



Preliminary

Bird and Bat Adaptive

Management Plan

Kojonup Wind Farm

Kojonup Wind Farm Pty Ltd

ACN 664 578 803

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Abbreviations

Abbreviation	Definition
AGL	Above Ground Level
AHD	Australian Height Datum
BACI	Before-After Control-Impact
BESS	Battery Energy Storage System
BBAMP	Bird and Bat Adaptive Management Plan
BBRAS	Bird and Bat Risk Assessment Survey
BBUA	Bird and Bat Utilisation Assessment
BBUS	Bird and Bat Utilisation Survey
BC Act	Biodiversity Conservation Act 2016 (WA)
BIA	Bird/Bat Investigation Area
BUS	Bird Utilisation Surveys
CASA	Air Services Australia and Civil Aviation Safety Authority
CR	Critically Endangered
DAWE	Department of Agriculture, Water and the Environment (now DCCEEW)
DBCA	Department of Biodiversity, Conservation and Attraction
DCCEEW	Department Climate Change, Energy, the Environment and Water
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EAAF	East Asian-Australasian Flyway
EN	Endangered
EP Act	Environmental Protection Act 1986 (WA)
EPA	Environmental Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
kV	Kilovolts
MI	Migratory
MNES	Matters of National Environmental Significance
NR	Not Recorded
OS	Other Specially Protected
P	Priority
PD Act	Planning and Development Act 2005
RSA	Rotor Swept Area

Abbreviation	Definition
VU	Vulnerable
WA	Western Australia
WTG	Wind Turbine Generator

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1 Introduction

1.1 Background

Moonies Hill New Energy Pty Ltd is the Project Manager for the Kojonup Wind Farm and is supporting Kojonup Wind Farm Pty Ltd (**KWF**) in seeking project approvals for the Kojonup Wind Farm (the **Project**). The Project is located in the locality of Jingalup, 20km south of the town of Kojonup in the Great Southern Region, and 270 km southeast of Perth.

1.2 Purpose

This Preliminary Bird and Bat Adaptive Management Plan (**BBAMP**) provides an overview of the management and mitigation of risks to bird and bat species occurring within the Project area and sets out the intended process for managing potential impacts on birds and bats from the proposed Kojonup Wind Farm. This BBAMP:

- Summarises pre-referral bird and bat survey results and baseline data conducted by KWF's consultants, particularly for Threatened, Migratory or other at-risk species;
- Outlines Operational plans, including bird and bat utilisation surveys and carcass detection programs aimed at measuring whether any significant change in bird and bat populations or mortality rates;
- Sets impact thresholds and trigger levels for Black Cockatoos and other species at risk;
- Proposes response procedures for triggered impacts;
- Establishes ongoing risk mitigation and reporting requirements; and
- Encourages learning from project impacts by analysing data from both before and after commissioning and operations

The BBAMP has been prepared as part of the Project's environmental approvals process including referral under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**) and *Environmental Protection Act 1986* (WA) (**EP Act**).

This BBAMP is focused on endangered species listed under the EPBC Act and *Biodiversity Conservation Act 2016* (WA) (**BC Act**). Consideration is also given to non-listed species considered to be at-risk of collision.

The design of the BBAMP has incorporated the data collected by KWF's consultants in the baseline Bird and Bat Utilisation Surveys (**BBUS**), in addition to bird and bat data collected as part of baseline ecology assessments (refer to Section 0). Field surveys were undertaken on the 20th – 24th November 2023, 10th – 15th August 2024, 3rd – 8th November 2024 and 14th – 19th December 2025.

1.3 Nature of BBAMP

This Preliminary Bird and Bat Management Plan has been prepared to inform the environmental impact assessment of the Project under the Western Australian Environmental Protection Authority (**EPA**) and the Commonwealth EPBC Act. Based on the outcomes of baseline surveys, site selection and iterative design refinement, potential impacts to avifauna and bat species are considered to be low and capable of being effectively managed through standard mitigation and adaptive management measures. The BBAMP provides a proportionate framework for impact avoidance, mitigation and monitoring commensurate with this risk profile.

The BBAMP is based on the current project design and available environmental information and will be subject to ongoing review and refinement as the Project progresses through detailed design,

procurement and construction planning. The final project design may evolve in response to a range of factors, including geotechnical investigations, which may result in micro-siting of wind turbine generators, market conditions, final feasibility optimisation, and the capacity and configuration permitted under grid connection. agreements.

A final BBAMP will be prepared and submitted for approval prior to commissioning, in accordance with Development Approval conditions as determined by the RDAP 26 February 2026. The final BBAMP will reflect the as-built project layout, incorporate updated assessment outcomes, and confirm the application of adaptive management measures where required.

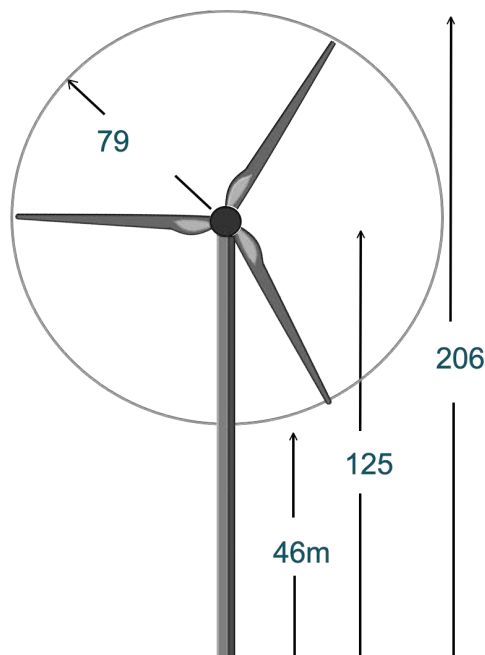
1.4 Project Description

The Kojonup Wind Farm Project comprises the following components:

- An installed generation capacity of 204MW,
- 33 wind turbine generators (**WTGs**) and ancillary infrastructure including a substation, Battery Energy Storage System (**BESS**) (100 MW/800 MWh), laydown areas, operations and maintenance building, internal access tracks, underground cables, and a temporary concrete batching plant and work site offices.
- A 20 km underground 132kV transmission line connecting the KWF substation to the Western Power Kojonup substation.

The WTGs will have a hub height of 125m with a maximum tip height of 206m, blade radius of 79m and a rotor swept area of 20216m² and a minimum sweep above the ground of 46m (refer to Figure 1).

Figure 1: Wind Turbine Dimensions



KWF has been cognisant of the results of the BBUS and fauna surveys in designing the Project with a focus on minimizing any detrimental impacts to the surrounding environment and community. Design aspects include:

- Locating WTGs, access tracks, and related infrastructure in already cleared farm paddocks and existing farm access tracks and laneways to reduce the need for remnant native vegetation clearance.
- Setting hub heights to lower the risk of black cockatoos colliding with turbines, since these birds generally fly at altitudes ranging from 5 to 29 metres above ground level and below the bottom of the RSA at 46m
- Connecting the Project to the South West Integrated System (**SWIS**) grid via an underground 132 kV transmission line rather than through overhead transmission lines, thereby reducing further clearing of remnant vegetation.

1.5 Study Area

The Study Area consists of the wind farm development area (**Development Area**) and the development corridor for the 132kV underground transmission line (**Transmission Corridor**). The total combined Development Area and Transmission Corridor is 5,872ha of mainly of broadacre farmland connected by disjointed patches of vegetation ranging from Completely Degraded to Excellent. After careful planning and a focus on vegetation avoidance, only a small portion of the vegetation footprint, in the order of 175 Ha, will be subject to any disturbance.

The KWF wind farm Development Area hosting the WTGs, laydown areas, access tracks, internal cables, operations building, BESS and substation, is predominantly cleared broadacre cropping and livestock grazing land with a north south extent of 12km and an east west extent of 8.5 km. The development site and surrounds range from a flat open landscape to gently undulating sections with some steeper, hilly terrain. Elevation across the Project ranges from 250 m AHD to 400 m AHD, with elevations highest at the central and eastern sections of the Development Area and lowest points at the north and west.

Less than 8% of the Study Area has been mapped as containing areas of remnant native vegetation in **Good or Better** condition¹.

To minimise environmental impact the Project design has deliberately sought to avoid siting any infrastructure in remnant vegetation and minimise clearing, with the WTGs, substation and BESS located in cleared paddocks and the access tracks located such that they utilise existing farm tracks and laneways or are in cleared paddocks, where possible.

The route of the underground 132kV transmission line and Transmission Corridor has been selected to avoid where possible and minimise the requirement for any clearing of vegetation. Due to the nature of construction (trenching, cable laying and then backfill) this should have minimal impact during the construction and negligible impact once the cable installation is complete as there will be no above ground infrastructure.

The Project's Development Envelope is shown in Figure 2 and Figure 3.

¹ [Based on the Keighery (1994) vegetation scale]

Figure 2: Project Area

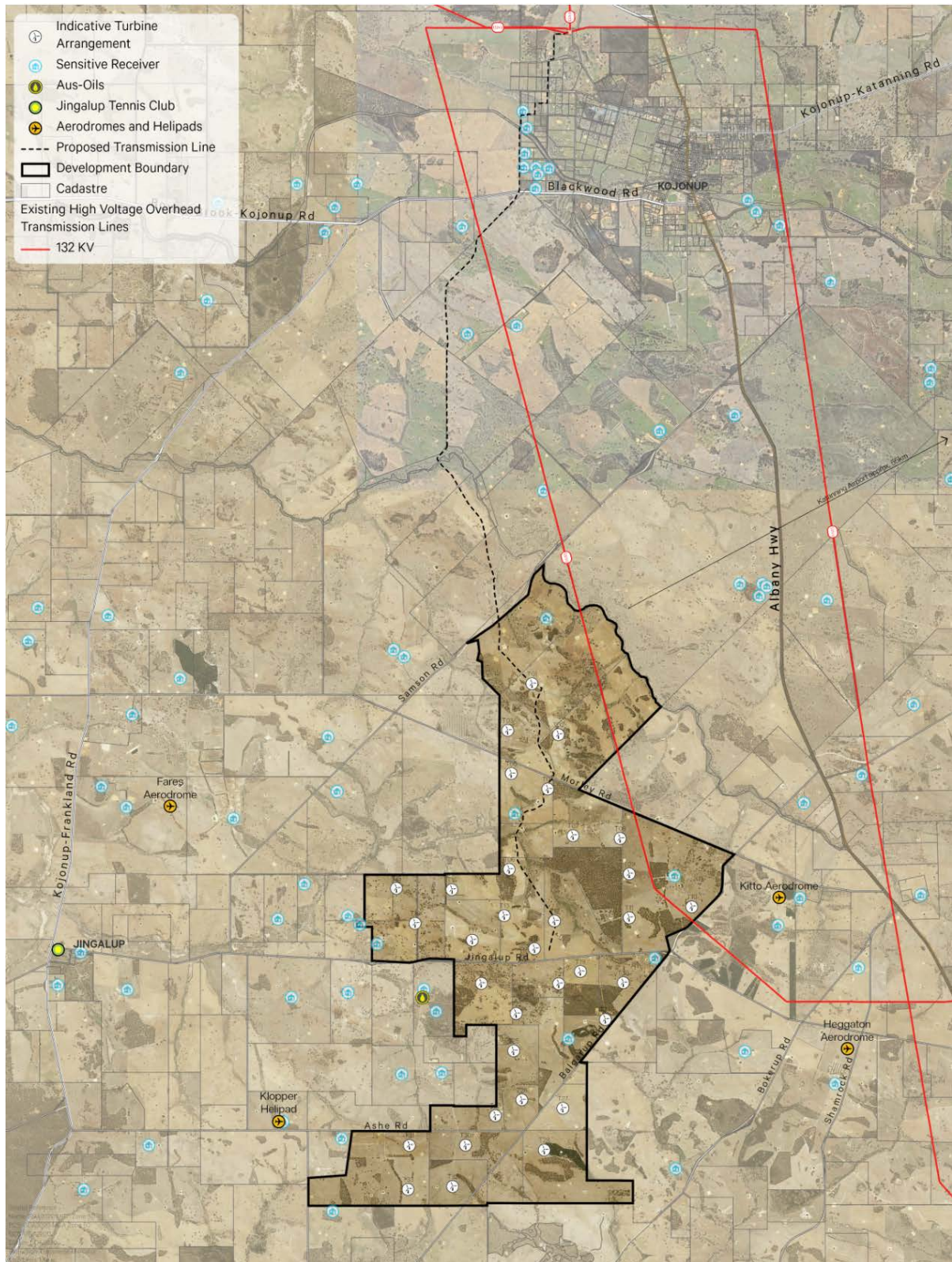
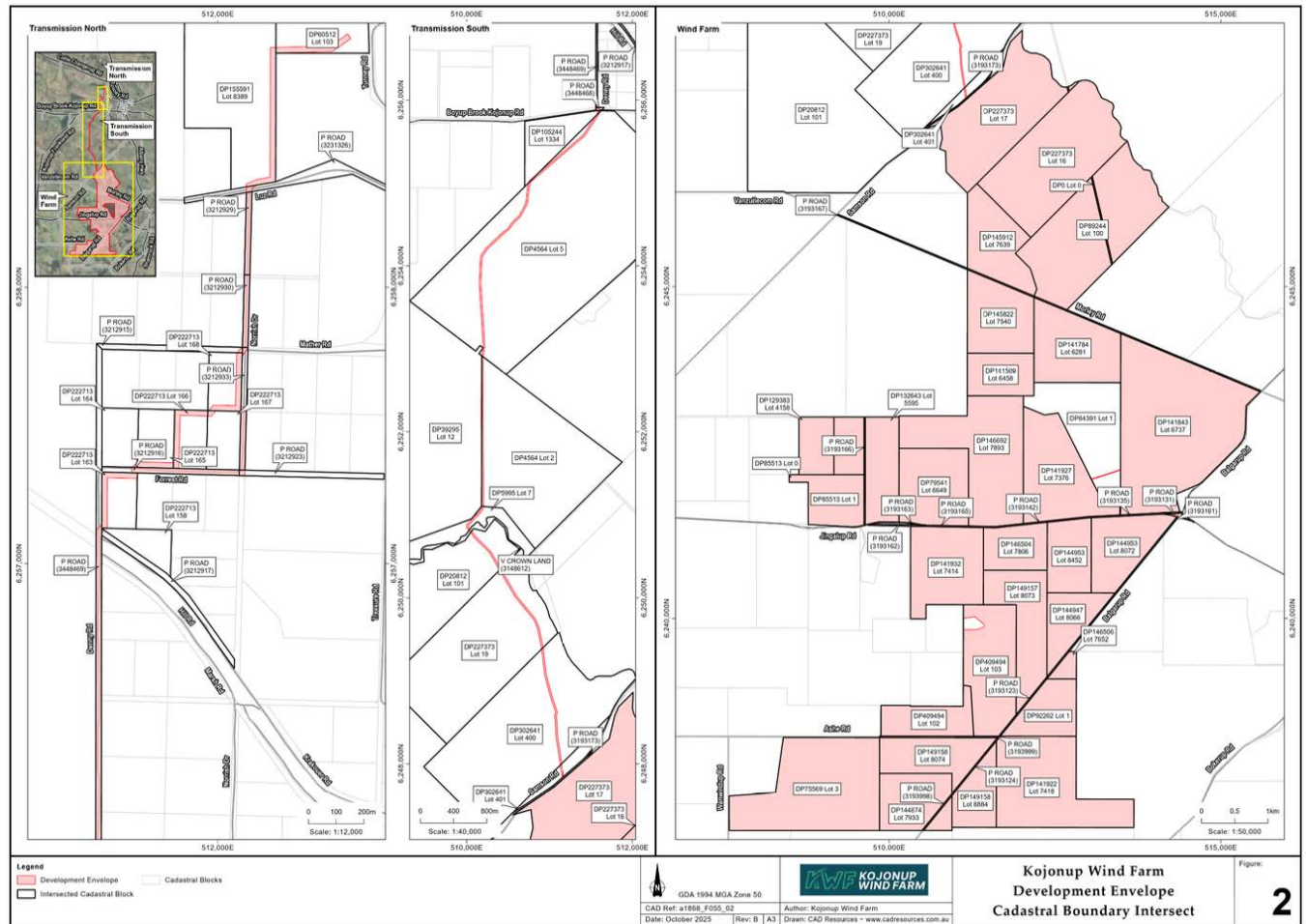


Figure 3: Project Development Envelope Including Transmission Line



2 Fauna

2.1 Desktop Assessment

A desktop assessment completed by Western Wildlife (2026)² identified 243 vertebrate fauna species as potentially occurring in the vicinity of the Study Area, twelve frogs, 46 reptiles, 147 native birds, four introduced birds, 29 native mammals and five introduced mammals. The observed assemblage to date includes two frogs, four reptiles, 78 native birds, one introduced bird, nine native mammals and two introduced mammals. Of these, 22 are species of **Conservation Significance**, comprising 11 birds and 11 mammals.

In November 2023, August 2024, November 2024 and December 2025 Western Wildlife undertook fauna surveys to identify terrestrial vertebrate fauna in the Study Area. Key survey findings include:

- A total of 96 vertebrate fauna species recorded in the survey area, comprising 78 birds, 11 mammals, 4 reptiles and 2 amphibians.
- Five species recorded are species of **Conservation Significance**³:
 - Carnaby’s Cockatoo - **Endangered** under the BC Act and EPBC Act;
 - Forest Red-tailed Black Cockatoo - **Vulnerable** under the BC Act and EPBC Act;
 - Inland Western Rosella - **DBCA** P4;
 - Muir’s Corella - **Conservation Dependent** under the BC Act; and
 - Peregrine Falcon - **Specially Protected** under the BC Act.
- The Red-tailed Phascogale vulnerable under the EPBC Act and Conservation Dependent under the BC Act) was assessed as likely to occur.
- 12 additional species of **Conservation Significance** were considered to possibly occur.

The following **Conservation Significant** species potentially occur in the survey area:

- Baudin’s Black Cockatoo (*Zanda baudinii*) (**Endangered**);
- Chuditch (*Dasyurus geoffroii*) (**Vulnerable**);
- Fork-tailed Swift (*Apus pacificis*) (**Migratory** under the EPBC Act and BC Act); and
- Brush-tailed Phascogale (**Conservation Dependent**).

2.1.1 Bird Utilisation Surveys

Bird utilisation surveys were undertaken by Western Wildlife in November 2023, August 2024, November 2024 and December 2025 at proposed turbine locations (referred to as **Impact Sites**) and in the surrounding areas (referred to as **Reference Sites**).

There was some variation in sites used at different surveys as the wind farm design changed from the initial design in 2023 and when accessibility was restricted by weather and farming activities. Based on survey times there was between 29 and 33 Impact Sites and 8 Reference Sites. Reference sites were

² “Kojonup Wind Farm, Vertebrate Fauna, Bird and Bat Survey 2023 – 2025”, Western Wildlife, April 2026

³ Species of **conservation significance** were classified as:

- 1) **Threatened** if listed as *Extinct in the Wild*, *Critically Endangered*, *Endangered* or *Vulnerable* under EPBC Act and/or BC Act;
- 2) **Migratory** if listed as *Migratory* under the EPBC Act and/or BC Act, excluding those species also listed as threatened;
- 3) **Specially Protected** if listed as *Other Specially Protected Species* or *Conservation Dependent Fauna* under the BC Act and *Priority* if listed as *Priority* by DBCA.

chosen using aerial photography and contours, to choose sites that had similar characteristics as the impact sites, including visibility, proximity to vegetation and height in the landscape. Each site was surveyed on four occasions for 20-minute periods at 2.00am and 2.00pm (except when vehicle movement bans prohibited site access). Each bird survey was undertaken by a single observer with all birds seen or heard within 200 m of the observer recorded, and the flight height was recorded as one of the following categories:

- Below Rotor Swept Area (**RSA**) (0-50 m);
- At RSA (50-200 m);
- Above RSA (>200 m); and
- Not observed flying⁴.

Black-cockatoos were considered a key group of species, flight paths were recorded both during the formal Bird Utilisation Surveys and opportunistically whenever these species were encountered.

A total of 5,409 bird flights were recorded at Impact Sites and 1,281 at Reference Sites including four Conservation Significant species, being:

- Carnaby's Cockatoo (**Endangered**) recorded at Impact and Reference Sites;
- Forest Red-tailed Black Cockatoo (**Vulnerable**) recorded at Impact and Reference Sites;
- Muir's Corella (**Conservation Dependent**) recorded at Impact Sites only; and
- Inland Western Rosella (**DBCA P4**) recorded at Impact and Reference Sites.

Of the bird flights recorded at Impact Sites, 274 birds (5% of flights) of 15 species were recorded in the turbine RSA. All but 1 of the remaining 5,135 birds (95% of flights) of 47 species were recorded below the RSA with one Wedge-tailed Eagle recorded above the RSA. Of note:

- Five conservation significant birds were observed during bird surveys.
- All flight records in the survey area for Carnaby's Black Cockatoo, Forest Red -tailed Black Cockatoo, Muir's Corella and Inland Western Rosella were below the RSA, other than one sighting of a Forest Red-tailed Black-cockatoo at a Reference Site.
- Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-tailed Black Cockatoo (all **conservation significant**) and the Wedge-tailed Eagle and Purple-crowned Lorikeet (**not conservation significant**) were considered to have a **Moderate** collision risk.
- No birds were assessed as being at **Very High** or **High** Risk.

2.1.2 Bat Utilisation Surveys

Bat utilisation surveys were undertaken by Western Wildlife in November 2023, August 2024, November 2024 and December 2025 to identify the bat assemblage in the Study Area.

Bat calls were recorded using Anabat Swift or Anabat Ranger call detectors placed a metre above ground level and set to record between dusk and dawn. Detectors were deployed over three to four nights at each sampling site providing a total of 22 nights of recordings across six sites in November 2024, and 16 nights of recordings across four sites in August and November 2024. The bat calls were then analysed by Specialised Zoological (2024, 2025), and the bat calls identified to species level where possible. In addition, Two measure the difference in bat activity between ground level and the RSA, a

⁴ This classification was used for birds either perched for the duration of the survey, heard only or moving entirely within vegetation and therefore deemed not to be crossing open habitat.

pair of bat detectors was placed with one at 75m and one at the base of a metrological mast (met mast). Bats were sampled at the met mast in December 2024 (16 nights) and May 2025 18 nights).

Based on the Bat Utilisation Surveys conducted to the date of this Preliminary BBAMP:

- Eleven bat species **may** occur within the development site. Of these six species were recorded, these being
 - Chocolate Wattled Bat *Chalinolobus morio*
 - Gould's Wattled Bat *Chalinolobus gouldii*
 - Inland Broad-nosed Bat *Scotorepens balstoni*
 - Long-eared Bats *Nyctophilus spp.*
 - South-west Freetail Bat *Ozimops kitcheneri*
 - Southern Forest Bat *Vespadelus regulus*.
- No **Threatened** bat species are expected to occur in the Development Area.
- The Central Long-eared Bat (**P3**) and the Western False Pipistrelle (**P4**) may possibly occur in the development site.
- No bat species were assessed as being at '**Very High**' or '**High**' risk of turbine collision.
- Two bats species, being the Gould's Wattled Bat and the White Striped Freetail Bat, were assessed as being at **Moderate** risk of turbine collision however, both species are common and widespread across Australia, hence the risk to the local population will unlikely impact the overall population.

2.2 Fauna Habitat

The Study Area was assessed for potential habitats and nesting trees to support the following **Threatened** black-cockatoo species:

- Forest Red-tailed Black-cockatoo (*Calyptorhynchus banksii naso*)
- Carnaby's Cockatoo (*Zanda latirostris*)
- Baudin's Cockatoo (*Zanda baudinii*)

The assessment was made using the scoring tool in DAWE (2022). Any evidence of roosting, such as aggregations of scats and feathers, or potential roost sites were recorded with a GPS location.

A total of six fauna habitats (including cleared area) were identified within the Study Area. A review of the fauna habitat in the development site found that:

- Approximately 78% of the Development Area has been cleared of trees and native vegetation for agricultural purposes.
 - 8% of the development site is mapped as containing areas of remnant native vegetation in **Good or Better** condition;
 - Remaining vegetation occurs in patches and is impacted by loss of native understory habitat due to livestock grazing, weed invasion, feral predators, feral herbivores, historical ringbarking of trees for timber and timber cutting for firewood.

- 17 trees were identified with potential Black Cockatoo hollows, and 225 trees were identified with hollows too small to be considered suitable for Black Cockatoo nesting⁵. Of these nine trees are in the Transmission Corridor and eight are in the Development Area A total of 242 trees containing hollows were identified during surveys, comprising 17 trees with hollows potentially suitable for Black Cockatoo nesting and a further 225 trees with hollows considered too small to be suitable.
- No known Black Cockatoo breeding trees were recorded in the Development Area or Transmission Corridor.
- No evidence of roosting was observed in the Development Area or Transmission Corridor for any of the three Black Cockatoo species.
- Roosting of 'white-tailed Black Cockatoos' is known to occur in Kojonup, with a maximum count of 48 birds at a roost in 2017.
- There are no known roost sites for the Forest Red-tailed Black Cockatoo in the region
- The foraging habitat in the development site was assessed as:
 - a score of 10 **High-quality foraging habitat** for both Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo in accordance with the Commonwealth Black Cockatoo Referral Guidelines foraging tool (DAWE, 2022).
 - a score of 8 **High-quality foraging habitat** for Baudin's Cockatoo due to an absence of foraging evidence during the survey.

⁵ **Potential** nesting trees have a suitable diameter at breast height (DBH) to develop a nest hollow (usually a minimum of 30 – 50cm), but do not have actual hollows. A **Suitable** nest tree has a suitable nesting hollow present, and a **Known** nesting tree is one where breeding or evidence of breeding has been recorded (DAWE 2022)

3 Bird and Bat Risk Assessment

3.1 Overview

Western Wildlife completed a risk assessment of bats and selected bird species with the results of the risk assessment summarised in Table 1 below.

Table 1: Summary of Bird and Bat Risk Assessment

Bird/Bat	Birds	Bats
Very High	nil	nil
High	nil	nil
Moderate	- Baudin's Cockatoo, - Carnaby's Cockatoo, (<i>Zanda latirostris</i>) - Forest Red-tailed Black- Cockatoo, (<i>Calyptorhynchus banksii naso</i>) - Wedge-tailed Eagle - Purple-crowned Lorikeet.	- Gould's Wattled Bat⁶(<i>Chalinolobus gouldii</i>) - White-striped Freetail Bat (<i>Austronomus australis</i>). - Chocolate Wattled Bat (<i>Chalinolobus morio</i>) - Southern Forest Bat (<i>Vespadelus regulus</i>)
Low	Migratory shorebirds and waterbirds are considered low risk due to the absence of suitable wetland habitats in or near to the Study Area.	nil
Minor or Negligible	The remaining species were assessed as being at Minor or Negligible risk, primarily due to an unlikely intersection with the RSA height due to rarity in the region and/or flight behaviour, and a large and widespread population reducing the likelihood of population impacts.	The remaining species were assessed as being at Minor or Negligible risk, primarily

⁶ All four species are common and widespread across Australia, so although there is a risk of an impact to the local population of these species, it is not likely that there would be an impact to the population as a whole.

3.2 Methodology

The risk of turbine collision was estimated for all species of bat, all conservation significant birds and categories of birds considered at risk of collision. Collision-risk species were considered to potentially include:

- Diurnal birds of prey
- Nocturnal birds of prey
- Waterbirds (only species recorded in the Study Area were assessed)
- Shorebirds (only species recorded in the Study Area were assessed)
- Any bird recorded flying at RSA height in this survey

The likelihood and consequence criteria used to determine risk are adapted from Lumsden et al. 2019, Onshore Wind Farms – interim guidance on bird and bat management (DAWE 2021) and a review of the literature (e.g. Thaxter et al. 2017, Perhold et al. 2020, Barrios and Rodriguez 2004, Ribeiro et al. 2022 and Stewart et al.).

The risk was estimated using six factors to determine the likelihood of a mortality (Table 2) and four factors to determine the consequences of those mortalities on the population of the species (Table 3).

Table 2: Likelihood Factors

Factors	Low Loss of individuals unlikely	Moderate Some loss of individuals	High Loss of many individuals
Flight height Known or likely frequency of flights within rotor-swept area (RSA)	Species rarely flies within RSA (<50 m or >200 m above ground).	Species does fly within the RSA (50 – 200 m above ground), although the bulk of their flights are below the RSA (<50 m).	Species regularly flies within the RSA (50 – 200 m above ground).
Flight behaviour Species may exhibit flight behaviour that makes individuals more or less likely to avoid turbines. For bats, species with a higher wing aspect ratio and high wing loading are at greater risk	Species flies slowly and/or has high maneuverability and/or does not soar. Bats with a low wing aspect ratio and low wing loading	Species flies at moderate speed and/or has moderate maneuverability and/or occasionally soars. Bats with a moderate wing aspect ratio and moderate wing loading.	Species flies fast and/or has low maneuverability and/or regularly soars. Bats with a higher wing aspect ratio and high wing loading.
Status in Study Area Species that are common in the Study Area are at greater risk than those that occur occasionally.	Likelihood of occurrence is possible (see Table 3).	Likelihood of occurrence is potential (see Table 3).	Likelihood of occurrence is likely or known to occur (see Table 3).
Habitat preference Species that occur in open habitats where turbines are sited are at greater risk than species that occur in closed habitats.	Species inhabits closed habitats such as woodlands, rarely entering open areas.	Species usually use closed habitats, but sometime use open habitats, regularly traversing open areas between occupied habitat patches.	Species regularly or usually occurs in open habitats.

Factors	Low Loss of individuals unlikely	Moderate Some loss of individuals	High Loss of many individuals
Migration Migratory species or species that undertake regular daily movements through the wind farm site potentially have an increased risk of mortality	Species is sedentary, does not undertake seasonal migration or regular movements between roosting and foraging areas.	Species undertakes regular daily movements in some seasons; wind farm site is not within a regular migration path.	Species is known to make regular or seasonal movements through the wind farm site, including movements of migratory shorebirds or waterbirds between wetlands.
Known wind farm mortalities Species known to have been subject to mortalities at other wind farm projects may be at greater risk of mortality.	No or very few losses reported at other wind farm projects.	Some losses reported at other wind farm projects.	Large losses reported at other wind farm projects.

Table 3: Potential Impact Consequence Factors

	Potential impact to total population			
	Negligible	Low	Moderate	High
Geographic population concentration Highly localised or concentrated population (for whole or part of lifecycle), such that siting of wind farm could have significant consequence to regional, national or international population.	Species that are widely dispersed within areas of suitable habitat and the habitat itself is relatively widespread.	Species that are relatively widespread but may exhibit temporary congregatory behaviour in response to seasonal events such as peak flowering.	Species, such as some shorebirds, that may be more widespread or have greater flexibility in the range of suitable habitat availability, but where a high proportion of the population is likely to be concentrated at sites where they do occur.	Species that congregate, e.g. bats with major aggregations at a few caves, birds that have very restricted distributions or may be seasonally concentrated at very few small locations, such as congregatory waterbirds.
Demographic resilience Impact on population relative to demographic capacity to replace fatalities (i.e. generalised combination of dispersal capacity of potential replacements, fecundity and generation time).	Species that form breeding territories and that have a reasonable proportion of the population as non-breeding 'floaters' that can rapidly replace breeding territorial adults if lost; species that may or may not form breeding territories and that are short-lived and have high fecundity; species that have capacity for long-range or widespread juvenile or sub-adult dispersal.	Species that form breeding territories with a moderate capacity to replace lost breeding adults; species that have modest life-spans with moderate fecundity; species with a capacity for moderate dispersal distances of juveniles or sub-adults.	Species that form breeding territories with some capacity to replace lost breeding adults; species that have moderately long life-spans with modest fecundity; species with capacity for modest dispersal distances of juveniles or sub-adults.	Species that form breeding territories where there is limited capacity for a lost breeding adult to be readily replaced; species that do not form breeding territories and that are long-lived and/or have low fecundity; species that may have short-distance juvenile or sub-adult dispersal capacity only.
Population size Estimated size of population of which the species is a part (Western Australian, Australian or global).	Total population is >100,000	Total population is 20,000 – 100,000 individuals.	Total population is 5,000 – 20,000 individuals	Total population is <5,000 individuals.

	Potential impact to total population			
	Negligible	Low	Moderate	High
Listed conservation status Highest level of conservation status under the EPBC Act, BC Act, DBCA Priority list or in current Action Plans.	No conservation listing.	Other Specially Protected Fauna or Conservation Dependent under the BC Act, DBCA Priority listed, Data Deficient or Near Threatened.	Vulnerable species	Endangered or Critically Endangered species.

Once the overall risk levels for the likelihood and consequence of mortality specific to the Project had been assigned for a species, the results were then placed into a risk matrix to determine the level of risk (Table 4).

The risk matrix should be considered a guide rather than a predictive tool, recognising that bird and bat behaviours are varied and complex and that at times the data available to assess likelihood and consequence rankings are incomplete. Where insufficient data were available, the precautionary principle was applied and a higher ranking selected.

Table 4: Risk Matrix

		Potential impact to total population			
		Negligible	Low	Moderate	High
Likelihood of mortality	Low	Negligible	Negligible	Minor	Moderate
	Moderate	Negligible	Minor	Moderate	High
	Negligible	Minor	Moderate	High	Very High

3.3 Results of Risk Analysis

Full details are provided in Table 5 for species with risk ratings above negligible.

Table 5: Risk Analysis Bird Details

Species	Status	Likelihood	Consequence	Risk Rating
Conservation Significant Birds				
Carnaby's Cockatoo <i>Zanda latirostris</i>	Endangered	Moderate - Recorded in the Study Area. - Of 71 recorded flights on BUS surveys, all were observed flying below the RSA, however, a single flight in the RSA by 2 birds was recorded opportunistically. It is considered likely that the majority of flights would be below the RSA, but this species is capable of flying at RSA. - A post-nuptial migrant, moving between inland breeding sites and coastal foraging sites, however, it is unknown whether the Study Area lies in a path of migration. Also undertakes daily movements averaging 16km between roost sites and foraging sites (Shephard and Warren 2018) and averaging 6km between breeding sites and foraging sites (Riley <i>et al.</i> 2023). - Species likely to largely occur in woodlands when foraging and breeding. A large bird, it is likely to traverse open habitats, although it is known to prefer following vegetated areas such as road verges (Shephard and Warren 2018).	Moderate - Population restricted to south-west Western Australia, estimated at 40,000 birds and declining (Garnett and Baker 2021). - Single young raised each year by long-lived birds. Generation length estimated at 10.85 years (BirdLife International 2024). Limited capacity to replace lost adults, population already under pressure from other threats. - Important breeding area occurs nearby in the vicinity of - Tambellup (between about 25 – 55km southeast), where there is likely to be a concentration of birds. Likely to concentrate at roost sites, but it is unknown whether roosting occurs near turbine locations. - Listed as Endangered (EPBC Act).	Moderate
Baudin's Black-Cockatoo <i>Zanda baudinii</i>	Endangered	Low - Not recorded in the Study Area but likely to occur. As this species has not been recorded across three field trips, it appears likely that this species is uncommon in the region. - It is considered likely that the majority of flights would be below the RSA, but this species is capable of flying at RSA. - A post-nuptial migrant, moving north after the breeding season, however, the Study Area is not likely to be in a path of migration as it is on the edge of the known range of the species. - Species likely to largely occur in woodlands when foraging and breeding. A large bird, it is likely to traverse open habitats.	High - Population estimated at 3,250 and declining rapidly (Garnett and Baker 2021). - Single young raised each year by long-lived birds. Generation length estimated at 13.24 years (BirdLife International 2024). Limited capacity to replace lost adults, population already under pressure from other threats. - Study area is on the eastern edge of this species' range and there are unlikely to be concentrations of the population present. - Listed as Endangered (EPBC Act). Listed as Critically Endangered in 2022 on the IUCN Red List for Birds (BirdLife International 2024).	Moderate
Forest Red-tailed Black Cockatoo <i>Calyptrorhynchus banksii naso</i>	Vulnerable	Moderate - Recorded in the Study Area. - Of 36 recorded flights on BUS surveys, one flight by one bird was recorded within the RSA, outside the study area It is considered likely that the majority of flights would be below the RSA, but this species is capable of flying at RSA. - Species likely to largely occur in woodlands when foraging and breeding. A large bird, it is likely to traverse open habitats	Moderate - Population estimated at 16,800 with the likelihood for future declines (Garnett and Baker 2021). - Single young raised each year by long-lived birds. Generation length estimated at 14.3 years (BirdLife International 2024). Limited capacity to replace lost adults, population already under pressure from other threats. - Likely to concentrate at roost sites, but it is unknown whether roosting occurs near turbine locations. - Listed as Vulnerable (EPBC Act).	Moderate

Species	Status	Likelihood	Consequence	Risk Rating
Malleefowl <i>Leipoa ocellata</i>	Vulnerable	Low - Not recorded in Study Area but may possibly occur as infrequent dispersing birds as they are known from the region. - Not migratory. - Adult birds rarely fly except when disturbed or to roost in the canopy (Frith 1962). Considered unlikely to fly at the RSA.	Moderate - Population estimated at 25,000 and are likely to decline further, mainly due to the increased frequency of drought and large-scale fires (Garnett and Baker 2021). - Species is not likely to congregate in the vicinity of the Study Area, instead it is less likely to occur compared to surrounding areas with larger areas of remnant native vegetation. - Long-lived, generation length estimated at 9.13 years (BirdLife International 2024). - Listed as Vulnerable (EPBC Act).	Minor
Fork-tailed Swift <i>Apus pacificus</i>	Migratory	Moderate - Not recorded in Study Area and no nearby records but may possibly occur in small groups in summer. - Flight heights between 1m and 1,000 m have been recorded (DoE 2015). - A non-breeding Migratory species, it enters north-west Australia in October-November, departing in April. 1 wind farm mortality recorded from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Low - Species has a very large global range and a large global population of at least 100,000, that is stable (Birdlife International 2024, DoE 2015). In Australia, it occurs across the country but is more common in the north and more common in coastal and sub-coastal areas. - Species is not likely to congregate in the vicinity of the Study Area and significant numbers (0.1% of the population or 100 birds) are unlikely to regularly occur. - Long-lived, generation length estimated at 12.5 years (BirdLife International 2024). - Listed as Migratory (EPBC Act).	Minor
Peregrine Falcon <i>Falco peregrinus</i>	Other Specially Protected Fauna (BC Act)	Moderate - Recorded opportunistically in Study Area, flying below RSA and once on a BUS, also flying below the RSA. - Likely to use open habitats for foraging. - Forages by hunting from a high perch, high quartering or soaring, or low fast flight. Also display flights during breeding season (Debus 1998), so likely to intersect the RSA. 2 wind farm mortalities recorded from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Low - Species occurs across Australia and has a very large global range. The global population is very large (248,000 – 478,000 individuals) and the trend is increasing after a ban on DDT in the 1970s (Birdlife International (2024). - Long-lived, generation length estimated at 6 years (BirdLife International 2024), young disperse widely (60km for males, 130k for females and up to 500km recorded) (Debus 1998). - Listed as Other Specially Protected Fauna (BC Act).	Minor
Muir's Corella <i>Cacatua pastinator pastinator</i>	Conservation Dependent (BC Act)	Moderate - Recorded in study area. Edge of the current known range of this species. - Of 10 recorded flights on BUS surveys, all were observed flying below the RSA. - Likely to largely occur in woodlands and farmlands when foraging and breeding. A large bird, it is likely to traverse open habitats between woodland patches. 3 (of other <i>Cacatua</i> sp.) in south-west Victoria (Biosis 2020).	Low - Population estimated at 20,000 and increasing (Garnett and Baker 2021). Population has increased to the extent that it has once again become a pest species in farmland and towns (DPAW 2015). - Small area of occupancy but expanding as the population increases. - Long-lived, generation length estimated at 13 years (BirdLife International 2024). - Listed as Conservation Dependent (BC Act) and as Least Concern in Action Plan (Garnett and Baker 2021).	Minor

Species	Status	Likelihood	Consequence	Risk Rating
Barking Owl <i>Ninox connivens connivens</i>	Priority 3	Low - Not recorded in Study Area. May possibly occur as the Study Area is within the known range of the species, but only one nearby record and extremely rarely recorded in the southwest. - May forage in open farmland.	Moderate - The south-west subspecies is considered extremely rare (Liddel <i>et al.</i> 2002). No population estimate exists, although the population of the species outside Queensland has been estimated at 1,000 individuals (Garnett and Baker 2021). - Not congregatory, breeding pairs spaced 2 – 10km apart and overall density low at 0.10 – 0.12birds/ha (Garnett and Baker 2021). - Moderately long-lived, generation length estimated at 4.1 years (BirdLife International 2024). - Listed as DBCA Priority 3	Minor
Masked Owl <i>Tyto novaehollandiae novaehollandiae</i>	Priority 3	Low - Not recorded in Study Area. May possibly occur as the Study Area is within the known range of the species, but no nearby records and likely to be uncommon. - May forage in open farmland.	Moderate - For the species overall, the population is suspected to be declining, little data available on this subspecies, but it is restricted to south-west Western Australia and poorly known. - Not congregatory. - Moderately long-lived, generation length estimated at 5.01 years (BirdLife International 2024). - Listed as DBCA Priority 3	Minor
Diurnal Birds of Prey				
Blackshouldered Kite <i>Elanus axillaris</i>	Least Concern	Moderate - Recorded in Study Area and likely to be a common species of open farmland habitats. - Of 9 recorded flights in the BUS, 3 were within the RSA. - Prefers open habitats, including farmland (Johnstone and Storr 1998). - Forages by quartering and hovering, or sometimes from a perch (Debus 1998). 3 wind farm mortalities recorded from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Low - Widespread across Australia, this species has increased in abundance due to clearing for agriculture. Global population very large, Australian population not quantified but likely to be large (Birdlife International 2024). - Not congregatory, usually occurs as singles, sometimes pairs (Johnstone and Storr 1998). - Moderately long-lived, generation length estimated at 6.6 years (BirdLife International 2024). May have 2 broods in a year, juveniles disperse widely, up to 1,000km recorded (Debus 1998). - No conservation listing.	Minor
Square-tailed Kite <i>Lophoictinia isura</i>	Least Concern	Moderate - Not recorded in Study Area and likely to be a relatively rare species in the region. - Mainly occurs in eucalypt woodlands (Johnstone and Storr 1998). - Migratory, with southern birds moving north in winter after breeding (Debus 1998). - Forages by low, slow quartering of the tree or shrub canopy, dropping to snatch prey. Aerial displays in breeding season (Debus 1998).	Low - Widespread across Australia. Population not quantified but believed to be small but stable (Birdlife International 2024). - Not congregatory, solitary outside of the breeding season (Debus 1998). - Moderately long-lived, generation length estimated at 7.6 years (BirdLife International 2024). - No conservation listing.	Minor

Species	Status	Likelihood	Consequence	Risk Rating
Wedge-tailed Eagle <i>Aquila audax</i>	Least Concern	High - Recorded in Study Area and nesting sites present. - Of 25 flights recorded in the BUS, 17 were in the RSA. - Occurs in lightly wooded habitats, including farmlands and is sedentary in favourable areas (Johnstone and Storr 1998). - Foraging strategy/flight behaviour involves regular soaring (Debus 1998) and likely intersection with the RSA. 2 mortalities reported at Silverton Wind Farm in NSW (Biosis 2021), 5 in south-west Victoria (Biosis 2020), 5 in NSW (EcoLogical 2022), 4 and 2 in Victoria (Elmoby 2020, 2021), 18 at 2 sites in Tasmania (Hull <i>et al.</i>, 2013), 58 from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Low - Widespread in Australia, population large and possibly increasing due to clearing for agriculture and the introduction of rabbits (Birdlife International 2024, Ferguson-Lees and Christie 2001). - Not congregatory, usually occurs in pairs and singles (Johnstone and Storr 1998). - May be other pressures on this species in farmland, including illegal trapping and shooting (Ferguson-Lees and Christie 2001) - Long-lived, generation time estimated at 18.1 years (Birdlife International 2024). Each pair in the south-west on average raises less than 1 young per year (Debus 2019). - No conservation listing.	Moderate
Little Eagle <i>Hieraaetus morphnoides</i>	Least Concern	Moderate - Not recorded in Study Area but may occur. - Inhabits woodlands and open habitats, particularly favours a mosaic of timbered and open country, such as farmland (Marchant and Higgins 1993). - Some populations migratory. - Foraging strategy/flight behaviour involves regular soaring (Debus 1998), therefore likely intersection with the RSA. 1 wind farm mortality recorded from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Low - Widespread in Australia, population large and stable (Birdlife International 2024). - Not congregatory, usually occurs as singles, sometimes pairs (Johnstone and Storr 1998). - Long lived, generation time estimated at 18 years (Birdlife International 2024), juveniles disperse up to 3,000km (Debus 1998). - No conservation listing.	Minor
Brown Falcon <i>Falco berigora</i>	Least Concern	Moderate - Recorded in Study Area, likely to be a relatively common inhabitant of open farmland and woodland edges. - Of 6 records in the BUS, all were below RSA. - Largely sedentary, some movement north in autumn has been recorded (Johnstone and Storr 1998). - Foraging is mostly from a perch, but some soaring is used (Debus 1998). 8 wind farm mortalities in south-west Victoria (Biosis 2020), 2 in NSW (EcoLogical 2022), 1 in Victoria (Elmoby 2021), 6 at 2 sites in Tasmania (Hull <i>et al.</i>, 2013), 1 from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Low - Common, widespread across Australia. Population may be declining slowly (BirdLife International 2024). - Not congregatory, usually occurs in pairs and singles (Johnstone and Storr 1998). - Moderately long-lived, generation length estimated at 6.2 years (BirdLife International 2024), clutch size usually 3 (Johnstone and Storr 1998). - No conservation listing.	Minor

Species	Status	Likelihood	Consequence	Risk Rating
Australian Kestrel <i>Falco cenchroides</i>	Least Concern	Moderate - Recorded in Study Area and likely to be a common species of open farmland habitats. - Of 28 records in the BUS, 22 were below RSA and 6 were at RSA height. - At least partly migratory, moving north in autumn, returning late winter (Johnstone and Storr 1998). - Foraging strategy to fly low and slow over ground, then hover when prey sighted (Johnstone and Storr 1998). May hover at RSA height. 1 mortality reported at Silverton Wind Farm in NSW (Biosis 2021), 23 in south-west Victoria (Biosis 2020), 5 in NSW (EcoLogical 2022), 2 in Victoria (Elmoby 2021), 54 from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Low - Common, widespread across Australia. Population large and increasing (BirdLife International 2024). - Not congregatory, usually occurs in singles, sometimes pairs (Johnstone and Storr 1998). - Moderately long-lived, generation length estimated at 6.2 years (BirdLife International 2024), clutch size usually 4 (Johnstone and Storr 1998). - No conservation listing.	Minor
Nocturnal Birds of Prey				
Waterbirds				
Species	Status	Likelihood	Consequence	Risk Rating
Bird species recorded flying at RSA in this survey				
Purple-crowned Lorikeet <i>Parvipsitta porphyrocephala</i>	Least Concern	High - Recorded in Study Area and likely to be common. - Of 433 records in the BUS, 354 were below RSA and 79 were in the RSA. - Forages in forests and woodlands but crosses open habitats between woodland patches. - Nomadic, moving in response to the availability of blossom (Johnstone and Storr 1998). Likely to be common in Study Area when eucalypt canopy is in flower. - Flight fast and direct when moving between habitat patches.	Low - Restricted to south-west Western Australia, common within its range but thought to be slowly declining (BirdLife International 2024). - Somewhat congregatory, occurring in small flocks up to 40, moving in response to availability of flowering eucalypts. Sometimes breed in groups, many pairs using tree hollows in close proximity (Johnstone and Storr 1998). - Modest lifespan, generation time estimated at 3.5 years (BirdLife International 2024), clutch size usually 2-4 (Johnstone and Storr 1998), reasonable capacity to replace lost adults. - No conservation listing.	Moderate
Species	Status	Likelihood	Consequence	Risk Rating
Elegant Parrot <i>Neophema elegans</i>	Least Concern	High - Recorded in Study Area and likely to be a common species of open farmland habitats. - Of 69 records in the BUS, 57 were below RSA and 12 were in the RSA. - Favours lightly wooded habitats including farmland, usually foraging on the ground. - Largely sedentary, some movements north and south-west in autumn (Johnstone and Storr 1998).	Negligible - Has increased its range since European settlement. Restricted to southern Australia, common in the southern part of its range, uncommon or scarce elsewhere (Johnstone and Storr 1998). - Not usually congregatory, pairs or small flocks, occasionally large flocks (Johnstone and Storr 1998). - Moderately long-lived, generation time estimated at 4.9 years (BirdLife International 2024), clutch size 4-6 (Johnstone and Storr 1998). - No conservation listing.	Minor

Species	Status	Likelihood	Consequence	Risk Rating
Tree Martin <i>Petrochelidon nigricans</i>	Least Concern	High - Recorded in Study Area and likely to be a common species of open farmland habitats. - Of 2,087 records in the BUS, 1,961 were below RSA and 126 were in the RSA. - Migratory; birds in south-west Australia forming flocks in early summer, moving north in late summer - autumn and returning in late winter – spring to breed (Johnstone and Storr 2004). - An aerial insectivore, flight highly manoeuvrable.	Negligible - Common and widespread across Australia, believed to be increasing in abundance (BirdLife International 2024). - Congregates in roaming flocks in early summer, but these flocks wander and are unlikely to be restricted to a particular site. - Moderately long-lived, generation length estimated at 4 years (BirdLife International 2024). - No conservation listing.	Minor
Welcome Swallow <i>Hirundo neoxena</i>	Least Concern	High - Recorded in Study Area and likely to be a common species of open farmland habitats, usually in association with buildings, tanks and other infrastructure. - Of 20 records in the BUS, 11 were below RSA and 9 were in the RSA. - Likely to be sedentary in the south-west, migratory elsewhere. - An aerial insectivore, flight highly manoeuvrable. 1 wind farm mortality in Victoria (Elmoby 2019), 4 from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Negligible - Originally confined to coasts, this species has colonised the interior with European settlement. Widespread and abundant, the population trend is increasing (Birdlife International 2024). - Not congregatory, occurs as singles, pairs and small flocks (Johnstone and Storr, 1998). - Moderately long-lived, generation length estimated at 4 years (BirdLife International 2024). - No conservation listing.	Minor
Australian Magpie <i>Gymnorhina tibicen</i>	Least Concern	Moderate - Recorded in Study Area and likely to be a common species of open farmland habitats. - Of 475 records in the BUS, 473 were below RSA and 2 were in the RSA. - Sedentary. - Known to collide with turbines (unpublished data reported in BL&A 2017), 13 in south-west Victoria (Biosis 2020), 9 in NSW (EcoLogical 2022), 1, 1 and 3 in Victoria (Elmoby 2019, 2020, 2021), 115 from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Low - Common and widespread across Australia, believed to be increasing in abundance and particularly common in coastal and agricultural areas (BirdLife International 2024). - Not congregatory, usually in pairs and small groups (Johnstone and Storr 2004). - Long-lived, generation length estimated at 12.7 years (BirdLife International 2024). - Usually breeds in small groups containing some non-breeding members, so some capacity to replace lost adults. - No conservation listing.	Minor
Black-faced Cuckoo-shrike <i>Coracina novaehollandiae</i>	Least Concern	Moderate - Recorded in Study Area. Occurs in wooded habitats and cleared land. This species can cross open areas on migration. - Of the 63 records in the BUS, 57 were below RSA and 6 were in the RSA. - Migrant, southern birds move north in mid-January to June (Johnstone and Storr 2004). - Usually forages in the tree canopy (Johnstone and Storr 2004).	Low - Common and widespread across Australia, this species has an extremely large range, and the population size is large, but the population trend is decreasing (BirdLife International 2024). - Not congregatory, usually in singles or pairs or small groups of up to 30 on migration (Johnstone and Storr 2004). - Moderately long-lived, generation length estimated at 4.6 years (BirdLife International 2024). - No conservation listing.	Minor

Species	Status	Likelihood	Consequence	Risk Rating
Dusky Woodswallow <i>Artamus cyanopterus</i>	Least Concern	Moderate - Recorded in Study Area. Favours partly cleared farmland and eucalypt woodlands but uncommon in the wheatbelt due to clearing (Johnstone and Storr 2004). - Of the 37 records in the RSA, 31 were below the RSA and 6 were in the RSA. - Partial migrant. Flocks in autumn and moves north. - An aerial insectivore, flight highly manoeuvrable. Hawks for insects over the canopy (Johnstone and Storr 2004). 1 wind farm mortality recorded from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Low - Common and widespread across southern Australia, this species has an extremely large range, and the population is large, but the population trend is decreasing (BirdLife International 2024). This species has declined in the south-west, often replaced by the conspecific Black-faced Woodswallow (Johnstone and Storr 2004). - Not usually congregatory, usually in singles, pairs or small groups, occasionally large flocks of up to 200 (Johnstone and Storr 2004). - Moderately long-lived, generation length estimated at 3.6 years (BirdLife International 2024). - No conservation listing.	Minor

Table 6: Risk Analysis Bat Details

Species	Status	Likelihood	Consequence	Risk Rating
Central Longeared Bat <i>Nyctophilus major tor</i>	Priority 3	Low - Possibly occurs, project is on very western edge of its known range. - Usually under the canopy, flying within the understory (Churchill 2008). ‘High altitude likelihood’ rated as low for <i>Nyctophilus spp.</i> present on site (Specialised Zoological 2025). - Wing aspect ratio high, wing loading low (Norberg and Rayner 1987).	Moderate - Population likely >10,000 (Woinarski <i>et al.</i>, 2014) and widespread across southern arid Australia. - Listed as DBCA Priority 3, Least Concern in Action Plan (Woinarski <i>et al.</i>, 2014).	Minor
Chocolate Wattled Bat <i>Chalinolobus morio</i>	Least Concern	Moderate - Recorded in Study Area, high frequency of detection (Specialised Zoological 2025). - Relatively unlikely to fly in RSA, flies in the open spaces between the forest canopy and understory (Churchill 2008). ‘High altitude likelihood’ rated as medium based on expert opinion (Specialised Zoological 2025). - Sedentary species, flies 5 – 10km from the roost to forage (Churchill 2008). - Flight agile (Bullen and McKenzie 2001), wing aspect ratio high, wing loading medium (Norberg and Rayner 1987). 5 wind farm mortalities from 15 sites across Victoria (Moloney <i>et al.</i> 2019), 1 from south-west Victoria (Bennett <i>et al.</i> 2022), 1 and 2 in Victoria (Elmoby 2019, 2021).	Low - No conservation listing. - Often bears twins (Churchill 2008), so moderate ability to replace lost individuals compared with other bats. - Population large and widespread across southern Australia.	Minor
Gould’s Wattled Bat <i>Chalinolobus gouldii</i>	Least Concern	High - Recorded in Study Area, high frequency of detection (Specialised Zoological 2025). - May fly in the RSA, flies below or within the lower level of the forest canopy, along forest edges, creek lines and around isolated paddock trees (Churchill 2008). ‘High altitude likelihood’ rated as medium based on expert opinion (Specialised Zoological 2025). - Flight agile (Bullen and McKenzie 2001), wing aspect ratio high, wing loading medium (Norberg and Rayner 1987). 38 wind farm mortalities in Tasmania (Hull and Cawthen 2013), 49 from 15 sites across Victoria (Moloney <i>et al.</i> 2019), 9 from south-west Victoria (Bennett <i>et al.</i> 2022), 11 in southwest Victoria (Biosis 2020), 2 from Silverton in NSW (Biosis 2021), 1 in NSW (EcoLogical 2022), 14 and 9 in Victoria (Elmoby 2019, 2021).	Low - No conservation listing. - Usually bears twins (Churchill 2008), so moderate ability to replace lost individuals compared with other bats. - Population large and widespread across Australia.	Moderate

Species	Status	Likelihood	Consequence	Risk Rating
Greater Longeared Bat <i>Nyctophilus major major</i>	Least Concern	Low - Possibly occurs, project is on very eastern edge of its known range. - Flight likely below RSA, usually under the canopy, flying within the understory (Churchill 2008). - High altitude likelihood' rated as low for <i>Nyctophilus</i> spp. present on site (Specialised Zoological 2025). - Sedentary but using multiple roosts, flying up to 1,200 m from the roost to forage. - Wing aspect ratio high, wing loading medium (Norberg and Rayner 1987).	Moderate - No conservation listing. - Often bears twins (Churchill 2008), so moderate ability to replace lost individuals compared with other bats. - Population restricted to forested regions in south-west Western Australia.	Minor
Holt's Longeared Bat, <i>Nyctophilus holtorum</i> (Previously Gould's Longeared Bat, <i>Nyctophilus gouldi</i>)	Least Concern	Low - Possibly occurs in Study Area but no records within 40km on ALA (2023) and species is on the very eastern edge of its range. - Unlikely to fly in RSA, flies under the forest canopy, 2-5m above the ground. 'High altitude likelihood' rated as low for <i>Nyctophilus</i> spp. present on site (Specialised Zoological 2025). - Wing aspect ratio high, wing loading low (Norberg and Raynor 1987). - Data from closely related <i>Nyctophilus gouldii</i>: 1 wind farm mortality from 15 sites across Victoria (Moloney <i>et al.</i> 2019) 3 in south-west Victoria (Biosis 2020).	Moderate - No conservation listing. - Bears twins about 50% of the time (Churchill 2008), so moderately-low ability to replace lost individuals compared with other bats. - Population restricted to forested regions in south-west Western Australia.	Minor
South-west Freetail Bat <i>Ozimops kitcheneri</i>	Least Concern	Moderate - Recorded in Study Area, relatively low frequency of detection (Specialised Zoological 2025). - Flies at or above canopy height, also forages on ground (Churchill 2008). Forages up to 12km from the roost. 'High altitude likelihood' rated as medium based expert opinion (Specialised Zoological 2025). - Wing aspect ratio average, wing loading high (Norberg and Rayner 1987).	Low - No conservation listing. - Bears a single young each year, but relatively long-lived at 10 years (Churchill 2008), so moderate ability to replace lost individuals. - Population large and widespread across Australia.	Minor

Species	Status	Likelihood	Consequence	Risk Rating
Southern Forest Bat <i>Vespadelus regulus</i>	Least Concern	High - Recorded in study area., high frequency of detection (Specialised Zoological 2025). - Unlikely to fly in RSA, usually forages at less than half the canopy height, close to vegetation, including foraging within the understory (Churchill 2008). ‘High altitude likelihood’ rated as medium based on expert opinion (Specialised Zoological 2025). - Flight agile (Bullen and McKenzie 2001), wing aspect ratio average, wing loading low (Norberg and Rayner 1987). 2 wind farm mortalities in Tasmania (Hull and Cawthen 2013), 2 from 15 sites across Victoria (Moloney <i>et al.</i> 2019), 2 from south-west Victoria (Bennett <i>et al.</i> 2022) 3 and 3 in Victoria (Elmoby 2019, 2021).	Low - No conservation listing. - Bears a single young each year (Churchill 2008), so limited ability to replace lost individuals. - Population large and widespread across Australia.	Moderate
Western False Pipistrelle <i>Falsistrellus mackenziei</i>	Priority 4	Low - Not recorded but possibly occurs, however, prefers old growth habitats and project is on the very eastern edge of its known range. - Flight fast and direct, but usually in the open spaces between the forest canopy and understory (Churchill 2008). - Wing aspect ratio high, wing loading high (Bullen 2008). 28 wind farm mortalities of a similar species, <i>Falsistrellus tasmaniensis</i>, from 15 sites across Victoria (Moloney <i>et al.</i> 2019).	Moderate - Population likely to be >10,000 individuals but declining (Woinarski <i>et al.</i> 2014). - Bears a single young each year (Churchill 2008), so limited ability to replace lost individuals. - Population restricted to forested regions in south-west Western Australia. - Listed as DBCA Priority 4, Near Threatened in Action Plan (Woinarski <i>et al.</i> 2014).	Minor
White-striped Freetail Bat <i>Austronomus australis</i>	Least Concern	High - Recorded in Study Area, activity levels moderate overall as not present all year. - Likely to fly in RSA, flies over canopy, typically 50 m above ground (Churchill 2008). ‘High altitude likelihood’ rated as high based on expert opinion (Specialised Zoological 2025). - Migratory, moving northwards during the cooler months of April - September and southwards during the warmer months of October – March) (Bullen and McKenzie 2005). - Wing aspect ratio high, wing loading very high (Norberg and Rayner 1987). 296 wind farm mortalities in Victoria across 15 sites (Moloney <i>et al.</i> 2019), 24 in southwest Victoria (Bennett <i>et al.</i> 2022), 18 in south-west Victoria (Biosis 2020), 4 from Silverton in NSW (Biosis 2021), 9 in NSW (EcoLogical 2022), 26 and 9 in Victoria (Elmoby 2019, 2021).	Low - No conservation listing. - Bears a single young each year (Churchill 2008), so limited ability to replace lost individuals. - High capacity for dispersal. - Population large and widespread across Australia.	Moderate

4 Proposed Bird and Bat Adaptive Monitoring Program

4.1 Overview

This section sets out the expected post-commissioning survey methods program that will be adopted to monitor bird and bat activity in the Development Area and surrounds. The methodology is based on current industry best practice, and the results of the studies conducted to date.

Bird and bat monitoring post commissioning will utilise data from the Bird and Bat Utilisation Surveys (BUS) conducted during the Project's development stage, **Carcass Search Surveys** and incidental trials, including **Carcass Persistence** and **Carcass Detection Trials**, and incidental records, described further below.

The Project is still in design stage. Accordingly, this BBAMP is preliminary in nature. In accordance with the conditions of the Development Approval granted in February 2026, this Preliminary BBAMP will be refined and finalised to minimise any potential impact on bird and bat populations with any changes will be reflected in a Final BBAMP to be prepared prior to commissioning to ensure compliance with Development Approval conditions.

4.2 Timing and Frequency of Surveys

An overview of the survey schedule for the different components of the bird and bat monitoring program is provided below in Table 7. Scheduling of the bird monitoring program has been timed to coincide with the seasonal migration/movement of conservation significant bird species that are likely to occur in the Study Area, including black-cockatoo species (Carnaby's Black Cockatoo, Forest Red-tailed Black Cockatoo; and Baudin's Black Cockatoo).

The bat monitoring program is timed to align with the bird monitoring program, the increased bat activity during the hotter spring and summer seasons and the spring time flowering of eucalypts.

Table 7: Survey Schedule Summary

Survey	Timing	Duration
Bird Utilisation Surveys	Twice annually, in October/November and February/March following commencement of operations	2 years from commencement of full Operations
Bat Utilisation Surveys	In line with Bird Utilisation Surveys	2 years from commencement of full Operations
Carcass Search Surveys	Conducted on a quarterly basis for the first two years of operation to capture equal coverage across the year, with key months in spring (October), Summer (February), and the higher-rainfall season (June) being captured. In the third and fourth years of operation, surveys will be undertaken to coincide with peak finds observed during previous surveys.	4 years
Carcass Persistence Trials	Six monthly.	2 years from commencement of full Operations

Survey	Timing	Duration
Carcass Detectability Trials	Six monthly.	1 year from commencement of full Operations

The requirement for ongoing Bird and Bat Utilisation Surveys, following the initial two-year period, will be reviewed in accordance with an adaptive management framework by the Project's Ecologist based on the results of historical surveys.

4.3 Bird Utilisation Surveys

4.3.1 Overview

Bird Utilisation Surveys (**BUS**) are to be conducted on a twice-yearly basis once operations have commenced⁷ and will continue for a period of two years from that time. The focus of the BUS is on the recording of data for Conservation Significant birds and bats and Other At-Risk birds and bats.

The timing of these BUS surveys has been set to coincide with seasonal migration of the Significant Bird Species, particularly Black Cockatoos.

A summary of the survey methodology is set out below, with reporting protocols set out in section 7. For consistency and comparison of pre and post operational bird and bat data, the BUS methodology will utilise the same overall methodology used in the Base Line Surveys (refer to section 0).

4.3.2 Vantage Point Surveys

Vantage Point Surveys will be conducted once Operations have commenced and will record the information on bird activity in the Study Area as set out in Table 8 below.

Table 8: Vantage Point Survey Data Collection

Aspect	Information to be Collected
Bird Data	- The species and number of birds - Observation type (visual or aural) - Age class of bird - Juvenile/adult
Location	- Location of observer/Vantage Point - Distance and direction from the observer - Approximate height AGL of the observed birds - Direction of flight
Type of Sighting	- Flight pattern - stationary, flying, local movement, directional flight, circling, swooping, varied, or other - Behaviour

⁷ To ensure the site is safe and accessible, surveys will not be permitted to commence until all turbines are commissioned and tested, and the site is handed over from the EPC Contractor to the Operator.

Aspect	Information to be Collected
	- flight, foraging, perching, mating, aggressive interactions, hollow inspection, nesting, on station)

The location of Vantage Point Surveys should where possible be located at or close to the same locations utilised during the Baseline Surveys.

4.3.3 Diurnal Bird Searches

Diurnal bird searches may be conducted in Operational BUS Surveys to collect data on relative abundance and diversity, and to a lesser degree, flight behaviour, of bird species across different habitat patches within the Study Area. This would allow an assessment of changes in habitat utilisation and presence for conservation significant species following wind farm operation and inform suitable mitigation and management measures.

The survey would involve searching a 400 m transect for 20 minutes to record species observed and the number of individuals present. Where targeted species (i.e. Conservation Significant or At-Risk species) are observed, additional data regarding flight behaviours will also be captured.

4.4 Bat Utilisation Surveys

Bat Utilisation Surveys will be completed once Operations commence, generally in accordance with pre-commissioning surveys.

Bat call detectors will be placed at previously selected Vantage Points, WTGs and Met Masts in accordance with Table 9 to record bat activity over two-to-five-day survey periods. Data to be observed and recorded will include the bat species and flight height.

Table 9: Location of Bat Detectors

Class	Height
Vantage Points	• 2m AHG
WTGs	• Hub Height
Met Mast	• Varying heights

4.5 Personnel

BUS and bat surveys are to be conducted by qualified ecologists or otherwise suitably qualified and trained personnel, as determined by the Project's Ecologist.

4.6 Carcass Search Program

4.6.1 Overview

Carcass Search Surveys will be conducted with the objective being to accurately monitor impact of the Project on the bird and bat population, in particular the **Species of Concern**.

The Carcass Search Surveys will be augmented by additional trials including **Carcass Efficiency**

Trials, Carcass Persistence Trials and Pulse Searches (refer to section 4.6.8) to allow for the best estimate of the underlying Mortality Rate⁸ after allowing for the accuracy of the searches and the potential for carcass removal by scavengers.

The information collected from these surveys and trials will be used to inform the adaptive management framework and also any measures that might be taken to reduce collision risk. The results will also be used as triggers for modification to the BBAMP or inform other mitigation actions.

4.6.2 Survey Timing

The Carcass Search Surveys will commence once 50% of the WTGs have become operational and will continue for a period of two years from the time when all WTGs become fully operational, referred to as the **Initial Carcass Search Term**). Additional trials will be conducted during the Initial Search Term.

The search program will be reviewed for efficacy after the Initial Carcass Search Term (2 years), with the nature of extension based on frequency and significance of bird and bat mortality due to collision from the operation of the wind turbines associated with the.

The timing and frequency of the Carcass Search Program is set out in Table 10 below.

Table 10: Carcass Search Survey Timing and Frequency

Stage	Survey/Trial	Frequency	Timing
Commissioning	Carcass Search Survey	Monthly	Commencing once 50% of WTGs are operating Additional WTGs to be included as they become operational
Initial Carcass Search Term	Carcass Search Survey	Monthly	Commencing once all WTGs are operating and then for period of two years from that time
	Carcass Detectability Trial	Annual	
	Carcass Detectability Trial	Annual	
Longer term	To be determined based on findings of prior survey and trial work at the completion of the Initial Carcass Search term		

4.6.3 Modifications to Timing

If a survey identifies any carcass or feather spot of a conservation Significant Species, a follow up survey within two weeks of the initial survey will be conducted of the inner search area will be undertaken to bolster detection rates.

The frequency of Carcass Search Surveys may be altered if the findings of the Carcass Persistence Trials indicate significant loss of carcasses due to scavenger activity.

⁸ The annual number of individual bird and bats that die due to collision impacts associated with the Project

4.6.4 Incidental Finds

Incidental or Casual finds of bird and bat carcasses made during Operations outside the scheduled surveys and trials will also be recorded in the Project database on the same basis as for finds made during scheduled monthly surveys and contribute to data on bird and bat collisions. If the finds are located in the WTG Search Zones, the finds are to be included in the Monthly Surveys.

All Project personnel will be trained on the procedures to be taken if bird carcasses or injured birds are found both during construction or operations and outside of scheduled surveys.

4.6.5 Personnel

The Carcass Search Surveys are to be conducted by ecologists or experienced dog handlers, with support as needed.

Specially selected site staff will also be trained in key protocols, including carcass recording, storage, handling injured wildlife, impact triggers, and reporting processes.

All staff will be informed of these procedures during site induction.

4.6.6 Search Location

WTG Selection

Given the nature of the regional topography and vegetation, all WTGs within the Study Area are considered as having a similar risk of collision for to Species of Concern. Carcass Detection Surveys will be conducted at 17 of the of the 33 WTGs planned for the Project, or slightly more than 50% of the installed WTGs. The specific sites will be selected to achieve a representative coverage of different vegetation and habitat types with greater weighting given to those WTGs closer to large patches of remnant vegetation.

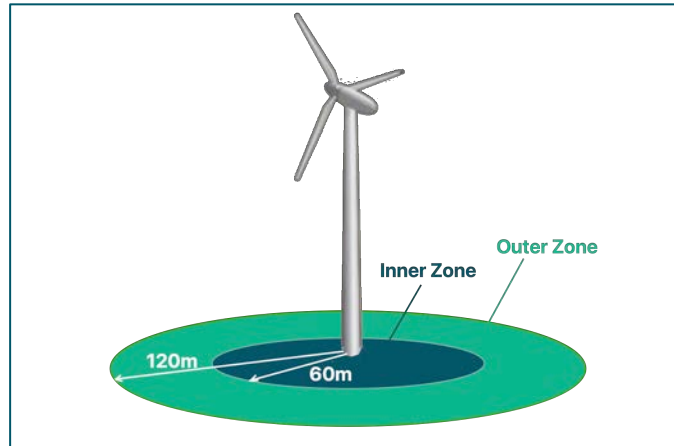
Search Zones

For each WTG there will be two separate search zones consisting of an **Inner Zone** with a radius of 60 metres from the centre of the WTG and an **Outer Zone** from the 60 to 120 m distance from the centre of the WTG⁹.

The Inner Zone (< 60 m) is the area in which carcasses of smaller to medium sized birds and bats are likely to be found post collisions. Larger birds are more likely to fall within the Outer Zone (60 – 120 m) at a greater distance from the WTG's.

⁹ The selection of the search zones is based on research by Hull and Muir (2010)

Figure 4: Search Zones



Detection Dogs

Trained detection dogs will be used in preference to human searchers wherever available due to the increased efficacy of dogs compared to human alone detection.

The dog and handler will traverse the search area along paths spaced by approximately 20–30 m from one another. In windier conditions, where scent detection and search efficacy is reduced, the spacing will be decreased.

Dog handlers will be trained and experienced in identification of all bird and bat species that may occur within the Project site. The dogs are to be fitted with GPS trackers to enable accurate recording of any carcasses found.

Human Searches

If detection dogs are unavailable, carcass searches will be conducted by trained searchers suitably experienced in identification of bird and bat species likely to occur within the Project site¹⁰.

For the Inner Zone the observer will walk transects spaced at 6m intervals. For the Outer Zone search area, the observer will walk transects spaced at 12 m intervals.

The observer will record their movement along transects using a handheld GPS device to enable accurate location of any remnants discovered during the survey.

¹⁰ identification will be confirmed by the Project's Ecologist if required

Table 11: Search Methods (KWF Alternate)

	Detection Dog	Human Detection
Personnel	Dog and handler adequately trained and experienced in identification of bird and bat species	Suitably trained Observer
Search Path Spacing	The Detection Dog will be led by Handler on paths spaced 20 – 30 m concentrically apart The interval between paths for the Outer Zone depends on wind speed	The Observers will walk on concentric paths 5 metres apart from the Inner Zone circumference and then 12m apart in the Outer Zone
Data Recording Equipment	Detection Dogs to be fitted with GPS device	Observers to carry Handheld GPS device
Comments	The preferred search method is the use of Detection Dogs, considered superior to human detection with the advantage that it covers larger areas.	Human Detection may be used if detection dog unavailable

4.6.7 Carcass Find Protocols

Recording

During regular monthly Carcass Search Surveys and Carcass Persistence Trials (Section 4.3.7), the data to be recorded and entered into the Study Database will include geographical location, weather details, and site-specific factors such as ground substrate and the accessible search area at each turbine. Any bird carcass or feather spot material found will be collected, photographed, stored, and the location logged by GPS. Each carcass must be carefully photographed to enable further identification.

The recording of survey results is summarised in Table 12 below.

Table 12: Carcass Recording Requirements

Aspect	Information to Entered in Database
Location	• Nearest WTG • GPS location along with distance (m) and compass bearing from the turbine (excludes incidental carcass finds) • Time and date of find
Nature of Find	• Species, age, and sex • Signs of injury and/or predation • Sate of decay/Estimated carcass age
Surroundings	• Groundcover type and height • Immediately surrounding vegetation • Presence and distance to key habitat features such as remnant vegetation, Hollow Trees, dams or surface water
Climatic Conditions	• Weather conditions • Any recent extreme or unusual weather events that may have influenced mortality

Aspect	Information to Entered in Database
Photographs	- Photographs (to be enable identification) - Photographs to be well lit, use of white background, and item for scale

Carcass Removal and Storage

All finds are to be removed from the site once recorded to reduce the risk of scavenging and double counting. Carcasses should be removed from the site by personnel wearing protective rubber gloves and placed into double plastic bags and properly labelled with species (if known), time, date and location of collection.

All carcasses are to be stored double bagged in freezer to allow further identification and potential use in carcass persistence or detectability trials (refer to section 4.6). Storage bags are to be clearly labelled with the time, date, WTG and species name (if identifiable).

If field identification is not possible referral is to be made to supervising ecologists for definitive identification. DNA swabbing to be considered if suspected of being a threatened species or a non-threatened species that would impact a trigger.

4.6.8 Trials

Carcass Efficiency Trials, Carcase Persistence Trials and Pulse Searches will be conducted as described below to adjust for the impact on mortality rate for the efficacy of the searches and the potential for carcass removal by scavengers. The data collected during these trials will be used to establish correction factors to account for search accuracy and better estimate the true mortality rates.

Carcass Detectability Trials/Observer Trials

The location of carcasses in the vicinity of WTGs during searches and surveys varies depending on the skill, experience and diligence of the observer, and more so the nature of the ground cover and the impact that has on visibility and access to carcasses. The presence of crops will reduce the ability to locate carcasses

To assess the effectiveness of the regular monthly surveys separate Carcass Detectability Trials (sometimes referred to as Observer Trials) will be conducted independently of the routine Carcass Search Surveys. The Carcass Detectability Trials will be conducted in the following manner:

- Birds and bats bodies collected during the normal detection program will be stored frozen until formal identification, if required, is confirmed.
- Five bird and bat carcasses of different sizes and species (referred to as **Trial Carcasses**), will then be thawed and randomly distributed around the designated trial WTG in varying ground covers just prior to the time for the next monthly Carcass Search Survey.
- If sufficient carcasses are not available from other surveys, then replicas may be used.
- The location of where the Trial Carcasses will be recorded by GPS. Importantly the location will not be let known to the normal detector team personnel, as the objective of the trial is to test their ability to locate carcasses.
- The detector teams will then conduct searches according to standard monthly survey methodology.

- For consistency, the teams used in the trials should be the same as used in the regular monthly surveys

Based on the subsequent search results a calibration factor will be calculated as follows:

$$\text{Calibration Factor} = \frac{\text{number of Trial Carcasses found}}{\text{Trial Carcasses}}$$

For example, if only three of the five Trial Carcasses are found during the search the calibration factor is 60%, indicating that 40% of carcasses were undetected.

Carcass Persistence Trials/Scavenger Trials

Scavengers, including raptors, ravens, and introduced species such as foxes may eat or otherwise remove the carcasses of birds and bats that are injured or killed by turbine collisions prior to the monthly surveys being conducted. **Carcass Persistence Trials**, often referred to as Scavenger Trials, will be conducted to estimate the impact of scavenger activity and carcass removal may have on recording of actual mortality rates.

The Carcass Persistence Trials will be conducted in the following manner:

- a range of carcass types will be placed around the WTGs representing large animals (such as raptors or waterbirds), mid-size birds and small animals such as parrots and microbats at specified distances from selected turbines across the Study Area.
- If insufficient bird or bat carcasses are available for the trials these may be substituted with other items such as mice for small birds and bats and rabbits for medium/larger birds.
- The WTG's selected for the Carcasses Persistence trial shall be a subset of those used for the regular monthly surveys.
- The trial carcasses will be monitored with motion-activated cameras to record the identity of scavengers and the time and date of carcass removal.
- Carcasses to be monitored for up to 30 days.

Carcass Persistence Trial results will then be used to estimate the average time for carcass removal to determine the survival function, The probability that carcasses will remain observable in the field following mortality events.

Pulse Searches

The regular monthly surveys will be augmented by twice yearly **Pulse Searches** conducted in spring and summer at selected turbines closest to high-quality habitat, potential nesting trees, and areas of higher bird and bat activity, as determined by comparison of baseline surveys and the results of the regular monthly Carcass Search Surveys.

The Pulse Survey will be conducted within several days of the monthly survey with objective being to detect additional mortality amongst the Species of Concern such as the Black Cockatoos. The Pulse Searches will be conducted on the basis of 12 m spaced concentric transects within the 120 m search zone to improve detection accuracy and reduce loss of carcasses to scavenging between monthly monitoring.

If a mortality of a conservation significant bird is found during a Monthly Survey, then that WTG will be included in future Pulse Searches.

Timing of Trials

Detectability trials will occur every six months during the first year of wind farm operations.

Review of Methodology

Trials methodology will be subject to continued refinement including modification may be modified as technology provides more advanced methods for capturing data.

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4.6.9 Longer term Carcass Monitoring

After the two-year initial carcass search term is completed the results of the surveys and trials will be analysed to determine if the risk of collision and heightened mortality rates attributable to the project is Low Moderate or High by the Project's Ecologist.

If deemed to be moderate or high impact the carcass monitoring program will continue on the same basis as set out above for the life of the Project. If the impact is deemed to be low the carcass monitoring programme may be reduced to the recording of incidental or casual carcass finds.

5 Risk Mitigation Actions

Mitigation measures as set out below will be conducted by the Operator to minimise potential harm to those bird and bat species assessed as at moderate and high risk of impact from the operation of the Project.

Additional measures may be implemented following the investigation of triggers being reached or exceeded and the BBAMP reviewed.

5.1 Considered Design and Construction

Specific management measures for protection of local and migratory birds and bats to be implemented during detailed design and construction include:

- Commitments to minimise the clearing of suitable Black Cockatoo trees through the siting of WTGs generators and associated Project infrastructure in previously disturbed areas where possible.
- Micro-siting of infrastructure during implementation to avoid sensitive environmental values that may be encountered or could not be avoided through the iterative planning process, this includes on-site alignment of roads and cables to avoid identified trees with suitable hollows for black cockatoos.
- Wherever possible, clearing of trees with potential black cockatoo hollows will be limited to outside of the breeding season (typically January – June).
- Pre-clearing surveys, by a suitably qualified zoologist, of trees to be cleared to reduce the risk of impact to black-cockatoos.
- Should any black cockatoo nesting trees be taken, an investigation will be undertaken to determine if suitable artificial hollows can be placed within a 100 m radius.
- Rehabilitation of cleared areas with suitable native foraging species (Marri, Jarrah, Banksia etc.).

5.2 Carrion Removal Program

The presence of carrion (for example dead farm or native animals) near WTGs can attract birds, especially raptors, thereby increasing the risk of collision. To mitigate this risk a **Carrion Removal Program** will be implemented during operations requiring the removal of any carcass located not only near WTGs, but also across the Project Area.

Any bird or bat carcasses found within 120 metres of the WTGs will be double bagged in clearly labelled plastic bags and kept in an on-site freezer. The GPS location, species, date and time, visible injuries, photographs, and weather conditions at the time of discovery are to be recorded in a program specific database. Carcasses are to remain stored frozen until identification is confirmed, including by an expert if required.

Carcasses may be preserved on site for mortality count calibration surveys to be conducted for first two years in accordance with section 4.6 .

For other carcasses such as farm animals, native and introduced animals the location, dates of finding and removal are to be logged in the program's database. The carcasses will then be removed from the Project area and disposed in a manner to avoid attracting raptors.

Any carrion discovered outside the monthly inspections are to be promptly removed using the same collection and documentation procedures used for scheduled surveys and trials.

The Carrion Removal Program will be revised in accordance with the an adaptive framework model and in consultation with relevant regulators. Annual Reports are to include a summary of the outcomes of

the Carrion Removal Program.

The Carrion Removal Program will be supervised by the Project's Environmental Representative and consist of monthly inspections. All full-time personnel on site will receive training on the removal of carrion.

5.3 Stock Feeding Restrictions

To reduce the risk of birds being attracted by stock food left close to the turbines, subject to landholder agreement/cooperation, no grain feeding of livestock is to be conducted within a 200 m radius of the WTGs limited.

5.4 Turbine and Infrastructure Lighting

To reduce the risk of attracting birds, bats, and insects WTG and other infrastructure, lighting is to be designed to reduce attraction, including the use of directional lighting, hoods, sensors. Preference will be given to using red lights where feasible rather than white or yellow lights that are more likely to attract birds, bats and insects

Aviation lighting will only be installed on the WTGs if required by Air Services Australia, CASA, or emergency services. Aviation Projects has undertaken an Aviation Impact Assessment (AIA) and concluded that turbine lighting is not required.

5.5 Black-Cockatoo nests

Prior to any clearing activities within the Project Area, surveys for hollow nests of Black Cockatoos are to be conducted using suitably qualified zoologist appointed by the Operator.

Clearing of trees with potential black cockatoo hollows will be limited to outside of the breeding season, being January through to June.

If any nests are located in trees marked for clearing, then all activities with the vicinity of the nest are to be halted until an assessment is made by the Project's zoologist.

Any identified Black-cockatoo nests will not be disturbed until chicks have fledged and adults have departed. Should any black cockatoo nesting trees be taken, an investigation will be undertaken to determine if suitable artificial hollows can be installed within a 100 m radius.

If the nest is determined not to be in active use by black-cockatoos or other listed species, clearance may continue. If the nest is home to non-listed native species, the nest may be relocated if appropriate and permitted.

Pre-clearing surveys are typically undertaken approximately one week prior to clearing (only in the appropriate season) using appropriate methods.

6 Impact Triggers

This section of the preliminary BBAMP outlines impact triggers applicable to both listed Threatened, Migratory, or Priority species, as well as non-listed species. It also specifies response actions, including monitoring and reporting requirements, and the implementation of risk mitigation strategies following the activation of an impact trigger.

6.1 Non-listed Species Impact Trigger

An impact trigger has been established for bird and bat species not listed for conservation but identified as having a higher likelihood of turbine collision (such as raptors and microbats).

For non-listed species, the impact trigger is met when four or more incidences involving carcasses or injured individuals are confirmed through the carcass detection program or located within 120 m of turbines during other activities at the same or adjacent turbine sites across two consecutive searches.

6.2 Conservation Significant Species Impact trigger

Impact triggers have been established for bird and bat species that are classified as Threatened, Migratory under the EPBC Act or BC Act, or designated as Priority by the DBCA (also referred to as Species of Concern).

In summary, for Threatened and Priority species, the impact trigger is met upon confirmation of a single dead or injured individual during carcass search surveys, or for incidental finds within 120 m of a WTG.

For species listed as Migratory under the EPBC Act or BC Act, the trigger is reached upon confirmation of four dead or injured individuals within 120 m of any turbine during the migratory season.

Table 6-1 provides the justification for the proposed outcome-based management trigger criteria, along with the associated response actions, management measures, and monitoring requirements.

Table 13: Trigger Events for Species of Concern

Risk	Trigger	Trigger level actions
Species of Concern		
Direct injury or mortality of a species listed as Threatened under the BC Act or EPBC Act or as Priority by DBCA	Any Threatened species listed under the BC Act or EPBC Act or Priority by DBCA is found dead or injured within a 120 m of a WTG	- Immediately notify the Project's Ecologist and State and Commonwealth agencies within five working days. - Increase monthly carcass monitoring frequency to fortnightly for an initial period of six weeks¹¹. - If additional carcasses are found, continue monitoring on fortnightly basis for another six weeks, or - if no carcasses are recorded, return to monthly monitoring
Direct injury or mortality of a species listed as Migratory under the BC Act or EPBC Act	Four or more carcasses from the same migratory species are recorded within 120 m of WTG during the species migratory season.	- Subject to the results of the carcass monitoring and consultation with the relevant regulators, implement targeted monitoring at the relevant WTG and any other WTGs where impacts are recorded or where species has been previously sighted to better understand the reason for the injury or mortality to inform any updates to the risk assessment. - For example, whether the impact is likely to be an isolated event or the result of regular seasonal movement.

¹¹ subject to the availability of qualified ecologists and in consultation with the relevant regulator

Risk	Trigger	Trigger level actions
		- Project Ecologist, in consultation with the regulators, to determine methodology and timing specific to the impacted species • Based on the results of the additional monitoring - update the risk assessment for the species including species risk level - determine whether there has been a significant impact¹² to the species or - may likely to result in a significant impact if repeated. • Prepare report within timeframe agreed upon by the relevant regulator, confirming the likely cause of death, contributing factors, and outcomes of additional carcass and targeted monitoring to assess whether impact significant. • If the impact is or is likely to be significant implement appropriate adaptive mitigation strategies, that may include: - deterrents such as noise or visual measures, or - turbine curtailment in high-risk environmental conditions, such as low wind speeds or periods of increased species activity. • If significant impacts are identified conduct further targeted monitoring to evaluate the effectiveness of adaptive mitigation strategies employed. • A summary of findings, including the likely cause of death, contributing factors, results of any supplementary monitoring, and the efficacy of mitigation, to be included in the annual report.
Presence of a Threatened or At-Risk bird nest close to a WTG	Confirmed active nest (excluding hollows) of Threatened or at-risk bird species within 200 m of WTG.	• Conduct monthly checks of the nest after the likely fledging period for the species, to confirm whether the breeding event has concluded and whether the nest is suitable for relocation. • If appropriate, relocate the nest once the breeding event has concluded. • Include details in the Annual Report
Other Species		
Direct injury or mortality of a species not listed as Threatened or Migratory under the BC Act or EPBC Act or as Priority by DBCA	Four or more carcasses from the same species are recorded within 120 m of same WTG in two successive searches. <i>Does not apply for introduced species or declared pests.</i>	• Initiate a desktop investigation within five working days to ascertain the cause of death and any contributing factors or circumstances. - Assess site conditions, review existing monitoring data for the species, and document consultations with State agencies and other relevant stakeholders to determine if further monitoring is warranted. - If required by State agencies within a regulator-approved timeframe, prepare a report confirming the likely cause of death, contributing factors, results of additional monitoring, revised risk assessment for the species, and whether the trigger has resulted in or could result in significant harm to the species if repeated. • If significant impact detected or anticipated, implement appropriate adaptive mitigation measures, such as deterrents (e.g., noise or

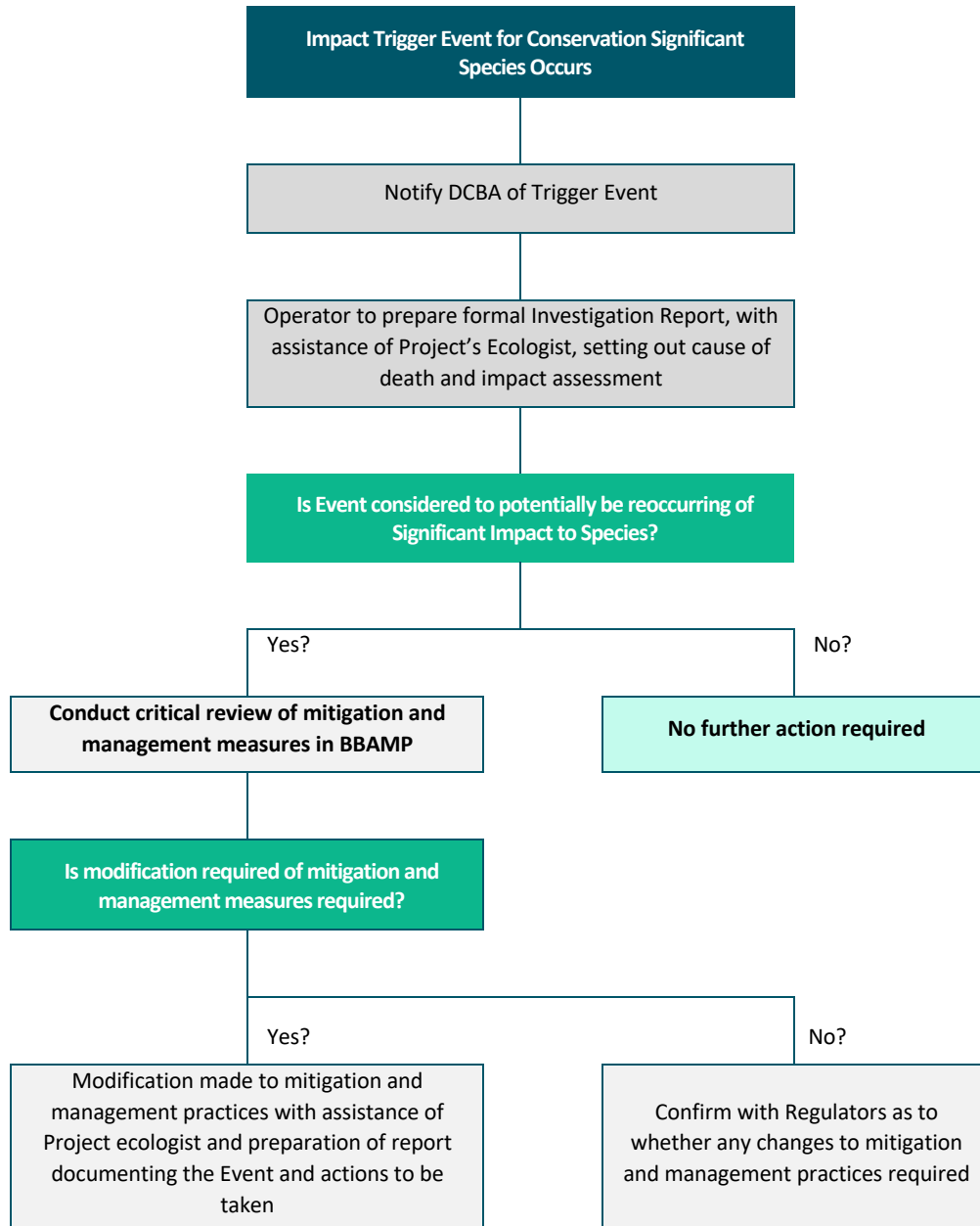
¹² A significant impact is defined as any effect likely to lower the viability or range of the species, based on regional population data. If such an impact is confirmed, the Operator with the assistant of the Project's ecologist will consult with DBCA in relation to mitigation measures.

Risk	Trigger	Trigger level actions
		visual) or turbine curtailment during high-risk environmental conditions (e.g., low wind speeds, periods of elevated species activity). • If impacts significant, conduct targeted additional monitoring to evaluate the effectiveness of the implemented adaptive mitigation measures and strategies. • Incorporate summary of the above in the annual report

6.3 Adaptive Mitigation Strategies for Species of Concern

- The framework for adaptive mitigation strategies for Species of Concern is shown in Figure 5 below.

Figure 5: Adaptive Mitigation Strategies



6.4 Non-listed Species

An impact trigger has been set for non-threatened bird and bat species with a higher risk of colliding

with turbines (such as raptors and microbats). If four or more carcasses or injured individuals are found at the same or adjacent turbine within two consecutive searches, an investigation by the Operator will be initiated.

6.5 Species with Revised Risk Rating Impact Trigger

Data from the bird and bat monitoring program will be evaluated using the risk assessment method in **Appendix C** to better understand turbine collision and barotrauma risks.

If monitoring changes a species' likelihood rating to **High** or **Very High** risk, the following steps will be taken by the Operator:

- Commission a Collision Risk Assessment to estimate annual collisions for the species, using a Collision Risk Model if sufficient data exists.
- Review and assess current BBAMP mitigation measures for their effectiveness.
- Consult with regulators to identify additional strategies to further reduce turbine collision and barotrauma risks.

7 Reporting

The proposed reporting requirements of the BBAMP is summarised in Table 14 below.

Table 14: Summary of Reporting Requirements

Report	Report Inclusions	Timing
Carcass Search Program	• Number of carcasses/feather spots detected per species, • Locations and dates of detections, • Details of any triggered impact levels, • The details of any Carcass Detectability or Persistence trials and number of carcasses used in detectability trials.	Monthly for 2 years post Operations at all WTGs commencing,
Early Response Exceedance/ Trigger Criteria Exceedance Reports	• Information on the reached criteria levels • Species and number of individuals affected • Dates and locations of carcass or feather spot recovery • Ecological factors contributing to the exceedance (e.g., climate, prey presence, seasonal effects) • Assessment of whether the event is rare, regular, or may adversely affect the species at various population scales	If a criteria level met
Annual Report	• Summary of bird and bat monitoring surveys and trials conducted that year including details of: - species presence - turbine strikes, - detection methods, - prevailing conditions during collisions. • estimate annual mortality and injury for relevant threatened and migratory species, • document conservation-significant species occurrences and assess the effectiveness of mitigation measures.	Annually

Report	Report Inclusions	Timing
Two Year Report	- Implementation of management actions to reduce turbine collision and barotrauma risks for conservation-significant birds and bats. - Noted changes in site use by these species. - Updated risk assessments for ongoing project operations. - Insights on how wind farm construction and operation affect site usage.	Upon completion of Initial Search Term.

7.1 Carcass Search Report

Following the completion each year of the Carcass Search Survey, the program findings will be compiled and recorded. The report should detail the species impacted including:

- Total carcasses/feather spots detected of each species.
- Locations of carcasses/feather spots detected.
- Dates carcasses/feather spots were detected.
- Details of any carcass/feather spots detections that triggered impact levels.

The number of carcasses of each species identified during the carcass search program which are utilised in the detectability trials will also be reported.

Statistical analysis should be undertaken to provide estimates of the annual total number of collisions for each species in consideration of the carcass search area and effort and the observed carcass persistence times and observer detectability rates.

The report is to be prepared on an annual basis for at least two years and provided within two months of each year of surveys being completed.

The timing may be extended based on frequency and significance of bird and bat mortality due to collision.

7.2 Early Response Exceedance Report

DBCA will be notified within five days from when the early response / trigger criteria are met for conservation significant species. The report compiled by the Project's ecologist will be submitted to DBCA and if required other regulators, and will include:

- any criteria level events and the species and number of individuals involved in the criteria exceedance
- the date and location of any recovered carcasses/feather spot
- any identified ecological factors contributing to the criteria exceedance such as climate, presence of prey species/foraging opportunities, seasonal factors (i.e. migration)
- whether the event is likely to be rare or regular or may constitute an adverse impact on the species at the local, regional or total population scale.

In cases where further monitoring or implementation of mitigation measures is deemed necessary

through consultation with regulators, the findings and effectiveness of such measures may be reported within specified timeframe as determined through consultation with the regulator

7.3 Annual Report

Annual compliance reporting will include a summary of any bird and bat monitoring program implemented throughout the year. It is anticipated that relevant information may comprise:

- provision of information regarding all turbine strikes, including method of detection, factors regarding the presence of a species, prevailing conditions at the time of collision
- estimations of annual mortality and injury for each relevant threatened and migratory species
- conservation significant species occurrence records
- evaluation regarding the effectiveness of measures implement to avoid and mitigate mortality and or injury to threatened and migratory species.

Annual compliance reports will be provided to regulators if deemed necessary or appropriate.

The Annual Reports will be prepared for an initial period of at least two years. In accordance with section [cr] if it is determined to be necessary or appropriate due to level of impact and mortality rates this will be extended.

7.4 Two Year Report

Following the completion of 24 months of bird and bat monitoring, the year 2 annual report should include discussion of the following items:

- The development and implementation of tangible management measures and corrective actions to promote a long-term reduction in the risk of turbine collision and barotrauma impacts on **Conservation Significant** bird and bat species.
- Any identified changes in site utilisation by Conservation Significant bird and bat species.
- Any Project site usage changes resulting from wind farm construction and operation.

8 Ongoing Review

8.1 Preparation of Final BBAMP

As required under the development Approval, this Preliminary BBAMP is to be replaced by a Final BBAMP prior to operations commencing.

8.2 Adaptive Management

The Final BBAMP will then be subject to continued review to ensure its ongoing effectiveness, particularly in the event changing conditions. A full-scale review may be triggered by adverse events or following on from the two-year Annual Report.

As part of ongoing operations adaptive management strategies are to developed to provide a structured, repeatable process will be instigated to supports flexible decisions and improved management over time, especially in uncertain or changing environmental situations. This is summarised in Table 15 below

Table 15: Adaptive Management Framework

Step	Description
Plan	Develop a clear plan with specific objectives, actions, and expected outcomes.
Do	Implement the plan while monitoring key indicators.
Evaluate	Assess the outcomes against the objectives.
Respond	Adjust the plan based on the evaluation to improve outcomes.

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