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KALGOORLIE REGIONAL RENEWABLE ENERGY PROJECT

Preliminary Bird and Bat Adaptive Management Plan

Revision	1.0
Date	7 November 2025
Proposal	Kalgoorlie Regional Renewable Energy Project
Proponent	Northern Star (EGP) Pty Ltd
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Document ID	Author		Reviewed		Approved	
NSR-KRREP-BBAMP-R1.0	DM	29/11/25	CB	5/11/25	CB	7/11/25

Executive Summary

Northern Star (EGP) Pty Ltd (the Proponent) a subsidiary of Northern Star Resources Ltd (Northern Star), is proposing to construct and operate the Kalgoorlie Regional Renewable Energy Project (the Proposal), located approximately 10 km northeast of Kalgoorlie-Boulder in the Goldfields Region of Western Australia. The Proposal includes construction and operation of a wind and solar farm and forms part of Northern Star's greenhouse gas emissions reduction strategy, designed to meet obligations set under the Safeguard Mechanism.

This BBAMP has been prepared to support the Proposal's referral under Part IV of the *Environmental Protection Act 1986* (EP Act). The BBAMP has been prepared in accordance with the Environmental Protection Authority's (EPA) "*Instructions: How to Prepare Environmental Protection Act 1986 – Part IV Environmental Management Plans*" (EPA, 2024).

The purpose of this Bird and Bat Adaptive Management Plan (BBAMP) is to outline the Proponent's approach to managing potential impacts on bird and bat species, specifically in relation to commissioning and operation of Wind Turbine Generators (WTG) associated with the implementation of the Proposal. The BBAMP has been informed by baseline bird and bat utilisation monitoring and baseline vertebrate fauna surveys, and a bird and bat risk assessment completed for the Proposal (DES, 2025).

The BBAMP has been developed to manage potential impacts to birds and bats following a risk-based approach and then applying the mitigation hierarchy of avoid, minimise, rehabilitate and offset. This management approach is consistent with the EPA mitigation hierarchy (EPA 2023) and has been applied across all applicable key environmental factors. With the adopted mitigation measures potential impacts to birds and bats will be reduced to acceptable levels.

The information contained in this BBAMP is summarised in Table ES-1.

Table ES-1: BAAMP Summary

Item	Description
Proposal Name	Kalgoorlie Regional Renewable Energy Project
Proponent Name	Northern Star (EGP) Pty Ltd
Ministerial Statement number	A Ministerial Statement Number and associated conditions have not been issued for this proposal.
Purpose of BBAMP	To minimise impacts to bird and bat species from the construction, commissioning and operation of WTGs associated with implementing the Proposal.
Key Environmental Factors and Objectives	Key Environmental Factor: Terrestrial Fauna EPA Objectives: 'To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.' (EPA, 2023)
Condition Clauses	A Ministerial Statement Number and associated conditions have not been issued for this Proposal.
Proposed Construction Date	2026-2028
EMP Requirements Preconstruction	Not Applicable
Related Documents	Referral Supporting Document (RSD) Environmental Management Plan (EMP)

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GLOSSARY

Abbreviation / Acronym	Definition
ALARP	As low as reasonably practicable
BBAMP	Bird and Bat Adaptive Management Plan
DCCEEW	Department of Climate Change, Energy, Environment and Water
DE	Development Envelope
DES	Donato Environmental Services
DMPE	Department of Mines, Petroleum and Exploration
EMP	Environmental Management Plan
mAGL	Metres above ground level
Northern Star	Northern Star Resources Ltd
Phoenix	Phoenix Environmental Services
Proposal	Kalgoorlie Regional Renewable Energy Project
RSA	Referral Study Area
WTG	Wind turbine generator

1 Content Scope and Rationale

Northern Star is proposing to develop the Kalgoorlie Regional Renewable Energy Project (the Proposal). The Proposal is key to Northern Star's strategy of reducing greenhouse gas (GHG) emissions by 35% by 2030 and will supply renewable energy to Northern Star's Kalgoorlie Consolidated Gold Mines (KGCM) operation.

This Bird and Bat Adaptive Manamgent Plan has been developed to demonstrate how potential impacts to birds and bats will be minimised. The focus of the BBAMP is how turbine operations will be managed during commissioning and operations to mitigate potential impacts to birds and bats from turbine collisions. While mitigation and management of potential impacts from construction are also referenced in this BBAMP, management commitments for these matters will be managed via with the EMP for the Proposal.

The BBAMP has been prepared in accordance with the Environmental Protection Authority's (EPA) "*Instructions: How to Prepare Environmental Protection Act 1986 – Part IV Environmental Management Plans*" (EPA, 2024). Therefore, it is expected to meet future conditions. This BBAMP has been prepared with consideration of the Guidance and Policy outlined in Table 1-1

Table 1-1: Relevant Guidance and Policy to BBAMP

Reference	Title
EPA 2016	Environmental Factor Guideline – Terrestrial Fauna
EPA 2023	Statement of Environmental Principles, Factors and Objectives
EPA 2024	How to Prepare Environmental Protection Act 1986 – Part IV Environmental Management Plans
DCCEEW 2024a	Environmental Management Plan Guidelines
DCCEEW 2024b	Onshore Wind Farm Guidance Best practice approaches when seeking approval under Australia's national environment law (Draft for Consultation and Feedback).

Several factors can affect the risk of bird and bat collisions with infrastructure. These include:

- Physical attributes of WTGs, such as turbine dimensions and lighting.
- Species-specific variables, including abundance, flight behaviour, WTG avoidance capacity, and illness.
- Biophysical attributes, such as landscape position, topography, and vegetation type.

The primary risks identified from the Proposal involve a physical alteration to the current environment that both birds and bats inhabit. This alteration includes the introduction of additional obstacles, such as WTG infrastructure into an otherwise undisturbed airspace. These physical alterations may result in injuries, or fatalities to individual birds or bats.

This BBAMP addresses the specific established risk pathway associated with bird and bat collision linked to operation of WTGs. The intended outcome of the BBAMP is to ensure that bird and bat fatalities caused by WTG collision are minimised as far as practicable by implementing an approach based on ongoing feedback between monitoring results and adaptive management including:

- Gaining an improved understanding of how bird and bat species utilise the DE and if this changes following the commissioning and operation of WTGs.
- Facilitating the systematic collection and analysis of bird and bat mortality data to identify potential impact patterns and inform adaptive management strategies.
- Proactive mitigation of potential impacts to birds and bats from WTG operations, including but not limited to the curtailment of wind turbines to avoid about 94% of bat activity.
- Implementing a robust, adaptive management framework that enables the timely review and update of the bird and bat risk assessment based on ongoing monitoring results.

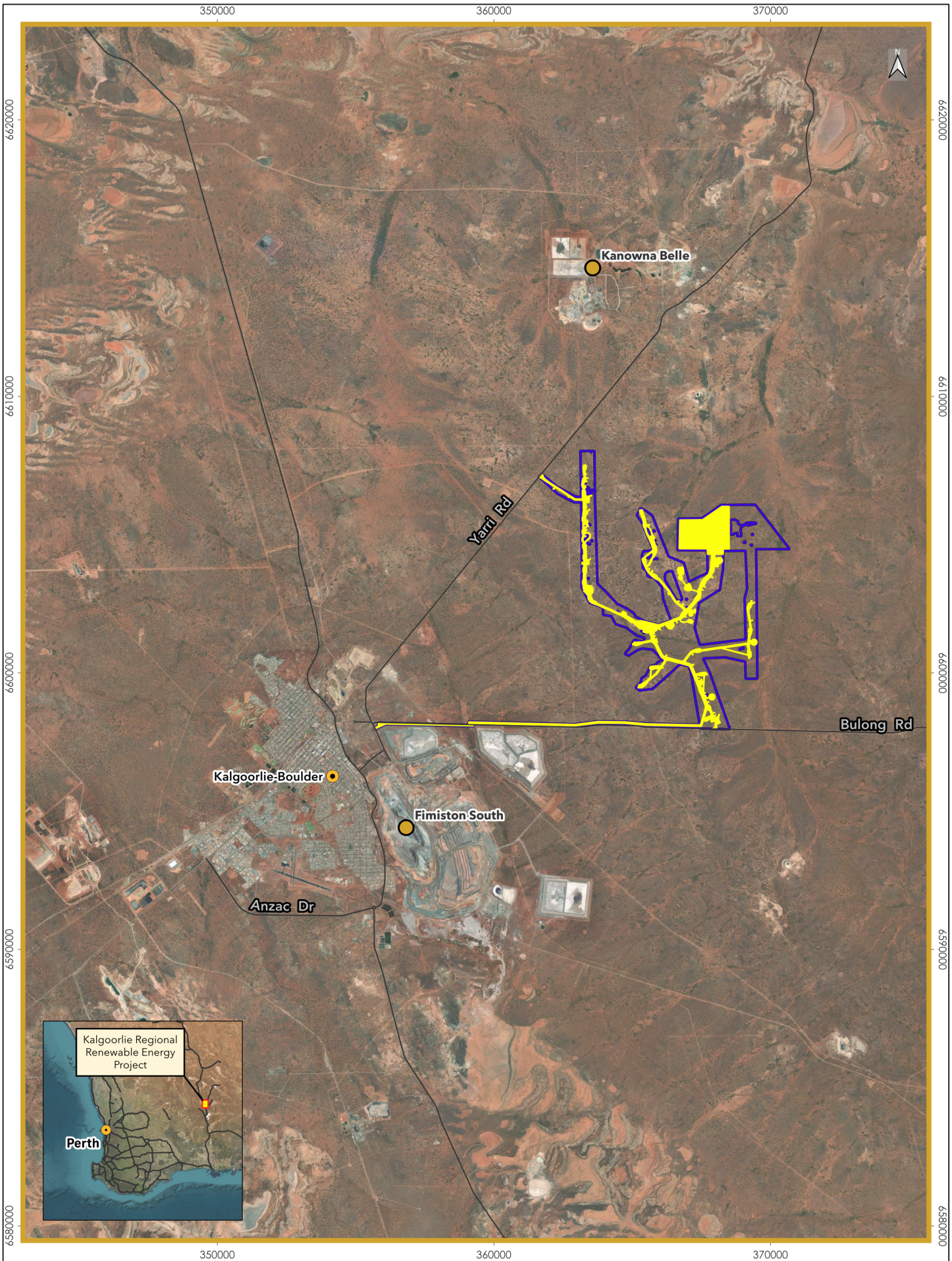
1.1 Proposal

Northern Star (EGP) Pty Ltd (the Proponent), a subsidiary of Northern Star Resources Ltd (Northern Star), is proposing to construct and operate the Kalgoorlie Regional Renewable Energy Project (the Proposal), located approximately 10 km northeast of Kalgoorlie-Boulder in the Goldfields Region of Western Australia (Figure 1-1).

The Proposal involves the construction and operation of a combined 256 megawatts (MW) of wind and solar farm across approximately 652 hectares (ha) within a 2,312 ha Development Envelope (DE). Physical elements of the Proposal include:

- Wind farm with up to 32 wind turbine generators (WTG).
- Solar farm.
- Battery Energy Storage System (BESS).
- Ancillary infrastructure such as access roads, transmission lines and substations.

The Proposal has been designed to avoid impacts to key environmental and culturally sensitive areas, with a total of 54 individual Exclusion Zones excised from the Development Envelope, and to minimise the residual impacts to environmental approximately 229 ha of construction disturbance will be progressively rehabilitated following construction, with the remaining land disturbance to be rehabilitated at closure.



Regional Location

Figure 1-1

Development Envelope
Town/City
Roads
Indicative Footprint
Northern Star Resources Operations

Date: 28/10/2025 | Author: McDonald, Lachlan R. | Coordinate System: GDA2020 / MGA zone 51 | Scale: 180000

0 2 4 6 km

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1.2 Wind Farm Design

The proposed wind farm includes up to 32 WTGs, capable of each producing up to 8 MW_{AC}. WTGs have a hub height of 150 m from which three 91 m blades extend at 120° from each other. The rotor swept area (RSA), the vertical range in which blades rotate, has been assessed from 59 m above ground level (mAGL) to 241 mAGL, representing a full range of 182 m blade rotation. The operation of WTGs can be controlled on an individual to allow for environmental controls such as curtailment, and each WTG is equipped with lightning protection systems.

Each WTG will be installed on a reinforced below ground concrete foundations of approximate dimensions 20 m x 20 m. The final dimensions and design of each foundation will be determined based on structural loading requirements, ground conditions, construction methodology, and drainage considerations. Construction of the WTG foundations will require the excavation of surface soils and soft overburden until either rock, or a firm stratum is reached.

WTG components will be delivered to the DE by road train from the port of Geraldton and assembled onsite. Assembly is relatively straightforward given all components are prefabricated and each component will be craned into place. WTGs are designed for an operational lifespan of approximately 25 years (maximum 30 years). Plate 1-1 provides a schematic of the basic WTG design selected for the Proposal, demonstrating the RSA of approximately 26,000 m^2. The indicative WTG layout is shown in Figure 1-2.

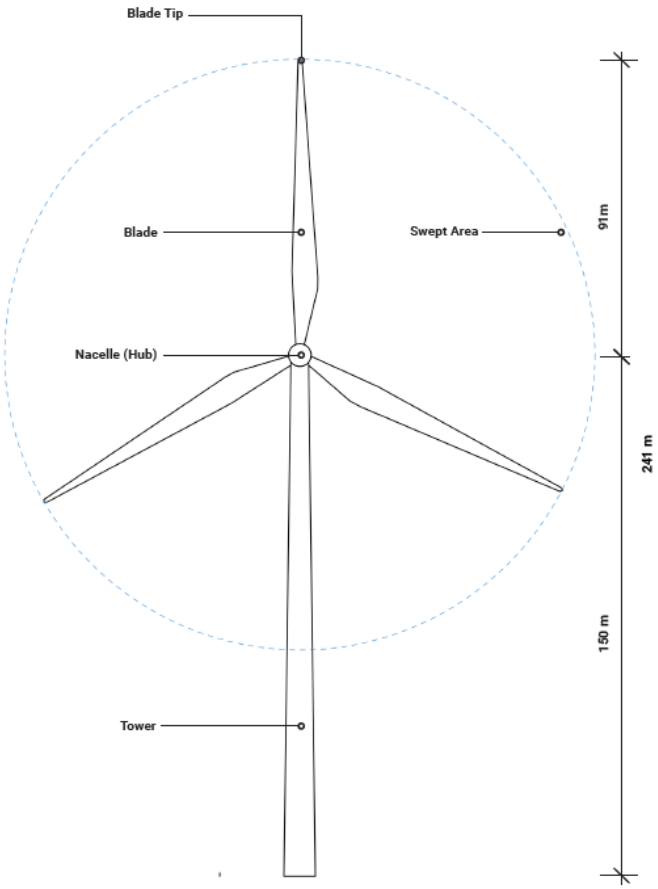
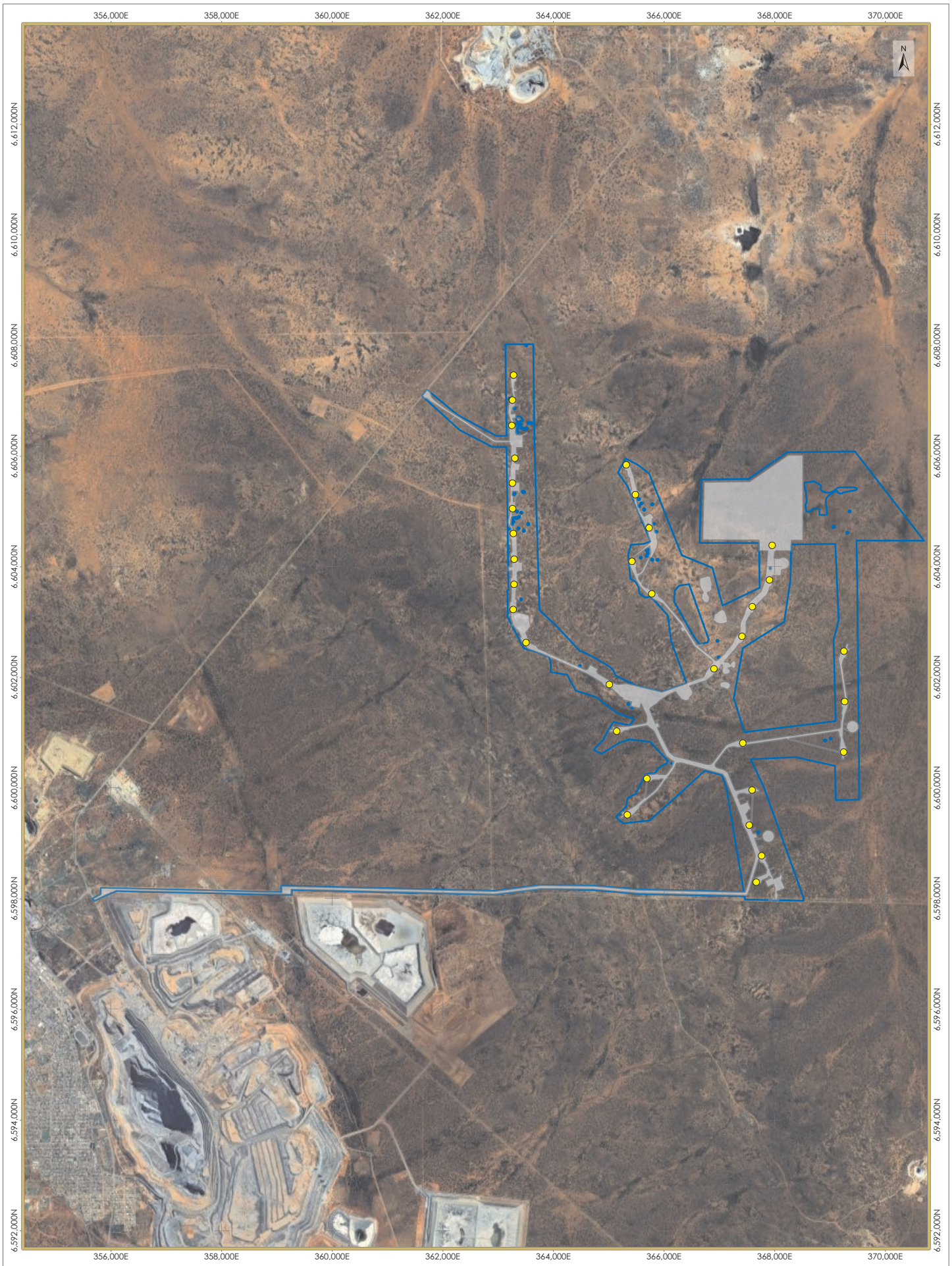


Plate 1-1: WTG Schematic



Indicative WTG Locations

Figure 1-2

Potential WTG Locations
Indicative Footprint
Development Envelope

Date: 5/11/2025 | Author: cbennison | Coordinate System: GDA2020 MGA Zone 51 | Scale: 1:90,000 | 0 1 2 4km

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1.3 Receiving Environment

1.3.1 Fauna Habitat

Eight broad habitat types have been mapped across the Study Area, with all habitat types regionally widespread across the Eastern Goldfields region (Phoenix 2025b). Fauna habitats within the DE and Indicative Footprint are primarily open woodland, shrubland and groved woodland, representing over 90% of both extents. These are the most well represented fauna habitats within the broader Study Area (86.5%), with rarer habitat types including minor breakaway and farm dam are not included in the DE or Indicative Footprint. Fauna habitat is summarised in Table 1-2.

Table 1-2: Fauna Habitat

Habitat Type	Description	Extent SA	DE	IF
Open woodland	Open woodland over low mixed shrubs on clay loam plain. High abundance of large fallen logs, large trees with hollows and leaf litter.	5,336 ha (40.5%)	1045 ha (45.2%)	350 ha (53.7%)
Shrubland	Shrubland with scattered mallee, Eucalyptus and Allocasuarina on clay loam with gravel or sparse sand. Dense shrubby understory provides cover from predators. High abundance of flowering/seeding shrubs.	4,021 ha (30.5%)	281 ha (12.1%)	67 (10.3%)
Groved woodland	Groved Eucalyptus woodland over mixed shrubs on plains and low hills. Areas of dense vegetation interspersed with open patches.	2,051 ha (15.6%)	811 ha (35.0%)	200 (30.1%)
Floodplain	Floodplain with scattered trees, shrubs and grasses on clay loam. Likely to be seasonally inundated.	387 ha (2.6%)	6 ha (0.2%)	0 (0%)
Drainage line	Drainage line with Eucalyptus over mixed shrubs on clay loam soils. Thick patches of leaf litter.	621 ha (4.7%)	151 ha (6.5%)	20 (3.1%)
Minor breakaway	Open Eucalyptus woodland over scattered shrubs on stony hill slopes with minor breakaway.	8 ha (0.06%)	0 ha (0%)	0 (0%)
Grassland	Grassland cleared of nearly all upper story vegetation. Sparse Eucalyptus and mulga shrubs.	516 ha (3.8%)	6 ha (0.3%)	5 (0.8%)
Farm Dam	Farm dams (pastoral dam) with permanent pools with scattered low-mid shrubs and grasses on dam walls.	2 ha (0.01%)	0 ha (0%)	0 (0%)
Cleared	Cleared, infrastructure areas.	251 ha (1.9%)	13 ha (0.6%)	10 (1.5%)
All	**All fauna habitat types identified across studies.**	**13,191 ha**	**2,312 ha**	**652 ha**

1.3.2 Potential Bird and Bat Species

A total of 193 bird species and 12 bat species were identified or considered likely within the DE (Phoenix 2025a; DES 2025).

- Multiple survey methodologies, including acoustic monitoring, field surveys, and habitat assessments, provided a robust baseline.
- Limited raptor nesting habitat exists within the Development Envelope due to vegetation and landscape structure.
- No definitive bird flyway was identified between key water bodies crossing the project footprint.
- Boom-and-bust ecological variability influences species activity and potential collision risk.
- Several conservation significant species, including threatened and migratory taxa, were recorded or likely present.

Based on the desktop review, Phoenix (2025b) identified 30 conservation significant fauna as possibly occurring within the search extent, including 25 birds, four mammals and one reptile. Of these 30 species only one species (Malleefowl, *Leipoa ocellata*) was recorded during the field survey. Following the field survey and habitat assessment Phoenix (2025b) undertook a likelihood assessment based upon presence within the Study Area based upon the following ratings:

- Recorded – species recorded within study area during survey.
- Likely – study area within current known range of species and suitable habitat present, recordings within study area.
- Possible – study area within current known range of species and suitable habitat present, no recordings within study area.
- Unlikely – study area outside current known range of species and no suitable habitat present.

Five significant fauna were determined to be likely, 14 were possible, and the remaining 10 were unlikely to occur within the Study Area (Phoenix 2025b).

DES (2025) also undertook a desktop review based on a slightly broader 50 km range from the DE and only on birds and bats which identified some additional species to Phoenix (2025b). DES (2025) is also undertaking a 24-month bird and bat monitoring program to determine bird and bat utilisation within the Study Area. The baseline monitoring program commenced in October 2024 and has a nominal completion date of October 2026.

Based on the results from monitoring completed between October 2024 and mid-May 2025, DES (2025) undertook a risk assessment to determine risk of WTG collision for bird and bat fauna based upon likelihood of occurrence and flight behaviour and included both inherent risk (no mitigation) and residual risk (mitigation) scenarios.

Table 1-3 presents an amalgamated assessment of likelihood of significant fauna within the DE and WTG collision risk assessment. The DES (2025) bird and bat risk assessment is described in further detail in Section 1.4.

Table 1-3: Significant Fauna Likelihood and WTG Risk Assessment

CR = Critically Endangered, EN = Endangered, VU = Vulnerable, MI = Migratory, MA = Marine, P = Priority

Species Name	Conservation Status		Habitat		Likelihood of Occurrence (Phoenix 2025b & DES 2025)	WTG Collision Risk Inherent / Residual (DES 2025)
	National	WA	Preference	Presence in DE		
Birds						
Southern Whiteface *(Aphelocephala leucopsis)*	VU	VU	Woodland Shrublands	Yes	**Likely** Suitable habitats within Study Area and desktop records within Study Area. Widespread across Australia, especially in arid and semi-arid areas.	**Low** Prefers low vegetation, open ground to forage. Does not sustain flight above the canopy.
Fork-tailed Swift *(Apus pacificus)*	MI	MI	Aerial (does not land in Australia)	N/A	**Recorded** Recorded within DE by DES (2025).	**Medium / Medium** Aerial forager that can fly at considerable height in large flocks. Seasonal migrant (October to May) and observed prior to storms and cyclones.
Fan-tailed Cuckoo (*Cacomantis flabelliformis*)	MA	-	Woodlands	Yes	**Recorded** Suitable habitats present within the study area. Recorded within DE by DES (2025).	**Low** Rare in the region but could occur during passage of migration. Follows the canopy on migration.
Pallid Cuckoo (*Cacomantis pallidus*)	MA	-	Woodlands	Yes	**Recorded** Suitable habitats present within the study area. Recorded within DE by DES (2025).	**Low** Night migrant that is only likely during favourable seasons.
Whiskered Tern (*Chlidonias hybrida*)	MI	MI	Wetlands, salt lakes	No	**Possible** Usually absent during dry conditions, sometimes for years. Rarely present on mine infrastructure water sources. Present at times at the KWTP, during favourable conditions.	**Medium / Low** Species is exceedingly rare in the region, low flying when not breeding and therefore unlikely to be impacted by WTG collision.
Rainbow bee-eater (*Merops ornatus*)	MI	-	Woodlands	Yes	**Recorded** Suitable habitats present within Study Area. Recorded within DE by DES (2025).	**Medium / Medium** Aerial forager above the vegetation canopy, flies at height during migration. Absent or rare during dry periods.
Hooded Plover *(Thinornis cucullatus)*	EN	P4	Wetlands, salt lakes	No	**Unlikely** Suitable habitat absent. Possible visitor to salt lakes 6 – 20 km from study area.	**Low** Not recorded in large flocks, stays near vegetation.
Grey Falcon (*Falco hypoleucos*)	-	VU	Open grasslands	Yes	**Unlikely** Rarely recorded in southern WA, may be a rare visitor. Suitable woodland, grassland and shrubland habitat present within the study area.	**Low** Habitat is unsuitable for species; presence of Peregrine Falcon will deter Grey Falcon.

Species Name	Conservation Status		Habitat		Likelihood of Occurrence (Phoenix 2025b & DES 2025)	WTG Collision Risk Inherent / Residual (DES 2025)
	National	WA	Preference	Presence in DE		
Peregrine Falcon (*Falco peregrinus*)	-	OS	Shrublands Woodlands	Yes	**Likely** Previously recorded nearby at Kanowna Belle mine, suitable habitat in study area.	**Medium** Hunts for prey above vegetation canopy, species is uncommon and low numbers with two or three in the area at any time.
Western Grasswren (*Amytornis textilis* subsp. *textilis*)		P4	-	-	**Unlikely** Not identified by Phoenix 2025b in the assessment.	**Low** Weak flyer incapable of sustained flight.
Malleefowl (*Leipoa ocellata*)	VU	VU	Shrublands Woodlands	Yes	**Recorded** Suitable nesting and foraging habitat in open woodland, woodland and shrubland habitat.	**Low** Primarily a ground dweller, flies into vegetation canopy to roost at night and evade predators. Unable to sustain flight above vegetation canopy.
Grey Wagtail *(Motacilla cinerea)*	MI	MI	Coastal areas	No	**Unlikely** Suitable stream and river habitat absent.	**N/A – not assessed**
Blue-billed Duck *(Oxyura australis)*		P4	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the study area. Additionally, may traverse study area to salt lakes 7-20 km outside study area.	**N/A – not assessed**
Western Rosella (inland ssp.) (*Platycercus icterotis* subsp. *xanthogenys*)		P4	Woodlands	Yes	**Likely** Suitable woodland habitat present. Recorded by Phoenix twice, both records within 2.3 km of the study area (Phoenix 2013, 2014a).	**Low** Species remains close to vegetation canopy and is not high flying. Few records in the region.
Carnaby's Black Cockatoo (*Zanda latirostris*)	EN	EN	Forests Woodlands (Bankisa) Shrublands	No	**Unlikely** Study area outside of current known range of species.	**Low** Species capable of flying at height, however not within range.
Pezoporus occidentalis Night Parrot	CR	CR	Spinifex grassland	No	**Unlikely** Suitable spinifex habitat absent.	**Low** Species known to fly below or at vegetation canopy, habitat unsuitable.

Species Name	Conservation Status		Habitat		Likelihood of Occurrence (Phoenix 2025b & DES 2025)	WTG Collision Risk Inherent / Residual (DES 2025)
	National	WA	Preference	Presence in DE		
Princess Parrot (*Polytelis alexandrae*)		P4	Woodland	Yes	**Unlikely** Study area outside of core range. Possibly a very rare visitor following periods of high rainfall	**N/A – not assessed**
Common Sandpiper *(Actitis hypoleucos)*	MI	MI	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**Low** Rare wetland species that is exceedingly rare to the region, can fly at heights during migration.
Sharp-tailed Sandpiper (*Calidris acuminata*)	MI	MI	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**Low** Rare to inland Australia, recorded in ones or twos as passing migrants remaining for few days. Can fly at heights greater than 100 m.
Sanderling (*Calidris alba*)	MI	MI	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**N/A – not assessed**
Curlew Sandpiper (*Calidris ferruginea*)	CR & MI	CR	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**Low** Exceedingly rare to inland Australia, passing migrant between September and October. Can fly at heights greater than 100 m.
Pectoral Sandpiper *(Calidris melanotos)*	MI	MI	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**N/A – not assessed**
Red-necked Stint *(Calidris ruficollis)*	MI	MI	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**Low** Exceedingly rare to inland Australia, passing migrant between September and October. Can fly at heights greater than 100 m.
Black-tailed Godwit *(Limosa limosa)*	EN & MI	MI	Coastal	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**N/A – not assessed**
Grey-tailed Tattler (*Tringa brevipes)*	MI	MI & P4	Coastal	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**Low** Coastal species vagrant to the region.

Species Name	Conservation Status		Habitat		Likelihood of Occurrence (Phoenix 2025b & DES 2025)	WTG Collision Risk Inherent / Residual (DES 2025)
	National	WA	Preference	Presence in DE		
Wood Sandpiper *(Tringa glareola)*	MI	MI	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**Low** Recorded annually at the KWTP in one or two staying for a few days, absent for rest of year. Flies at height during migration.
Common Greenshank (*Tringa nebularia*)	MI	MI	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**Low** Rare passing migrant during August to October.
Marsh Sandpiper *(Tringa stagnatilis)*	MI	MI	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**Low** Recorded annually at the KWTP in one or two staying for a few days, absent for rest of year. Flies at height during migration.
Glossy Ibis *(Plegadis falcinellus)*	MI	MI	Wetlands, salt lakes	No	**Possible** Possible rare visitor to permanent water features within the Study Area. Additionally, may traverse Study Area to salt lakes 7-20 km away.	**Low** Vagrant to region and only likely present during exceptionally favourable seasons. Closely tied to wetland habitats. Can fly at height when travelling long distances.
Mammals						
Central Long-eared Bat *(Nyctophilus major* subsp. *tor*)	-	P3	Woodlands	Yes	**Likely** Previously observed in 2011 during bat survey at Kanowna Belle mine site (17 km north). Recorded across Goldfields region.	**Low** Nocturnal species that flies and hunts close to vegetation. Unlikely to fly above canopy.

1.4 Potential Direct and Indirect Impacts

Potential direct and indirect impacts on birds and bats are summarised in Table 1-4. Understanding the potential consequences resulting from the impacts was used to develop the environmental objectives and outcomes in this BBAMP.

Table 1-4: Potential Direct and Indirect Impacts on Birds and Bats

Environmental Value	Potential Impacts Direct	Indirect
Terrestrial Fauna		
Birds and bats	• Loss of 652 ha of fauna habitat. • Fauna deaths from construction activities (e.g. clearing, vehicle strike, entrapment etc.). • Fauna deaths from WTG collision (including barotrauma)	• Habitat fragmentation • Increased predation from introduced fauna (e.g. cats and wild dogs). • Degradation of fauna habitat from: ▪ Fugitive dust emissions ▪ Altered surface water flows ▪ Increased risk of fire. • Displacement or disruption to fauna behaviour from anthropogenic activity (unnatural light, shadow effects, noise and vibration, dust, movement etc.)

1.4.1 Bird and Bat Risk Assessment

A preliminary bird and bat risk assessment was undertaken by Phoenix (2025b) based on baseline surveys between 2022 to 2024. A subsequent risk assessment was developed by DES (2025) based on ongoing bird and bat utilisation monitoring that commenced in October 2024 (using data up to mid-May 2025). This initial two-year monitoring program will continue until October 2026 with the final dataset to be reviewed prior to commissioning and operation of WTGs.

Each risk assessment evaluated the potential impact on bird and bat fauna from the construction and operation of the Proposal. The methodologies used by Phoenix (2025b) and DES (2025) in their respective WTG risk assessments shared a common foundation but diverged in several important ways that influenced their findings and recommendations. DES (2025) applied a more precautionary and ecologically nuanced approach, including a broader rotor sweep area and site-specific monitoring, and accordingly has been adopted as the more conservative and comprehensive assessment for this BBAMP.

The likelihood and consequence descriptions, as well as risk matrix from DES (2025) are provided in Table 1-5 and Table 1-6 respectively.

Table 1-5: Likelihood and Consequence Descriptors (DES 2025)

Likelihood		Consequence	
Descriptor	Definition	Descriptor	Definition
Almost certain	Is expected to occur in most circumstances	Catastrophic	A significant number (5) of endangered and/or internationally listed species are impacted. Local loss of conservation listed species. A significant number of non-listed species. Loss of control of risk. Systemic failure. Notification to the regulatory bodies. Implementation of a Corrective Action Plan is required.
Likely	Will probably occur in most circumstances	Major	Impact on conservation listed species (more than five individuals, more than one occurrence). Major impact on non-listed species (more than ten individuals, regular occurrence). Loss of >50% of the known local population. Notification to the regulatory body. Loss of control of risk. Implementation of a Corrective Action Plan is required.
Possible / Occasional	Could occur	Moderate	More than five individuals of non-listed species in a single incident or more than five non-listed individuals in multiple incidents. Loss of <50% known local population. Additional actions are required to address a deficiency.
Unlikely	Could occur but is not expected	Minor	Less than five individuals of non-listed or conservation listed species. Isolated incident. Control of risk maintained. No immediate additional action is required to address the impact. The site remains compliant with regulatory authorities if adequate and timely actions are in place.
Rare	Occurs only in exceptional circumstances	Insignificant	Loss of a non-listed or conservation listed individual animal.

Table 1-6: Risk Matrix (DES 2025)

Likelihood	Consequence				
	Significant	Minor	Moderate	Major	Catastrophic
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible / Occasional	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Medium	Medium

Based upon DES (2025) the level of risk acceptability has been assessed by the Proponent as per Table 1-7 for the development of this BBAMP.

Table 1-7: Risk Level Acceptability

Risk Level	Measure (DES 2025)	BBAMP Risk Acceptability	
		Listed Species	Non-Listed Species
Extreme	Immediate action required	Level of risk not acceptable	Level of risk not acceptable
High	Senior management attention required	Level of risk not acceptable	Level of risk may be acceptable subject to controls.
Medium	Management responsibility must be specified	Level of risk acceptable subject to controls.	Level of risk acceptable subject to controls.
Low	Managed by routine procedure	Level of risk acceptable.	Level of risk acceptable.

1.4.2 Inherent Risk

Bird and bat deaths are almost certain to occur at all commercial wind farms across the world, and the risk assessment determines that the Proposal would not differentiate from this assessment (DES 2025). Most of the risk associated with WTGs to birds and bats are weighted towards species more likely to utilise the DE in numbers, which by nature are more likely to be common species than rarer conservation significant species. The assessment concluded that while wildlife fatalities are expected, ongoing targeted surveys and risk assessments will refine understanding and inform adaptive mitigation strategies (DES 2025).

The risk assessment identified three bat species with a high inherent risk of impact from WTGs i.e. if no management and mitigation measures are adopted. An additional 14 bird and bat species were identified with a moderate inherent risk. No species were identified as having an extreme risk level of risk.

A high inherent-risk rating was identified for:

- White-striped Free-tailed Bat (*Austronomus australis*)
- Inland Free-tailed Bat (*Ozimops petersi*)
- Southern Free-tailed Bat (*Ozimops planiceps*).

A medium inherent risk rating was identified for:

- Fork-tailed Swift (*Apus pacificus*) – Migratory (EPBC Act / BC Act)
- Rainbow Bee-eater (*Merops ornatus*) – Marine (EPBC Act)
- Whiskered Tern (*Chlidonias hybrida*) – Migratory (EPBC Act)
- Peregrine falcon (*Falco peregrinus*) – (DBCA OS)
- Common Bronzewing (*Phaps chalcoptera*)
- Crested Pigeon (*Ocyphaps lophotes*)
- Black-shouldered Kite (*Elanus axillaris*)
- Wedge-tailed Eagle (*Aquila audax*)
- Whistling Kite (*Haliastur sphenurus*)
- Black Kite (*Milvus migrans*)
- Nankeen Kestrel (*Falco cenchroides*)
- Brown Falcon (*Falco berigora*)
- Budgerigar (*Melopsittacus undulatus*)
- Gould's Wattled Bat (*Chalinolobus gouldii*).

Remaining species were identified with an inherent risk of low and are not discussed in further detail. The full risk assessment is provided in **Appendix A**

1.4.3 Residual Risk

Following consideration of proposed management and mitigation measures, the risk assessment identified no bird or bat species with a high residual risk. Fourteen (14) bird and bat species were identified with a moderate residual risk (DES 2025).

A medium residual risk rating was identified for:

- Fork-tailed Swift (*Apus pacificus*) – Migratory (EPBC Act)
- Rainbow Bee-eater (*Merops ornatus*) – Migratory (EPBC Act)
- Peregrine falcon (*Falco peregrinus*) – (DBCA OS)
- Black-shouldered Kite (*Elanus axillaris*)
- Wedge-tailed Eagle (*Aquila audax*)
- Whistling kite (*Haliastur sphenurus*)
- Black Kite (*Milvus migrans*)
- Nankeen Kestrel (*Falco cenchroides*)
- Brown Falcon (*Falco berigora*)
- Budgerigar (*Melopsittacus undulatus*)
- White-striped Free-tailed Bat (*Austronomus australis*)

- Inland Free-tailed Bat (*Ozimops petersi*)
- Southern Free-tailed Bat (*Ozimops planiceps*)
- Gould's Wattled Bat (*Chalinolobus gouldii*).

Risk of WTG collisions for significant fauna species is also summarised in Table 1-3.

Based on this level of risk and acceptability outlined in Table 1-7 the Proposal and specifically commissioning and operation of WTGs can be implemented to an acceptable level of risk subject to implementation of controls specified in this BBAMP.

1.5 Condition Requirements

This BBAMP has been prepared to support the s38 referral for the Proposal and therefore there are currently no specific conditions of approval applicable. The mechanism for conditioning the BBAMP will depend on whether the Proposal is assessed under Part IV of the EP Act. A condition to prepare and implement an BBAMP could be included in either the Approvals Statement granted under the *Mining Act 1978*, or a Ministerial Statement granted under the Part IV of the EP Act.

1.6 Rationale and Approach

This BBAMP draws upon various sources to establish management measures that will achieve environmental objectives for each key factor. These sources include:

- Findings from surveys and studies
- Identification of key assumptions and any uncertainties
- Scientific knowledge specific to the site and broader region
- An analysis of the impacts, considering intensity, duration, magnitude, and overall footprint
- Recognition of potential environmental changes that may occur
- Consideration of external factors that may influence the Proposal
- A defined timeframe for implementing mitigation strategies.

1.6.1 Survey and Study Findings

A series of targeted bird and bat fauna surveys have been undertaken to inform the environmental impact assessment and adaptive management framework for the Proposal. These surveys aimed to establish a comprehensive understanding of species composition, habitat use, seasonal activity, and the potential interaction of birds and bats (predominantly) in relation to WTGs within the DE.

The surveys undertaken to date for the Proposal have focused on:

- Identifying species of conservation significance, including species listed under:
  - *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
  - *Biodiversity Conservation Act 2016 (BC Act)*
- Understanding habitat utilisation for foraging, roosting, and breeding within and around the DE.
- Informing the design and refinement of the DE and IF, with the goal of avoiding direct impacts where possible.
- Establishing a robust ecological baseline to support ongoing monitoring
- Predicting and assessing the risk of collision or displacement from WTG operation.

This work has significantly enhanced both local and regional knowledge of bird and bat species and provides critical input for adaptive management and mitigation planning.

Survey Scope and Methodology

Multiple surveys have been conducted between 2022 and 2025 by Phoenix Environmental Sciences (Phoenix) and Donato Environmental Services (DES) employing a combination of desktop reviews, field observations, acoustic monitoring, and targeted species searches. Since 2022, these surveys have specifically assessed the potential risks to birds and bats associated with the proposed installation of WTGs.

A 24-month bird and bat monitoring program is being implemented to determine bird and bat utilisation within the Study Area. The baseline monitoring program commenced in October 2024 and will has a nominal completion date of October 2026. Following completion of this baseline monitoring program, additional monitoring will be conducted throughout commissioning and operations, in accordance with this BBAMP.

A summary of the bird and bat survey methodologies, scope, and key findings is provided in Table 1-8.

Table 1-8: Bird and Bat Surveys

Report	Description	Dates
Wind turbine interim baseline assessment (DES, 2024)	Evaluates the potential risks to wildlife, particularly birds and bats, from the proposed installation of WTGs near Kalgoorlie-Boulder, Western Australia.	Bat Survey 22/10/2024 – 21/01/2025 Bird Survey 28/10/2024 – 22/01/2025
Basic and Targeted Terrestrial Fauna Survey for the Black Flag Wind Farm (Phoenix, 2025a)	Basic vertebrate and short-range endemic (SRE) invertebrate fauna survey, and additional targeted searches for conservation significant vertebrates and invertebrates within part of the Black Flag Pastoral Lease over 2022, 2023 and 2024.	12–16 September 2022 21–27 November 2023 and 11–14 June 2024
Bird and Bat risk assessment for the Black Flag Wind Farm Project, Kalgoorlie Operations (Phoenix, 2025b)	Predict the potential for listed threatened and Migratory bird and bat species to use the Proposal area and surrounds.	12-16 September 2022 21-27 November 2023 11-13 June 2024
Wind turbine electricity generators: avian and microbat risk assessment (DES 2025) (Appendix A)	Avian and microbat fauna qualitative risk assessment regarding the proposed wind turbine electricity generators for KRRE.	Desktop

1.6.2 Key Assumptions and Uncertainties

The management provisions presented in this EMP are based on information currently available on environmental and social values within Study Area. Accordingly, there are several assumptions and uncertainties relevant to implementation of the EMP.

Key assumptions include:

- Baseline surveys provided representative species lists.
- Construction activities and methods will be consistent with those described in the EMP and related documents.
- Boom conditions occur once every ten years.
- Where species are known to fly above the canopy, it is not always known how high some species fly above the canopy, so it was conservatively assumed that these species may fly within the swept path of the rotor blades.

Key uncertainties include:

- The BBAMP considered monitoring data available from October 2024 to mid-May 2025. The winter season has not been considered and relative abundance and activity through the winter season are unknown. The field survey data, will need to be reassessed once field data surveys are completed.
- It is not known if the bat relative abundance between October 2024 and May 2025 is unusually high compared to other years.
- Data from two of the five audio recording devices (SM4s) has been analysed (KWT01 and KWT04). This limits the understanding of avian inventory and bird abundance across the landscape.
- No specific searches for maternity roosts have been conducted, although limited hollows are available in the Study Area.

- Influences of site-specific factors contributing to the flight behaviour of many species are not known but are inferred from literature, field observations, database searches and field experience.
- Limited data exists on the sensitivity of Threatened species to light, noise, and vibration, as well as on the likely impacts of climate change and drought on these species.
- External factors, such as bushfires and occasional tropical storms, can influence environmental monitoring results and the ability to meet environmental targets. These factors should be considered during data interpretation and when evaluating compliance with environmental criteria.

The baseline bird and bat utilisation studies commenced in October 2024 and will continue until October 2026. These will be completed prior to commissioning. As part of these studies, additional investigations will be completed to address uncertainties identified during monitoring to date, including:

- Conducting searches for maternity roosts – it is anticipated that maternity roosts are unlikely to be present due the limited number of suitable hollows present
- Additional analysis of audio recordings to improve understanding specifies inventory and abundance across the landscape.
- Monitoring and analysis during winter months to determine differences in activity between seasons.
- Analysis of monitoring data between years to identify potential for temporal variability.

Upon completion of these investigations the BBAMP will be reviewed and updated to incorporate the findings of the studies.

1.6.3 Management Approach

The BBAMP has been developed to manage potential impacts to birds and bats following a risk-based approach and then applying the mitigation hierarchy of avoid, minimise, rehabilitate and offset. This management approach is consistent with the EPA mitigation hierarchy (EPA 2023) and has been applied across all applicable key environmental factors.

The primary management approach adopted for this Proposal is avoiding both direct and indirect impacts to the environment. The Development Envelope for the Proposal has been designed to avoid direct impacts to fauna habitat. Infrastructure has gone through a 15-stage iterative design process to achieve an optimised layout whereby 54 Exclusion Zones have been excised from the Development Envelope to protect environmental values.

Where impacts cannot be completely avoided, management measures will be implemented to minimise the severity and duration of the impacts. Construction related impacts and be minimised through controlled clearing, dust suppression, surface water management, fire management, traffic management, maintenance of equipment and machinery, and maintaining Exclusions Zones including buffers around significant environmental values. The net loss of fauna habitat will also be minimised through progressive rehabilitation in accordance with a Mine Closure Plan (MCP) to be prepared and implemented under the *Mining Act 1978*.

During operations the primary risk to birds and bats will be collisions with wind turbines. Key management strategies considered for minimising impacts to birds and bats have included:

- Use of largest turbine available - large turbines are more visible and have lower blade rotational speeds than smaller turbines. Collision rates also appear to be related to ease of visibility.
- Turbines are designed to be widely spaced to reduce the diversionary responses by birds and bats
- Implementation of a bird and bat adaptive monitoring program that detects and quantifies impacts to birds and bats
- Implementation of a carcass search and carrion removal program
- Transmission cabling to connect into the existing transmission line present on site will be underground, hence avoiding/reducing impacts to terrestrial fauna
- Curtailment of turbines - adjusting cut-in speeds during periods with high bat activity and low wind speeds.

Baseline environmental data indicates that curtailment of turbines can avoid about 94% of bat activity if curtailment takes place between 630PM and 530AM in: January, March, April and August to December. Curtailment during these periods will be applied through increasing the cut-in speed of turbines to 4.5 m/s. This approach is consistent with studies of curtailment in Australia, such as a study by Bennett et al. (2022) that found that increasing the cut-in speed from 3.0 m/s to 4.5 m/s from dawn to dust significantly reduced bat fatality by 54%. In this study, White-striped Free-tailed (WSFT) bats were the most affected by curtailment, with curtailment reducing their mortality by two-thirds.

Curtailment will be implemented as an adaptive process, where the impact is constantly assessed through a carcass monitoring program and the turbine curtailment time amended to reduce the impact to an acceptable level.

Offsets are the least preferred mitigation option and provide compensatory environmental outcomes where significant adverse impacts cannot be mitigated by preferred measures. The Proposal will not result in significant residual impacts to the environment and therefore environmental offsets are not considered necessary for this Proposal.

1.6.4 Rationale and Choice of Provisions

This BAAMP employs a holistic approach to achieving environmental outcomes and objectives. The specific provisions chosen are based on a thorough evaluation of the following:

- Baseline data and Proposal design:
    - Findings from dedicated surveys and historical surveys and monitoring from other nearby operations (e.g. Fimiston Operations), including local and regional data.
    - Proposal requirements and Indicative Footprint.
- Risk assessment:
    - Significance of potential impacts on environmental values.
    - Threatening processes and risks specific to conservation-significant species.
- Scientific Knowledge and industry practices for mitigation:
    - Establishing scientific information for the site and surrounding region.
    - Industry practices for minimising impact and promoting successful rehabilitation.
- Monitoring and Measurement of Environmental Performance:
    - Availability of suitable methods.
    - Defined environmental criteria and management targets to assess performance.
    - Monitoring methods and reporting frequency for compliance assessment.

This combination of factors ensures the chosen provisions are targeted, measurable, proactive and adaptive. The specific provisions for each environmental factor, along with their justification and related monitoring are detailed in Section 0. Further detail of proposed environmental monitoring is provided in Section 3.

2 Mitigation and Management Provisions

The provisions that Norther Star will undertake to achieve the environmental objectives and outcomes for the Proposal are outlined below.

Mitigation and management measures have been proposed to avoid and minimise impacts to bird and bat species which have moderate or high risks of impact from WTGs. These measures have been adopted in accordance with the environmental protection authorities' (EPA) mitigation hierarchy to reduce risk to as low as reasonably practicable.

Table 2-1 Objectives Based Criteria

Objective: 'To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.' **Overarching outcome:** To ensure the Proposal is carried out in a manner that minimises direct and indirect impacts to terrestrial fauna. **Key Environmental Values:** Birds and Bats **Management Targets**	Management Actions	Monitoring	Timing / Frequency of Actions	Reporting
Minimise bird and bat deaths from WTG collisions (including barotrauma)	• Selection of WTGs with high blade separation distance from ground (59 m) to avoid impacts to low flying species.	• Review of as constructed report.	• Construction	As constructed report
	• Burial of transmission cables and transmission lines to prevent bird roosting / perching throughout the DE.	• Review of as constructed report.	• Construction	As constructed report
	• Lighting on WTGs will be limited to Civil Aviation Safety Authority requirements to prevent bird and bat attraction to WTGs. Lighting may be installed on WTGs for this purpose however will only be turned on when required for regulatory purposes.	• Review of as constructed report.	• Commissioning • Operations	As constructed report
	• Curtailment of wind turbines during high-risk periods Over 90% of bat activity will be avoided by increasing the cut-in speed to 4.5m/s from 630PM to 530AM during January, March, April and August to December. • Curtailment to be adapted in response to trigger criteria defined in Table 2-2. • Targeted curtailment of individual turbines will be implemented to allow for site specific curtailment to minimise bird and bat deaths i.e. increased mitigation if specific WTG exhibits higher bird and bat mortalities.	• Monitoring in accordance with monitoring program outlined in Section 3	• Operations	Annual Environmental Report (DMPE)
	• A carrion removal program to prevent scavenging by birds of prey within proximity of WTGs. The carrion removal program will require removal and disposal of carcasses off site.	• Carrion removal register developed prior to commissioning and maintained during commissioning and operations. • Monitoring in accordance with monitoring program outlined in Section 3.	• Commissioning • Operations	Annual Environmental Report (DMPE)

Objective: 'To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.'
Overarching outcome: To ensure the Proposal is carried out in a manner that minimises direct and indirect impacts to terrestrial fauna.
Key Environmental Values: Birds and Bats

Management Targets	Management Actions	Monitoring	Timing / Frequency of Actions	Reporting
Minimise impacts to birds and bats from construction activities (clearing, earthworks, vehicle operations, introduced fauna, habitat fragmentation etc.)	• Management in accordance with EMP.	• Monitoring in accordance with EMP.	• Construction	Annual Environmental Report (DMPE)
Minimise disturbance to birds and bats (e.g. noise, dust, light etc.)	• Management in accordance with EMP.	• Monitoring in accordance with EMP.	• Construction • Operations	Annual Environmental Report (DMPE)

Table 2-2: Curtailment trigger criteria

Objective: 'To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.' **Overarching outcome:** To ensure the Proposal is carried out in a manner that minimises direct and indirect impacts to terrestrial fauna. **Key Environmental Values:** Birds and Bats **Indicators**	**Response Action**	**Monitoring**	**Timing / Frequency of Actions**	**Reporting**
Trigger criteria				
Listed Species One or more injured or deceased Threatened or Priority species found in any monitoring event within a WTG search radius. Four or more injured or deceased Migratory species found in any monitoring event during migratory season within a WTG search radius.	Investigate additional operational or engineering controls to mitigate impact. Potential contingency measures may include: • Changes to cut-in speeds. • Changes to curtailment time periods. • Installation and operation of ultrasonic deterrents. • Removal of pastoral dams near DE (following consultation with affect stakeholders). • Investigation of other controls that may be implemented.	Monitoring accordance with monitoring program outlined in Section 3.	Monthly	Annual Environmental Report (DMPE)
Non-listed Species Five or more carcasses of the same non-listed species found in two consecutive monitoring events within a WTG search radius. Ten or more carcasses of the same non-listed species found in the same monitoring event within a WTG search radius.	Investigate additional operational or engineering controls to mitigate impact. Potential contingency measures may include: • Changes to cut-in speeds. • Changes to curtailment time periods. • Installation and operation of ultrasonic deterrents. • Removal of pastoral dams near DE (following consultation with affect stakeholders). • Investigation of other controls based on technology available.	Monitoring accordance with monitoring program outlined in Section 3.	Monthly	Annual Environmental Report (DMPE)

3 Bird and Bat Monitoring Program

The purpose of the bird and bat monitoring program is to ensure that impacts on bird and bat species are comprehensively understood so that adaptive management measures are both effective and commensurate to risk levels. The implementation of the monitoring program during commissioning will help to verify the accuracy of predictions and risk assessment for commencement of operations.

The bird and bat monitoring program has been designed based on the field survey effort undertaken between 2022 and 2024 and the risk assessment. The monitoring program will be reviewed and updated from information derived from with the results of the ongoing initial two-year monitoring program to October 2026.

The main objectives of the monitoring program are:

- To assess both direct and indirect impacts upon birds and bats and identify any requirements for adaptive management and/or mitigation
- To conduct a carcass persistence and detection trial to determine the statistical confidence in the data
- To document an agreed decision-making process, including impact trigger criteria which would prompt a management response
- To present a robust operational phase carcass search monitoring program to detect birds and bats that collide fatally with the WTGs, to estimate overall bird and bat mortality rates for the Proposal
- To identity elements to be captured as part of periodic reporting, to document the overall success of implementation of the BBAMP.

Findings from the monitoring program will be utilised to update the risk assessment, adapt the monitoring methodology, and define ongoing commitments for the operational phase for the expected life of the the Proposal.

3.1 Carcass Detectability Trial

The efficacy of a carcass detection program will be investigated using carcass detectability trials which aim to detect the degree of error present as a calibration factor. The detectability of carcasses under WTGs can vary depending on a range of factors such as efficacy of the observer, size of the carcass, and type of ground cover. To address these factors, carcass detectability trials will be undertaken to determine the efficacy based on the following methodology:

- Carcasses of previously deceased birds and bats collected during the carcass detection program will be stored in a suitably designated freezer and used in the carcass detectability trial
- Five carcasses of varying size and species (both bird and bat) will be placed around WTGs, across the varying types of groundcover present (e.g. bare-ground, cropping, and native vegetation cover) and their location captured using a GPS
- Without the knowledge of the calibration survey, the Proponent will undertake the carcass detection program as per the methodology outlined.

This method enables results of the carcass detection program to be corrected using a calibration factor, which will be derived from the number of placed carcasses found, divided by the number of carcasses placed. As more trials are completed, the level of certainty in the calibration will increase. Carcass detection trials will be undertaken once every six months following commencement of commissioning for a period of one year. The trial can be undertaken concurrently with the carcass persistence trials and / or the carcass search surveys to maximise survey efficiency.

3.2 Carcass Persistence Trial

The likelihood a carcass remains detectable in the field can vary greatly depending on several factors. This may include but not be limited to size of the carcass, type of ground cover, the time passed since death, and the occurrence of scavengers (fox, dingo, cat, crow or eagles or insects). Quantifying the mean and confidence interval of the time to removal of carcasses is required for input into calculation of accurate mortality estimates.

The carcass persistence trial can provide a level of confidence in the carcass retrieval rate via application of a calibration factor to account for any potential losses. A one-off trial following WTG commissioning will be undertaken to establish the persistence of a bird or bat carcass following a collision with a WTG to improve the confidence in reported statistics.

A set number of trial carcasses will be placed in the field 4-5 days prior to search teams entering the field. Placement of any carcass will be complimented by a motion detection camera to capture any natural predation over a set time. The collection of field data will then be utilised to reduce the numerical uncertainty. These trial methods will assist quantifying the mean and confidence interval of the time until removal of carcasses as required for input into calculation of mortality estimates.

3.3 Carcass Monitoring Program

A comprehensive study of bird and bat mortality in the United States evaluated 2,457 fatalities across 44 different wind farms and analysed the density distribution for fall distance for birds and bats. The study results indicates that birds and bats have different fall distributions, with bats falling closer to the base of WTGs than birds, and both birds and bats having almost all falls occurring within 60 m of the base of WTGs (Choi et al. 2020) as shown in Plate 3-1. This indicates that carcass monitoring effort should be focussed on the area directly surrounding WTGs.

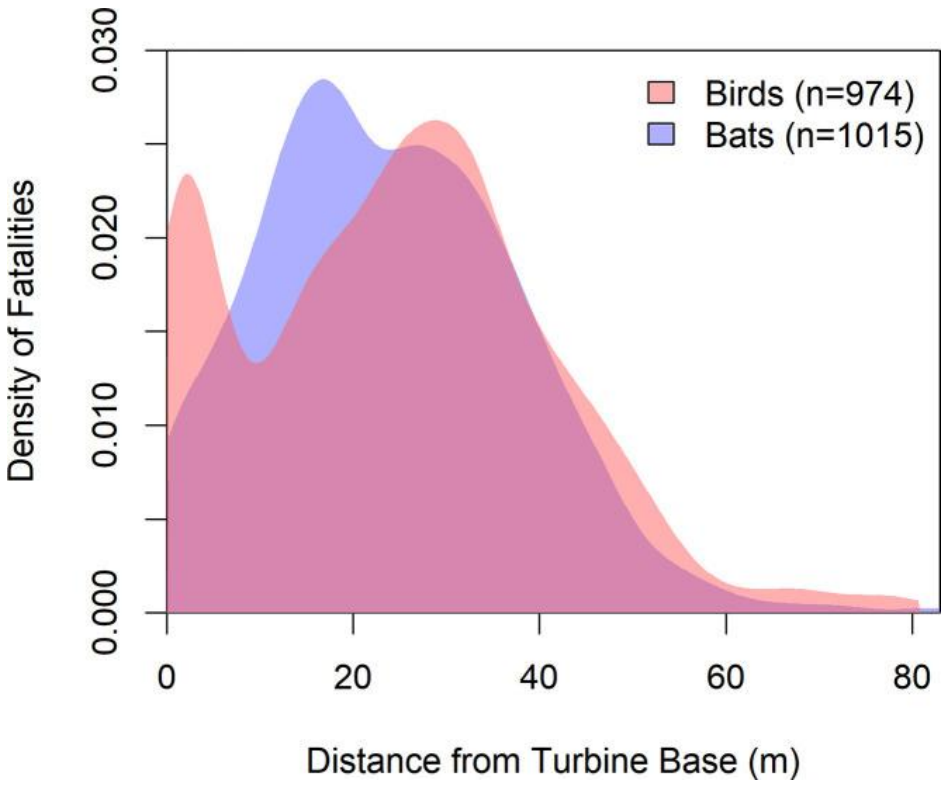

Plate 3-1: Density distributions for the fall distance of birds and bats at WTGs (Choi et al. 2020).

The proposed carcass monitoring program area will extend over a 100 m radius from the base of each WTG which is expected to cover the vast majority of carcass fall (Choi et al. 2020) and is within similar ranges of benchmarked projects as detailed in Table 3-1. The WTG search radius is demonstrated in

Table 3-1: Monitoring Area Benchmarking

Wind Farm	WTG Height (m)	WTG Blade Radius (m)	WTG Search Radius (m)	Search Radius /
The Proposal	241 m	91 m	100	1.09
Scott River Wind Farm (WA)	250 m	105 m	120	1.14
Narrogin (WA)	291 m	91 m	100 (inner search radius) *	1.09
Chalumbin Wind Farm (Queensland)	160 m	90 m	130	1.44
Uungula Wind Farm (NSW)	230 m	82 m	60	0.73

*outer search radius of 200m with half the effort of inner search radius.

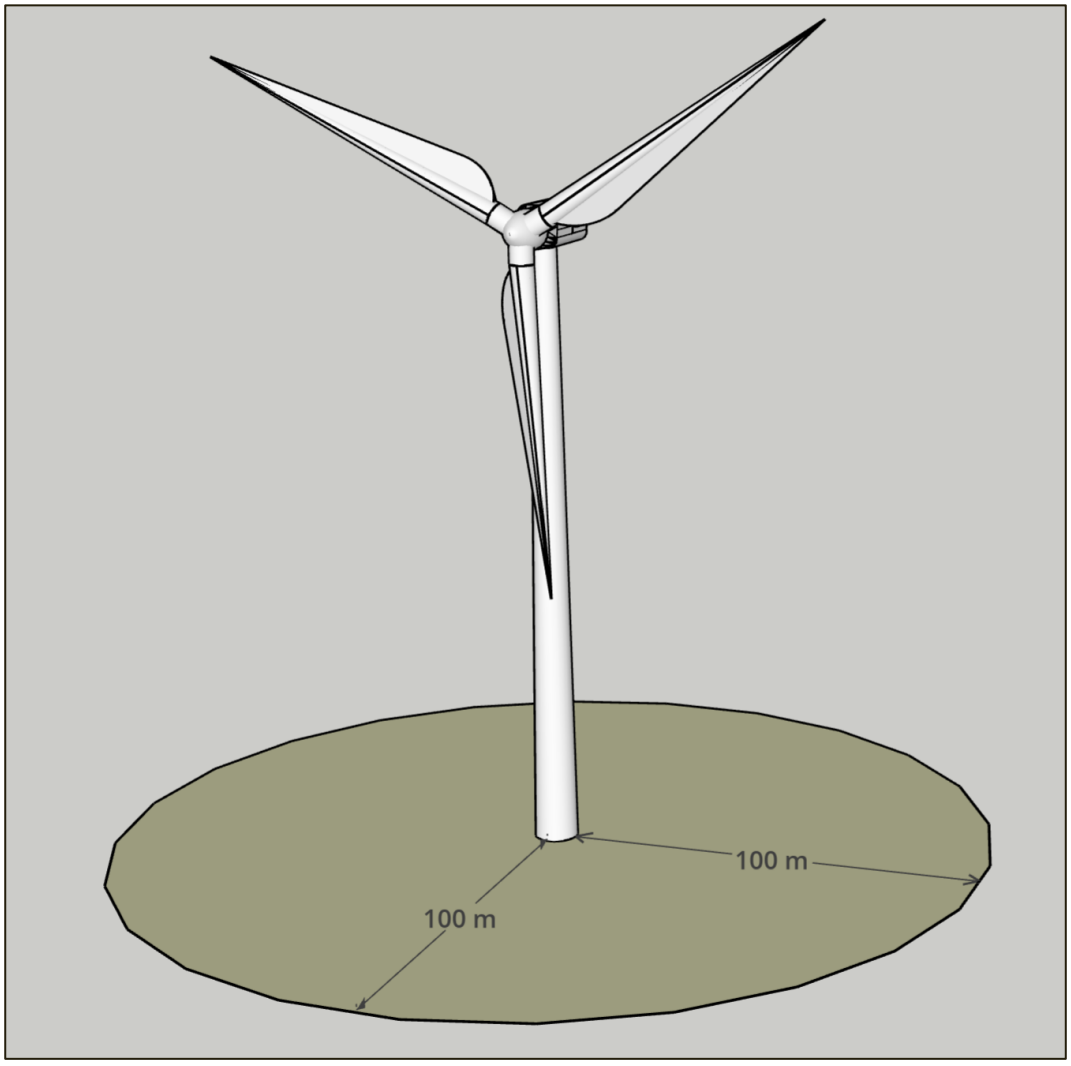

Plate 3-2: WTG Search Radius

All WTGs within the DE are regarded as having equal risk of collision for identified species. On this basis, all WTGs will be surveyed for carcasses equally over the course of the monitoring program, until data identifies any spatial patterns that would warrant changes to this methodology.

3.3.1 Carcass Monitoring Method

The carcass monitoring program will be undertaken by Northern Star personnel or contractors who have been trained and verified by suitably qualified ecologists as competent to identify and collect carcasses. The WTG search radius will be traversed via transects on foot, with GPS tracks recorded to verify monitoring effort. Photos and GPS locations will be taken for any carcasses identified within the WTG search radius.

Where carcasses are not readily identifiable this information will then be sent to a suitably qualified ecologist with competence in identification of species from remains. In instances where only skeletal or partial remains are located, efforts to locate and collect the skull is encouraged to ensure the species mortality rate remains reflective of actual impacts.

Carcass monitoring will be conducted monthly at a frequency of at least 15 days apart.

3.3.2 Incidental Carcass Finds

Throughout the DE, carcasses of birds or bats may be identified by operational personnel during day-to-day activities prior to monthly monitoring. Personnel will be trained to report any bird or bat mortality within the DE to the project environmental department, with a photo of the carcass and location recorded, and the carcass collected. The project environmental department will follow the data collection protocol for incidental finds.

3.3.3 Data Collection Protocol

In the event where carcasses require handling, the following protocol is implemented:

- GPS and photo of remains undisturbed in the field
- Double nitrile or PVC gloves must be worn whilst handling any remains
- Placement into suitable zip lock type or heavy-duty plastic bag using a double bagging method
- The sample collection bag is to be clearly labelled as per the field note collection sheet (**Appendix B**) with indelible ink (Texta/pen/sharpie) and dated
- Placement of the specimen into a freezer is recommended
- Transportation for identification will include temperature-controlled climate (esky and ice or refrigerated transport).

All information collected during a carcass search will be entered into the supporting register.

3.3.4 Injured Fauna Protocol

Where injured birds or bats are identified within the DE, notification will be made to the project environmental department. Injured fauna will be managed in accordance with Northern Star environmental procedures including the Native Fauna Management Procedure (NSR-ENV-004-PRO) and the Humane Fauna Euthanasia Procedure (NSR-ENV-008/PRO). The injured animal will be assessed, where it is evident that the there is no chance of survival it will be humanely euthanised. Where the animal has possibility of survival it will be taken to a nearby veterinarian clinic for treatment, and then a local wildlife carer will be called to take care of the animal.

3.3.5 Monitoring Schedule

The carcass monitoring program will run for an initial two years starting within three months of commencement of commissioning of the Proposal. Scheduled monitoring will be undertaken monthly to provide equal coverage across all seasons including times of peak activity for conservation significant species that may or are known to occur, as well as higher rainfall periods which may attract additional species to the DE. The monitoring program will be reviewed for efficacy after two years, with the future monitoring schedule to be informed by collected data and revision to the risk assessment.

The monitoring for this BBAMP is summarised in Table 3-2.

Table 3-2: Monitoring Schedule Summary

Monitoring	Timing	Duration
Carcass detectability and persistence trials	Trial to be conducted over 4-5 days. January to March – during or post wet season September to October – during dry season, following winter rainfall if possible.	At least twice over the first 12 months of commissioning / operations.
Carcass monitoring program	Monthly field carcass search to capture all seasonal variations, with monitoring occurring at least 15 days apart.	For the first 2 years of commissioning / operations. Following this period the frequency will be reviewed based upon data collected and established risk of WTG operations.

4 Management Framework

Northern Star is committed to operating the Proposal in a sustainable manner that prioritises the health and safety of the workforce, the well-being of surrounding communities, and the protection of the environment. Northern Star is dedicated to minimising adverse impacts and strives to achieve industry-leading environmental standards.

Northern Star maintains an Environmental Management System (EMS), aligned with ISO 14001, that outlines specific policies and procedures for its operations. Northern Star's environmental management philosophy is based on the principle of environmental impact mitigation, compliance and continual improvement through a risk-based approach on the management of operational aspects with inherent potential environmental risk.

Northern Star's EMS is built on the Plan-Do-Check-Act (PDCA) management cycle recommended by ISO 14001:2015, and facilitates a step-by-step approach to continual improvement. The Northern Star EMS has also been developed to align with the requirements of Northern Star's Corporate EMS Standard (NSR-ENV-001-STA). This Manual provides an overview of how these elements are implemented and supported by management plans, programs and procedures.

Key EMS documents relevant to this Proposal include:

- Environmental Policy (NSR-COR-003-POL)
- Environmental Standards include:
  - Environmental Management System Global Standard (NSR-ENV-001-STA)
  - Biodiversity Global Standard (NSR-ENV-005-STA)
  - Waste Management Global Standard (NSR-ENV-004-PRO)
  - Water Management Global Standard (NSR-ENV-004-PRO)
  - Incident Reporting Global Standard (NSR-OHS-008-STA)
- Environmental Procedures include:
  - Environmental Obligations & Compliance Procedure (NSR-ENV-003-PRO)
  - Environmental Incident Reporting & Investigation Procedure (NSR-ENV-002-PRO)
  - Land Disturbance Procedure (NSR-ENV-001-PRO)
  - Native Fauna Management Procedure (NSR-ENV-004-PRO)
  - Feral Animal & Pest Control (NSR-ENV-007-PRO)
  - Humane Fauna Euthanasia (NSR-ENV-008/PRO)
  - Weed Management Procedure (NSR-ENV-004-PRO)

4.1 Reporting

The Proponent will request in the Mining Development and Closure Proposal (MDCP) submission that this BBAMP is included as a non-standard condition of the Approvals Statement issued under the *Mining Act 1978* by the Department of Mines, Petroleum and Exploration (DMPE). This will ensure that the BBAMP is a statutory condition of approval with an agreed environmental outcome, requiring mandatory environmental monitoring to demonstrate achievement of the environmental outcome in annual environmental reports (AER).

Reporting requirements to both the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and the Department of Biodiversity, Conservation and Attractions (DBCA) have been included if impacts to conservation significant species occur. Should no impacts occur to conservation significant species then no external reporting will be required to DCCEEW / DBCA.

4.1.1 Conservation Significant Species Reporting

In the unlikely event of a death or injury to an EPBC Act or BC Act listed species, this will require notification to DMPE, DCCEEW and/or DBCA as soon as practicable (i.e. following confirmation a listed conservation significant species has been impacted). The initial report will be issued within 48 hours of confirmation that the impact has occurred, with details to include the estimated date of impact, WTG location and detection method. The event will be internally registered as an incident and an investigation will be conducted, with the findings of the investigation and proposed adaptive mitigation measures to prevent reoccurrence to be provided as a follow-up report no later than 28 days after the incident.

4.1.2 Monthly Carcass Monitoring Reports and Non-Listed Species Reporting

Monthly carcass monitoring will be reported internally to the Project Environmental Coordinator and Construction / Operation Manager including a summary of carcass monitoring and review against impact non-listed species impact triggers. Where impact triggers are exceeded, an incident will be registered, and reported to DMPE. The report will be issued within seven (7) business days s of confirmation that the impact triggers have been exceeded. The event will be internally registered as an incident and an investigation will be conducted, with the findings of the investigation and proposed adaptive mitigation measures to prevent reoccurrence to be provided as a follow-up report no later than 28 days after the incident.

4.1.3 Annual Reporting

The annual results of the BBAMP monitoring program will be provided as an attachment to the AER submitted to DMPE under tenement and Approvals Statement requirements. The annual report will include a summary of the following information:

- Summary of monitoring effort by month including a summary of data collected in field notes.
- Details on monthly bird and bat mortality by species, including identification of any impact trigger exceedances and external reporting
- Trends identified (i.e. spatial, temporal, species) and statistical analysis to confirm if trends are significant
- Any limitations identified in relation to data collection and statistical analysis
- Any updates to the BBAMP which occurred during the annual reporting period

The annual report will be for the reporting period specified in the Approvals Statement following approval of the MDCP, which will be reflected in future updates to the BBAMP.

4.2 Roles and Responsibilities

The BBAMP applies to all Northern Star's employees, contractors, sub-contractors and visitors that are conducting construction-related activities within the Proposal. Management at all levels and supervisory personnel are to lead by example and set the highest standards for environmental management. They are to act immediately to correct any non-conforming conditions or behaviours and promote environmental awareness at every opportunity.

The roles and responsibilities of site personnel can be found in Table 4-1. Importantly, all personnel within Northern Star have the authority to stop work if they observe a situation that poses a potential environmental threat. This ensures a proactive approach to environmental protection and empowers everyone to address potential issues immediately.

Table 4-1: Roles and Responsibilities

Role	Responibility
Executive Leadership Team / Board	• Maintain governance and oversight of Northern Star's Environmental performance. • Endorse the Northern Star Environmental Policy or its equivalent.
Project Manager / General Manager - Operations	• Overall responsibility for the implementation of this Plan. • Ensure resources are available to manage environmental risks present during the construction phase of the Project. • Support and facilitate the communication to Northern Star personnel and contractors, regarding the need to comply with this plan. • Report regularly on performance against the plan.
General Manager – Environment / Environment Manager – Kalgoorlie Region	• Approve and support the communication of this Plan to all Managers for implementation throughout the construction phases of the Project. • Ensure adequate resources are available to facilitate and assess compliance with this Plan. • Communicate relevant aspects of this plan to the Executive Leadership Team.
Construction / Operations Managers	• Facilitate implementation and compliance with this Plan. • Ensure personnel and contractors are familiar with their requirements and responsibilities outlined in this Plan. • Where necessary, coordinate and/or assist in the response to environmental incidents. • Ensure relevant licences, permits or approvals have been obtained prior to activities being undertaken. • Ensure adequate training and resourcing is available to support this Plan. • Ensure environmental data is available from contractors in a timely manner. • Assist with communicating the outcomes of inspections and audits relating to relevant contractor areas and activities undertaken in relation to this plan. • Liaise with the environment team on improvement opportunities relating to contractor activities.
Environmental Superintendent – Kalgoorlie Region	• Facilitate this plan being audited to ensure risks are being managed accordingly. • Facilitate continuous improvement to this Plan through the development, implementation and review of supporting environmental management system documentation. • Communicate compliance outcomes to the wider Northern Star business. • Ensure annual review of this Plan is undertaken in line with of this plan. • Provide technical advice to the business regarding environmental management outcomes. • Ensure external notification of incidents is actioned in line with the Incident Reporting and Investigation standards and procedures.
All Site Superintendents	• Facilitate implementation and compliance with this Plan. • Ensure personnel and contractors are familiar with their requirements and responsibilities outlined in this Plan. • Where necessary, coordinate and/or assist in the response to environmental incidents. • Ensure environmental data is available from the construction team and operation team. • Assist with communicating the outcomes of inspections and audits of contractors' areas, and activities undertaken with this plan. • Liaise with the Environment team on improvement opportunities relating to all associated activities.

Role	Responibility
Senior Field Service Personnel	• Provide guidance to Northern Star personnel and contractors regarding environmental expectations in line with this Plan. • Provide adequate supervision to Northern Star personnel and contractors to ensure compliance with this Plan. • Ensure adequate resources are readily accessible in the event of an environmental incident. • Communicate any non-compliance to this Plan. • Where necessary, coordinate and/or assist in the response to environmental incidents. • Undertake data collection for regulatory reporting purposes.
Environmental Superintendent	• Provide technical advice and guidance to Northern Star personnel in relation to this Plan. • Ensure adequate monitoring and measurement is undertaken in relation to this Plan. • Communicate environmental requirements relating to incidents and non-conformances internally and externally, as required. • Investigate environmental improvement opportunities to deliver continuous improvement and integrate outcomes into the environmental management system.
Project Environmental Coordinator	• Support the construction and operation team in the implementation of this Plan. • Undertake monitoring and measurement in accordance with this Plan. • Review environmental incidents, hazards, and non-conformances, ensuring adequate corrective and preventative actions have been assigned. • Identify opportunities for improvement in relation to environmental management.
All Personnel and Contractors	• Familiarise themselves with the requirements of this Plan. • Comply with all Northern Star systems and processes, including the requirements of this Plan. • Communicate the requirements of this Plan to any sub-contractors. • Comply with relevant legislation as well as industry guidelines, and standards. • Ensure all incidents are reported and communicated in line with the Incident Reporting and Investigation standards and procedures.

4.3 Training Awareness

Northern Star's inductions include environmental information relevant to all personnel and contractors. Information that is specific to business units, physical locations and individual activities is included within the specific location, work area or task inductions. This information aligns with the key aspects and impacts and communicates the expectations and responsibilities for personnel in relation to environmental management principles.

Regular and ongoing training and awareness packages are presented to personnel in the form of toolbox presentations, environmental bulletins, pre-shift notices and posters displayed in relevant locations. In addition to internal awareness programs, external environmental training is delivered/available as required for specific tasks or individual roles within the organisation.

- Records of all training conducted on-site will be maintained, including:
- The person/persons receiving the training.
- The date the training was received.
- The names of the people conducting the training and their respective roles.
- A brief description of the training.

This Plan aims to ensure all people involved with the Proposal will receive relevant environmental training to understand their responsibilities when implementing the environmental management plan. People to be trained include those at the site/s for all project activities and operations, including contractors, subcontractors, and visitors.

4.4 Emergency Contacts and Procedures

All environment-related events, incidents and hazards must be reported and managed in line with the Environmental Obligations & Compliance Procedure (NSR-ENV-003-PRO) and Environmental Incident Reporting & Investigation Procedure (NSR-ENV-002-PRO).

This ensures suitable information is captured to understand the event, including images and statements where necessary, the identification of the root and/or underlying causes, and the assignment of corrective and preventative controls to prevent recurrence.

Where events are required to be reported to external parties, including regulators, the Environment Manager or Environmental Superintendent will liaise with the appropriate stakeholders to ensure adequate information is provided to stakeholders promptly.

5 Adaptive Management and Review

Adaptive management is a continuous cycle of monitoring, evaluating, and adjusting management practices to improve environmental outcomes and objectives based on new information and changing circumstances. This may include:

- Monitoring and Evaluation: monitor the effectiveness of the implemented management measures through ongoing monitoring programs.
- Annual Review: review the BBAMP every year, by a suitably qualified and experienced person, considering monitoring data and its implications for achieving environmental objectives, the effectiveness of management actions and targets in mitigating environmental impacts, and the relevance of threshold criteria in light of new information or changes in environmental conditions.

In addition to the annual review, the BBAMP will be reviewed if any of the following occur:

- Following completion of the two-year initial bird and bat monitoring program (October 2026)
- Inclusion of any relevant conditions of approval (tentative)
- Pertinent changes to legislation, guidelines or regulatory requirements (ongoing)
- New information becomes available, such as changes to risk assessment which elevate the risk of any species, unexpected monitoring results or non-achievement of management targets, and advancements in environmental management practices or technologies.
- Significant changes to the Proposal (e.g. unforeseen expansion to infrastructure).
- Incidents or audits that identify non-conformances with the BBAMP.
- Changes in relevant legislation or policies.

Based on the review findings, existing management actions may be adjusted or enhanced to improve their effectiveness or new management actions may be implemented to address unforeseen impacts or emerging issues. Moreover, monitoring programs may be modified to better reflect environmental changes or gather more targeted data.

Any significant changes to the BBAMP will be documented and communicated to relevant stakeholders, including regulatory authorities. Depending on the nature of the changes, approval from the authorities might be required.

This BBAMP will be maintained through a document control system with the reason for each revision outlined in Table 5-1.

Table 5-1: Document History

Revision	Revision Summary	Changes from Previous Revision
1.0	Initial document to be provided as supporting attachment to EPA referral and MDCP submission.	N/A

6 Stakeholder Engagement

Effective stakeholder consultation is crucial for a successful and sustainable Proposal. Northern Star is committed to open and transparent communication with stakeholders throughout the Proposal's life. This section outlines Northern Star's approach to stakeholder engagement for developing and implementing this BBAMP. Northern Star encourages stakeholders to provide feedback on the mine's operations and the EMP to raise concerns and submit grievances.

A broad range of stakeholders with potential interests in the Proposal include:

- Government: Relevant government agencies overseeing environmental protection and mining operations.
- Investors and Financiers: Northern Star is listed under the Australian Securities Exchange.
- Local Communities: Residents and community groups residing in the City of Kalgoorlie-Boulder.
- Traditional Owners: Aboriginal groups with traditional connections to the land.
- Non-Governmental Organisations (NGOs): Environmental and social advocacy groups.
- Industry Associations: Mining industry representatives and organisations.

The primary objectives for stakeholder consultation are:

- To inform stakeholders about the Proposal, potential environmental impacts, and the proposed mitigation measures.
- To understand stakeholder concerns regarding the environmental impacts of the Proposal and incorporate their feedback into the BBAMP, where practicable.
- To foster collaboration and build positive relationships with stakeholders to ensure the long-term success of the Proposal and its environmental management practices.

Northern Star has employed and will employ various methods to engage with stakeholders throughout the Proposal's life. These methods may include community meetings, participation in committees, written communications, publishing relevant information on the website and via social media, and maintaining access to a suitable feedback and complaint mechanism.

Northern Star is committed to reviewing the effectiveness of its stakeholder consultation practices, and making adjustments to ensure meaningful ongoing stakeholder engagement.

7 References

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Donato Environmental Services (DES) (2024) KCGM Wind Turbine Interim Baseline Assessment.

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Phoenix Environmental Sciences (Phoenix) (2025a) Basic and Targeted Terrestrial Fauna Survey for the Black Flag Windfarm- Prepared for Northern Star Limited.

Phoenix Environmental Sciences (Phoenix) (2025b) Bird and Bat Risk Assessment for the Black Flag Windfarm Project for the Kalgoorlie Operations- Prepared for Northern Star Resources Ltd.

8 Appendices

Appendix	Report	Reference
Appendix A	Bird and bat risk assessment	DES 2025
Appendix B	Bird and Bat Monitoring Program – Field Collection Checklist	

APPENDIX A – BIRD AND BAT RISK ASSESSMENT (DES 2025)

APPENDIX B – BIRD AND BAT MONITORING PROGRAM – FIELD COLLECTION NOTES CHECKLIST

Kalgoorlie Regional Renewable Energy Project – Bird and Bat Carcass Monitoring Data Sheet One form is to be completed per each carcass find.					
Name			Date		
Time					
WTG Number			WTG Activity	Operational ☐	Inactive ☐
Wind speed and direction			Weather events		
Carcass Description					
GPS Location	Easting	Northing	GPS Recorded	Yes ☐ No ☐	
Distance from WTG base (m)			Bearing from WTG (°)		
Type of carcass	Bird ☐	Bat ☐	Preliminary species identification		
Signs of injury			Carcass size		
Other notes					