within 10 kilometres (to the north) of the study area. The presence of several large and ecologically important wetland systems along the north-eastern boundary of the proposed site (Figure 1) indicates that birds (particularly waterbird and migratory shorebird species) are likely to regularly use this area. These wetlands exhibit episodic or seasonal inundation, with water levels driven by local rainfall events, or overbank flooding of the Loddon and Avoca River systems. Inundation periods can vary significantly in frequency, duration, and extent, resulting in dynamic habitat conditions. The spatial arrangement and condition of these habitat types are key determinants of fauna distribution, movement patterns, and habitat utilisation.

The proposed works area for the Meering West Wind Farm is approximately 20,000 hectares, situated between Boort-Quambatook Road (to the south and west), Kerang-Quambatook Road (to the north) and Boort-Kerang Road (to the east), located on a low-relief plateau, predominantly situated 10-20 metres above the flat alluvial plain. Two large roads (Meering West Road and Meran Road) bisect the study area in an east-west direction. The remaining study area is split by several small ancillary roads utilised predominantly by local traffic. Most of the land within the project site is privately owned, apart from the road networks and associated road reserves, the Meering West Bushland Reserve, the Quambatook-Ultima Channel and two small patches of uncategorised public land.

The native vegetation and fauna habitat within the proposed works area occurs predominantly in public road reserves. These linear strips of vegetation occur alongside almost all of the roads within the wind farm area and vary in width, disturbance history and quality. Given the extensive network of roads, many of these linear patches are connected, however minor interruptions to connectivity occur where roads cross and there are large entrances into paddocks and private land. Native vegetation also remains within the proposed works area where scattered paddock trees and remnant (often isolated) patches of woodland vegetation have not been cleared on private property.

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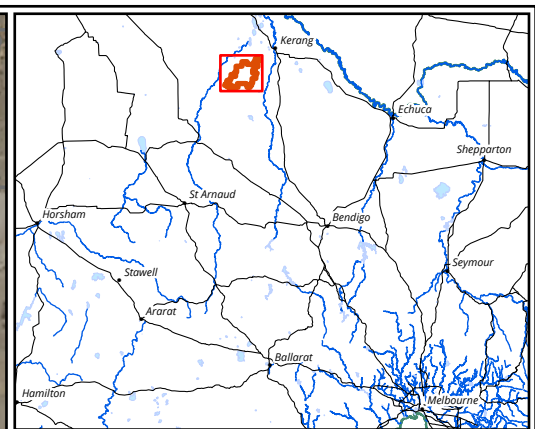
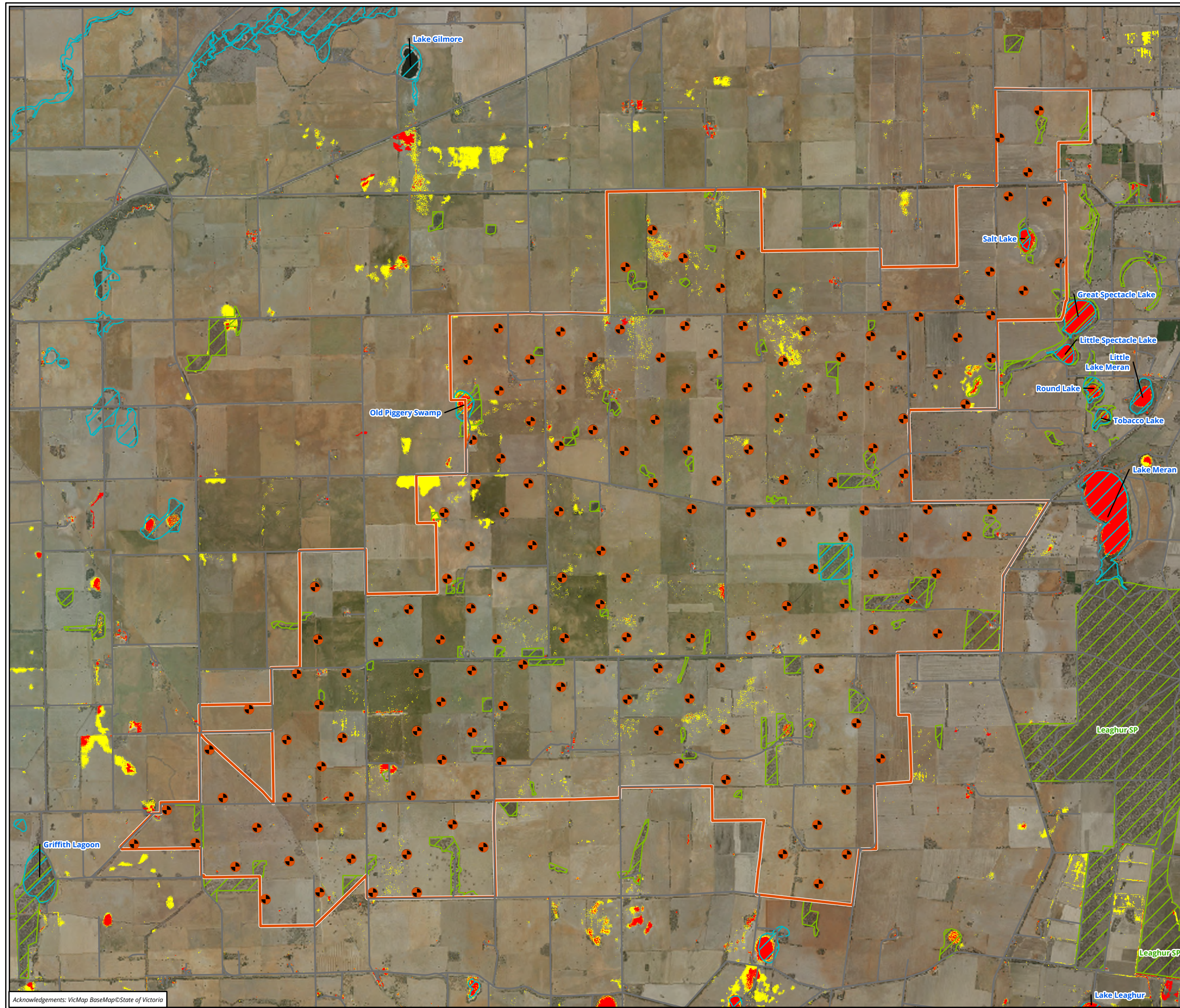
Fauna habitat within and in direct proximity of the study area is largely determined by the extent, condition, and connectivity of remnant vegetation and proximity to higher-value habitats, particularly wetlands. These factors form the basis for assessing fauna habitat values and potential impacts within the study area.

Woodland habitat within study area is highly modified and fragmented, reflecting extensive historical clearing for agricultural development (Figure 1). Remnant woodland vegetation is largely restricted to isolated paddock trees, small patches, and linear roadside reserves, with limited occurrence of intact canopy-understorey structure. The reduced patch size, simplified understorey, and high edge-to-area ratios constrain habitat quality, limit habitat values to the condition and connectivity of remnant elements, particularly where they occur in proximity to other native vegetation or higher-quality habitat such as wetlands.

Within the study area, two natural wetlands are recorded in the Victorian Wetland Inventory (Salt Lake and Old Piggery Swamp), along with 209 farm dams. In addition, paddocks are occasionally inundated following significant local rainfall events, such as those in December 2023 –January 2024 and March 2026. Within 5 kilometres of the study area, significant wetlands are primarily located along the north-east boundary, including open freshwater lakes within the Great Spectacle Lakes Complex System, as well as Meran Lake and Lake Murphy. Other important wetlands include Griffith Lagoon Nature Conservation Reserve (2 kilometres southwest of the study area) and isolated wetlands along Gredgwin East Road (1.5–2 kilometres south of the study area) (Figure 1).

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Legend

- Study area
- Turbine layout
- Large woodland patch

Wetlands

- DEECA Wetland

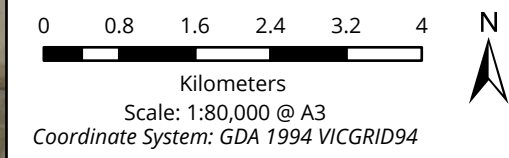
Temporary inundated paddocks following 02/03/2026 rainfall event

- Inundated area (27/03/26)
- Inundated area (10/03/26)

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Figure 1 Key fauna habitat



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Layout: 41107_F3_Floods
Project: P:\40700s\40787\Mapping\40787_Mapping_reset_again.aprx

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2.2 Threatened species recorded or likely to occur at the site or in the surrounding area

Up to 37 bird species listed under the EPBC Act and/or FFG Act have been identified as having a medium or greater likelihood of occurrence within the study area (Table 1). No threatened bats were recorded or considered likely to occur at the site or surrounding area (see Section 2.4.2).

Table 1 Summary of threatened and migratory fauna species recorded or most likely to occur at the proposed site or in the surrounding area

Scientific name	Common name	Conservation status		Recorded in study area
		EPBC Act	FFG Act	
National significance				
<i>Gallinago hardwickii</i>	Latham's Snipe	VU, Migratory		X
<i>Tringa nebularia</i>	Common Greenshank	EN, Migratory	e	X
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	VU, Migratory		X
<i>Melanodryas cucullata</i>	Hooded Robin	EN	v	X
<i>Stagonopleura guttata</i>	Diamond Firetail	VU	v	X
<i>Climacteris picumnus</i>	Brown Treecreeper	VU		X
<i>Hirundapus caudacutus</i>	White-throated Needletail	VU, Migratory	v	X
<i>Neophema chrysostoma</i>	Blue-winged Parrot	VU		X
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	cr	
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR, Migratory	cr	
<i>Aphelocephala leucopsis</i>	Southern Whiteface	VU		
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory		X
<i>Calidris ruficollis</i>	Red-necked Stint	Migratory		X
<i>Plegadis falcinellus</i>	Glossy Ibis	Migratory		
<i>Hydroprogne caspia</i>	Caspian Tern	Migratory	v	X
<i>Charadrius bicinctus</i>	Double-banded Plover	Migratory		
<i>Tringa glareola</i>	Wood Sandpiper	Migratory	e	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Migratory	e	
<i>Calidris pugnax</i>	Ruff	Migratory		
<i>Calidris melanotos</i>	Pectoral Sandpiper	Migratory		
<i>Limosa limosa</i>	Black-tailed Godwit	Migratory		
State significance				
<i>Egretta garzetta</i>	Little Egret		e	X
<i>Ardea alba modesta</i>	Eastern Great Egret		v	X

Scientific name	Common name	Conservation status		Recorded in study area
		EPBC Act	FFG Act	
<i>Spatula rhynchotis</i>	Australasian Shoveler		v	X
<i>Aythya australis</i>	Hardhead		v	X
<i>Stictonetta naevosa</i>	Freckled Duck		e	X
<i>Oxyura australis</i>	Blue-billed Duck		v	X
<i>Biziura lobata</i>	Musk Duck		v	X
<i>Hieraaetus morphnoides</i>	Little Eagle		v	X
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		e	X
<i>Falco subniger</i>	Black Falcon		cr	X
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		v	X
<i>Struthidea cinerea</i>	Apostlebird		v	X
<i>Geopelia cuneata</i>	Diamond Dove		v	
<i>Antigone rubicunda</i>	Brolga		e	
<i>Ardea intermedia plumifera</i>	Plumed Egret		v	
<i>Anseranas semipalmata</i>	Magpie Goose		v	

cr – critically endangered

En, e – endangered

VU, v – vulnerable

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2.3 Bird utilisation surveys (BUS)

2.3.1 Bird utilisation survey method

Eight seasonal bird and bat utilisation surveys were conducted covering a two-year period, in winter (August 2024 and July 2025), spring (October 2024 and September 2025), summer (December 2024 and December 2025) and autumn (April 2025 and March 2026), with the objective to obtain information about the bird and bat species using the site throughout the year, including any threatened and/or migratory species.

For bird surveys, the number of survey points were determined based on the number of proposed turbines. At least one impact point site was established for every six planned turbines, and one control point site was established for every four impact sites, for a total of 29 impact point count sites and seven control point count sites. The bird survey point sites were selected to sample a range of habitat types throughout the study area, including open farmland, scattered trees and woodland.

Surveys comprised fixed-point counts, which included one observer stationed at each point for 20 minutes. Survey details, including the date, start and end times, site location, weather conditions, and temporal habitat features of relevance (e.g. water levels, flowering) were recorded during each survey. During the 20-minute survey period, all observations within 360 degrees and up to 3 kilometres of the observer were recorded, including:

- Species observed making flights.
- Count of individuals.

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- Height of bird above ground when first detected.
- Distance and direction of bird from observer when first detected.
- Flight direction.
- Species behaviour (if relevant).
- Incidental bird observations were also recorded across the subject land.

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The 29 fixed survey impact points (25 for the winter and spring 2024 surveys, and 29 for the following surveys) obtaining a total of 890 replicates and 17,800 minutes (or a total of 296.7 hours) of targeted diurnal bird surveys. In addition, seven fixed survey experimental control points (6 for the winter and spring 2024 surveys, and 7 for the following surveys) obtaining a total of 215 replicates and 4,300 minutes (71.7 hours) of reference surveys. This provides a total of 1105 replicates across the 36 fixed survey points (impact and control).

In addition to seasonal BUS effort, targeted surveys for White-throated Needletail and Fork-tailed Swift were conducted between December 2025 and March 2026. This additional survey effort was implemented following incidental observations of both species in summer 2024 and autumn 2025 (see Section 2.9 for mor details). These results were added to the general BUS observations but were not included in the CRM.

At the time of writing this report, the turbine model had not been confirmed. Therefore, BBUS results were analysed using a conservative Rotor Swept Height (RSH). The following draft height matrix was defined to classify bird flight heights; however, it remains subject to revision pending final turbine specifications, particularly the lower and upper blade tip heights:

- Below RSH: <80 metres.
- Within RSH: 80-280.
- Above RSH: >280 metres.

The following bird guilds were used to categorise species:

- Raptors
- Grassland, shrubland and ground-dwelling birds
- Waterbirds, seabirds and other aquatic foragers
- Woodland birds (including parrots and songbirds)
- Exotic birds (introduced species)

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The above guilds were applied to the BUS results to identify birds of concern for the collision risk assessment (see Section 2.10).

2.3.2 Bird utilisation survey results

A total of 115 bird species were recorded during the eight BUS seasons, including 13 raptor species, eight threatened species and one migratory species. Threatened and migratory species consisted of:

- Black Falcon *Falco subniger* (Critically Endangered, FFG Act).
- Brown Treecreeper *Climacteris picumnus* (Vulnerable, EPBC Act, FFG Act).
- Fork-tailed Swift *Apus pacificus* (Migratory, EPBC Act).

- Grey-crowned Babbler *Pomatostomus temporalis* (Vulnerable, FFG Act).
- Hardhead *Aythya australis* (Vulnerable, FFG Act).
- Hooded Robin *Melanodryas cucullata cucullata* (Endangered, EPBC Act; Vulnerable, FFG Act).
- Little Eagle *Hieraaetus morphnoides* (Vulnerable, FFG Act).
- White-bellied Sea-Eagle *Haliaeetus leucogaster* (Endangered, FFG Act).
- White-throated Needletail *Hirundapus caudacutus* (Vulnerable, EPBC Act and FFG Act).

Of the 115 bird species recorded during BUS, nine species were never recorded flying, 13 species were only recorded once, and 28 additional species were recorded 10 times or less. The most common species recorded were Common Starling *Sturnus vulgaris* (4,062 observations), Raven sp (which includes Australian Raven *Corvus coronoides* and Little Raven *C. mellori*; 3,154 observations), Eastern Rosella *Platycercus eximius* (2,072 observations), Galah *Eolophus roseicapilla* (1,731 observations), Miner sp (which includes Noisy Miner *Manorina melanocephala* and Yellow-throated Miner *M. flavigula*; 1,416 observations), and Australian Magpie *Gymnorhina tibicen* (1,408 observations). These eight bird species make up 53% of all bird movement observations.

Movements within rotor RSH

Out of 24,086 movements recorded, 952 (3.95%) were recorded within RSH, and 58 (0.24%) were recorded above RSH. Most of the birds recorded during BUS were observed below RSH at both the impact and reference survey points. This is generally expected as the tree canopy across the study area is about 10-15 metres high and most species utilise this height to forage and move between vegetation patches. Species that were only observed flying below RSH were typically smaller birds with strong affiliations to vegetation.

A total of 26 species were observed flying within RSH, including:

- 10 raptor species: Brown Goshawk *Accipiter fasciatus*, Wedge-tailed Eagle *Aquila audax*, Black-shouldered Kite *Elanus axillaris*, Brown Falcon *Falco berigora*, Nankeen Kestrel *Falco cenchroides*, Black Falcon (Critically Endangered, FFG Act), Whistling Kite *Haliastur sphenurus*, Spotted Harrier *Circus assimilis*, Little Eagle (Vulnerable, FFG Act) and Black Kite *Milvus migrans*.
- 12 woodland species: Sulphur-crested Cockatoo *Catutua galerita*, Long-billed Corella *Cacatua tenuirostris*, Australian Raven, Little Raven, Australian Magpie, Welcome Swallow *Hirundo neoxena*, Crested Pigeon *Ocyphaps lophotes*, Fairy Martin *Petrochelidon ariel*, Tree Martin *Petrochelidon nigricans*, Magpie-lark *Grallina cyanoleuca* and Dusky Woodswallow *Artamus cyanopterus*.
- Three waterbird species: Australian Pelican *Pelecanus conspicillatus*, Australian White Ibis *Threskiornis Molucca*, and Straw-necked Ibis *Threskiornis spinicollis*.
- One exotic species: Common Starling *Sturnus vulgaris*.

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Flyways and movements

Flyways and movements of aerial taxa likely to occur, or recorded within the study area, are described below in the following species groups: raptors, waterbirds, woodland and shrubland birds and ground dwelling birds and microbats.

Raptors

Raptor presence varied between seasons, however the raptor species recorded are considered resident within the study area. Raptor species utilise woodland and scattered trees for roosting and nesting. Foraging was observed over woodland, scattered trees and grassland. Raptor species move throughout the day

between nesting, roosting and foraging locations. These species can cover large areas of habitat while foraging, especially Wedge-tailed Eagle.

Waterbirds

Common waterbird species such as ducks, cormorants and herons were identified primarily within farm dams, or flying between dams. Movements of common and local waterbird species are likely to occur throughout the year within the study area due to the presence of permanent water and ephemeral water from farm dams and earthen channels. In general, minimal areas within the study area were identified as containing water outside of dams, however, important rainfall events such as March 2026 (which may occur every 2–5 years) can provide temporary foraging habitat throughout the proposed wind farm area.

Movements of waterbird species are likely to occur as a mixture of resident day or night movements, nomadic movements subject to climatic conditions and for some species, seasonal migration movements at various times throughout the year. Flight paths are likely to occur through the study area and across into the broader landscape. Key riparian and wetland movement corridors are located outside the study area along the Avoca and Loddon Rivers.

Woodland and grassland birds

A total of 66 woodland and grassland birds were recorded within the study area during the BUS, targeted and incidental survey. The collective sum of these species utilise almost all the habitat within the study area for foraging, roosting or nesting. Resident species such as ravens, cockatoos or parrots complete daily movements, moving from roosting habitat across foraging areas. Movements of many species are centred on abundance and availability of food, or occur seasonally with temperature changes and seasonal conditions. Breeding is likely to occur year-round across the species identified. Species subject to nomadic movements are likely to use woodland patches to connect with large corridor outside the study area. Movement of grassland species is subject to fragmentation and structural changes from grazing and cropping. Common grassland species such as ground foraging parrots are likely to use woodland patches and roadside reserves to connect to patches of grassland for foraging.

2.4 Bat utilisation surveys

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2.4.1 Bat utilisation survey method

For each survey, nine to 11 ultrasonic bat detectors were deployed in habitat types likely to be relevant to bats using desktop analysis to allocate survey points across the site in representative habitats. Stratification was associated with vegetation structure and diversity, with modified land assumed to provide little structural or floristic (and insect) diversity and woodland habitats likely to contain the highest structural and floristic diversity and therefore be more highly utilised by bats. Scattered trees were also sampled as they are known to be attractive to bats in the landscape. Waterbodies are known to be focal points in the landscape for bat activity and were sampled to ensure species richness in the area was sufficiently captured. The four habitat types selected therefore included:

- Modified land (crops).
- Scattered trees (isolated trees with no vegetation within >50 metres of the tree).
- Woodland (locations with >1 hectare of woodland noting that the site does not contain large woodland patches).
- Wetlands / farm dams.

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Different sample sites were selected within each habitat type in each of winter 2024, spring 2024 and summer 2024 to increase spatial coverage at the site. From autumn 2025, sites were resampled, resulting in each site having at least one sample in a period of high bat activity (spring/summer) and a period of low bat activity (autumn/winter).

Data was also collected at height during each seasonal deployment by using an ultrasonic detector mounted at 70 and 110 metre heights on a meteorological mast (met mast) located south of Meran Road (35.8735°S 143.6730°E). A unit was also placed at ground level at the met mast, resulting in paired detectors sampling call data at ground level and at two heights simultaneously.

Calls were recorded from dusk until dawn for a duration of 10-12 days per survey using Anabat Swift (Titley Scientific) ultrasonic bat detectors. Default settings for trigger, sensitivity, sampling rate and minimum / maximum frequency were used. Each time a calling bat flies past the detector, its call is recorded as a digital file that is saved directly onto a memory card in the detector unit. Units were set on trigger mode to record at night.

Units were located to allow space in front of and around the microphone to minimise echoes from hard surfaces, call attenuation from surrounding vegetation, and ensure adequate flight space around the microphone. All units were deployed at ground level (between 1-3 metres above the ground) except the units attached to the met mast at 70 and 110 metres.

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2.4.2 Bat utilisation survey results

A total of 731,744 files were recorded across the bat utilisation survey program. Of these, 301,112 were considered to be valid bat calls, with 32,247 manually reviewed. The remainder were 'trash' files containing unidentified noise (e.g. insects) or false triggers (such as wind, rain, vegetation movement).

Bat analysis positively identified 10 microbat species (almost certain or probable) of the 11 species of microbat considered likely to occur within the study area and surrounds. These species include:

- White-striped Free-tailed Bat *Austronomus australis*
- Gould's Wattled Bat *Chalinolobus gouldii*
- Chocolate Wattled Bat *Chalinolobus morio*
- South-eastern Free-tailed Bat *Ozimops planiceps*
- Ride's Free-tailed Bat *Ozimops ridei*
- Inland Broad-nosed Bat *Scotorepens balstoni*
- Southern Forest Bat *Vespadelus regulus*
- Lesser Long-eared Bat *Nyctophilus geoffroyi*
- Large Forest Bat *Vespadelus darlingtoni*

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No threatened bat species were positively identified (probable or almost certain) during the bat utilisation surveys. Calls for the *Nyctophilus* bat genus that were recorded during the survey are most likely to represent the Lesser Long-eared Bat. Although these calls cannot be reliably differentiated from the threatened Corben's Long-eared Bat (Endangered EPBC Act and Vulnerable FFG Act), the likelihood of it being at the site, and the likelihood of it being subject to operational impacts from the project, are both considered to be low.

Yellow-bellied Sheath-tailed Bat (Vulnerable EPBC Act) is a high-flying species however, it is likely to be migratory in southern Australia, appearing as a vagrant in southern NSW and Victoria during summer and

autumn (Baker & Gynther 2023). No calls were identified for this species from the data collected. Biosis has also conducted extensive call data collection in south-western NSW in recent years and has not recorded this species in that region since monitoring commenced in 2022. Given the study area occurs at the southern extent of the species' range, if present this species is considered only likely to occur seasonally and in very low numbers.

Activity at the met mast was highly variable between nights. Unexpected equipment issues resulted in a limited number of nights where all three units (ground, 70 metres, 110 metres) recorded simultaneously, concentrated in spring 2024 and 2025, and autumn 2025. Activity recorded at 110 metres was lower than either the 70 metres detector or the ground-based detector. These results suggest that bat activity is likely to be concentrated between 0–70 metres, with reduced activity above 70 metres as reflected by the lower number of calls recorded on the 100-metre microphone consistently throughout the sampling period.

2.5 Brolga assessments

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2.5.1 Brolga assessment methods

A desktop survey was conducted in July 2024, followed by three Brolga targeted surveys in winter (August 2024) and spring (October and November 2024), to determine the presence of the FFG Act listed Brolga breeding within 10 kilometres of the study area, and map high-quality breeding habitat. These Brolga assessments followed the *Interim Guidelines for the Assessment, Avoidance, Mitigation and Offsetting of Potential Wind Farm Impacts on the Victorian Brolga Population 2011* (DSE 2012).

Step One of the assessments (July 2024) was to undertake desktop studies reviewing all relevant information sources to identify known and potential breeding and flocking sites within the radius of investigation.

The following step (Level One - Step Two) was conducted in August 2024 to field-verify the nature and extent of the species habitat identified via the desktop studies. Wetlands listed in the Victorian Wetland Inventory (VWI) within 10 kilometres of the proposed wind farm boundary were investigated, and breeding habitat suitability information was collected for every accessible wetland. The objective of a Level Two Assessment was to conduct a comprehensive survey on the presence and movements of Brolga within the radius of investigation. According to the guidelines (DSE 2012) and based on the limited potential breeding habitat identified during the Level 1 Assessment, roaming surveys were determined to be the most suited method to detect isolated breeding Brolga for this assessment. The breeding season occurs during the wetter months of the year, predominantly July to December in Victoria, the period during which roaming surveys were conducted. Because detecting breeding Brolgas can be difficult when they occur at low density, Biosis undertook two rounds of surveys (two four-day field assessments), in October and November 2024. For this assessment, all the areas inundated in October–December 2022 that retained water for six months or more were investigated within 5 kilometres of the study area, and information about presence of Brolga and habitat suitability for breeding Brolgas was collected.

Community consultation with landholders and local community groups (environment, Landcare and bird groups) was conducted by the Proponent in March and April 2026 to obtain undocumented records within 10 kilometres of the proposed wind farm. A total of 298 pieces of correspondence were sent to landholders and community groups within 10 kilometres of the proposed wind farm. The objective of this consultation was to identify current and historical Brolga flocking and breeding wetlands not recorded in available databases or accessible during field studies.

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2.5.2 Brolga assessment results

The desktop review (Level One – Step One) identified 48 Brolga records within 10 kilometres of the proposed wind farm boundary. These records were concentrated east and north-east of the study area, particularly at Lake Murphy (6 kilometres north-east of the study area). Notably, Lake Murphy was identified as high-quality breeding habitat, supported by breeding records from 2019. Another breeding record from 1984 was noted approximately 8 kilometres east near the Loddon River. No known flocking sites were recorded within 25 kilometres of the study area, and Brolga group sizes recorded did not exceed five individuals, which is below the threshold (10 Brolgas) defining flocking habitat in the *Interim Guidelines*.

Field verification during the Level One – Step Two Assessment classified only Lake Murphy as a high-quality breeding wetland. Although this wetland showed suitable characteristics for potential breeding, no direct Brolga observations had been recorded within this lake during recent surveys. In October and November 2024, a Level Two Brolga assessment (DSE 2012) was conducted to collect additional information on the presence and movements of Brolga within the radius of investigation. According to the guidelines and based on the limited potential breeding habitat identified during the Level 1 Assessment, roaming surveys were determined to be the most suited method to detect isolated breeding Brolga for this assessment. The Level Two Assessment confirmed the absence of high-quality breeding habitat for the species within the radius of investigation, elsewhere than at Lake Murphy. During both the August and October-November 2024 field surveys, no Brolgas were observed.

The community consultation conducted in March and April 2026 did not identify any flocking or breeding Brolga records within the study area and within 5 kilometres of the proposed site. In total 298 pieces of correspondence were sent. Responses were received from 21 landholders, including the following:

- 10 respondents had not seen brolgas on their properties.
- 11 respondents had seen brolgas on their properties, of which:
 - Two respondents provided no information on where their properties were located (including after follow-up). There were no photos or videos to confirm these observations.
 - Four respondents did not provide any details of where, when and what was observed (including after follow-up). There were no photos or videos to confirm these observations.
 - One respondent has misidentified Brolgas. This followed a conversation with project ecologists who concluded that the species observed was likely White-faced Herons.
 - Four respondents were located adjoining Lake Murphy (5-7 kilometres east of the proposed wind farm), a known breeding location for Brolgas. One of these respondents provided photographs of Brolga foraging in paddocks.
 - One respondent was located 8.5 kilometres east of the proposed wind farm, between Delamare Ln and Hewitt Rd. This landholder mentioned observing chicks at two occasions. There were no photos or videos to confirm these observations.
 - One respondent was located 4.5 kilometres south of the proposed wind farm (Piccoli Swamp), mentioning Brolgas occasionally foraging in the swamp. There were no photos or videos to confirm these observations.
 - One respondent was located adjoining Koorangie State Game Reserve (9 kilometres north of the proposed wind farm), mentioning Brolgas occasionally foraging in paddocks. There were no photos or videos to confirm these observations.

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It is noted that, in two instances, records initially reported as Brolga were subsequently confirmed to be White-faced Heron *Egretta novaehollandiae* and/or White-necked Heron *Ardea pacifica*. Of the remaining observations, all but one (near Lake Murphy) could not be confirmed due to the absence of photos or videos.

No Brolga was recorded between August 2024 and March 2026 during the bird utilisation surveys conducted throughout the study area, including five survey points close to the wetlands occurring near the eastern boundary of the study area. These wetlands were also surveyed during targeted shorebird and Latham's Snipe surveys (11 visits from December 2024 to March 2026), and Brolga were not observed. This is consistent with available records within online biodiversity databases (Victorian Biodiversity Atlas, Birddata, eBird) indicating that no individuals were recorded within 10 kilometres of the study area between March 2022 and April 2026. In addition, during the assessment period (August 2024 to April 2026), no Brolga was recorded during the 430 hours of bird utilisation surveys that were conducted throughout the proposed area, including three survey points near the wetlands along the eastern boundary of the study area. No Brolga was observed during surveys conducted following the inundation event on 2 March 2026 (i.e. surveys conducted from 3-6 March 2026 and 13-17 March 2026).

According to the recently released *Species-Specific Guidance for Onshore Wind Energy Facilities – Victorian Brolga* published in the *Revised Draft – Handbook for the development of renewable energy in Victoria* (DEECA 2025) the present project does not trigger the Level Three – Qualitative risk assessment for the following reasons:

- There are no known flocking sites within at least 25 kilometres of the study site.
- No breeding records within 5 kilometres of the proposed area.
- No high-quality Brolga breeding wetlands within 5 kilometres of the proposed area, based on the criteria that high-quality habitat requires wetlands with sufficient emergent vegetation to allow for nest building, which is not a feature present in any of the wetlands occurring within the radius of investigation other than Lake Murphy in 2018 to 2020.

2.6 Shorebird targeted surveys

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2.6.1 Shorebird targeted survey methods

Eleven targeted surveys were conducted for shorebirds throughout spring (November 2024 and October 2025), summer (December 2024, January 2025, December 2025, January 2026 and February 2026) autumn (March 2025, April 2025 and March 2026) and winter (July 2025) to determine the presence, abundance and diversity of EPBC Act listed threatened and migratory shorebird species utilising the temporary wetlands along the north-eastern boundary of the proposed area.

This survey program was implemented after identifying that the wetland known as “Salt Lake” (no official name available) was found to host several shorebird and waterbird species listed under the EPBC Act and the FFG Act. Salt Lake is a 20-hectare temporary saline lake, situated in the north-east section of the proposed Meering West Wind Farm area (35.8210°S 143.7860°E). Although this wetland is not permanent (filling up during important flood events every 10-20 years), it has a long water retention rate (up to 2 years), and the recent incidental records collected by Biosis suggest that this site may support habitat for EPBC Act listed threatened and migratory shorebird species. In order to measure population variability, and in accordance with the *EPBC Act Policy Statement 3.21 – Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DoEE 2017), these targeted surveys comprised a minimum of four replicates in summer, one at the start and end of the non-breeding period (spring and autumn), and one in winter to capture data on birds that remain in Australia during the breeding season.

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In addition to surveying Salt Lake, any shorebird and waterbird species present at the nearby Great/Little Spectacle Lakes system (1 kilometre south-east of Salt Lake) were recorded during the targeted survey.

2.6.2 Shorebird targeted survey results

During the initial opportunistic surveys and the following targeted shorebird surveys (April 2025 – March 2026), three EPBC Act listed shorebirds were observed at Salt Lake:

- Sharp-tailed Sandpiper (10-15 individuals observed on multiple occasions)
- Common Greenshank (one individual observed on one occasion)
- Red-necked Stint (two individuals observed on one occasion)

In addition, 18 other bird species were recorded at Salt Lake, including the following three FFG Act listed species:

- Hardhead
- Australasian Shoveler
- White-bellied Sea-Eagle

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2.7 Black Falcon, Little Eagle and White-bellied Sea-Eagle targeted surveys

2.7.1 Black Falcon targeted survey methods

Two targeted surveys were conducted for the FFG Act listed Black Falcon (critically endangered) in winter (July 2025) and spring (September 2025) to provide an understanding of the presence of the species; to identify and map all stick nests that could be used by a breeding pair of Black Falcons; and to confirm if the nests are used or not. This information was also used to assess the presence of any other raptor species breeding in the area, in particular the FFG Act listed Little Eagle (vulnerable) and White-bellied Sea-Eagle (vulnerable).

This assessment was undertaken after observing Black Falcons during other surveys or incidentally at multiple occasions within and in the direct vicinity of the study area. In addition, the Victorian Biodiversity Atlas (VBA) indicates that the species was also recorded in 2023 and 2024 less than 2-3 kilometres north of Normanville Road (northern boundary of the study area). The regular observations of Black Falcons within the same area over multiple years may suggest that the species is breeding or could breed within or near the proposed wind farm area. The Black Falcon breeds in solitary/dispersed pairs, and uses old stick nests, typically built by corvids or other raptor species, in the top of emergent trees in woodland. Breeding pairs defend their nesting territories against other individuals and other species, and may use the same breeding territories in successive years.

Survey effort comprised two surveys during the breeding season (ranging from June to October). During both surveys (roaming surveys), experienced ornithologists systematically searched for breeding Black Falcons within the study area and its direct vicinity (2-kilometre buffer).

In addition to the targeted Black Falcon survey, 433 hours of bird utilisation surveys were conducted between August 2024 and March 2026. These surveys represent a substantial additional survey effort and contribute to a more comprehensive understanding of the species' presence within and around the study area. In particular, additional survey effort was undertaken in summer and autumn 2025–2026 as part of White-throated Needletail surveys (see Section 2.9), providing further information about the presence of Black Falcon across the project area during a key period of its life cycle. It is also noted that the presence of raptor

species was recorded around harvesters while zoologists were travelling between survey points, as Black Falcons are more likely to be observed during harvest activities.

2.7.2 Black Falcon results

Nest mapping was undertaken to identify and record the locations of stick nests considered to be potential breeding locations for Black Falcon. Searches were conducted both opportunistically—during transit across the site for BBUS and other targeted surveys—and systematically, with efforts made to traverse the majority of public roads within the study area and a 2-kilometre buffer. Additional targeted searches were carried out on foot in woodlands, treed areas, and large wooded patches on accessible private properties as identified during a desktop assessment of aerial imagery.

Nest surveys conducted during the reporting period provided comprehensive coverage over approximately nine person-survey days. Raptor nests were identified along road corridors and within woodland patches throughout the site. However, none of the observed nests were confirmed to be in use by Black Falcons, Little Eagles or White-bellied Sea-Eagle. Active nests were recorded for other raptor species, including Brown Falcon *Falco berigora* and Wedge-tailed Eagle *Aquila audax*.

During the July and September 2025 targeted surveys, no additional Black Falcon, Little Eagle and White-bellied Sea-Eagle individuals were recorded within the study area. There was no Black Falcon observed following harvesters during harvesting periods. During the course of the project eight observations of Black Falcons were recorded during BBUS and 10 incidental observations have been made (outside of official surveys). These sightings were distributed across the entire study area, with a notable clustering in the south-west.

2.8 Latham's Snipe targeted surveys

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2.8.1 Latham's Snipe targeted survey methods

While not originally considered for further surveys at the outset of the overall project, one Latham's Snipe was observed incidentally on 19 December 2024 by a Biosis Zoologist during separate BBUS surveys for the Summer 2024-2025 survey season. The individual was observed on the muddy edges of a predominantly unvegetated artificial dam which would typically not be considered preferred habitat for this species. This prompted a re-evaluation of the potential for more individuals and important habitat to be present as defined in the *EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DoEE 2017). As stated in this EPBC Act policy statement (DoEE 2017), important habitat for Latham's Snipes cannot be readily identified as the species does not commonly aggregate in large flocks or use the same habitat as many other migratory shorebirds. As such, targeted searches for this cryptic shorebird species are required to detect presence.

Four targeted surveys were conducted for Latham's Snipe to assess potential habitat and determine the presence and abundance of the species within the proposed area. Surveys were undertaken across four two-day assessment windows in September 2025, December 2025, January 2026 and February 2026. As Latham's Snipe is more commonly observed in Victoria during summer months following the peak of their migration; the initial survey in September 2025 focussed on identifying key locations which constituted suitable habitat in order to target our survey effort more precisely and increase detection probability during the subsequent surveys. A desktop review of DEECA mapped wetlands and aerial imagery contributed to an initial plan for potential suitable habitat which were investigated further in the field.

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2.8.2 Latham's Snipe targeted survey results

Known wetlands and dams as well as ephemerally inundated areas observed opportunistically were visited from publicly accessible roadsides and assessed for Latham's Snipe habitat values. Photos were taken and the area mapped and classified for suitability. This simultaneously improved understanding of the extent of habitat within the study area and allowed us to identify priority areas where further direct observations of Latham's Snipe were more likely to occur.

No further observations of Latham's Snipe were made during targeted surveys. Approximately 125.6 hectares of wetlands are mapped within the study area (DEECA), of which an estimated 19.9 hectares were considered to provide marginally suitable habitat for Latham's Snipe. These include several dams and ephemeral wetlands within and adjacent to the study area. These wetlands are generally small, ephemeral, and lack the extent and consistency of inundation typical of important Latham's Snipe sites across Victoria.

Based on survey results, habitat availability and the absence of repeated detections, the likelihood of regular or sustained use of the study area by Latham's Snipe is considered low.

2.9 White-throated Needletail and Fork-tailed Swift targeted surveys

2.9.1 White-throated Needletail targeted survey methods

During the first year of survey, the EPBC Act and FFG Act listed White-throated Needletail (vulnerable and migratory) and Fork-tailed Swift (migratory) were recorded within the study area. Given that these species are highly mobile and can occur sporadically, it was recommended to conduct targeted surveys during the peak of their presence in Victoria (late November – early April). The aim was to increase the survey effort of general BUS by undertaking additional surveys for three consecutive days in December 2025, January 2026, February 2026 and March 2026. The surveys consisted of 20-minute fixed-point counts from 10 additional points (four replicates per point for each survey).

2.9.2 White-throated Needletail targeted survey results

No White-throated Needletail or Fork-tailed Swift were recorded from the study area or incidentally during targeted surveys between December 2025 and March 2026. This is despite extensive survey effort exceeding 240 person-hours of observation across targeted aerial avifauna surveys and ongoing regular BUS in December and March 2026.

Over recent years, flocks of both species have been recorded in small numbers (3-30) as well as one reliable observation of approximately 300 Fork-tailed Swifts over Lake Leaghur, 5 kilometres south-east of the proposed wind farm (via eBird). However, observations are sporadic and do not show consistent or numerous sightings over consecutive years historically. Since these are citizen science observations, they cannot be matched to a regimented survey effort or protocol to determine how regularly these species are observed compared with survey effort. But in comparison with the rest of Victoria and into NSW, there are less observations around the study area particularly when considering coastal and high elevation areas.

Based on the lack of observations during extensive survey effort over the targeted survey period (December 2025 to March 2026) and the 2-year BUS (August 2024 to March 2026), the risk of impact to White-throated Needletail and Fork-Tailed Swift by the proposed development is considered low.

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2.10 Collision risk assessment

2.10.1 Qualitative risk assessment

Collision risk can be assessed using both qualitative and quantitative approaches. The quantitative approach (collision risk modelling (CRM)) provides a numerical estimate of collision risk but is only applicable to species for which BUS data are available, particularly records of individuals flying within RSH at impact points. As species more likely to fly at night such as waterbirds or migratory shorebirds have not met these data requirements, a qualitative assessment has also been undertaken to ensure that potential risks are considered more broadly across species. This assessment also allows to include bat species, as bats cannot currently be assessed using CRM. The qualitative approach allows consideration of presence likelihood, behavioural traits, habitat use, and known sensitivities to wind farms, and is therefore applicable to a wider range of species.

Therefore, in order to gain an understanding of potential impacts to all bird and bat species occurring within the study area, Biosis has undertaken a bird and bat qualitative risk assessment to inform the overall biodiversity impact assessment for the proposed wind farm. This assessment identified species or groups of birds and bats considered at potential risk of collision with turbines, as well as potential impacts associated with disturbance and/or barrier effects posed by operational wind turbines. The outcomes of these assessments are presented below. These assessments have enabled targeted evaluation of key species to be considered in the preparation of the overall impact assessment for the wind farm.

This risk assessment has been applied to all bird and bat species recorded by Biosis during the field assessments (excluding exotic species), and EPBC or FFG Act listed species recorded or predicted to occur within 10 kilometres of the study area.

The results of the qualitative risk assessment have identified the likely species at risk of collision with operational wind turbines. This then accounts for species that may fly within RSH, but were not recorded during BBUS and accounted for in the CRM, or species that are nocturnal, vagrant, cryptic or migratory. The qualitative risk assessment found 44 species (40 birds and four bats) to be at more than a negligible risk of collision with an operating turbine.

The qualitative risk assessment identified:

- Up to 38 bird species with a Low collision risk.
- Three bat species with a Low collision risk.
- Two bird species with a Moderate collision risk, including:
 - Wedge-tailed Eagle.
 - Black Falcon.
- One bat species with a High collision risk:
 - White-striped Free-tailed Bat.
- No bird species with a High collision risk.

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Up to two bird and two bat species are considered to have a Low risk of impact as a result of barrier effects for the proposed wind farm layout including; Wedge-tailed Eagle, Black Falcon, White-striped Free-tailed Bat and Gould's Wattled Bat. All other species have no more than a Negligible risk of impact as a result of barrier effect for the proposed wind farm layout.

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An assessment of the impacts on birds and bats from onshore wind farms in Australia has been undertaken by Reid & Baker (2025), where spatial distribution, productivity (based on generation time and population status) and susceptibility (based on flight height, flight manoeuvrability / morphology, flight time for birds and habitat specialisation) were used to determine an overall risk score and rating (low, moderate, high). Reid & Baker's (2025) risk value considers both collision risk and barrier effects at the state-wide scale, without site-specific considerations, and thus cannot be applied directly to the qualitative risk assessment approach applied here, which addresses collision and barrier likelihood and consequence as separate measures that are influenced by species abundance in the locality and flight / movement data collected at the site-specific scale. However, where a species considered herein has been assessed by Reid & Baker (2025), the risk applied by the latter has been considered in the assessment. Some species have had a lower risk applied herein than that proposed by Reid & Baker (2025), generally where there are a low number of records in the locality, where the species has not been recorded by Biosis during field investigations, or the species has been recorded but no flights at RSH have been recorded by Biosis or are considered likely to occur based on the species habitat association and site-specific characteristics.

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2.10.2 Collision risk model

The Biosis collision risk model takes account of bird flights that occur within the height zone that will be occupied by turbines (RSH). Data for the number of flights and their heights was documented by a regime of fixed-time point counts for locations representative of future turbine locations across the site (see Section 2.3). The model uses the empirical sample flight data for each species and extrapolates that to determine a potential number of such flights that might occur over an entire 12-month period. This factor takes into account what is known about seasonal presence of particular species that may be migratory or may be present only for part of the year for other reasons.

The key assumptions and limitations of Biosis CRM include:

- CRM is applicable to diurnal birds but not to bats and nocturnal birds because it can be applied only when the number of flights for a given species can be measured in time and space to provide a *flight flux rate*.
- Diurnal birds that are highly cryptic or occur rarely at a site are usually poorly represented in BUS data and despite a substantial BUS campaign there may still be insufficient data to provide a robust and defensible CRM result.
- Bird utilisation survey data are collected during the pre-approval phase before there are any turbines at the site of a proposed wind farm. Behaviours of birds may change if a wind farm is built and becomes operational at the site, and if that happens it may be in a site-specific manner. It is thus necessary for CRM to assume that bird flight behaviours recorded during pre-approval BUS studies are applicable to the operational phase of the wind farm, but that may not be the case.
- Any collision is assumed to result in a bird mortality. It is possible that some collisions result in non-fatal injuries from which birds recover, but at present, that cannot be measured. The assumption that all collisions are fatal is conservative, but appropriate.

Because the final turbine specifications had not been confirmed at the time of writing this report, two models using different RSH values were used:

- Model 1 with below RSH-1 < 80 metres, RSH-1 = 80-252 metres and above RSH-1 > 252 metres.
- Model 2 with below RSH-2 < 104 metres, RSH-2 = 104-280 metres and above RSH-2 > 280 metres.

Following the results of the BUS that was undertaken across eight seasons, the CRM was run for all species for which there were any flights recorded at impact points within rotor swept height. A total of 115 species of

birds were recorded during BBUS, 88 of which were recorded at impact sites being considered for CRM. While many of them may have capacity to fly at rotor swept height, 18 species were recorded flying at RSH-1 at impact sites, and 12 species at RSH-2. In both cases, one species was an introduced bird species (Common Starling), which was excluded from the CRM analysis. Species not recorded flying within RSH, but that have potential to fly within RSH on occasion, or that were not recorded during BUS due to their cryptic nature, have only been considered in the qualitative risk assessments presented in Section 2.10.1.

CRM results for the all native species recorded flying at RSH at impact sites are shown in Table 2 (model RSH-1) and Table 3 (model RSH-2). Results for the species provided are expressed as projected numbers of annual average collisions across the entire wind farm. It is noted that the model is deterministic and therefore cannot forecast the frequency of collisions around the predicted annual average and it is important to recognise that the number of any actual collisions that might occur can be expected to vary from year to year in a distribution around the average.

Table 2 CRM movements at risk and mortality results for species recorded at RSH-1 (80-252 metres)

Common name	Movements at risk			Mortality (Collisions/Year)		
	Dynamic rotor avoidance rate					
	95%	98%	99%	95%	98%	99%
Australian Magpie	3.78	3.71	3.69	3.74	3.67	3.65
Australian Raven	1.13	1.10	1.08	0.13	1.10	1.08
Australian White Ibis	2.02	0.95	0.60	1.99	0.95	0.59
Black Kite	0.44	0.25	0.19	0.44	0.25	0.19
Black-shouldered Kite	0.44	0.34	0.31	0.44	0.34	0.31
Brown Falcon	0.26	0.21	0.19	0.26	0.21	0.19
Brown Goshawk	0.15	0.10	0.08	0.15	0.10	0.08
Little Eagle	0.06	0.03	0.03	0.06	0.03	0.03
Little Raven	1.67	1.62	1.60	1.67	1.62	1.60
Magpie-lark	0.37	0.35	0.35	0.37	0.35	0.35
Nankeen Kestrel	1.29	1.15	1.10	1.28	1.14	1.10
Spotted Harrier	0.17	0.13	0.12	0.17	0.13	0.12
Straw-necked Ibis	11.64	5.75	3.79	11.54	5.73	3.78
Sulphur-crested Cockatoo	0.31	0.17	0.13	0.30	0.17	0.13
Wedge-tailed Eagle	0.76	0.39	0.26	0.75	0.38	0.26
Welcome Swallow	1.86	1.64	1.57	1.84	1.63	1.56
Whistling Kite	0.55	0.31	0.23	0.54	0.31	0.23

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Table 3 CRM movements at risk and mortality results for species recorded at RSH-2 (104-280 metres)

Common name	Movements at risk			Mortality (Collisions/Year)		
	Dynamic rotor avoidance rate					
	95%	98%	99%	95%	98%	99%
Australian Raven	1.31	1.29	1.29	1.30	1.29	1.28
Australian White Ibis	0.40	0.26	0.22	0.40	0.26	0.22
Black Kite	0.27	0.18	0.15	0.27	0.18	0.15
Brown Falcon	0.22	0.20	0.20	0.22	0.20	0.20
Brown Goshawk	0.15	0.09	0.08	0.14	0.09	0.08
Little Eagle	0.05	0.03	0.02	0.05	0.03	0.02
Magpie-lark	0.43	0.42	0.41	0.43	0.42	0.41
Nankeen Kestrel	1.32	1.27	1.25	1.31	1.26	1.24
Spotted Harrier	0.18	0.14	0.13	0.18	0.14	0.13
Wedge-tailed Eagle	0.44	0.25	0.18	0.44	0.25	0.18
Whistling Kite	0.29	0.20	0.17	0.29	0.20	0.17

On the assumption that the collision avoidance capacity of these species above is at least 95%, the results can be summarised as follows:

- Model RSH-1:
 - 10 species with up to one flight per annum that would be at some risk of collision across the entire wind farm.
 - Six with one to five flights per annum that would be at some risk of collision across the entire wind farm.
 - One with greater than five flights per annum that would be at some risk of collision across the entire wind farm (Straw-necked Ibis).
- Model RSH-2:
 - nine species with up to one flight per annum that would be at some risk of collision across the entire wind farm.
 - two species with greater than one per annum that would be at some risk of collision across the entire wind farm (Nankeen Kestrel and Australian Raven).

Experience with these species at wind energy facilities in south-eastern Australia demonstrates that the following species relevant to the project have been document colliding with wind turbines (Moloney et al. 2019):

- Australian Raven
- Australian White Ibis
- Brown Falcon
- Magpie-lark
- Nankeen Kestrel

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- Straw-necked Ibis
- Wedge-tailed Eagle
- Whistling Kite

Wedge-tailed Eagle avoidance rate

For Wedge-tailed Eagles, there is some published empirical data (Smales 2023) where evidence suggests that the model's projections accurately equate to avoidance capacity of between 0.90 and 0.97. On the assumption that the collision avoidance capacity was 0.90, the mortality rates for Wedge-tailed Eagles would be 1.37 (model RSH-1) and 0.76 (model RSH-2). It is noted that these values remain relatively low compared over wind farms (Hull et al. 2010). Although this may reflect an underestimation of the number of collisions, it is primarily due to the limited number of observations recorded during the survey. The proposed project area consists predominantly of cropped paddocks with limited grazing, which provides few scavenging opportunities for Wedge-tailed Eagles (a limited number of sheep or kangaroo carcasses).

Unidentified raptors and ravens

Up to 6 raptors were not identified to species level at impact sites during BUS, usually due to distance from the observer or lighting conditions. These records have not been included in the above CRM, as they could not be allocated to any particular species. This means that the CRM results are likely underestimated for some species. In the case of unidentified raptors, field notes indicate that these observations were likely Nankeen Kestrels, Whistling Kites, or Brown Falcons.

Number of movements limitation

The Biosis CRM generally requires a minimum of 50 movements from pooled surveys in order to obtain suitable data for analysis and confidence in results. As there are limited movements recorded for Black Kite (24), Brown Falcon (37), Brown Goshawk (3), Little Eagle (2), Spotted Harrier (11) and Whistling Kite (31), the CRM results for these species should be considered to be of a lower accuracy than the results where the minimum 50 movements have been recorded.

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3 Construction and post-construction utilisation surveys

3.1 Bird utilisation surveys

Post-construction BUS will be undertaken by qualified ecologists over a five-year period commencing in the first year of operation, with surveys conducted across all four seasons each year to align with the pre-construction survey program (see Section 2.3.1). The purpose of these surveys is to assess whether the site continues to support the species recorded prior to construction, and to evaluate whether any turbines present a heightened risk to species of concern or other listed species. These surveys will also provide key information to support updates to adaptive mitigation measures when necessary (see Section 6).

Key components of the post-construction BUS include:

- Survey timing will be finalised in consultation with the regulator following project commissioning.
- Surveys will be carried out at the same survey and reference locations as those used during the pre-construction phase, applying consistent methods.
- The BUS will complement carcass search data and assist in identifying indirect impacts of the wind farm on avian use of the site, through comparison of post-construction bird abundance and diversity with baseline conditions.

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3.2 Bat utilisation surveys

Post-construction bat surveys will be undertaken by qualified ecologists over a five-year period commencing in the first year of operation. Surveys will be designed to replicate the pre-construction program to ensure comparability of results (see Section 2.4.1). The objective is to determine whether the site continues to support the species recorded prior to construction and to assess whether turbines present a particular risk to threatened species. These surveys will also provide key information to support updates to adaptive mitigation measures when necessary (see Section 6).

Key elements of the microbat survey program include:

- Surveys will be conducted at approximately the same locations and during similar time periods as the pre-construction surveys, using consistent methods.
- The surveys will complement carcass search data and assist in identifying indirect effects of the wind farm on bat activity at the site.
- Particular emphasis will be placed on detecting species of concern identified during pre-construction surveys and the bird and bat risk assessment, and evaluating potential impacts on these species.

3.3 Black Falcon targeted surveys

Multiple fatalities of Black Falcon at operating wind farms in Victoria have been recently reported by DEECA (DEECA unpublished data). The Black Falcon, listed as Critically Endangered under the FFG Act, is therefore considered a species of particular concern in the context of wind farm development.

Black Falcon activity within the proposed Meering West Wind Farm area has been recorded at low levels, and no breeding has been observed on the Project site or within 2 kilometres at the time of reporting. The qualitative risk assessment identified the project as presenting a Moderate collision risk for this species.

However, due to the absence of breeding observations, the lack of information on avoidance capacity and the absence of flights within RSH recorded at impact points, it is not possible to predict (via CRM) the number of blade-strike events per year for this species. As a precautionary and conservative approach, a targeted monitoring program for Black Falcon will be implemented to avoid disturbance during the breeding season and to better understand site use and potential collision risk.

The survey program for this species will be implemented by qualified ecologists for five years, commencing in the construction phase, and will be reviewed as part of the 5-year review program (see Section 7.1.2). The surveys will build on pre-construction data to determine the presence of breeding pair(s) and further characterise spatial use patterns within the project area, which will enable comparison between pre- and post-construction conditions. The program aims to determine whether Black Falcons breed within or near the project area, and to assess whether turbines pose a specific risk to the species.

Key components of the Black Falcon survey program include:

- An autumn roaming survey will be conducted to identify the presence and location of breeding pairs within the Project area. Each year, an initial survey will be conducted in late April or early May to determine whether Black Falcons are breeding within the survey area. If, during the winter BUS survey (June, July, or August), observations suggest that a nest may have been missed during the initial roaming survey, a second roaming survey will be conducted. If an active nest is detected, it will be monitored monthly to determine its status, from pre-laying through to fledging (April–May to October). This survey program will be implemented in the year construction begins and will continue for at least five years.
- Long-term monitoring of nest occupancy will be conducted. Because Black Falcons can use a range of nest types (from medium-sized corvid nests to larger raptor nests; Whelan et al. 2025), the GPS location of every detected medium- to large-sized nest will be recorded, regardless of whether it is empty or occupied by the target species or another species. Nest locations and status will be collected and/or updated during the roaming surveys. In addition to improving knowledge of Black Falcons, this long-term program will provide supplementary information on other raptor species such as the Wedge-tailed Eagle, Little Eagle, Brown Falcon, Australian Hobby, Black Kite, Whistling Kite, Black-shouldered Kite, and Nankeen Kestrel.
- Additional BUS during the harvest period to further document spatial use patterns of Black Falcons within the project area, during a time when they may be responding to harvest activities.
- Survey timing will be finalised in consultation with the regulator following project commissioning.
- The targeted survey will complement carcass search data and assist in identifying indirect impacts of the wind farm on Black Falcon use of the site, through comparison of post-construction abundance and activity with baseline conditions.

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4 Post-construction mortality monitoring

The main objective of the mortality monitoring program is to provide information about trigger levels and to inform estimates of total annual numbers of collisions, with associated confidence intervals, for all at-risk bird and bat species.

Results of the study are intended to be used in calculating an annual estimate of total mortalities of species recorded, and to initiate adaptive management responses should any of the trigger levels detailed in Section 5 be met as a result of routine monitoring.

The results of monitoring will be used to assess the wind farm's annual performance relative to prescribed thresholds. Depending on the number of collisions detected, the study may also be able to provide information about variable usage of the site by different species.

4.1 Carcass search method

A minimum period of five years of data collection is required to ensure robust results and to provide reliable estimates of bird and bat mortality rates. Several factors, such as carcass scavenging and carcass detectability, can affect mortality rate estimates and will be measured and included in the monitoring program.

Purpose-trained dogs have been shown to be highly efficient at detecting carcasses (Mathews et al. 2013) and have been used for this purpose at a number of wind farms in Australia. Using purpose-trained dogs obviates the need for formal transects to be established in the search zones, as dogs use scent to detect carcasses and are permitted to roam to do so. Transects will be spaced 20 metres apart in optimal conditions, or less in unfavourable scent conditions such as high or still wind or tall vegetation. Every dog will be fitted with a GPS tracking device while undertaking searches. GPS tracks will be downloaded and maintained for future reference and used for analyses of search effort and coverage. GIS maps showing routes taken by dogs will be made available to DEECA on request. The use of trained dogs is the preferred method for searches and will be used, provided appropriately trained dogs and handlers are available and landholders allow dogs onto the wind farm. Dog handler(s) must have demonstrated capacity to identify bird and bat species relevant to northern Victoria.

However, if the use of dogs is not practical in the wind farm the alternative is to use people. Human observers will search by walking transects through the search zones. Searches by people will be undertaken by ecologists with demonstrated capacity to identify bird and bat species of northern Victoria. Transects will be spaced 6 metres apart, or as near to 6 metres as is practical and observers will thus search the ground for 3 metres either side of each transect. Each observer will carry a hand-held GPS unit and record transects they walk. GPS tracks will be downloaded and maintained for future reference and used for analyses of search effort and coverage. GIS maps showing transects walked will be made available to DEECA on request.

A minimum of 50% of carcass searches will be undertaken by purpose-trained dogs, where practical and authorised by landholders.

After the first year of implementation, the methodology and mortality results will be subject to a review, and any refinements of the method will be made in consultation with DEECA and submitted for approval to the Department of Transport and Planning. A detailed report will be prepared at the end of the two-year monitoring program, evaluating the results of the mortality detection program and providing recommendations for the future in response to any issues.

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4.2 Turbine selection

Given the large scale and size of the project, a random sample of 33.3% (one third) of all turbines will be surveyed each month. Under this approach, all turbines will be included in the carcass search regime over a three-month cycle. This cycle involves surveying one-third of the turbines each month—specifically, the first third in month one, the second third in month two, and the final third in month three. Following this protocol, each turbine will be surveyed at least once per season. Note this program may change depending on the number of turbines approved for this project.

Turbines will initially be selected at random; however, stratified adjustments will be applied to ensure adequate spatial representation, particularly for turbines located near ecological vegetation classes known or likely to support species of concern that are vulnerable to collision. Additional adjustments may be made by substituting selected turbines with nearby alternatives to address accessibility constraints and to maintain an approximately even distribution across the site. Survey locations may also be revised if on-site conditions at a preselected turbine are deemed unsafe for surveying most of the designated search radius.

4.3 Search area

Hull and Muir (2010) describe likely fall zones for different turbine types and bird and bat size classes based on ballistics theory. They note that distance from the turbine base is a key factor influencing carcass distribution, with carcass density decreasing as distance increases. Their study presents modelled fall zones and corresponding radii representing expected distribution percentages for two bird size classes and one small bat class.

Given that the final turbine specifications have not yet been confirmed, the carcass search area has been designed using a precautionary and scalable approach. The maximum indicative dimensions currently under consideration include a tower height of up to 194 metres and blade lengths of up to 84.6 metres (i.e. a rotor radius of approximately 85 metres). However, final turbine dimensions may be smaller.

Carcass distribution around turbines is strongly influenced by rotor size and turbine height, with larger turbines generally associated with greater potential fall distances. Accordingly, search effort should be aligned with rotor radius to ensure adequate coverage of the expected fall zone.

In the absence of confirmed turbine specifications, the search design adopts a conservative approach based on the maximum potential dimensions. A primary search radius of up to 120 metres from the turbine base is proposed to capture the majority of expected carcasses, consistent with current understanding of carcass fall patterns for modern, large-scale turbines. Where feasible, an outer search zone extending beyond the primary area (e.g. up to approximately 150 metres) may be included to inform distance-based carcass density modelling.

Once final turbine specifications are confirmed, the search area may be refined to ensure it remains proportionate to turbine size while maintaining sufficient coverage of the likely carcass fall zone. This adaptive approach ensures that the monitoring program remains both effective and efficient across the range of possible turbine configurations.

4.4 Search duration and frequency

Monitoring should commence immediately after the wind farm is commissioned and starts operating. However, given the scale of the project, an interim carcass search program should be implemented in

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consultation with DEECA and the Victorian Government Department of Transport and Planning (DTP). The sections below provide key elements of both interim and operating carcass search programs.

Interim carcass search program

Given that the project is a large wind farm, construction staging of the wind farm will result in clusters of turbines becoming operational at different times. The risk of turbine impacts to birds and bats commences in the timeframe immediately following commissioning and operation of any wind turbine/s, therefore incidental carcass searches must be undertaken.

The interim carcass search program will occur following completion of construction of turbine clusters, once all construction activities have been completed and exclusion areas have been removed, to allow safe access to turbines. Once the turbines are operational, an ecologist will undertake monthly inspections of turbines within each cluster, and incidental searches will be undertaken by site personnel and contractors following additional training.

The interim carcass search program will increase as more turbine clusters become operational, and continue until all turbines become operational, and the operational carcass search program below commences.

Although these searches are not as rigorous as the operational carcass search program, it is important that monitoring occurs as turbines are commissioned to ensure impacted fauna are recorded prior to the commencement of the operational carcass search program.

Operational overall carcass search program

The regime of carcass searching will run for five years and will commence when all turbines are commissioned and become operational at the wind farm (Table 4). At the completion of the first year of the monitoring program results will be collated and an interim report will be prepared. The results will be provided to DEECA and in collaboration with DEECA a determination will be made about any changes to search duration and/or frequency that might be made to improve effectiveness of the monitoring program.

Similarly, at the conclusion of the third and fifth years of the monitoring program, and after analyses of results including the outcome of any mitigation measures implemented, a review will be undertaken in collaboration with DEECA to determine whether any further monitoring is warranted.

A primary purpose of the search regime is to ascertain the frequency at which collisions occur. This is necessary for use in extrapolations to estimate total mortality rates. For this reason, the monthly regime of searches includes a pulse in which two searches are undertaken with a short interval between them. The rationale for this is that there is a high probability that a carcass found on the second search will have collided in the period since the preceding search. This method provides a sound empirical basis for estimation of total collisions from the number of carcasses detected. In each month when a turbine is to be searched, one search will be undertaken followed by a second search three to seven days later (pulse search).

The search regime will provide increased confidence in the tier alert triggers, to ensure the appropriate mitigation responses are initiated.

Table 4 Monitoring requirements for carcass searches

Turbines	Monitoring schedule
Pre-commissioning	
All operational turbine clusters	- Monthly inspections by the project ecologist. - Incidental inspections by site personnel.

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Turbines	Monitoring schedule
Following completion of construction and commencement of operation	
Year 1-2	- Monthly for the first 24 months following commissioning of turbines. - Search in a randomised order over a three-month cycle. - Follow up pulse search 3-7 days later. - Yearly review of sampling frequency to inform year 2 and 3 of the monitoring program.
Year 3	- Protocol revised following year 1 and 2 results and update, if necessary, monitoring requirements/methods in response to adaptive management. - Review of sampling frequency to inform year 4 and 5 of the monitoring program.
Year 4-5	- Protocol revised following year 1, 2 and 3 results. - From five years following commissioning of relevant turbines, sampling frequency thereafter will be informed by a series of scavenger surveys and adaptive management.

Targeted carcass search program for Black Falcon

When an active Black Falcon nest is detected during targeted Black Falcon surveys (see Section 3.3), the carcass search program will be increased to fortnightly surveys for all turbines within a 2-kilometre radius of the nest. These surveys will be conducted throughout the breeding season (April–October), as long as the nest remains occupied, and will be discontinued 15 days after the last evidence of occupancy (with nest status assessed monthly). This survey program will be reviewed in accordance with the same schedule as the overall carcass search program.

In addition, due to the potential increased collision risk during the harvest season, the overall carcass search program will be expanded from 33.3% to 50% of turbines during the monthly and pulse surveys following the peak harvest period (December or January survey). This increased effort will apply only during this period unless otherwise revised through adaptive management.

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4.5 Carcass data collection and management

During all searches, all species of birds and bats detected as carcasses or as bird featherspots, will be recorded on a data pro forma designed for that purpose (see Appendix 2 and Appendix 3). A featherspot is any collection of five or more feathers found grouped together in a manner that suggests a bird has died at the location.

Data will be collected on-site using electronic tablets which will maximise efficiency in data management. All information, including metadata for each turbine search will also be recorded irrespective of whether a carcass is found during a given search. All data will be entered into a single (backed-up) database to be maintained by the wind farm operator. Raw data will be available to relevant regulatory authorities on request. The database must include information on carcasses collected during the search program as well as pertaining to incidental findings or injured fauna. Records of whether carcasses have been retained, disposed of or sent-off site would also be included.

On finding a carcass, it will be photographed *in situ* and its location will be logged using a portable GPS device. Carcasses of all taxa, whether at-risk species or not, will be collected, labelled with relevant data details and frozen to permit any necessary investigations of cause of death and/or for use in future searcher efficiency or persistence trials. A freezer for this purpose will be available on-site. At the conclusion of the overall investigation, all specimens will be made available to the Australian Museum.

Retrieved carcasses of common species may be used later for scavenger trials and as the presence of human scent may influence scavenging rates, it is best to avoid direct human contact. Therefore, to avoid human

scent being imparted to a carcass, and for WHS reasons, gloves must be worn when handling bird and bat carcasses.

Handling and collection of carcasses will be undertaken as follows:

- The carcass must be photographed *in situ* upon discovery.
- Following collection, the carcass must also be photographed in such a way that it can be further identified such as on a white background, adequate lighting, and an indication of scale. For bats, images taken dorsally, ventrally and laterally as well as images showing the outstretched wing, tail, feet, face and male genitalia will assist identification.
- The carcass must be removed from the site by a person wearing rubber gloves.
- The carcass must be placed in a plastic bag and clearly labelled with the date, turbine number, species name (if known), name of collector and a unique specimen code.
- The bagged specimen must be placed in a second bag containing the completed dead or injured bat data sheet (Appendix 3).
- The specimen will be transported to a freezer for further identification or storage for carcass persistence or searcher efficiency trials.

If featherspots or carcasses are not able to be identified by the field surveyor, additional confirmation should be sought if there is potential it could be a threatened species or would trigger a non-threatened species impact trigger. This may include sending photos or the carcass to a species specialist or museum, or DNA testing. If the uncertain carcass can be readily dismissed as a threatened species, a confidence level for the identification could be assigned such as 'likely' or 'probable'.

At the conclusion of the carcass search program any carcasses of interest may be made available to a museum, used for carcass persistence or searcher efficiency trials at another location, or disposed of if deemed appropriate in consultation with DEECA.

4.6 Carcass persistence trials

Carcasses of birds and bats that collide with turbines may be removed by scavengers or will ultimately disappear due to decomposition. Carcass persistence affects the detection of dead bats that collide with turbines and consequently influences estimation of the total number of fatalities for each species.

Trials to determine persistence time of carcasses are required to derive correction factors necessary to estimate total fatalities from the results of the carcass searches. Two persistence trials will be undertaken in each year of the monitoring regime (minimum of three years), one in spring and one in summer/autumn.

Remote cameras will be used to record persistence of carcasses placed on-site for the purpose. Carcasses for the trials will be sourced from bird and bat carcasses found at the site or from other local sources, such as road kills. It is vital that species used are representative of the bird and bat fauna of the wind farm, however, if the collection of carcasses is lower than the requirement for scavenger trial, carcasses will be supplemented with proxies.

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Carcasses used for trials will be individually marked to ensure they are not confused with collision carcasses. Data collected during carcass efficiency trials is to include:

- At the start of the trial period:
 - Carcass unique identification number.
 - Species.
 - Carcass size class.
 - Date and time of placement.
 - GPS coordinates.
 - Distance and direction to associated turbine.
 - Vegetation formation surrounding the potential fall zone.
- Throughout the trial period:
 - Date and time of the scavenger visit(s).
 - Presence or absence of the carcass.
 - Carcass condition (intact, partially scavenged, heavily scavenged).
 - Scavenger species (or probable scavenger).
 - Signs of scavengers in the area (e.g., tracks, scat).
 - Any changes to habitat or visibility.

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Individual marking allows trial carcasses to be identified if they are simply moved by scavengers. Radio-frequency identification microchips inserted into carcasses will be used to provide individual identification. Cameras used for the purpose will be set to take a photograph every hour (day and night) and also when triggered by movement and infrared. This method has been demonstrated in Victoria to be highly efficient and substantially reduces potential influence on scavengers, as may occur when human observers visit frequently to check carcasses. Cameras are deployed and left to operate for the duration of the trial as this entails substantially less effort than having people check carcasses daily. Cameras have the additional advantage of recording the precise time of carcass removal and the species of scavenger that removes a carcass. As a result of the precise documentation of the time of carcass removal there is no need to estimate the period of carcass persistence which is required when carcasses are checked only at an interval of several days. Censored analysis will be required when carcasses persist beyond the trial period (Klein & Moeschberger 2010).

The field of view for the cameras is limited and scavengers can simply move a carcass out of that view. To check for this, each trial will commence approximately one week before the next routine search for carcasses.

In each trial, a total of 10 carcasses of birds and 10 carcasses of bats will be distributed under 20 randomly chosen turbines across the wind farm. Each trial will run for up to one month, but cameras will be checked after two weeks to confirm their operation and at that point the trial may be terminated if the carcass has been removed or a second carcass may be placed to increase the sample size of the trial.

The results of these trials will permit average carcass persistence times to be determined. The resulting persistence rates will be used in analyses to estimate total numbers of mortalities.

4.7 Searcher efficiency trials

Searchers do not routinely find all carcasses, so it is necessary to ascertain the efficiency of searchers to determine and apply appropriate correction factors for carcasses missed and therefore inform estimation of total collision mortality for at-risk species.

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The efficiency of each dog or person undertaking searches will be determined by the use of blind trials. Without the prior knowledge of searchers, a known number of bat carcasses will be placed within search plots prior to routine searches. Carcasses will be placed in sufficient numbers, at a range of turbines and over sufficient time to permit the rate of carcass detection to be adequately determined. After the trial, the person who placed the carcasses will collect any that have not been detected and document whether any carcasses have been scavenged to ensure accuracy of the searcher efficiency trial. The number and type of carcasses found during the searcher efficiency trials will be compared with the known number and type of carcasses placed under the turbines.

Data collected during carcass efficiency trials is to include:

- Date, time and duration of survey.
- Name and description of searcher(s) (dog and/or human).
- GPS tracklog of search path.
- Prevailing weather conditions (e.g., temperature, wind speed and direction).
- For each trial carcass used:
 - Carcass unique identification number.
 - Species (genus and species).
 - Carcass size class.
 - Carcass condition at placement (intact, partially scavenged and/or decomposed).
 - Date and time of placement.
 - GPS coordinates.
 - Distance and direction to associated wind turbine.
 - Vegetation formation within the potential fall zone.
 - Found or missed by the searcher.

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An example data sheet for searcher efficiency trials is provided in Appendix 4.

Two searcher efficiency trials will be undertaken for each searcher in each year of the monitoring regime, one in spring and one in autumn.

Carcasses for the trials will be sourced from bird and bat carcasses found at the site or from other local sources such as road kills. It is vital that species used are representative of the bird and bat fauna of the wind farm. Carcasses used for the purpose should be marked to ensure they are not confused with previously undetected collision carcasses, but in a manner that does not draw the attention of the searcher.

At any time that new search personnel or dogs are employed to undertake searches, the rate of their detection ability must also be evaluated by a searcher efficiency trial as detailed herein.

4.8 Incidental finds of bird and bat carcasses

It is possible that during the life of the wind farm, bird and bat carcasses will be discovered incidentally by site personnel. Therefore, all site personnel will be trained on procedures for the event in which they encounter dead or injured birds and bats. Upon incidental discovery, carcasses and featherspots must be photographed *in situ*, however, the carcass or featherspot must be left where it was found to eliminate bias to detection rates of the official search regime. Any member of the site personnel who finds a carcass of a bird or bat must

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complete the relevant carcass data sheet (Appendix 3). Copies of carcass data sheets must be available on site for use by all site staff.

4.9 Injured birds and bats

Injured birds and bats may be encountered during carcass searches or incidentally. Handling injured birds and bats requires specialist skill as there is the risk of injury to both animals and people and there is potential for disease transmission in some cases. To reduce the risk associated with Australian Bat Lyssavirus, any injured bats must be handled only by people who have up-to-date rabies vaccination (an appropriate level of antibodies for the rabies virus, based on vaccination, is considered to offer the best available protection against Australian Bat Lyssavirus). The details of any injured birds and bats found will be recorded on a dead or injured bird and bat data sheet (Appendix 2 and Appendix 3).

Assistance with injured wildlife may be required from local wildlife carers and local relevant veterinarians. This ensures that arrangements are in place for acceptance and treatment of any injured birds or bats. Arrangement must be kept current and current telephone numbers for local carers must be readily available to all site personnel (e.g., on their mobile phones). Where an injured animal can be readily captured it should be placed into a tied calico bag or a box and kept in a quiet and dark location while it is transported to a veterinarian for treatment. No staff are to handle injured bats. In the event that an injured animal cannot be readily captured site personnel should telephone relevant local carers or suitably qualified ecologists for assistance, and record the details the relevant data sheet (Appendix 2 and Appendix 3).

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5 Adaptive management triggers and actions

This section defines impact triggers and associated adaptive management responses for bird and bat mortality during operation of the wind farm. The framework is consistent with the Victorian guidelines for managing impacts of renewable energy on the environment and adopts a precautionary, evidence-based approach.

Impact triggers are based on numbers of detected mortalities (carcasses, feather spots or injured individuals) recorded during formal monitoring or incidentally. Trigger levels are set conservatively, recognising uncertainty in detectability and population size, and are intended to initiate investigation and response well below levels likely to result in significant population impacts.

The objective of the framework is to ensure that impacts do not result in a significant adverse effect on the viability of any local or regional population.

5.1 Listed species impact trigger

5.1.1 Definition of impact trigger for listed species

An impact trigger for listed species occurs where any individual bird or bat listed as threatened and/or migratory under the EPBC Act or FFG Act (or recognisable remains) is found dead or injured within the wind farm during mortality searches or incidentally during construction, commissioning or operation.

5.1.2 Definition of (cumulative) impact trigger for Black Falcon

An impact trigger for Black Falcon occurs where an individual is found dead or injured within the Project site or, Meering West Wind Farm has been advised by DEECA (or relevant agency) and provided with evidence of an individual being found dead or injured at a wind energy facility within 20 kilometres (to closest wind turbine) of the Project.

5.1.3 Impact trigger procedure

Where a listed species trigger is reached, the following actions must be implemented:

- Notification: the detection must be reported to the Project Environmental Manager immediately upon detection and identification and to DEECA (and DCCEE, where relevant) within two business days.
- Initial investigation: an investigation must commence within 10 business days. The objectives of this investigation are to:
 - confirm cause of death/injury (where possible).
 - assess environmental and operational conditions at the time of impact.
 - identify any behavioural or site-specific risk factors.
 - assess the likelihood of recurrence.
- Enhanced monitoring: carcass search effort must be increased in the vicinity of the detection to determine whether the event is isolated or ongoing.

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- Assessment of impact: the investigation must consider whether the event represents a one-off or highly unlikely occurrence, or a potentially recurring impact with risk to the species at a population scale.
- Management response:
 - If the impact is assessed as a one-off with negligible population risk, no further action is required beyond routine monitoring.
 - If uncertainty remains, targeted monitoring and/or investigation must continue for up to six weeks, in consultation with DEECA (and DCCEEW, where relevant).
 - If the impact is likely to recur or may affect population viability, species-specific mitigation measures must be developed and implemented as soon as practicable.
- Further measures: where mitigation is not feasible or effective, additional measures (including offsets, if required) must be developed in consultation with DEECA and DCCEEW.

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5.2 Non-listed species impact trigger

5.2.1 Definition of impact trigger

An impact trigger for non-listed species occurs where:

- For general bird and bat species, five or more carcasses (or recognisable remains) of a single species are detected within a two-month period under the same or adjacent within a 1-kilometre radius.
- For raptors, four or more carcasses of non-listed raptor species are detected within a two-month period under the same or adjacent within a 1-kilometre radius, or six or more carcasses of a single non-listed raptor species is detected within a 12-month period.

Trigger levels do not apply to introduced species; however, all detections will be recorded and reported.

5.2.2 Impact trigger procedure

Where a non-listed species trigger is reached, the following actions must be implemented:

- Notification: DEECA must be notified within seven business days of confirming the trigger.
- An investigation must be undertaken within three weeks to:
 - Characterise the mortality events (timing, weather, seasonality).
 - Assess spatial patterns (e.g. turbine-specific clustering).
 - Identify habitat or behavioural risk factors.
 - Evaluate the likelihood of recurrence.
- Assessment of significance: the investigation must determine the significance of the mortalities at the population level, and whether the mortality is likely to have a meaningful effect on the local population, or represents a low or uncertain risk of population-level impact.
- Monitoring response:
 - If the event is assessed as isolated and low risk, no further action is required beyond routine monitoring.
 - If uncertainty remains, targeted monitoring must be undertaken for up to six weeks to assess recurrence.
- Adaptive management: if impacts are determined to be recurring or may pose a population-level risk:

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- Appropriate mitigation measures must be developed and implemented.
- Measures may include turbine-specific actions (e.g. operational curtailment), deterrents, or other evidence-based responses.
- Effectiveness of mitigation must be monitored and reviewed.
- Reporting and consultation: a summary report of the investigation and proposed actions must be provided to DEECA, and implementation of mitigation measures must be undertaken in consultation with the regulator.

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6 Applying measures under the mitigation hierarchy

This section outlines preventive mitigation measures to minimise the risk of bird and bat mortality prior to the activation of any impact triggers. These measures form part of standard operational practices and are designed to reduce attractants and risk factors associated with turbine collisions. As part of the adaptive management framework of the BAMP, the below mitigation measures are subject to change throughout the duration of the project based on the results of monitoring surveys or new alternative mitigation measures that may be more effective or appropriate for the site (see Section 7). The mitigation presented below will be implemented for five years once the Project is commissioned and operational. The effectiveness of these measures will be assessed at the end of the five-year period, and, if required, changes will be made to the BAMP following this review.

Sections 6.1 and 6.2 present proposed mandatory mitigation measures, and sections 6.3 and 6.4 provide suggestions for additional mitigation measures and compensation measures. All these measures and species benefiting from them are presented in Table 5.

Table 5 List of mitigation measures and compensation measures proposed for Meering West wind farm.

Measure	Species targeted	Other species
Proposed mandatory mitigation measures		
Setbacks from wetlands and local curtailments	- Migratory shorebirds - FFG listed duck species	- All waterbird species utilising the Project area - White-bellied Sea-Eagle - White-throated Needletail - Fork-tailed Swift - Bat species
Invasive prey species management	- Black Falcon - Little Eagle	- All raptor species utilising the Project area
Carcass removal	- Wedge-tailed Eagle	- All raptor species utilising the Project area
Minimising raptor perch sites	- Black Falcon - Little Eagle - Wedge-tailed Eagle	- All raptor species utilising the Project area
Nest identification	- Black Falcon - Little Eagle - Wedge-tailed Eagle	- All medium and large bird species utilising the Project area
Curtailment during key agricultural activities	- Black Falcon - Little Eagle	- All raptor species utilising the Project area and attracted by agricultural activities
Additional mitigation measures in response to impact triggers		
Feathering	- Bat species	- All bird species flying at RSH

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Measure	Species targeted	Other species
Low windspeed curtailment	- Bat species	- All bird species flying at RSH
Informed curtailment	- Bat species	- All bird species flying at RSH
Automated on-demand shutdown	- Black Falcon - Little Eagle - Wedge-tailed Eagle - White-bellied Sea-Eagle	- White-throated Needletail - Fork-tailed Swift
Compensation measures in case of residual impact		
Improved foraging and breeding habitat	- Any relevant species	This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright
Contribution to species knowledge	- Any relevant species	

6.1 Setbacks from major wetlands and Salt Lake curtailments

For threatened and migratory shorebird species, high-quality habitat within the project area is largely limited to a 20-hectare temporary saline lake (Salt Lake; 35.8210°S, 143.7860°E), located near the north-eastern boundary of the site (Figure 1). The wetland is recorded in the Victorian Wetland Inventory (wetland 43165) as an intermittently inundated freshwater Temporary Lignum Swamp; however, field observations indicate higher salinity, with salt deposits visible during dry periods. The lake is not permanent and becomes inundated following significant local rainfall events (e.g. 2011, 2022, and 2026), retaining water for up to 30 months and providing temporary foraging habitat for shorebirds and other waterbirds.

To reduce the risk of collision for threatened and migratory shorebird species, Meering West Wind Farm will propose to implement the following mitigation measures:

- Establishment of a permanent, turbine-free buffer of 500 metres around Salt Lake and 900 metres around Great Spectacle Lake.
- Day and night curtailment of wind turbines 16, 10 and 5 during periods when the wetland retains water. These turbines are located along the eastern boundary of the project, between Salt Lake and the wetland system to the east and south-east, where bird movements are likely to be concentrated due to the presence of adjacent foraging and movement corridors. Other turbines located to the west and north of the lake are considered to represent a lower collision risk, as no other wetlands or comparable habitat features are situated within 10 kilometres in these directions, and therefore lower levels of bird activity are expected in these areas.

Although these measures have been designed primarily to reduce potential impacts on species migratory shorebird species, they are also expected to benefit all threatened (White-throated Needletail, Forked-tailed Swift, White-bellied Sea-Eagle and FGG listed duck species) and non-threatened bird and bat species that utilise wetland habitats within and surrounding the project area.

Salt Lake will be closely monitored by an ecologist to determine when the system changes hydrological state (from fully dry to retaining water, or from retaining water to fully dry).

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A local rainfall event exceeded 70 mm within two consecutive days (necessary rainfall event to refill Salt Lake; see Appendix 6), will trigger the immediate curtailment of wind turbines 16, 10 and 5. Within 72 hours of the rainfall event the lake will be inspected by an ecologist, or other qualified professional.

Monitoring

Following a refilling event, photographs will be collected monthly to monitor the state of the lake. The duration for which Salt Lake contains water can vary substantially, depending on the frequency of significant rainfall events capable of maintaining the wetland state. Such events will be reported if determined necessary.

Recommendencing turbine operation

A change of state from containing water to dry will be confirmed by an ecologist and reported to DEECA (and DCCEE, if relevant) prior to resuming operations of the three turbines.

6.2 Preventive mitigation measures for raptor species

6.2.1 Invasive prey species management

A management program for the control of invasive species likely to attract raptors (including Black Falcons) must be implemented for the life of the wind farm. This program includes, but is not limited to:

- Ripping of rabbit warrens throughout the Project area, to be implemented prior to wind farm commissioning.
- Minimising grain spillage to prevent attracting prey species such as rodents, Feral Pigeons, or Common Starlings.

It is noted that it is the responsibility of Meering West Wind Farm to implement these measures appropriately, in liaison with landholders.

6.2.2 Carcass removal

While most of the site is used for cropping, the timely removal of carcasses of livestock and other larger animals including feral species, from the wind farm may help reduce the incidence of collision with turbines by raptors that routinely feed on carrion and may be attracted to carcasses. Carcasses of birds and bats that may have resulted from collisions with turbines are not to be removed as part of this process.

A carcass removal program must be implemented for the life of the wind farm and will apply to any carcass other than those of birds and bats, found within 200 metres of all turbines or along public road and access tracks. All site personnel (staff and contractors) must be inducted into a reporting procedure that will apply during all wind farm operations, including collision carcass searches (see below). The wind farm must implement a routine for removal and burial or appropriate disposal of any carcass within 24 hours of its discovery. Any program of feral animal control on the wind farm will include the removal of all carcasses from the wind farm site. The wind farm has legal agreements that cover specific areas including all its

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infrastructure, roads and hardstand areas. This condition is enforceable on land areas covered by those agreements.

6.2.3 Minimising raptor perch sites

The earliest wind farms used turbines with lattice towers that provided multiple perching opportunities for raptors and this attraction to those turbines was implicated in high rates of turbine collisions. As with all modern turbines, the towers to be used for the project are monopoles that offer no perching opportunities for raptors or other bird species.

Trees and other features provide natural perching sites for raptors. It is not known whether these perches are used more frequently than any others, but from the variety of raptor species identified in the vicinity, there can be no doubt that raptors will use multiple natural sites as perches. It is not considered to be appropriate to remove natural perches or to otherwise actively attempt to discourage birds from using natural perches.

It is possible that raptors of various species may frequent favoured perch locations within 200 metres of a turbine during the operational life of the wind farm. Wind farm operations personnel will be provided with training in the basic identification of raptor species. If a potentially favoured raptor perch site is detected within 200 metres of a turbine, a qualified ecologist will be called in to confirm identity of the species and to ascertain whether the perch location represents heightened risk to a threatened species. If so, DEECA will be notified and a strategy to reduce risk will be determined. Removal of the perch site may be considered if it is a dead tree and there is a reasonable likelihood of reducing risk by doing so. It is noted that removal of any native vegetation (even dead) will be subject to relevant environment approvals.

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6.2.4 Black Falcon mitigation measures

Black Falcon nest disturbance

As outlined in Section 3.3, yearly targeted surveys for Black Falcon will be implemented to determine whether the species is breeding within the Project area. If a nest is detected, the following mitigation measures will apply:

- Construction, heavy maintenance (requiring ground disturbance), and decommissioning must not be conducted within 200 metres of an active nest during the breeding season.
- During operation, all turbines within 300 metres of an active nest must be curtailed during daytime hours.

These measures will apply until a qualified ecologist has confirmed that the nest is no longer in use (i.e., is abandoned or post-fledging).

Curtailment during key agricultural activities

Agricultural activities (such as harvesting and stubble burning) can flush small prey species and create foraging opportunities for raptors, including Black Falcon. Given that much of the project area is actively cropped, these activities have the potential to temporarily increase raptor presence and foraging behaviour in proximity to operating turbines, thereby elevating collision risk.

To minimise this risk, temporary turbine curtailment (during daylight hours) must be implemented when harvesting operations or stubble burning are occurring within approximately 500 metres of a turbine, or an alternative distance informed by site-specific observations and monitoring data. This approach aims to

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reduce the likelihood of raptors being attracted into the rotor-swept area during periods of heightened foraging activity. This measure will also reduce the risk of collision for other raptor species.

It is noted that it is the responsibility of the Proponent to implement these measures appropriately, ensuring that farming practices and operational requirements are not adversely affected by the application of the BAMP.

6.3 Additional mitigation measures in response to impact triggers

As outlined in Section 3, surveys will be implemented to further characterise species specific use of the Project area and to assess potential interactions with wind turbines. The outcomes of this program, together with routine mortality monitoring (see Section 4), will inform the application of the impact triggers pathway described in Section 5. Where an impact trigger is reached, the procedures set out in Section 5 will guide the investigation, monitoring, and implementation of appropriate mitigation measures.

This section describes the range of mitigation measures that may be implemented where impact triggers are reached during operation of the wind farm. The selection and application of measures will be guided by investigation outcomes, the characteristics of the affected species, and the likelihood of ongoing impacts. Measures will be adaptive and may be refined over time to ensure their effectiveness. All measures will be developed and implemented in consultation with DEECA (and DCCEEW, where relevant).

As part of the Renewables Environmental Research Initiative, funded by the Australian Government, the Arthur Rylah Institute for Environmental Research has reviewed the effectiveness of mitigation measures for onshore wind farms (van Harten et al. 2026). Table 6 presents a summary of the most relevant measures that could be applied to Meering West Wind Farm as part of the adaptive management plan.

Table 6 Summary of potential measures applied in response to impact triggers

Mitigation measure	Description	Relevance to the project	Feasibility
Feathering	Prevents turbine blades from spinning when wind speeds are below the cut-in wind speed (minimum wind speed to produce energy).	Feathering is primarily applied for insectivorous bats, as they are more active when wind speeds are low. Therefore, reducing blades turning when there are higher levels of insectivorous bat activity will result in fewer fatalities.	Energy loss and revenue cost for feathering below this speed is negligible, and no upfront costs are required.
Low windspeed curtailment	Operational mitigation measure that involves raising the specified wind speed at which turbines begin to produce energy (the 'cut-in speed') during periods of highest risk to wildlife.	Low wind speed curtailment is known to be effective for a range of insectivorous bat species, with seasonal nighttime low windspeed curtailment has been shown to be effective in reducing collision impacts for microbats in Victoria.	There are expected to be greater costs to energy generation and revenue with the application of higher cut-in speeds and longer periods of curtailment, however costs will vary and need to be estimated on a site-specific basis. Activity data and carcass monitoring will provide necessary information in order to optimise mortality reductions

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Mitigation measure	Description	Relevance to the project	Feasibility
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Informed curtailment	Operational mitigation measure that involves additional factors other than just wind speed (and season/time of day), such as weather variables (temperature, rainfall) and/or acoustic detection of bat calls, into curtailment regimes. Also known as “smart” curtailment, this measure typically aimed at reducing energy losses compared to comparable low wind speed curtailment strategies.	Implementation of informed curtailment approaches would need to be developed based on local bat species and activity patterns, and acoustic-triggered systems require regional call data and testing. This measure has the potential to be effective for insectivorous bats.	Informed curtailment approaches include up-front costs for the development and training of algorithms, system installation and testing, as well as ongoing costs from curtailment-related energy losses, and the maintenance and periodic replacement of system components. Applying this measure will therefore require a multi-phased approach, with adequate time and resourcing for data acquisition, creation of site approach, ongoing monitoring, and subsequent refinement informed by monitoring outcomes.
Manual shutdown/curtailment	Operational mitigation measure that involves the curtailment of turbines during identified high-risk periods.	This measure can be put in place during and immediately following farming activities that can attract raptors, or following extreme weather events such as local inundations or regional floods resulting in increased waterbird and bat activity.	Costs will vary widely depending on a range of factors, especially the period of time that shutdowns would occur over. Note that this measure is already proposed to be applied to three turbines that would be located in the vicinity of Salt Lake (see Section 6.1).
Automated on-demand shutdown	Operational mitigation measure that involves a rapid ceasing of turbine rotation when triggered by the detection of an approaching (flying) animal belonging to a target species or group.	The relevance of on-demand shutdown approaches for different bird taxa is an area which requires further investigation. In the case of a large project such as Meering West Wind Farm, it is unlikely that this system could be applied to all the turbines. In this context, this measure would more likely be applied to single	Total expenditure will depend on the proprietary system chosen and infrastructure required (e.g. the number of cameras), the time and expertise needed to train an automated system on local target species or groups, and the cost of infrastructure installation.

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Mitigation measure	Description	Relevance to the project	Feasibility
		turbines that have been identified to be more at risk for specific reasons.	

6.4 Compensation measures in case of residual impact

If residual impacts are recorded despite the implementation of the mitigation measures described in Sections 6.1, 6.2, and 6.3, best-practice compensation measures will be developed and implemented to ensure the best possible outcomes for the species. The selection of measures will be species-specific and guided by emerging project-specific monitoring data and broader scientific understanding. Measures may include the following:

- Investigating methods to improve foraging and breeding success outside the Project area, such as the creation of artificial nests or roosts, and the enhancement of safe (where human impact is minimised) flight corridors and foraging habitat.
- Contributing to improved ecological knowledge of target species through either direct funding of research within the Project area or supporting relevant research institutions to undertake applied studies.

This list of measures is not exhaustive and will be refined over time as part of the adaptive management framework of the BAMP. It reflects both the inherent uncertainty in potential residual risk and the progressive reduction of knowledge gaps as additional data becomes available prior to and during project operation.

In the case of the Black Falcon, targeted research contributions to species ecology and behaviour could be initiated prior to the Project becoming fully operational. This could include the following options:

- Deploying flight detection and recognition systems (such as Identiflight) to train algorithms to identify Black Falcons specifically, and other species where relevant. In addition to supporting automated, on-demand turbine curtailment (see Table 6), the resulting dataset would provide site-specific information on activity and flight heights.
- Implementing a telemetry-based tracking program to collect continuous data on movement patterns, behavioural activity, and flight heights. Such data would help refine both mitigation and compensation measures, particularly those aimed at enhancing foraging and breeding habitat suitability.

It is noted that the implementation of these approaches would require either relatively high Black Falcon activity (to support effective training of flight detection systems) and/or access to active nests for capture and tagging. In the case of the Project, limited activity has been recorded over two years of surveys (BUS and targeted surveys), and no nests have been identified within two kilometres of the Project area (targeted surveys). As such, feasibility and timing of implementation would need to be further assessed in consultation with DEECA.

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7 Reporting requirements

7.1 Impact trigger reporting

DEECA and/or DCCEEW must be notified when impact triggers are met (Section 5) where the species is threatened under the FFG Act or EPBC Act or considered at-risk. An investigation into likely causes of the trigger-level mortalities will be conducted within 10 business days and submit the results of this investigation to DEECA/DCCEEW within 10 business days of the investigation report being completed by the qualified ecologist. This would include:

- The impact trigger level that was reached and the relevant turbine/s at which it occurred.
- Details regarding the incident, including:
 - Type of find (incidental or formal monitoring, human, dog).
 - Detection date.
 - Turbine number/s.
 - Distance from tower base.
 - GPS Coordinates.
 - Species.
 - Age (juvenile or adult) and sex.
 - Number of carcasses detected.
 - Map showing the strike location/s in relation to turbine/s.
 - Photographs of the carcass/feather spots.
- A discussion of the identified operational, land management, or ecological factors (environmental and seasonal) contributing to the impact trigger and an assessment on whether the event is likely to be rare or regular and the risk of the event constituting an adverse impact on the species at either a local or total population scale.
- A discussion on any proposed management interventions including rationale for selection of mitigation measures, timing and duration of implementation, and any monitoring that will be implemented to measure their effectiveness.
- Where no management interventions are proposed, justification for this must be provided.

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7.1.1 Annual reports

Following each year of the monitoring program described in Section 4, the program findings will be compiled into an annual report and submitted to DEECA, and/or DCCEEW within two months of final survey completion for that monitoring year. The report will include, but not be limited to:

- Results of the ongoing operational monitoring program for birds and microbats. This will include a summary of survey effort and methodology, data analysis and a discussion of the findings of the surveys including comparisons with baseline data and interpretation of the findings in the context of prevailing environmental conditions.
- Results of carcass persistence trials and searcher efficiency trials undertaken and commentary on the implications for the carcass search monitoring program.

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- Results of the carcass search monitoring program including:
 - Total number, dates recorded and locations of carcasses/featherspots detected of each species.
 - Statistical analysis that provides estimates of the annual total number of collisions for each species, taking into account search area, effort, persistence times and detectability rates.
- Summary of any injured wildlife recorded and outcomes.
- Maps showing mortality monitoring undertaken, turbine layout, turbines monitored (including areas subject to higher frequency monitoring), and searcher coverage of all fall zones (GPS tracks).
- If implemented, description of any mitigation measures including the nature, timing and duration of these measures and the results of any monitoring to determine their effectiveness, and commentary on their success or otherwise.
- Reassessment of the mitigation strategies to be implemented over the following year of operation, including consideration to the actual/ extrapolated impacts to bird and bat species calculated across the preceding year, as well as associated mitigation measures and potential additional offsets for the following year of operation.
- Summary of any correspondence with DEECA and/or DCCEEW including any directions issued by either department on mitigation measures to be implemented.
- Discussion of environmental factors or significant events that may have influenced data collection (e.g., significant weather events such as drought or flooding).
- A record of all activities associated with conditions of approval and this plan, including measures taken to implement the plan.
- Information about whether the outcomes of this plan have been or are on track to being met.

7.1.2 BAMP review

The BAMP will be reviewed at any time in response to:

- An incident.
- Submission of relevant reporting.

If not reviewed before, the BAMP will be reviewed after five years following the commissioning of the wind farm. The review should consider the following:

- Ongoing process improvement and incorporation of new technology.
- Target species risk assessment updates based on actual turbine strike impacts, including monitoring data and incidental species sightings.
- Analysis of flight paths and habitat predictions and collisions to date compared against actual turbine strike impacts to date, including monitoring data and incidental species sightings.
- Improvements to the monitoring program including methods.
- Adjustments to impact thresholds and adaptive management plans.
- Unforeseen limitations and issues during operation.

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- Discontinuation of mitigation measures if no longer required or proven not effective.

Where the review results in the revision to the BAMP, consultation with DEECA and DCCEEW will be undertaken as relevant.

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Appendices

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Appendix 1 BBUS data

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Table A 1 Abbreviations and symbols relevant to this Appendix

Code	Meaning	Reference	purpose which may breach a copyright
National listings			
CR	Critically endangered	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	
EN	Endangered		
VU	Vulnerable		
State listings			
cr	Critically endangered	Victorian <i>Flora and Fauna Guarantee Act 1988</i> (FFG Act)	
e	Endangered		
v	Vulnerable		

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Table A 2 Bird species recorded from the study area

Status	Scientific name	Common name	Recorded during BBUS
v	<i>Struthidea cinerea</i>	Apostlebird	-
-	<i>Anhinga novaehollandiae</i>	Australasian Darter	-
-	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	-
-	<i>Anthus novaeseelandiae</i>	Australasian Pipit	Impact, control
v	<i>Spatula rhynchotis</i>	Australasian Shoveler	-
-	<i>Porphyrio melanotus</i>	Australasian Swamphen	-
-	<i>Falco longipennis</i>	Australian Hobby	Impact, control
-	<i>Cracticus tibicen</i>	Australian Magpie	Impact, control
-	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	Impact
-	<i>Pelecanus conspicillatus</i>	Australian Pelican	Impact, control
-	<i>Corvus coronoides</i>	Australian Raven	Impact, control
-	<i>Tadorna tadornoides</i>	Australian Shelduck	Impact, control
-	<i>Threskiornis molucca</i>	Australian White Ibis	Impact, control
-	<i>Chenonetta jubata</i>	Australian Wood Duck	Impact, control
-	<i>Porzana pusilla</i>	Baillon's Crake	-
-	<i>Vanellus tricolor</i>	Banded Lapwing	Impact
cr	<i>Falco subniger</i>	Black Falcon	Impact, control
-	<i>Sugomel nigrum</i>	Black Honeyeater	-
-	<i>Milvus migrans</i>	Black Kite	Impact, control
-	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Impact, control

Status	Scientific name	Common name	Recorded during BBUS
-	<i>Artamus cinereus</i>	Black-faced Woodswallow	Impact
-	<i>Elseya melanops</i>	Black-fronted Dotterel	-
-	<i>Elanus axillaris</i>	Black-shouldered Kite	Impact, control
-	<i>Tribonyx ventralis</i>	Black-tailed Native-hen	-
-	<i>Cygnus atratus</i>	Black Swan	-
-	<i>Northiella haematogaster</i>	Blue Bonnet	Impact, control
v	<i>Oxyura australis</i>	Blue-billed Duck	-
-	<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	Impact, control
VU, v	<i>Neophema chrysostoma</i>	Blue-winged Parrot	-
-	<i>Falco berigora</i>	Brown Falcon	Impact, control
-	<i>Accipiter fasciatus</i>	Brown Goshawk	Impact, control
-	<i>Synoicus ypsilophorus</i>	Brown Quail	-
-	<i>Cincloramphus cruralis</i>	Brown Songlark	Impact, control
-	<i>Acanthiza pusilla</i>	Brown Thornbill	Impact
VU, v	<i>Climacteris picumnus</i>	Brown Treecreeper	Impact, control
-	<i>Melopsittacus undulatus</i>	Budgerigar	-
-	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill	Impact, control
M, v	<i>Hydroprogne caspia</i>	Caspian Tern	-
-	<i>Anas castanea</i>	Chestnut Teal	-
-	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	Impact, control
-	<i>Nymphicus hollandicus</i>	Cockatiel	Impact, control
-	<i>Turdus merula</i>	Common Blackbird*	Control
-	<i>Phaps chalcoptera</i>	Common Bronzewing	Impact
EN, M, e	<i>Tringa nebularia</i>	Common Greenshank	-
-	<i>Acridotheres tristis</i>	Common Myna*	Impact, control
-	<i>Sturnus vulgaris</i>	Common Starling*	Impact, control
-	<i>Ocyphaps lophotes</i>	Crested Pigeon	Impact, control
VU, v	<i>Stagonopleura guttata</i>	Diamond Firetail	-
-	<i>Gallinula tenebrosa</i>	Dusky Moorhen	-
-	<i>Artamus cyanopterus</i>	Dusky Woodswallow	Impact, control
v	<i>Ardea alba modesta</i>	Eastern Great Egret	-
-	<i>Platycercus eximius</i>	Eastern Rosella	Impact, control
-	<i>Fulica atra</i>	Eurasian Coot	-
-	<i>Alauda arvensis</i>	Eurasian Skylark*	Impact

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Status	Scientific name	Common name	Recorded during BBUS
-	<i>Petrochelidon ariel</i>	Fairy Martin	Impact, control
M	<i>Apus pacificus</i>	Fork-tailed Swift	Control
e	<i>Stricktonetta naevosa</i>	Freckled Duck	-
-	<i>Eolophus roseicapillus</i>	Galah	Impact, control
-	<i>Pachycephala inornata</i>	Gilbert's Whistler	Impact
-	<i>Pachycephala pectoralis</i>	Golden Whistler	Impact
-	<i>Cisticola exilis</i>	Golden-headed Cisticola	-
-	<i>Phalacrocorax carbo</i>	Great Cormorant	Impact, control
-	<i>Podiceps cristatus</i>	Great Crested Grebe	-
-	<i>Cracticus torquatus</i>	Grey Butcherbird	Impact, control
-	<i>Rhipidura albiscapa</i>	Grey Fantail	Impact
-	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	Impact
-	<i>Anas gracilis</i>	Grey Teal	Impact, control
v	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	Impact, control
v	<i>Aythya australis</i>	Hardhead	-
-	<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe	-
EN, v	<i>Melanodryas cucullata</i>	Hooded Robin	Impact
-	<i>Chrysococcyx basalis</i>	Horsefield's Bronze-Cuckoo	-
-	<i>Passer domesticus</i>	House Sparrow*	Impact, control
-	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	-
VU, v	<i>Gallinago hardwickii</i>	Latham's Snipe	-
-	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	-
-	<i>Catantua sanguinea</i>	Little Corella	Impact, control
v	<i>Hieraaetus morphnoides</i>	Little Eagle	Impact
v	<i>Egretta garzetta</i>	Little Egret	-
-	<i>Poodytes gramineus</i>	Little Grassbird	-
-	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	-
-	<i>Corvus mellori</i>	Little Raven	Impact, control
-	<i>Cacatua tenuirostris</i>	Long-billed Corella	Impact, control
-	<i>Grallina cyanoleuca</i>	Magpie-lark	Impact, control
-	<i>Vanellus miles</i>	Masked Lapwing	Impact, control
v	<i>Biziura lobata</i>	Musk Duck	-
-	<i>Glossopsitta concinna</i>	Musk Lorikeet	Impact, control
-	<i>Falco cenchroides</i>	Nankeen Kestrel	Impact, control

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Status	Scientific name	Common name	Recorded during BBUS
-	<i>Manorina melanocephala</i>	Noisy Miner	Impact, control
-	<i>Anas superciliosa</i>	Pacific Black Duck	Impact
-	<i>Cacomantis pallidus</i>	Pallid Cuckoo	-
-	<i>Geopelia placida</i>	Peaceful Dove	Impact
-	<i>Cracticus nigrogularis</i>	Pied Butcherbird	Impact, control
-	<i>Himantopus leucocephalus</i>	Pied Stilt	-
-	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck	-
-	<i>Malurus assimilis</i>	Purple-backed Fairywren	-
-	<i>Parvipsitta porphyrocephala</i>	Purple-crowned Lorikeet	-
-	<i>Merops ornatiss</i>	Rainbow Bee-eater	-
-	<i>Anthochaera carunculata</i>	Red Wattlebird	Impact, control
-	<i>Charadrius ruficapillus</i>	Red-capped Plover	-
-	<i>Petroica goodenovii</i>	Red-capped Robin	Impact, control
-	<i>Erythronyx cinctus</i>	Red-kneed Dotterel	-
-	<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet	-
M	<i>Calidris ruficollis</i>	Red-necked Stint	-
-	<i>Psephotus haematonotus</i>	Red-rumped Parrot	Impact, control
-	<i>Acrocephalus australis</i>	Reed-Warbler	-
-	<i>Myiagra inquieta</i>	Restless Flycatcher	-
-	<i>Columba livia</i>	Rock Dove*	Control
-	<i>Cinloramphus mathewsi</i>	Rufous Songlark	Impact, control
-	<i>Pachycephala rufiventris</i>	Rufous Whistler	Impact
-	<i>Todiramphus sanctus</i>	Sacred Kingfisher	-
VU, M	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-
-	<i>Chroicocephalus novaehollandiae</i>	Silver Gull	-
-	<i>Gavialis virens</i>	Singing Honeyeater	Impact, control
-	<i>Acanthagenys furogularis</i>	Spiny-cheeked Honeyeater	Impact
-	<i>Circus assimilis</i>	Spotted Harrier	Impact, control
-	<i>Pardalotus punctatus</i>	Spotted Pardalote	Impact
-	<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Impact, control
-	<i>Pardalotus striatus</i>	Striated Pardalote	Impact, control
-	<i>Cotumix pectoralis</i>	Stubble Quail	Impact, control
-	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	Impact, control
-	<i>Malurus cyaneus</i>	Superb Fairy-wren	Impact, control

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Status	Scientific name	Common name	Recorded during BBUS
-	<i>Circus approximans</i>	Swamp Harrier	Impact, control
-	<i>Podargus strigoides</i>	Tawny Frogmouth	-
-	<i>Petrochelidon nigricans</i>	Tree Martin	Impact, control
-	<i>Aquila audax</i>	Wedge-tailed Eagle	Impact, control
-	<i>Smicrornis brevirostris</i>	Weebill	Impact, control
-	<i>Hirundo neoxena</i>	Welcome Swallow	Impact, control
-	<i>Chlidonias hybrida</i>	Whiskered Tern	-
-	<i>Haliastur spheurnus</i>	Whistling Kite	Impact, control
e	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Control
-	<i>Artamus superciliosus</i>	White-browed Woodswallow	Impact
-	<i>Egretta novaehollandiae</i>	White-faced Heron	Impact, control
-	<i>Epthianura albifrons</i>	White-fronted Chat	Impact
-	<i>Purnella albifrons</i>	White-fronted Honeyeater	Impact
-	<i>Melithreptus lunatus</i>	White-naped Honeyeater	-
-	<i>Ardea pacifica</i>	White-necked Heron	Impact
-	<i>Ptilotula penicillata</i>	White-plumed Honeyeater	Impact, control
VU, M, v	<i>Hirundapus caudacutus</i>	White-throated Needletail	-
-	<i>Corcorax melanorhamphos</i>	White-winged Chough	Impact, control
-	<i>Lalage sueurii</i>	White-winged Triller	Impact
-	<i>Rhipidura leucophrys</i>	Willie Wagtail	Impact, control
-	<i>Acanthiza nana</i>	Yellow Thornbill	Impact, control
-	<i>Platalea flavipes</i>	Yellow-billed Spoonbill	-
-	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Impact, control
-	<i>Manorina flavigula</i>	Yellow-throated Miner	Impact, control

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Appendix 2 Turbine mortality survey data sheet

Survey details:			
Date:	Observer/s:	This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright	
Start time:	Finish time:		
Turbine ID:			
Survey methodology (please tick):			
Dog ID			
Human observers			
Incidental (Any bird or bat turbine mortality observed outside a routine survey)			
Ground visibility (circle): <i>High</i> <i>Moderate</i> <i>Poor</i>			
Was entire search area covered? Yes / No		NOTE: If not, estimate area covered as a percentage (%) of total search area:	
Survey limitations (e.g., long grass, any areas that were inaccessible/not surveyed and why):			
Weather details (please circle):			
Temperature:			
Precipitation: <i>Fine</i> <i>Showers</i> <i>Rain</i>			
Wind strength: <i>Calm</i> <i>Breeze</i> <i>Moderate</i> <i>Strong</i>			
Wind direction:		Cloud cover (%):	
Turbine bird and bat mortality record:			
Dead/injured bird or bat recorded? Yes / No	If yes, record total number:	Bird and Bat carcass / injury datasheet completed? Yes / No	Photographs taken? Yes / No
Additional notes:			
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Appendix 3 Dead or injured bird/bat data sheet

This datasheet must be completed for every dead / injured bird or bat found during turbine mortality surveys and any dead /injured bird or bat recorded incidentally (i.e., not during routine surveys). Each dead bird or bat (including feather spots) must be removed upon discovery and placed into a clearly labelled plastic bag with the date, time, location (GPS coordinates) and turbine number, as required for species identification.

Date and location:				
Date:	Time of find:		Observer/s:	
Turbine ID:	Easting/Northing of carcass:			
Detection:				
Survey method (circle):	<i>Dog search</i>	<i>Human search intensity</i>	<i>Incidental</i>	NOTE: turbine survey datasheet must also be completed.
Distance of carcass / injured animal from observer when first detected:				
Describe ground visibility within a 1 m radius of where carcass / injured animal was found:				
Carcass / injured animal photographed? <i>Yes / No</i>	Photo and camera details (e.g., camera number, photo numbers, location of saved photos):			
Weather details at time of detection (please circle):				
Temperature:				
Precipitation:	<i>Fine</i>	<i>Showers</i>	<i>Rain</i>	
Wind strength:	<i>Calm</i>	<i>Breeze</i>	<i>Moderate</i>	<i>Strong</i>
Wind direction:	Cloud cover (%):			
Carcass / injured animal information and condition:				
Species (if unknown closest taxonomic group, e.g., raptor, bat):				
Age (circle):	<i>Unknown</i>	<i>Adult</i>	<i>Juvenile</i>	
Sex (circle):	<i>Unknown</i>	<i>Male</i>	<i>Female</i>	
Condition (circle):	<i>Dead (carcass)</i>	<i>Injured but alive</i>	<i>Feather spot (≥ 10 feathers)</i>	
Degree of decay (circle):	<i>Fresh</i>	<i>More than a week old</i>	<i>Very old or highly decayed</i>	
Describe location and type of any injuries evident:				
Describe evidence of scavenging, if any:				
Notes / additional information:				
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Appendix 4 Carcass persistence trial data sheet

This carcass deployment sheet must be completed for each turbine used in the scavenger trial.

Survey and turbine details:					
Date:			Observers:		
Time:					
Turbine ID:					
Ground visibility (circle): <i>High</i> <i>Moderate</i> <i>Poor</i>					
Description of ground visibility (e.g., grass height, rock cover):					
Carcass deployment record:					
Carcass type	Unique carcass identifier:	Direction from turbine base:	Distance from turbine base:	Easting / northing:	Notes:
Additional notes:					
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Appendix 5 Searcher efficiency trial data sheet

Survey details:					
Date:			Observers:		
Time commenced:			Time completed:		
Turbine ID:					
Ground visibility (circle): <i>High</i> <i>Moderate</i> <i>Poor</i>					
Description of ground visibility (e.g., grass height, rock cover):					
Carcass deployment record:					
Carcass type (Species, size class)	Unique carcass identifier:	Direction from turbine base:	Distance from turbine base:	Easting / northing:	Notes:
Additional notes:					
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Appendix 6 Additional hydrological information for Salt Lake: description of significant rainfall events

Salt Lake is not a permanent wetland and becomes inundated following significant local rainfall events (e.g. 2011, 2022, and 2026), retaining water for up to 30 months and providing temporary foraging habitat for shorebirds and other waterbirds.

Daily rainfall data from Climate Data Online (Bureau of Meteorology, Commonwealth of Australia) suggests that the last three times the lake refilled (from a dry state) over the last 30 years (2011, 2022, and 2026), rainfall exceeded 70 mm within two consecutive days (Table A6). The duration for which Salt Lake contains water can vary substantially, depending on the frequency of significant rainfall events capable of maintaining the wetland state. It is noted that the Bureau of Meteorology does not have a weather station at Meering West; therefore, the following stations will be used as references:

- Automated rain gauge located on Meering Wind Farm met mast
- Kerang (Meran Downs), 7.3 kilometres north-east (station 080024)
- Canary Island, 11.0 kilometres south-east (station 080004)
- Quambatook (Barraport North), 11.4 kilometres west (station 077001)
- Boort (Gredgwin), 13.9 kilometres south (station 077016)

Table A7 Key rainfall events

Significant rainfall events	Rainfall over two consecutive days (Kerang weather station)
Events resulting in change of state from fully dry to retaining water (last 30 years)	
10-11/01/2011	119.6 mm (including 80 mm on 10/01/2011)
13-14/10/2022	85 mm (including 61 mm on 13/10/2022)
02-03/03/2026	118.6 mm (including 102 mm on 02/03/2026)
Event occurring when water was already present (resulting in significant water level rise)	
25-16/12/2023	101.8 mm (including 85 mm on 25/12/2023)

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