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APEM Group

SGP North Solar Farm

Offset Management Plan



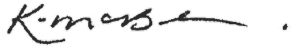
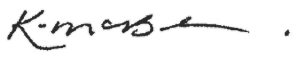
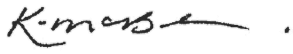
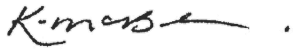
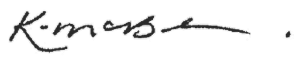
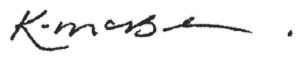
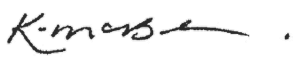
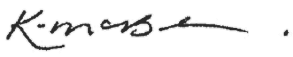
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Terms and Abbreviations

Term/Acronym	Definition
AHT	Associated Habitat Trees
AI	Activity Index
ALA	Atlas of Living Australia
AU	Assessment Unit
Biosecurity Act	*Biosecurity Act 2014* (Qld)
BoM	Bureau of Meteorology
DAWE	Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DES	Department of Environment and Science (Queensland)
DEWHA	Department of the Environment, Water, Heritage and the Arts
DoE	Department of the Environment
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPC	Exploration Permit for Coal
FCS	Field Compression Station
GBO	General Biosecurity Obligation
HPF	Hybrid Power Facility
Land Title Act	*Land Title Act 1994* (Qld)
LIKT	Locally Important Koala Trees
MHQA	Modified Habitat Quality Assessment
MNES	Matters of National Environmental Significance
NEPA	National Environmental Protection Agency
OMP	Offset Management Plan
OP	Offset Proposal
PD	Preliminary Documentation
PL	Petroleum Lease
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
RFI	Request for Further Information
SAT	Spot Assessment Technique
SGP	Surat Gas Project

1. Introduction

1.1 Background

Arrow CSG Australia Pty Ltd (Arrow CSG) is proposing to develop the Surat Gas Project (SGP) North Solar Farm (the Project) on land at Retreat Road, Kowguran approximately 18 km north of Miles. The Project will supply renewable electricity to a planned hybrid power facility (HPF) being developed to power the SGP North Field Compression Station (FCS) and is a key initiative in Arrow CSG's plans to reduce greenhouse gas emissions and meet net zero targets. The Project was originally referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW), now known as the National Environmental Protection Agency (NEPA), on 11 September 2024 for consideration of its impacts on Matters of National Environmental Significance (MNES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

On 17 February 2025, DCCEEW determined the Project to be a 'controlled action' requiring assessment and approval by Preliminary Documentation (PD) in accordance with Part 8, Division 4 of the EPBC Act (EPBC 2024/10002).

To assess the relevant impacts of the Project, a Request for Further Information (RFI) was received from DCCEEW on the 19 March 2025. As outlined in the RFI, where residual significant impacts to MNES remain after application of all reasonable avoidance and mitigation measures, a compensatory environmental offset in accordance with the EPBC Act is required.

This Offset Management Plan (OMP) has been prepared to outline the management, monitoring and reporting requirements for the 302.9 ha offset area located on the Girrahween Station property Lots 31 and 32 AU60 to compensate for the Project's significant residual impacts outlined in **Table 1.1** below.

Table 1.1: Impacted MNES species

MNES	EPBC Status*	Total significant residual impact (ha)	Habitat within offset area (ha)#
Corben's long eared bat (*Nyctophilus corbeni)*	V	30.1	292.2
Diamond firetail (*Stagonopleura guttata)*	V	30.1	292.2
South-eastern glossy black-cockatoo *(Calyptorhynchus lathami lathami)*	V	19.8	286.4
Koala *(Phascolarctos cinereus)*	E	30.1	292.2
Dunmall's snake (*Furina dunmalli*)	V	19.8	290.2

* Vulnerable (V); Endangered (E)
# The 302.9 ha offset area comprises 292.2 ha of remnant, regrowth and non-remnant areas supporting habitat for the MNES offset values, and 10.7 ha of existing constructed tracks located within the offset area boundary.

1.2 Purpose and scope

The objective of the offset is to deliver an overall conservation outcome that improves or maintains the viability of the protected MNES. This OMP is a practical document to guide the management, monitoring and reporting activities at the offset site to achieve this objective. It addresses the relevant requirements of Section 6 and Attachment B of the RFI as outlined in **Table 1.2**.

Table 1.2: Summary of RFI requirements relating to the Offset Management Plan

RFI Section	Requirement	Relevant Section in the OMP
Section 6	If an offset is required, prior to publication, the preliminary documentation must include an: 2. Offset Management Plan (OMP) – The OMP supports the Offset Proposal and must detail all the management activities to be undertaken at the offset site including setting environmental objectives, milestones, monitoring and reporting measures. Management plans and activities must be targeted towards the specific plant, animal or ecological community (protected matter) that is being offset. If there is more than one offset site, then a separate OMP must be prepared for each site.	The Offset Management Plan has been prepared to address this requirement
Attachment B – Offset Management Plan (OMP) Requirements		
2.	An offset management plan is a practical document that outlines what must be done to manage an offset site. A plan must detail all the management activities at the offset site and how progress will be monitored and reported. An OMP provides confidence that the outcomes described in an offset proposal can and will be achieved. The OMP must include, but may not be limited to:	
2.1	A description of the proposed offset site(s) including location, size, condition, existing and future tenure, and relevant ecological/species values present and surrounding uses.	**Section 2**
2.2	Maps and shapefiles to clearly define the location and boundaries of the offset area/s, accompanied by the offset attributes (e.g., physical address of the offset area/s, coordinates of the boundary points in decimal degrees, the relevant MNES that the environmental offset/s compensates for, and the size of the environmental offset/s in hectares.	**Figure 2.1** **Figure 2.3** **Figure 2.4** **Appendix A** Spatial files of the offset area are provided separate to OMP
2.3	Baseline survey information showing MNES presence and the extent and quality of the respective habitat(s) at the proposed offset site(s) in accordance with the relevant survey guidelines or using a scientifically robust and repeatable methodology.	**Sections 2.5 to 2.10** **Appendix B**
2.4	Baseline survey information showing present threat levels to MNES (e.g., invasive flora and fauna)	**Sections 2.5 to 2.10**
2.5	Summarised details of the nature of the conservation gain to be achieved for relevant MNES, including the creation, restoration and revegetation of habitat in the proposed offset area/s	**Section 3**

RFI Section	Requirement	Relevant Section in the OMP
2.6	Information about how the proposed offset area will provide connectivity with other habitats and biodiversity corridors and/or will contribute to a larger strategic offset for the relevant MNES. This should include information about how the proposed offset/s area contributes to any state and/or regional plan/s for the conservation of the protected matter.	**Section 2.3** **Section 2.7**
2.7	Completion criteria and, if necessary, performance targets that evidence protection of improvement of EPBC Act listed communities, species and their habitat. For the purposes of the plan, completion criteria are longer term time-bound values, specified for measurable parameters, that if attained and maintained ensure the plan's environmental objectives are achieved. For example: *By Year 20, the approval holder must reduce non-native plant cover to within 5% of the benchmark value associated with each Regional Ecosystem.* Performance targets are time-bound short and medium term targets, for management interventions and environmental condition, that are used to monitor, evaluate, review and improve the effectiveness of the plan to offset impacts. For example: *By Year 10, the approval holder must reduce non-native plan cover to within 10% of the benchmark value associated with each Regional Ecosystem.*	**Section 3**
	a. interim performance targets (e.g. at years 5, 10, 15 and 20) for each attribute must be identified to demonstrate offset site quality improvement and must be measurable and related to the completion targets identified.	**Section 3**
	b. Corrective actions must be identified should anticipated habitat quality improvements not be achieved prior to the subsequent interim performance target event.	**Section 5 (Table 5.2)**
2.8	The plan includes management measures that will protect or improve EPBC Act listed threatened ecological communities and/or species and their habitat. Each management measure: a. is specifically linked to the attribute of the protected matter for which the management measure applies b. has timeframes for implementation c. is described sufficiently to avoid ambiguity and to inform plan implementation d. is related to attaining/maintaining completion criteria and/or performance targets e. is derived from recognised principals, practice, or guidelines, and is justified – technically, scientifically and legally (e.g. by recommendation in a national recovery plan) – as an effective and appropriate measure to attain and/or maintain the plan's completion criteria and/or performance targets	**Section 5**
2.9	The plan identifies and manages uncertainty. To this end the plan specifies:	**Section 4.2**

RFI Section	Requirement	Relevant Section in the OMP
	a. key data/information used to formulate the plan b. the limitations and/or uncertainty associated with the use of the data/information c. the risks that limitation and/or uncertainty represents for plan failure d. How limitations and/or uncertainty, and associated risks, are mitigated during plan implementation. For example, where a margin of safety is applied to management measures until uncertainty is reduced to an acceptable level or performance targets/completion criteria are attained/maintained	**Appendix C (Risk Assessment)**
2.10	The plan assesses the risk or failure to achieve the plan's performance targets and/or completion criteria. To this end, the plan: a. States the plan's performance targets and or completion criteria b. identifies events or circumstances that prejudice attainment/maintenance of address scientific/ecological uncertainty, stochastic events and legal/land use planning factors that may represent risks c. includes a qualitative assessment of the likelihood and consequences of those events or circumstances, and the residual risk of failure to achieve those criteria due to identified event or circumstances (assuming management measures will be implemented) d. characterises risk as low, medium, high or severe, and derived from likelihood (highly likely, likely, possible, unlikely, rare) and consequence (minor, moderate, high, major and critical); and e. outlines how consequence, likelihood and risk level for each risk have been determined	**Section 5 (Table 5.2)** **Section 4.2** **Appendix C (Risk Assessment)**
2.11	The plan describes the monitoring methods that will be implemented, and: a. the relevance of the monitoring methods to the protection of the relevant aspect of the protected matter(s) for which the offset is implemented b. includes quantitative (e.g. on-ground survey results) and qualitative baseline data (e.g. photo-point monitoring sites) that established the start quality/condition of the environment, and which can be used to measure performance against c. describes the sampling strategy (including monitoring area, site selection and sampling intensity over space and time) and statistical analyses to be employed d. Justifies the sampling strategy/monitoring methods, including through: i. an assessment of effectiveness and constraints to use ii. capacity to detect change in environmental condition due to management interventions iii. capacity to demonstrate attainment of performance targets and/or completion criteria	**Section 5.7.7**

RFI Section	Requirement	Relevant Section in the OMP
	iv. the statistical power of the strategy/method e. commits to engage appropriately qualified experts to design and conduct monitoring and survey activities, and analyse monitoring results f. accounts for seasonal/climatic variability g. details the location, nature and number of monitoring sites, including benchmark/reference sites to evaluate management performance	
2.12	The plan includes commitments to report on plan implementation and success as well as opportunities for improvement. This is achieved by: a. if the project is approved, identify relevant reporting obligations under the EPBC approval, or otherwise proposing appropriate regular reporting intervals, objectives and methods b. specifying how plan/strategy implementation will be reported in accordance with those obligations c. including a reporting template specifying key risk management, management measure, monitoring and adaptive implementation outcomes for the reporting period d. including a schedule and triggers for reporting types (e.g. annual compliance, incident, non-compliance, contingency)	**Section 7**

2. Offset Area Description

2.1 Size and location

The 302.9 ha offset area is located within the two eastern lots of the Girrahween Station property, Lots 31 and 32 AU60 (**Figure 2.1**), approximately 4 km to the east of the Project where it shares a boundary with Barakula State Forest. The Girrahween Station property is located in the Barakula subregion of the Brigalow Belt Bioregion, within the Western Downs Regional Council area.

The freehold property is owned and operated by Arrow (Tipton Two) Pty Ltd (a subsidiary company of Arrow CSG). While the property was originally purchased in 2012 for the purpose of developing its SGP North gasfields, Arrow CSG has excluded the identified offset areas from their proposed Coal Seam Gas (CSG) development plans that will be tied into their existing network as shown in **Figure 2.1.** Arrow CSG is committed to securing the proposed offset area and will ensure no future infrastructure is located within the offset area boundary, regardless of any changes to the design of any future project infrastructure within Lots 31 and 32 AU60.

The offset area is currently subject to the following production and exploration permits:

- Petroleum Lease (PL) 492, 305 and 491 held by Arrow CSG (Australia) Pty Ltd
- Exploration permit for coal (EPC) 1041 held by March Thirteen Investments Pty Ltd.

In addition to the use of Lots 31 and 32 AU60 for future CSG development purposes, the property is currently subject to an existing agistment agreement with livestock currently grazed within the offset area. Surrounding land uses are predominantly grazing, native vegetation, CSG development and forestry (Barakula State Forest) with a small number of residences associated with larger rural and agricultural properties in the surrounding area.

2.2 Legal security

Prior to the commencement of the action Arrow CSG will legally secure the offset as a declared area of high nature conservation value under section 19E of the *Vegetation Management Act 1999*. Within 18 months of the declared area being registered on title, Arrow CSG will subsequently secure the offset area with a covenant under the *Land Title Act 1994* for at least the duration of the impact. Prior to the application of the covenant, Arrow CSG will provide a copy of the terms to NEPA for review to ensure they are appropriate for the protection of MNES values at the offset area.

Should additional time be required to allow for further consultation between stakeholders, or delays beyond Arrow CSG's control, Arrow CSG will ensure NEPA is informed on their progress, with evidence, and proposed timing to secure the legally binding mechanisms.

2.3 Connectivity

The northern portion of the offset area sits within the Barakula to St George State significant biodiversity corridor, mapped as part of the Queensland Government Biodiversity Planning Assessment (BPA) (**Figure 2.1**). Both State and regional corridors have been identified as significant areas of connectivity across bioregions to guide land-use planning and conservation efforts as part of a broader plan to ensure the resilience of Queensland's ecosystems.

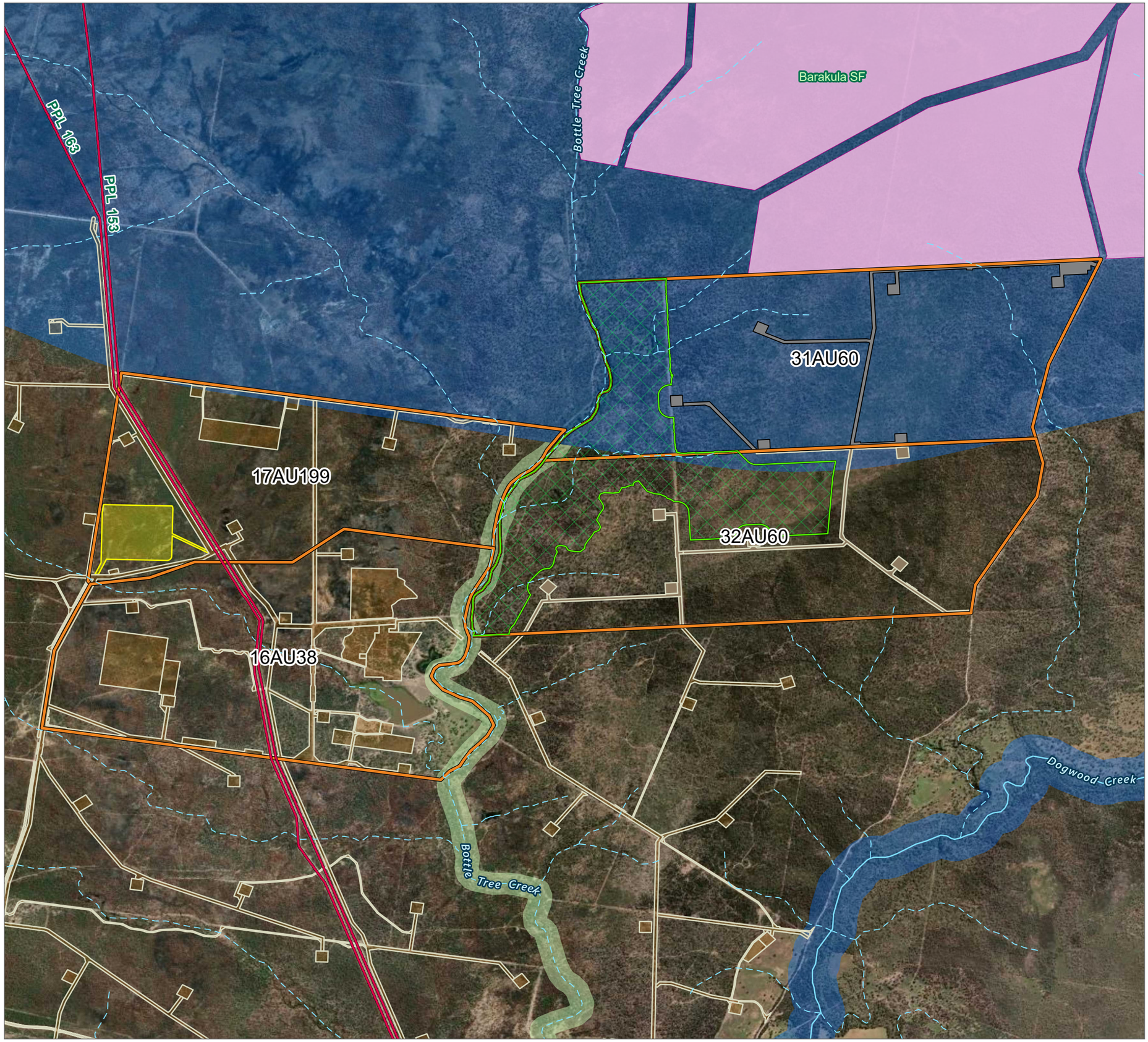
The offset area forms part of a larger patch of remnant and regrowth vegetation connecting the offset area with Barakula State Forest to the north, providing additional areas of protected, contiguous habitat and wildlife refuge (**Figure 2.1**)**.** The offset area is strategically located within the Girrahween Station property, on Lot 31 and 32 AU60, to encompass Bottle Tree Creek and its adjacent vegetation communities supporting suitable habitat for the MNES offset values. Bottle Tree Creek is part of a regional riparian corridor that connects the Barakula to St George State significant biodiversity corridor to Dogwood Creek in the south (also mapped as a State biodiversity corridor) which eventually discharges into the Balonne River at its junction with the Condamine approximately 120 km downstream (**Figure 2.1**).

SGP NORTH SOLAR FARM

Offset Management Plan

Figure 2.1

Project and offset area location and connectivity



- Petroleum Pipeline Licence (PPL)
- Major Watercourse
- Minor Watercourse
- Girrahween Station
- Development Footprint (30.1 ha)
- Offset Area (302.9 ha)
- Approved Infrastructure Footprint
- Proposed Infrastructure Footprint

Biodiversity Corridor Buffers:

- State
- Regional

Protected areas and forests of Queensland:

- State Forest

DRAWN: KB
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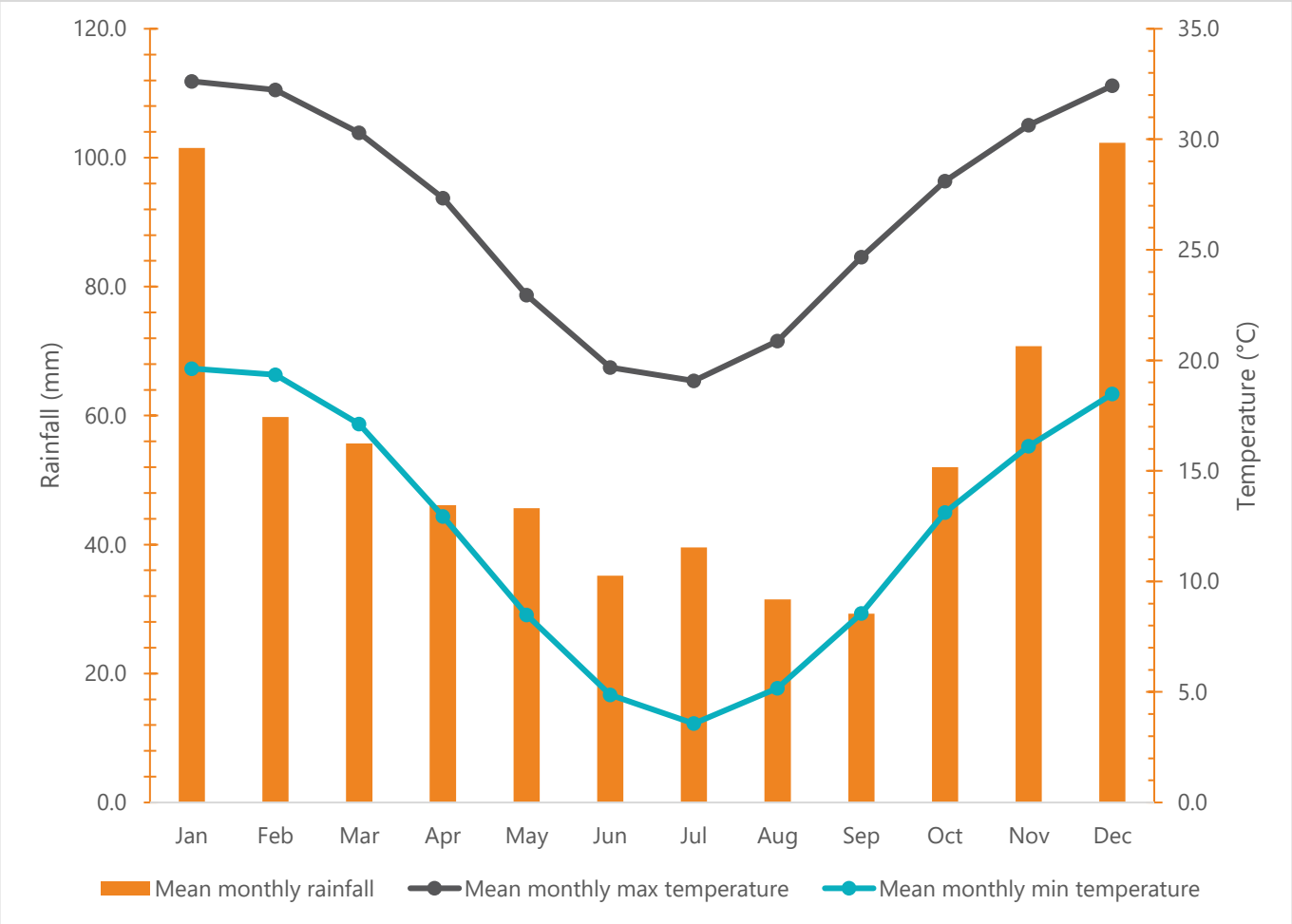
Data Source:© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2024, © State of Queensland (Department of Resources), 2023, Not to be used as a definitive absolute location of reserve boundaries. This dataset is derived from the Digital Cadastre Database (DCDB). The accuracy of the spatial representation is determined by the accuracy of records in the version of the DCDB from which this dataset was derived., © State of Queensland (Department of Environment and Heritage Protection) 2017, Earthstar Geographics, © OpenStreetMap contributors, © State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development) 2025, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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2.4 Climate

The climate of the offset area locality is characterised by a subtropical climate with hot, wet summers and mild, dry winters. The wet season is typically from November to March with the driest and coolest months typically June, July, and August. Weather records from the Miles Post Office station (42023; **Figure 2.2**) (approximately 18 km to the south of the offset site) based on the current reference climate normal (1 January 1961 to 31 December 1990) indicate the mean monthly rainfall ranges from 29.3 mm (September) to >100mm (January and December). Mean monthly maximum temperatures range from 19 °C (June and July) to >30°C (November to March). Mean monthly minimum temperatures range from 3°C (July) to 19 °C (January and February) (BoM 2025).

Figure 2.2: Mean monthly temperature and rainfall records from the Miles Post Office station (42023) from 1 January 1961 to 31 December 1990



2.5 Baseline survey effort

A combination of desktop and detailed field surveys were undertaken across Lots 31 and 32 AU60 to assess the baseline condition of the offset area and habitat for the MNES offset values as well as inform preparation of this OMP.

Field surveys were undertaken by suitably qualified Attexo and Arrow ecologists over three separate deployments from 2-6 and 15-24 of September 2025 and 17-19 August 2026. The baseline survey effort and subsequent analysis completed to date includes:

- Ground-truthing and verification of regional ecosystems (RE) mapping including quaternary assessments in accordance with *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0* (Neldner et al. 2023) (see **Section 2.6**)

- Identification and assessment of suitable habitat for MNES fauna species, informed by incidental observations and targeted searches within the offset area, as well as targeted surveys undertaken across the broader Project area, Arrow CSG's ecology data and species records collected from the surrounding region to support the development of the broader SGP (see **Section 2.7**)
- BioCondition and habitat quality assessments in accordance with the project specific Modified Habitat Quality Assessment method developed for the Project (see **Section 2.8** and **Appendix B**).
- Weed cover surveys and photo-monitoring (see **Section 2.9** and **Appendix D**).
- Deployment of remote traps to assess pest fauna activity across the offset area (see **Section 2.10** and **Appendix D**).

2.6 Ground-truthed vegetation

The 302.9 ha offset area comprises a total of nine unique REs including a combination of remnant, regrowth and non-remnant areas, as summarised in **Table 2.1** and presented on **Figure 2.3**. **Table 2.1** also summarises the assessment units used to assess and derive the habitat quality scores for the offset area based on the different RE condition status and type.

The offset area is composed of remnant (205.5 ha; 68%) and regrowth (84.8 ha; 28%) vegetation dominated by a mixture of *Eucalypt* and *Corymbia* communities as well as areas of non-remnant (2 ha; 1%) vegetation and 10.7 ha of existing constructed tracks (4%). The Girrahween Station property, including the offset area, was significantly impacted by a recent bushfire in 2022-2023, which affected a large portion of the surrounding landscape. Evidence of this bushfire was still readily apparent during baseline field surveys.

Table 2.1: Regional Ecosystems within the offset area

Regional Ecosystem	Condition Status	Assessment Unit	Short Description	Area (ha)
11.3.4	Remnant	AU01	*Eucalyptus tereticornis* and/or Eucalyptus spp. woodland on alluvial plains	20.9
11.3.14	Remnant	AU02	Eucalyptus spp., Angophora spp., Callitris spp. woodland on alluvial plains	5.8
11.3.27f	Remnant	AU03	*Eucalyptus coolabah* and/or *E. tereticornis* open woodland to woodland fringing swamps	3.9
11.3.25	Remnant	AU04	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	8.1
11.5.1	Remnant	AU05	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces	68.2
	Regrowth	AU06		78.7
11.5.4	Regrowth	AU07	*Eucalyptus chloroclada*, *Callitris glaucophylla*, *C. endlicheri*, *Angophora leiocarpa* woodland on Cainozoic sand plains and/or remnant surfaces	6.1
11.5.20	Remnant	AU08	*Eucalyptus moluccana* and/or *E. microcarpa* and/or *E. woollsiana* +/- *E. crebra* woodland on Cainozoic sand plains	5.1

Regional Ecosystem	Condition Status	Assessment Unit	Short Description	Area (ha)
11.5.21	Remnant	AU09	*Corymbia bloxsomei* +/- *Callitris glaucophylla* +/- *Eucalyptus crebra* +/- *Angophora leiocarpa* woodland on Cainozoic sand plains and/or remnant surfaces	20.5
	Non-Remnant*	AU10		2.0
11.7.7	Remnant	AU12	*Eucalyptus fibrosa subsp. nubilis* +/- Corymbia spp. +/- Eucalyptus spp. woodland on Cainozoic lateritic duricrust	73.0
Constructed Access Tracks[#]		-	Cleared areas along existing access tracks.	10.7
Total				**302.9**

* Areas of non-remnant vegetation within the offset area are considered to correspond with pre-clearing RE 11.5.21 based on in-field records of adjacent vegetation communities, isolated trees, and vegetation within the non-remnant patch as well as surrounding landform, soils and geology. At the time of the field surveys this area was considered highly desiccated, potentially due to dry conditions and prior disturbance, and was not considered representative of the structure and diversity of RE 11.5.21. However, this patch of non-remnant vegetation is still considered to support suitable future habitat for Corben's long-eared bat, diamond firetail, and koala (see **Section 2.7**). The pre-clearing RE 11.5.21 has been used as a reference benchmark to calculate the associated offset habitat quality scores for this area (see **Section 2.8**).

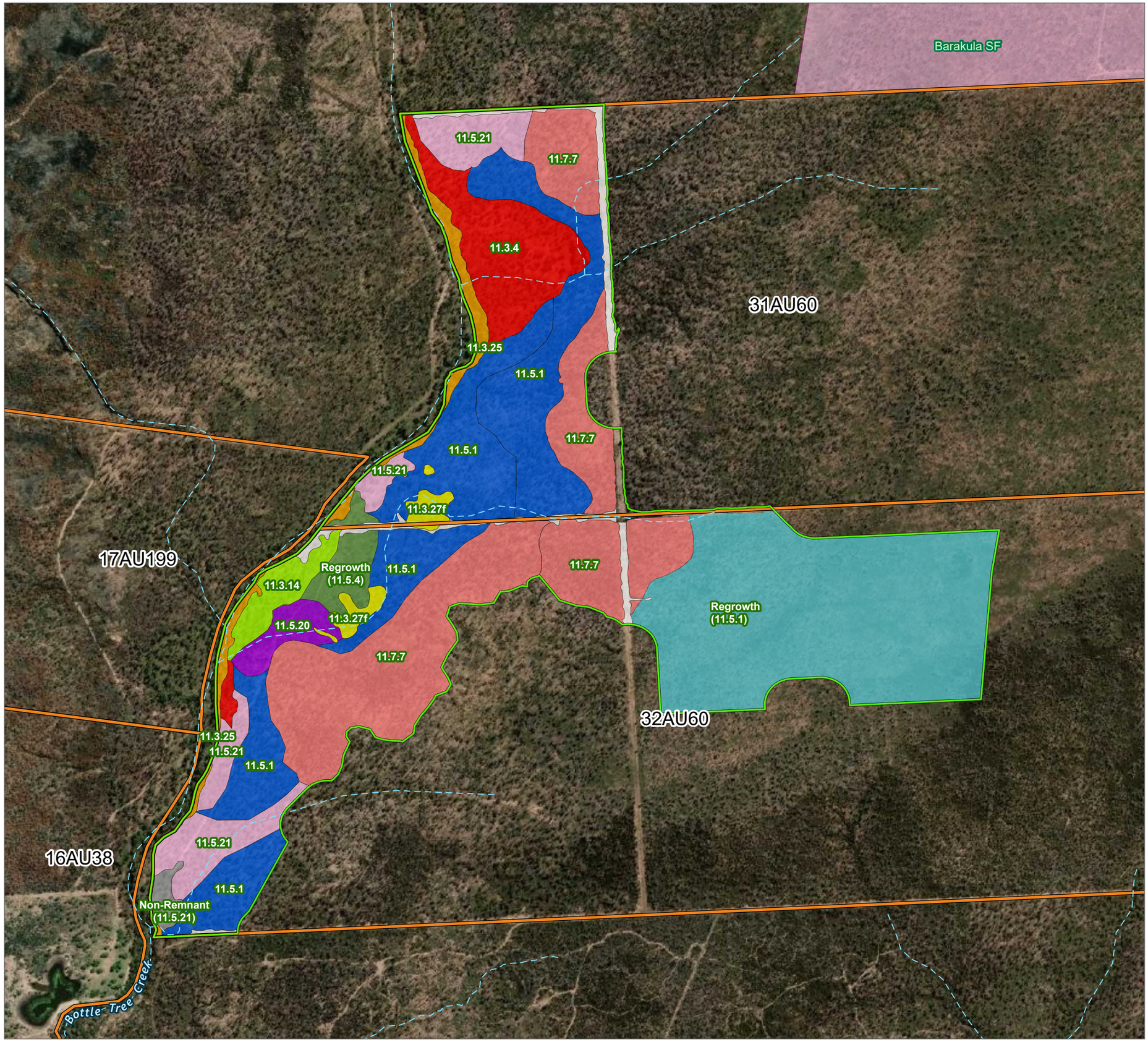
[#] Whilst these areas have been incorporated into the overall offset area, they have not been used in calculations for MNES habitat.

SGP NORTH SOLAR FARM

Offset Management Plan

Figure 2.3

Ground-truthed RE mapping across the offset area



- Minor Watercourse
- Girrahween Station
- Offset Area (302.9 ha)

Protected areas and forests of Queensland:

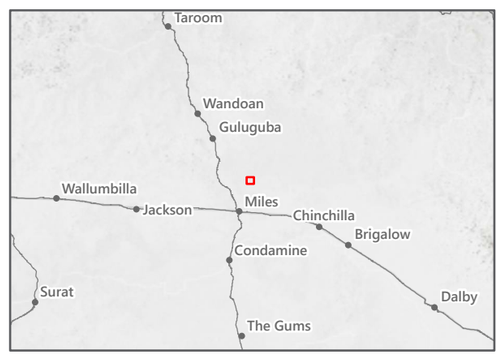
- State Forest

Ground-truthed Regional Ecosystem within Offset Area:

- 11.3.4
- 11.3.14
- 11.3.25
- 11.3.27f
- 11.5.1
- 11.5.20
- 11.5.21
- 11.7.7
- Regrowth (11.5.1)
- Regrowth (11.5.4)
- Cleared
- Non-Remnant (11.5.21)

DRAWN: KB
REVIEWED: MW

DATE: 22/05/2026
DWG No.: ARR-005_081[C]



N

0 m 500

SCALE (A3): 1:15,000

Attexo

Data Source:© State of Queensland (Department of Resources) 2024, © State of Queensland (Department of Resources), 2023, Not to be used as a definitive absolute location of reserve boundaries. This dataset is derived from the Digital Cadastre Database (DCDB). The accuracy of the spatial representation is determined by the accuracy of records in the version of the DCDB from which this dataset was derived., Vantor, © OpenStreetMap contributors, © State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development) 2025, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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2.7 MNES habitat, threats and conservation

Suitable MNES habitat within the offset area was identified based on ground-truthed RE, habitat values identified through field surveys across Lots 31 and 32 AU60, and the known ecology of the MNES species significantly impacted by the Project and additional desktop analysis. An overview of how suitable habitat was defined for each species and its extent within the offset area is provided in **Table 2.2**. Defined areas of suitable habitat and nearby species records are shown on **Figure 2.4**.

Table 2.2: Habitat mapping rules and available habitat for each MNES within the offset area

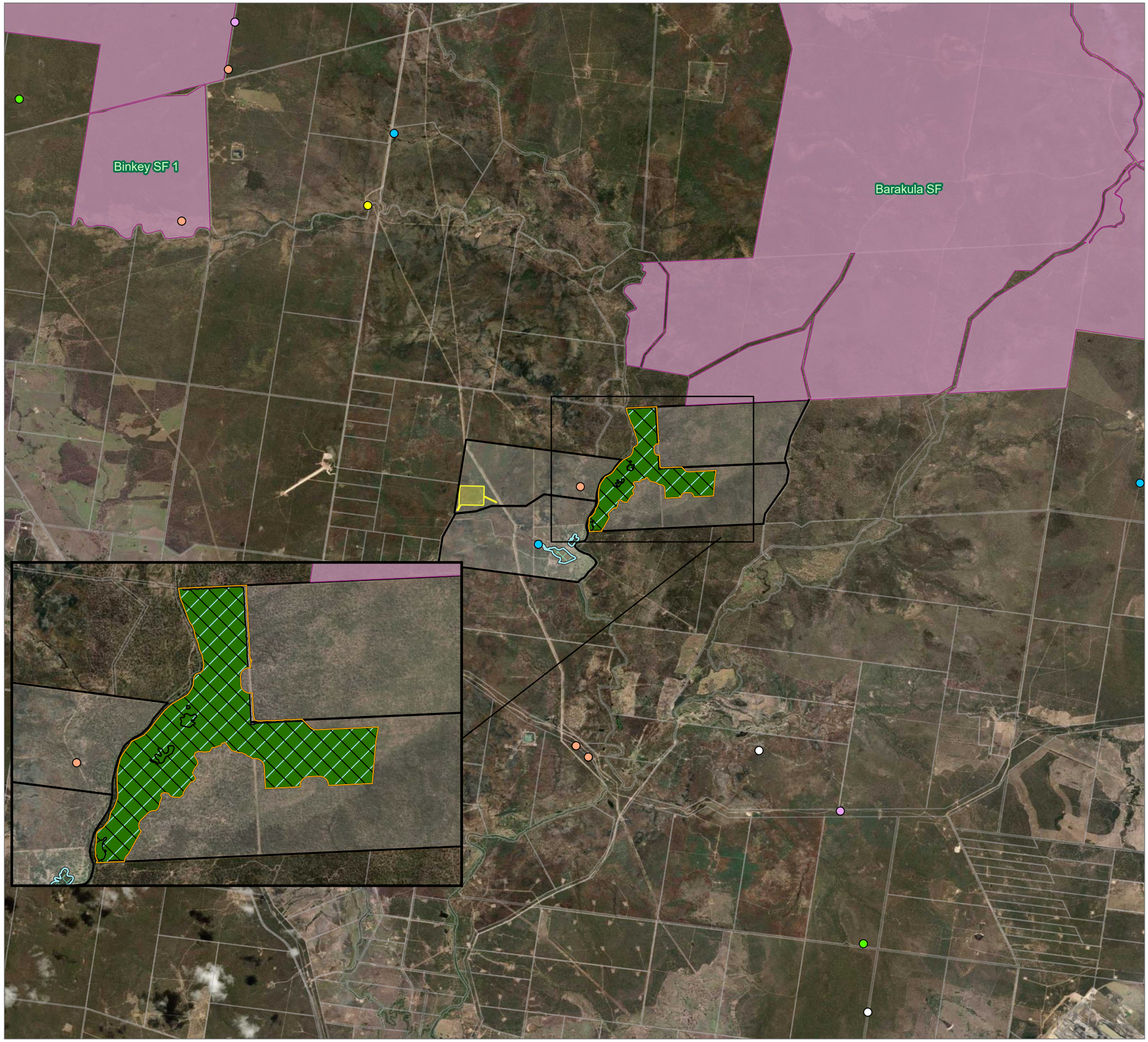
MNES	Suitable RE	Habitat mapping rules	Offset area available (ha)
Corben's long eared bat	11.3.4, 11.3.14 11.3.25, 11.3.27f, 11.5.1, 11.5.4, 11.5.20, 11.5.21, 11.7.7	Species is known to occupy vegetated communities in which they are also known to roost. All remnant and regrowth vegetation communities likely provide foraging and roosting opportunities. Adjacent areas of non-remnant vegetation, located within 100m of remnant habitat, were also included as suitable foraging habitat.	292.2
Diamond firetail	11.3.4, 11.3.14 11.3.25, 11.3.27f, 11.5.1, 11.5.4, 11.5.20, 11.5.21, 11.7.7	This species is known to utilise a wide range of vegetated and non-vegetated habitats, as it feeds on grass seeds. All remnant, regrowth and non-remnant vegetation communities described within the offset area likely to constitute habitat for this species.	292.2
South-eastern glossy black-cockatoo	11.3.4, 11.3.14 11.3.25, 11.5.1, 11.5.4, 11.5.20, 11.5.21, 11.7.7	This species has specific foraging and roosting habitat requirements. Foraging habitat for this species includes all vegetation communities that can contain known foraging tree species (see **Appendix B**). Considering their reliance on large tree hollows for roosting, suitable roosting habitat has been defined as all remnant vegetation communities within 200 m of major watercourses (stream order 4-5).	286.4
Koala	11.3.4, 11.3.14 11.3.25, 11.3.27f, 11.5.1, 11.5.4, 11.5.20, 11.5.21, 11.7.7	The koala can utilise a wide range of vegetation communities and is also known to disperse over large distances. All remnant, regrowth and non-remnant vegetation communities that contain foraging resources have been mapped as suitable habitat for this species.	292.2
Dunmall's snake	11.3.4, 11.3.14 11.3.25, 11.3.27f, 11.5.1, 11.5.4, 11.5.20, 11.5.21, 11.7.7	The species relies on the presence of microhabitat features for shelter as well as the availability of prey species (i.e. small invertebrates including geckos and skinks). The species is known to shelter under fallen timber, ground litter and within cracks in alluvial clay soils typically associated with black cracking clays dominated by *Acacia*, *Callitris* or *Allocasuarina* species or on sandstone derived soils dominated by *Eucalyptus*, *Corymbia*, *Callitris* and *Allocasuarina*. All remnant and regrowth vegetation within the offset area has been mapped as suitable habitat.	290.2
Squatter pigeon	11.3.4, 11.3.14 11.3.25, 11.3.27f, 11.5.1, 11.5.4, 11.5.20, 11.5.21, 11.7.7	The species occurs within open forest to sparse open woodland typically dominated in the overstory by *Eucalyptus, Acacia, Callitris* and *Melaleuca* species. The species is heavily reliant on groundcover vegetation within proximity of a permanent water source for both suitable foraging and nesting habitat. All remnant and regrowth	290.2

MNES	Suitable RE	Habitat mapping rules	Offset area available (ha)
		vegetation communities within approximately 1.7km of a permanent water source has been mapped as suitable foraging habitat.	

SGP NORTH SOLAR FARM

Offset Management Plan

Figure 2.4
MNES offset value habitat



Development Footprint (30.1 ha)

Offset Area (302.9 ha)

MNES Species:

- Corben's Long-eared Bat
- Diamond Firetail
- Dunmall's Snake
- Glossy Black-cockatoo
- Koala
- Squatter Pigeon

Girrahween Station

Base Lot Type Parcel

Reservoirs

Suitable Habitat:

Glossy Black-Cockatoo

Dunmall's Snake, Squatter Pigeon

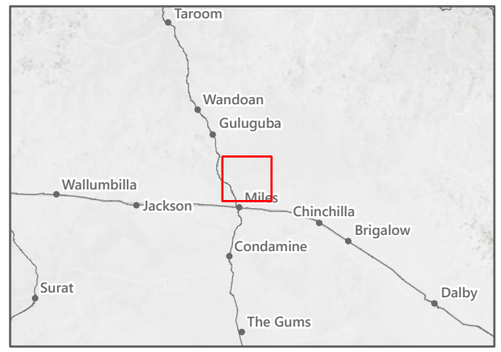
Corben's Long-Eared Bat, Diamond Firetail and Koala

Protected areas and forests of Queensland:

State Forest

DRAWN: KB
REVIEWED: MW

DATE: 1/06/2026
DWG No.: ARR-005_076[C]



N

0 km 2.5

SCALE (A3): 1:100,000

Attexo

Data Source:Not to be used as a definitive absolute location of reserve boundaries. This dataset is derived from the Digital Cadastre Database (DCDB). The accuracy of the spatial representation is determined by the accuracy of records in the version of the DCDB from which this dataset was derived., © State of Queensland (Department of Resources) 2024, © State of Queensland (Department of Resources), 2023, Earthstar Geographics, © OpenStreetMap contributors, © State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development) 2025, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS, Vantor

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2.7.1 Corben's long-eared Bat

2.7.1.1 Habitat description

The Corben's long-eared bat appears to be more concentrated around patches of vegetation in the landscape which are likely used as roosting locations (under exfoliating bark or in tree hollows) (TSSC 2015). Suitable habitat for this species has been mapped to include all remnant and regrowth vegetation with the inclusion of all non-remnant vegetation as it occurs within 100m of these ground-truthed communities.

The offset area is dominated by a mixture of *Eucalypt* and *Corymbia* vegetation communities of varying ages. Whilst most of these vegetation communities have been described as remnant (~68% of the offset area) and regrowth (28% of the offset area), much of this area has been degraded by a recent bushfire that severely impacted the Girrahween Station property and the surrounding area in 2022-2023. The fire appears to have reduced the abundance and overall cover of the shrub and ground layers within the offset area, potentially limiting the availability of foraging resources for this species. Despite this disturbance, much of the decorticating bark observed within this area appears to be intact indicating that roosting locations for this species may not have been significantly affected. The connectivity of this offset area to surrounding contiguous vegetation is likely to be beneficial for this species during periods of limited resource availability, such as those caused by bushfires or droughts.

Whilst no Corben's long-eared bat records have been recorded within the offset area, several historical records have been identified within nearby contiguous vegetation, the closest of which occurs within the broader Girrawheen Station approximately 0.5 km to the west from 2013 (ALA 2025; **Figure 2.4**). Other records observed between 2000 and 2002 have also been recorded in Binkey State Forest (approximately 12 km to the north-west) and Barakula State Forest (approximately 70 km to the north-east), both of which are connected via contiguous vegetation to the offset area, supporting the likelihood that local populations may utilise these habitat values. Little is known about the home range of individual (or groups of) Corben's long-eared bats; however, the conservation advice suggests their home range is likely to be large considering their reliance on large stands of wooded vegetation (TSSC 2015).

Due to the cryptic nature of this species, and the fact that they cannot be positively identified using passive acoustic detection, it is difficult to confirm their usage of the offset area. Based on the proximity of nearby records and the contiguous nature of the available habitat, their usage or potential usage has been inferred with ongoing targeted surveys proposed to be undertaken as part of the monitoring program (**Section 6.7.2**).

2.7.1.2 Threats and conservation initiatives

Table 2.3 summarises the known and potential threats for Corben's long-eared bat based on the species conservation advice (TSSC 2015), and the proposed management activities to mitigate these threats and enhance the quality of habitat for the species within the offset area. Threats and management activities presented in this section, align with the assessment presented in the Project's MHQA method.

The protection and ongoing management of the offset area will reduce the risk of the identified threatening processes occurring and support the recovery of the species. Based on the key conservation and management actions outlined for this species in its conservation advice (TSSC 2015) the development and ongoing management of the offset area will contribute to these initiatives through:

- Protection and enhancement of the quality of known suitable habitat to support the species to prevent future habitat loss and degradation associated with future resource development, with a focus on retaining hollow-bearing trees and supporting hollow tree recruitment, wherever possible.
- Consideration of species-specific requirements as part of fire management plans.
- Implementation of control programmes for feral pests.
- Excluding grazing to eliminate the impacts associated with of livestock grazing pressure.

Table 2.3: Relevant conservation priorities for Corben's long eared bat

MNES known and potential threats	Management activity			
	Legal security (Section 2.2)	Livestock exclusion (Section 5.2, 5.3)	Fire management (Section 5.4)	Restoration planting (Section 5.7)
Loss of habitat, habitat fragmentation and a reduction in hollow availability through land clearing	✓			✓
Alteration to the structure of suitable habitat and roosting sites, including loss of hollow bearing trees through inappropriate fire regimes			✓	✓
Alteration to the structure and diversity of habitat through inappropriate grazing regimes, as well as a reduction in shrubs and understory habitat.		✓		✓

2.7.2 Diamond firetail

2.7.2.1 Habitat description

The diamond firetail can occur in *Eucalypt*, *Acacia* or *Casuarina* woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees (DCCEEW 2023a). Due to the wide range of habitats that this species is capable of utilising, the entire offset area (292.2 ha) has been mapped as suitable habitat for this species. Considering the proximity of the impact and offset areas (approximately 2 km apart), it is possible that any locally occurring populations may utilise both areas, however diamond firetails are generally regarded as being sedentary and not typically prone to seasonal movements or long-distance travel.

Some authors, however, have noted seasonal movement between denser and more open environments. O'Gorman (1981) documented regular annual movements from their spring/summer breeding areas in the Grampians (National Park in Victoria) to the more open mallee plains to the north-west where the birds spent the winter. Another study, in the Mt Lofty Ranges of South Australia, found that this species completely disappeared from revegetation sites in winter, with individuals recorded up to 2 km away from their original banding location (DEH 2008).

The offset area is dominated by a mixture of *Eucalypt* and *Corymbia* vegetation communities of varying ages. Whilst most of these vegetation communities have been described as remnant (~68% of the offset area) and regrowth (28% of the offset area), much of this area has been degraded by a recent bushfire that severely impacted the Girrahween Station property and the surrounding area in 2022-2023. This fire appears to have reduced the abundance and overall cover of the ground layer within the offset area, potentially limiting the availability of foraging resources for this species. Remaining and recovering native perennial grass species observed across the offset area include but are not limited to *Aristida gracilipes, A. caput-medusae, Lomandra longifolia, Entolasia stricta* (wiry panic), *Eriachne mucronata* and *Themeda triandra (kangaroo grass)*. The connectivity of this offset area to surrounding contiguous vegetation is likely to be beneficial for this species during periods of limited resource availability, such as those caused by bushfires or droughts.

Whilst no diamond firetails have been recorded within the offset area, numerous historical records have been identified in the region surrounding the offset, the nearest of which being approximately 26 km to the north-west from 2019 (ALA 2025; **Figure 2.4**). There are also several spatially concealed records of this species throughout Barakula State Forest suggesting that this species may be common throughout contiguous vegetation to the north

and east of the offset area. Based on the proximity and abundance of nearby records, and the contiguous nature of the available habitat, their usage or potential usage has been inferred with ongoing targeted surveys proposed to be undertaken as part of the monitoring program (**Section 6.7.2**).

2.7.2.2 Threats and conservation initiatives

Table 2.4 summarises the known and potential threats for diamond firetail based on the species conservation advice (DCCEEW 2023a), and the proposed management activities to mitigate these threats and enhance the quality of habitat for the species within the offset area. Threats and management activities presented in this section, align with the assessment presented in the Project's MHQA method.

The protection and ongoing management of the offset area will reduce the risk of the identified threatening processes occurring to protect habitat values for this species and provide a wide range of seasonal foraging resources. Based on the key conservation and management actions outlined for this species in its conservation advice (DCCEEW 2023a) the development and ongoing management of the offset area will contribute to these initiatives through:

- Protection and maintenance of areas of high-quality habitat to prevent future habitat loss and degradation associated with future resource development, with a focus on supporting a diverse ground layer dominated by a mixture of grass species which seed at different times of the year.
- Consideration of species-specific requirements as part of fire management plans.
- Implementation of control programmes for weeds and pest animals.
- Excluding grazing to eliminate the impacts associated with of livestock grazing pressure.

Table 2.4: Relevant conservation priorities for diamond firetail

MNES known and potential threats	Management activity				
	Legal security (Section 2.2)	Livestock exclusion (Section 5.2, 5.3)	Fire management (Section 5.4)	Weed management (Section 5.5)	Restoration planting (Section 5.7)
Loss of habitat and fragmentation through land clearing	✓				✓
Alterations to the floristic and structural characteristics of habitat and food availability through invasive weed incursion, particularly exotic annual grasses				✓	✓
Alteration to the structure and diversity of habitat through inappropriate grazing regimes		✓			✓
Changes in composition and/or structure of vegetation and habitat through inappropriate fire regimes			✓		✓

2.7.3 South-eastern glossy black-cockatoo

2.7.3.1 Habitat description

South-eastern glossy black-cockatoos feed almost exclusively on the seeds of sheoaks (*Allocasuarina* spp. and *Casuarina* spp.), usually relying on one or two species within a given region (DCCEEW 2022). They are also known hollow nesters who prefer large hollows in both living and dead eucalypt trees. Considering these habitat preferences, most of the offset area (286.4 ha) (excluding RE 11.3.27f and non-remnant RE 11.5.21 community in the south-western corner) has been mapped as suitable habitat for this species, including:

- Remnant and regrowth vegetation communities known to contain foraging resources or provide suitable roosting habitat for this species including REs 11.3.4, 11.3.14, 11.3.25, 11.5.1, 11.5.4, 11.5.20, 11.5.21 and 11.7.7.
- All remnant vegetation within 200 m of Bottle Tree Creek as these areas are more likely to contain large hollow bearing trees that this species can utilise as roosting habitat, with hollow bearing trees observed during field surveys of the offset area.

The offset area is dominated by a mixture of *Eucalypt* and *Corymbia* vegetation communities of varying ages. Whilst most of these vegetation communities have been described as remnant (~68% of the offset area) and regrowth (28% of the offset area), much of this area has been degraded by a recent bushfire that severely impacted the Girrahween Station property and the surrounding area in 2022-2023. Buloke (*Allocasuarina luehmannii*) (listed as an occasional food resource for this species) was observed through the offset area within remnant and regrowth patches; however, canopy cover and recruitment of species for foraging was relatively low, whilst the area still recovers from the recent bushfires. The connectivity of this offset area to surrounding contiguous vegetation is likely to be beneficial for this species during periods of limited resource availability, such as those caused by bushfires or droughts.

Considering the proximity of the impact and offset areas (~ 2 km apart) and the similarities in the mapped vegetation communities, it is likely that any locally occurring populations will travel between these two areas. Whilst no south-eastern glossy black cockatoo's have been recorded within the offset area, several historical records have been identified in the surrounding region, the nearest of which being approximately 1.5 km to the south-west from 2013 (ALA 2025; **Figure 2.4**). There are also numerous records of this species throughout Barakula State Forest suggesting that it may be common in the surrounding area but restricted to certain patches of suitable foraging habitat. Research suggests that even within foraging habitat, populations may prefer specific feed tree species, resulting in a patchy distribution within their range (DCCEEW 2022). Based on the proximity and abundance of nearby records, and the contiguous nature of the available habitat, their usage or potential usage of the offset site has been inferred with ongoing targeted surveys proposed to be undertaken as part of the monitoring program (**Section 6.7.2**).

2.7.3.2 Threats and conservation initiatives

Table 2.5 summarises the known and potential threats for south-eastern glossy black cockatoo based on the species conservation advice (DCCEEW 2022) and the proposed management activities to mitigate these threats and enhance the quality of habitat for the species within the offset area. Threats and management activities presented in this section, align with the assessment presented in the Project's MHQA method.

The protection and ongoing management of the offset area will reduce the risk of the identified threatening processes. Implementation of the offset will protect both existing and future habitat (foraging and roosting) for this species, prevent future habitat loss and degradation associated with future resource development, and support the maturation of habitat to support mature hollow bearing trees. Based on the key conservation and management actions outlined for this species in its conservation advice (DCCEEW 2022) the development and ongoing management of the offset area will contribute to these initiatives through:

- Protection and maintenance of areas of known suitable habitat (both breeding and foraging).
- Consideration of species-specific requirements as part of fire management plans.
- Implementation of control programmes for weeds and pest animals.
- Excluding grazing to eliminate the impacts associated with of livestock grazing pressure.

Table 2.5: Relevant conservation priorities for south-eastern glossy black cockatoo

MNES known and potential threats	Management activity				
	Legal security (Section 2.2)	Livestock exclusion (Section 5.2, 5.3)	Fire management (Section 5.4)	Pest management (Section 5.6)	Restoration planting (Section 5.7)
Loss of habitat (including feeding and hollow bearing trees) and fragmentation through land clearing	✓				✓
Alteration of habitat impacting the quality of feeding and breeding habitats as a result of inappropriate fire regimes			✓		✓
Alteration to the structure and diversity of habitat through inappropriate grazing regimes		✓			✓
Predation by feral animals (cats and foxes)				✓	

2.7.4 Koala

2.7.4.1 Habitat description

Koalas are tree-dwelling, obligate folivores with a highly specialised diet. Their diet is defined by the availability and palatability of a limited variety of *Eucalyptus*, *Corymbia* and *Angophora* species (DAWE 2022a). The current definition of habitat for the koala includes land that has attributes that support this species (such as the presence of feed trees, connectivity to other habitat and proximity to areas with known koala populations) (DAWE 2022a). Koala habitat typically includes:

- Forests or woodlands, especially with a higher proportion of feed tree species, and may include remnant or non-remnant vegetation.
- Roadside and railway vegetation and paddock trees.
- Safe intervening ground for travelling between trees and patches to forage, shelter and reproduce.
- Access to vegetated corridors or paddock trees to facilitate movement between patches.

Several studies have also broadly recognised the koala's dispersal capabilities across cleared land (Melzer 1995; White 1999; Dique et al. 2003; Matthews et al. 2016). In addition to regular movements across the ground between trees within their own home ranges, koalas, particularly subadult males but also females, are known to generally disperse across distances of 1 to 3 km (but sometimes over 10 km).

The offset area supports the following LIKT species as defined by Youngentob et al (2021):

- *Eucalyptus chloroclada,*
- *Eucalyptus crebra,*
- *Eucalyptus exserta,*
- *Eucalyptus fibrosa,*
- *Eucalyptus longirostrata,*
- *Eucalyptus moluccana,* and
- *Eucalyptus populnea.*

Considering these factors, all remnant and regrowth vegetation within the offset area has been mapped as suitable breeding and foraging habitat (290.2 ha), and all non-remnant areas have been mapped as suitable dispersal habitat (~2 ha). In total 292.2 ha of suitable habitat has been mapped for the koala within the offset area.

The offset area is dominated by a mixture of *Eucalypt* and *Corymbia* vegetation communities of varying ages. Whilst most of these vegetation communities have been described as remnant (~68% of the offset area) and regrowth (28% of the offset area), much of this area has been degraded by a recent bushfire that severely impacted the Girrahween Station property and the surrounding area in 2022-2023. Whilst this fire does not appear to have significantly impacted mature vegetation across the offset area, it appears that the recruiting canopy and shrub layers were severely impacted, stunting the development of new foraging resources. The connectivity of this offset area to surrounding contiguous vegetation is likely to be beneficial for this species during periods of limited resource availability, such as those caused by bushfires or droughts.

Whilst no koalas have been recorded within the offset area, several historical and modern records have been recorded in the surrounding region, the nearest modern record being approximately 19 km to the north-east from 2017 (ALA 2025; **Figure 2.4**). There are closer historical records to the offset area; however, these were all recorded in the late 1980's and are not necessarily representative of this species modern distribution. Contemporary koala records occur throughout Barakula State Forest and in areas south of Miles, Qld. Based on the proximity of nearby records, and the contiguous nature of the available habitat, their usage or potential usage of habitat values within the offset has been inferred, with ongoing targeted surveys proposed to be undertaken as part of the monitoring program (**Section 6.7.2**).

2.7.4.2 Threats and conservation initiatives

Table 2.6 summarises the known and potential threats for koala based on the National Recovery Plan for the Koala (DAWE 2022b), and the proposed management activities to mitigate these threats and enhance the quality of habitat for the species within the offset area. One of the key objectives is the improvement of metapopulation processes through the improvement in indicators of ecosystem health. Management of the offset area will focus on the improvement in the quality of habitat for koala, as well as managing the risk of threatening processes that impact the future quality and viability of habitat through:

- Protection and maintenance of areas of high-quality habitat to prevent future habitat loss and degradation associated with future resource development, to enable local populations to disperse between patches of suitable habitat.
- Consideration of species-specific requirements as part of fire management plans.
- Implementation of control programmes pest animals.
- Minimise the risk of fatalities cause by vehicle interactions.

Table 2.6: Relevant conservation priorities for koala

MNES known and potential threats	Management activity				
	Legal security (Section 2.2)	Access restrictions (Section 5.2, 5.3)	Fire management (Section 5.4)	Pest management (Section 5.6)	Restoration planting (Section 5.7)
Loss of habitat and fragmentation through land clearing	✓				✓
Alteration of habitat, including the loss of food and shelter trees, as a result of inappropriate fire regimes			✓		✓

MNES known and potential threats	Management activity				
	Legal security (Section 2.2)	Access restrictions (Section 5.2, 5.3)	Fire management (Section 5.4)	Pest management (Section 5.6)	Restoration planting (Section 5.7)
Predation by feral animals (dogs)				✓	
Direct mortality from vehicle strike		✓			

2.7.5 Dunmall's snake

2.7.5.1 Habitat description

The Dunmall's snake is a venomous snake in the Elapidae family. The species diet consists of small skinks and geckos (DoE 2014, DoE 2026b) and it relies on microhabitat features for availability of prey species (Brown et al. 2008). The species is primarily nocturnal and is known to shelter under fallen timber, ground litter and within cracks in alluvial clay soils (DoE 2026b, DoE 2014) and possibly prefer habitats between 200 and 500 m above sea level (DoE 2026b). Habitats supporting Dunmall's snake are typically associated with black cracking clays dominated by *Acacia*, *Callitris* or *Allocasuarina* species. It can also occur on sandstone derived soils dominated by *Eucalyptus, Corymbia, Callitris* and *Allocasuarina* (DoE 2026b). Considering these factors, all remnant and regrowth vegetation within the offset area has been mapped as suitable habitat, with a total of 290.2 ha for the species.

Very little is known about the home range, dispersal activity and movement patterns of Dunmall's snake (DoE 2026b). However, the spatial ecology of Australian elapids that are similar in size and share habitat characteristics with Dunmall's snake (i.e. prey on small vertebrates including geckos and skinks and shelter under rocks and logs), has been well documented (Shine 1987, Macartney et al. 1988, Webb and Shine 1997, Whittaker and Shine 2003). Movement patterns of similar Australian elapids are limited naturally, with daily, monthly and even yearly movements between 3-300 m reported (Shine 1987, Webb and Shine 1997, Whittaker and Shine 2003). Typical movements of broad-headed snake (*Holocephalus bungaroides*), which is a smaller elapid that is closer in size and ecology to Dunmall's snake, rarely moved with average distances moved per month <200 m (Webb and Shine 1997). The closest recent record of Dunmall's snake to the offset area is ~8 km northwest. The connectivity of this offset area to surrounding contiguous vegetation also provides benefits for this species during periods of limited resource availability (i.e. droughts).

The offset area is dominated by a mixture of remnant and regrowth *Eucalyptus* and *Corymbia* vegetation communities. Key microhabitat features known to support suitable shelter habitat for the species were observed across the offset area including coarse woody debris and large log piles (DoE 2014). Habitat for Dunmall's snake will benefit from active management and restoration to enhance the recovery of impacts associated with recent bushfires to the shrub and ground layers and improve the quality of habitat to support the species.

2.7.5.2 Threats and conservation initiatives

Table 2.7 summarises the known and potential threats for Dunmall's snake based on the species conservation advice (DoE 2014; DoE 2026b), the Draft referral guidelines for the nationally listed Brigalow Belt reptiles (DCCEEW 2023b) and the Threat abatement plan for predation by feral cats 2024 (DCCEEW 2024a) and the proposed management activities to mitigate these threats and enhance the quality of habitat for the species within the offset area. Threats and management activities presented in this section, align with the assessment presented in the Project's MHQA method.

The protection and ongoing management of the offset area will reduce the risk of the identified threatening processes occurring and support the recovery of the species. Considering the key conservation and management actions outlined for this species in its conservation advice (DoE 2014; DoE 2026b) and more recently in the Draft referral

guidelines for the nationally listed Brigalow Belt reptiles (DCCEEW 2023b), the development and ongoing management of the offset area will contribute to these initiatives through:

- Protection and enhancement of the quality of known suitable habitat to support the species to prevent future habitat loss and degradation associated with future resource development.
- Exclusion of grazing at all times.
- Development of site-based fire management strategies (for both prescribed burning and fire suppression activities) considering the ecological needs of the species.
- Implementation of weed and pest animal management activities to reduce their impact on Dunmall's snake habitat and viability.

Table 2.7: Relevant conservation priorities for Dunmall's snake

MNES known and potential threats	Management activity					
	Legal security (Section 2.2)	Livestock exclusion (Section 5.2, 5.3)	Fire management (Section 5.4)	Weed management (Section 5.5)	Pest management (Section 5.6)	Restoration planting (Section 5.7)
Habitat loss and fragmentation caused by land clearing	✓					✓
Habitat degradation associated with overgrazing by livestock		✓				✓
Predation by feral animals (e.g. feral cat)					✓	
Inappropriate fire regimes resulting in a loss of fallen timber and ground litter			✓			✓
Invasion of weeds				✓		

2.7.6 Squatter pigeon

2.7.6.1 Habitat description

The squatter pigeon is a granivorous species that occurs within open forest to sparse open woodland typically dominated in the overstory by *Eucalyptus, Acacia, Callitris* and *Melaleuca* species (DoE 2026a). The species is heavily reliant on groundcover vegetation within proximity of a permanent water source for both suitable foraging and nesting habitat. Previous advice suggested that foraging habitat was likely located within 3 km of permanent water and breeding habitat was located within 1 km (DoE 2026a), however, based on the results of the Lloyd *et al.* (2025) analysis this is more likely to be within 1.7 km and 500 m of permanent water, respectively (Lloyd *et al.* 2025).

The subspecies is thought to be sedentary but has been observed dispersing locally between cleared areas and adjacent natural grasslands and highly modified or degraded habitat (i.e. pastures, stockyards, road reserves) to forage for seed on the ground, drink from stock troughs or dams, and dust bathe on bare ground (DoE 2026a; Squatter Pigeon Workshop 2011). The subspecies is less likely to be found on heavier soils with dense grass but can often be found in burnt areas and alongside tracks and roadsides (Ward et al 2021).

The offset area is dominated by a mixture of *Eucalyptus* and *Corymbia* vegetation communities of varying ages. Whilst most of these vegetation communities have been described as remnant (68% of the offset area) and regrowth (28% of the offset area), much of this area has been degraded by a recent bushfire that severely impacted the Girrahween Station property and the surrounding area in 2022-2023. This fire appears to have reduced the abundance and overall cover of the ground layer within the offset area, potentially limiting the availability of foraging resources for the squatter pigeon. The connectivity of this offset area to surrounding contiguous vegetation is likely to be beneficial for this species during periods of limited resource availability, such as those caused by bushfires or droughts.

All remnant and regrowth vegetation communities (290.2 ha) are considered to support foraging habitat for squatter pigeon with multiple permanent water sources within approximately 1.7 km of the offset area (**Figure 2.4**). The nearest record is approximately 9 km to the south of the offset area with several squatter pigeon records identified in the surrounding region including Binkey State Forest, Cherwondah State Forest and Barakula State Forest (**Figure 2.4**). Direct connectivity with Barakula State Forest will provide opportunities to extend movement and dispersal corridors for the species.

2.7.6.2 Threats and conservation initiatives

Table 2.8 summarises the known and potential threats for squatter pigeon based on the species conservation advice (TSSC 2015b; DoE 2026b) and threat abatement plan for predation by feral cats (DCCEEW 2024) and the proposed management activities to mitigate these threats and enhance the quality of habitat for the species within the offset area. Threats and management activities presented in this section, align with the assessment presented in the Project's MHQA method.

The protection and ongoing management of the offset area will reduce the risk of the identified threatening processes occurring and support the recovery of the species. Considering the key conservation and management actions outlined for this species in its conservation advice (TSSC 2015b) and related threat abatement plans (DoE 2026b; DCCEEW 2024), the development and ongoing management of the offset area will contribute to these initiatives through:

- Protection and enhancement of the quality of known suitable foraging and breeding habitat to support the species to prevent future habitat loss and degradation associated with resource development.
- Exclusion of grazing at all times.
- Development of site-based fire management strategies (for both prescribed burning and fire suppression activities) with local authorities which considers the ecological needs of the species.
- Implementation of weed and pest animal management activities to reduce their impact on squatter pigeon habitat and viability.

Table 2.8: Relevant conservation priorities for squatter pigeon

MNES known and potential threats	Management activity					
	Legal security (Section 2.2)	Livestock exclusion (Section 5.2, 5.3)	Fire management (Section 5.4)	Weed management (Section 5.5)	Pest management (Section 5.6)	Restoration planting (Section 5.7)
Habitat loss caused by land clearing	✓					✓
Invasive weeds (especially buffel grass)				✓		✓
Habitat degradation caused by livestock grazing		✓				✓

MNES known and potential threats	Management activity					
	Legal security (Section 2.2)	Livestock exclusion (Section 5.2, 5.3)	Fire management (Section 5.4)	Weed management (Section 5.5)	Pest management (Section 5.6)	Restoration planting (Section 5.7)
Inappropriate fire regimes			✓			✓
Predation by feral cats, European red foxes and feral dogs					✓	

2.8 Baseline habitat quality

The baseline habitat quality score for each MNES offset value was determined in accordance with the Project specific MHQA method (**Appendix B**). A summary of the baseline habitat quality scores for each MNES is provided below in **Table 2.9.**

Baseline habitat quality scores have been populated in the assessment-template-MHQA-spreadsheet provided by DCCEEW with the PD RFI, which was modified to reflect the specific scoring approach outlined in the project specific MHQA method. The modified MHQA-spreadsheet for each MNES accompany this OMP to provide a comprehensive summary of the raw data collected and habitat quality score calculations in accordance with the project specific MHQA method. Each spreadsheet provides the baseline habitat quality score calculations for the offset area, including MNES specific scoring calculations and justifications. The spreadsheets must be used to assist with calculation of future habitat quality scores as part of ongoing habitat quality assessments undertaken over the life of the offset (**Section 6.7**).

Table 2.9: Summary of the habitat quality scores for the Project's MNES offset requirements

MNES	Offset area (ha)	Start offset habitat quality score
Corben's long eared bat	292.2	7
Diamond firetail	292.2	6
South-eastern glossy black-cockatoo	286.4	6
Koala	292.2	5
Dunmall's snake	290.2	6
Squatter pigeon	290.2	6

2.9 Baseline weed cover

Baseline weed surveys were undertaken at 26 surveys sites across Lots 31 and 32 AU60 in September 2025 and August 2026 to assess the abundance and richness of non-native species including restricted invasive plants under the *Biosecurity Act 2014* (Qld) and restricted pest weeds listed by the Western Downs Regional Council. Weed survey sites are collocated within the BioCondition plots used to inform the habitat quality scores (see **Section 2.8** and **Section 6.7.1**). A detailed summary of the weed survey methods is provided in **Section 6.4**, with the results of the baseline weed surveys and photo monitoring included in **Appendix D**.

Based on the outcomes of baseline weed surveys, 11 weed species were observed within the offset area. The most prevalent species observed were *Glandularia aristigera*, *Oxalis corniculate*, *Megathyrsus maximus* and *Melinis repens* (**Table 2.10**). *Opuntia tomentosa* (velvety tree-pear) was also observed across the broader offset property; however, was not recorded within the offset area.

The average weed species richness per plot was 1.5 species ranging from 0-6 species observed per plot across the sites. The average % weed cover per plot was 2.5%, ranging from 0-12% cover across the sites. Weed species richness and cover was most prevalent in sites along and adjacent to Bottle Tree creek.

Table 2.10: Baseline weed survey results across Lots 31 and 32 AU60

Scientific Name	Common Name	Biosecurity Status in QLD*	Number of sites observed at	Total % cover
Bidens pilosa	Cobbler's pegs	GBO applies	1	1
Calyptocarpus vialis	Straggler daisy	GBO applies	2	2
Chamaecrista rotundifolia	Round-leaf cassia	GBO applies	1	1
Erigeron bonariensis	Flaxleaf fleabane	GBO applies	1	1
Glandularia aristigera	Moss verbena	GBO applies	12	25
Heliotropium amplexicaule	Blue heliotrope	GBO applies	2	3
Megathyrsus maximus	Guinea grass	GBO applies	5	14
Melinis repens	Natal grass	GBO applies	6	10
Oxalis corniculata	Creeping woodsorrel	GBO applies	7	7
Pannicum spp.	Panic grasses	GBO applies	1	1
Silybum marianum	Milk thistle	GBO applies	1	1

* GBO (General Biosecurity Obligation): Even if a species is not listed as restricted or prohibited, landholders and managers are still required to take reasonable and practical steps to prevent its spread.

2.10 Baseline pest animal activity

Pest animal surveys were undertaken in July and August 2025 through the deployment of remote sensing camera traps to determine pest animal species presence and activity within the offset area. Cameras were deployed at 12 sites across Lots 31 and 32 AU60 over a total of 3,827 trap hours. At each site an Activity Index (AI) was calculated, informed by methods in Jenks et al. (2011), and based on the following formula:

$$Activity\ Index\ (AI) = (\frac{Total\ number\ of\ detections}{Totalnumber\ of\ trap\ hours})\ x100$$

A detection is the positive identification of one of the target species within a 20-minute interval, with a maximum of three independent detections possible per hour. For example, if the maximum number of detections were observed (3 per hour), on a single trap day (24 hours), using a single camera, the AI would be 300 (72 detections ÷ 24 hours x 100 = 300).

A detailed summary of the pest animal survey methods and AI calculation is provided in **Section 6.5**, with the detailed results of pest animal AI scores included in **Appendix D**.

The baseline surveys recorded a total of seven (7) pest animals (five (5) cats, one (1) rabbit and one (1) pig). The calculated AI score for each species is presented in **Table 2.11**, which also lists other pest species known in the region and considered a threat to the MNES offset values.

Table 2.11: Pest animals known or likely to occur within the offset area

Scientific Name	Common Name	Biosecurity Classification in QLD	Baseline Activity Index
Felis catus	Cat (Feral)*	Restricted invasive animal – Category 3	0.1306
Lepus europaeus	European hare*	Not listed	0.0261
Sus scrofa	Pig (Feral)*	Restricted invasive animal – Category 3	0.0261
Canis familiaris	Dog (Wild)^	Restricted invasive animal – Category 3	0
Vulpes vulpes	Fox^	Restricted invasive animal – Category 3	0

* Identified within the offset area during baseline surveys; ^Known to occur in the region

3. Offset Area Outcomes

3.1 Interim milestones and completion criteria

The objective of the offset is to deliver an overall conservation outcome that improves or maintains the viability of the MNES offset values. This will be achieved through the improvement in habitat quality scores over the life of the offset and the attainment of the completion criteria presented in **Table 3.1**. Once achieved, the completion criteria will be maintained for the duration of the approval. Interim milestones are also provided in **Table 3.1** to compare monitoring results and track progress. While attainment of the interim milestones is required to achieve the completion criteria, the trajectory of improvement in the habitat quality scores may vary from the milestones presented in **Table 3.1**.

The interim milestones and completion criteria are proposed to be achieved through the measurable improvement in a combination of the attributes and metrics presented in **Appendix E**. These attributes and metrics form part of the habitat quality scores calculations in accordance with the project specific MHQA method (**Appendix B**) including both site and species-specific attributes and metrics. The modified MHQA-spreadsheet for each MNES, provided with this OMP, includes a comprehensive overview of the attributes and metrics anticipated to be improved over the 20-year management period to achieve the completion criteria. It is important to note that the attributes and metrics outlined in **Appendix E** are indicative examples of the scores that could be attained at the site level to achieve the completion criteria, based on the current condition and knowledge of the site, providing a focus for improvement as part of the management program.

The interim milestones, completion criteria and site and species-specific attribute targets proposed to be achieved through the implementation of this OMP have been considered based on the SMART goal framework requiring each goal to be:

- **Specific** – clear, well-defined and concise.
- **Measurable** – a quantifiable metric that can be tracked through the application of replicable methods of assessment and compared to a baseline.
- **Achievable** – realistic and attainable over the life of the offset.
- **Relevant** – relates specifically to the site-condition and site-context attributes that diminished the baseline habitat quality scores, and which can be improved upon through targeted management actions over time.
- **Time-bound** – achieved within the clearly defined time intervals at 5, 10, 15 and 20 years.

Table 3.1: Interim milestones and completion criteria

MNES	Start offset area HQ score	Offset Area Interim Milestones			Completion Criteria
	Baseline	Year 5	Year 10	Year 15	Year 20
Corben's long eared bat	6.61 (7)	7.02	7.42	7.83	8.23 (8)
Diamond firetail	5.73 (6)	6.05	6.37	6.68	7.00 (7)
South-eastern glossy black-cockatoo	6.07 (6)	6.41	6.75	7.08	7.42 (7)
Koala	4.92 (5)	5.28	5.64	5.99	6.35 (6)
Dunmall's snake	6.49 (6)	6.70	6.91	7.12	7.33 (7)
Squatter pigeon	6.16 (6)	6.45	6.73	7.02	7.30 (7)

4. Adaptive Management Framework

4.1 Process

This OMP will be implemented based on an adaptive management process. This will include the iterative approach of learning and adapting the management program to facilitate improved management and decision-making over time in response to evolving knowledge, changing circumstances and uncertainty to ensure the offset area outcomes are achieved.

The effectiveness of the management actions implemented will be monitored as part of a comprehensive program in which the results will be assessed to adapt and correct the required future management actions as required. **Figure 4.1** provides a simple overview of the adaptive management process.



Figure 4.1: An example of the adaptive management cycle (Jones 2005)

4.2 Risk assessment

Through the adaptive management process, management actions will be implemented to minimise the risk of the known and potential threats to the MNES offset values occurring resulting in the offset area not achieving its required completion criteria and conservation outcome. A risk assessment has been prepared to evaluate the consequence and likelihood of the identified threats both with and without implementation of the proposed management actions (**Appendix C**). The outcomes of the risk assessment have been used to inform development of the OMP including the inclusion of relevant threats, management actions, monitoring programs, adaptive management triggers and corrective actions.

4.3 Timing for implementation

The offset area will be managed and monitored until the completion criteria are achieved which is anticipated to occur within the proposed 20-year management period. In the event the completion has not been achieved within the anticipated timeframes, management and monitoring will continue in accordance with this OMP until the completion criteria are met. Beyond the OMP, the legally binding mechanism (**Section 2.2)** will continue to provide enduring protection of the offset area in perpetuity to manage future clearing and loss of the offset area.

5. Management Program

5.1 Management zones and approach

The offset area has been divided into three management zones based on the current condition of vegetation and the management requirements for each zone including active restoration through revegetation and infill planting, as illustrated in **Figure 5.1**. **Table 5.1** summarises the management zones and the management measures to be undertaken within each zone.

- **Management zone 1** comprises all remnant vegetation assessment units within the offset area, totalling 205.5 ha. Impacts on mature trees was still apparent from recent bushfires based on the presence of charred trunks; however, canopy cover and height are still considered to meet the requirements of a remnant ecosystem. The most significant impacts were evident the shrub layer of these remnant communities, with a low shrub cover observed across the majority of the offset area. Based on the current condition of the remnant vegetation communities, active management is required to specifically improve the canopy cover, shrub cover and number of large trees and enhance the overall structure, composition, and diversity of the vegetation community compared to the reference benchmark.

  The proposed management actions for this management zone will enhance natural regeneration and recruitment of endemic native species from the seed bank to improve the quality of MNES habitat through the removal of livestock, controlling weed species and managing the risk of an unplanned, uncontrolled or catastrophic fire within the offset area.
- **Management zone 2** comprises all regrowth vegetation assessment units within the offset area, totalling 84.8 ha. These vegetation communities were heavily impacted by the recent bushfires, as evident in the shrub and ground layers recording low percentage cover across these attributes. Whilst these communities displayed some evidence of young natural recruitment, it is likely that the bushfire killed older regenerating vegetation.

  Active restoration of this management zone will be undertaken through targeted infill planting of tree, shrub and ground layer species to re-establish the vegetation communities in structure, composition, and diversity compared to that of the benchmark of the ground-truthed RE for each assessment unit. Planting will prioritise species known to support and align with specific habitat requirements for the MNES offset values to enhance and improve the quality of habitat. The successful establishment of infill plantings will be supported through the removal of livestock from the offset area, controlling weed species presence, managing disturbance to plantings from browsing and trampling, and managing the risk of an unplanned, uncontrolled or catastrophic fire within the offset area.
- **Management zone 3** is an area of non-remnant vegetation (2.0 ha) considered to correspond with pre-clearing RE 11.5.21 based on in-field records of adjacent vegetation communities, isolated trees, as well as surrounding landform, soils and geology. At the time of the field surveys this area was considered highly desiccated, potentially due to dry conditions and prior disturbance. A review of aerial imagery (QI 2026) indicates that this area was cleared prior to 1952, likely to facilitate pastoral activities, and has not naturally regenerated. Whilst some mature, large trees are present, there is a distinct lack of shrub or recruiting layers. The ground layer is dominated by a mixture of native grasses and pasture grasses.

  Active restoration of this management zone will be undertaken through large scale revegetation utilising locally sourced and grown native species to re-establish RE 11.5.21 in structure, composition, and diversity compared to the RE benchmark. The successful establishment of revegetation will be supported through the removal of livestock from the offset area, controlling weed species, managing disturbance to plantings from browsing and trampling, and managing the risk of an unplanned, uncontrolled or catastrophic fire within the offset area.

While the management measures for each zone are similar, the frequency and intensity of management will be adapted based on the outcomes of monitoring events within each zone to ensure the offset area outcomes are achieved in accordance with the adaptive management program outlined in **Table 5.2.**

SGP NORTH SOLAR FARM

Offset Management Plan

Figure 5.1

Ground-truthed RE mapping across the offset area

Barakula SF

31AU60

17AU199

32AU60

16AU38

Bottle Tree Creek

- Minor Watercourse
- Girrahween Station
- Offset Area (302.9 ha)

Protected areas and forests of Queensland:

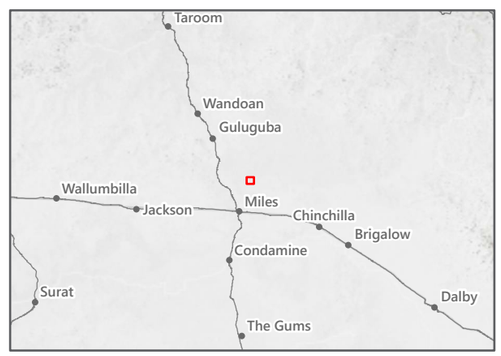
- State Forest

Management Area:

- Management Zone 1
- Management Zone 2
- Management Zone 3

DRAWN: KB
REVIEWED: MW

DATE: 29/05/2026
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Data Source:© State of Queensland (Department of Resources) 2024, © State of Queensland (Department of Resources), 2023, Not to be used as a definitive absolute location of reserve boundaries. This dataset is derived from the Digital Cadastre Database (DCDB). The accuracy of the spatial representation is determined by the accuracy of records in the version of the DCDB from which this dataset was derived., Vantor, © OpenStreetMap contributors, © State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development) 2025, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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Table 5.1: Management zones and required management activities to be undertaken

Management zone	Assessment units	Area (ha)	Management activity					
			Legal security (Section 2.2)	Fencing, livestock exclusion & access restrictions (Section 5.2, 5.3)	Fire management (Section 5.4)	Weed management (Section 5.5)	Pest management (Section 5.6)	Restoration planting (Section 5.7)
1 (remnant vegetation)	AU1, 2, 3, 4, 5, 8, 9 and 12	205.5	✓	✓	✓	✓	✓	
2 (regrowth vegetation)	AU6, and 7	84.8	✓	✓	✓	✓	✓	✓
3 (non-remnant vegetation)	AU10	2.0	✓	✓	✓	✓	✓	✓

Table 5.2: Adaptive management framework for the offset area

Management action	Timing or frequency	Monitoring activity	Adaptive management trigger	Corrective action
Implement the general restrictions outlined in **Table 5.3** related to unauthorised access and vegetation clearing.	The restrictions will remain in place for the life of the OMP. Restrictions related to land use within the offset area will remain in accordance with the legally binding mechanism secured on title.	Offset area inspections will be undertaken biannually for the duration of the management period, as outlined in **Section 6.1**.	Activities undertaken in contravention of the general restrictions outlined in **Table 5.3** related to unauthorised access and vegetation clearing.	Step 1: Investigate cause of trigger within one month of detection of the trigger • Investigate how and why unauthorised access and/or clearing occurred. • Assess the extent of unauthorised clearing and identify appropriate corrective actions. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented and may include: • Installation of additional fencing and/or signage and security for the offset area within 3 months of the unauthorised event. • Additional habitat quality assessments to assess any damage and progress toward recovery to meet the next interim milestones or completion criteria within 3 months of the unauthorised event. • Restoration of the impacted/cleared area as required to ensure completion criteria can be achieved within 6 months of the unauthorised event.
Fire management activities to be undertaken in accordance with **Section 5.4** through the implementation of: • Maintained firebreaks • Prescribed burns and weed control to manage fuel loads	The timing, location and requirement for fire management activities will be undertaken based on the Prescribed Burn Strategy (to be developed in year 1 of management) and supported by the results of biomass and fuel load monitoring in collaboration with the landholder and suitably qualified ecologists/contractors.	Fuel loads and the requirements for management will be assessed based on the results of monitoring events including: • Offset area inspections (**Section 6.1**) • Biomass monitoring (**Section 6.2**) • Fuel load monitoring (**Section 6.3**) • Habitat quality assessments (**Section 6.7**)	There is a decrease in the habitat quality scores for any MNES offset value as a result of an unplanned, uncontrolled or catastrophic fire or implementation of fire management measures. Biomass monitoring indicates there is >2,500kg/ha of groundcover at any of the monitoring sites at the end of the dry season.	Step 1: Investigate cause of trigger within one month of detection of the trigger • Investigate the reasons why the fire management activities have resulted in a decrease to the habitat quality scores or reason for high biomass loads. • Review adherence to fire management protocols and activities. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented within 3 months of detection of the trigger and may include: • Increase the frequency of biomass monitoring. • Increase the frequency of weed control measures. • Review the effectiveness of firebreaks and if required establish additional fire breaks and/or widen existing firebreaks. • Review the timing, frequency and intensity of prescribed burns for the particular offset value and vegetation communities. • Third party review of fire management protocols and activities, to advise on amendments or additional measures required. • Where appropriate, dispersal of additional coarse woody debris throughout the offset area to provide habitat resources for MNES. This may include importation of felled native timber from known (approved) impact areas where it would ordinarily be mulched and sent to landfill.
Implement control actions for pest animals in accordance with **Section 5.6** to minimise predation risk and degradation of habitat by pest animals	The timing and location for pest animal management will be informed by the results of pest animal monitoring and certified contractors engaged to undertake management.	Monitoring for pest animals will be undertaken in accordance with **Section 6.5**. Remote sensing camera will be deployed throughout the offset area to assess pest animal activity. An Activity Index (AI) will be calculated based on positive identification of a species and informed by methods in Jenks et al. (2011) and is to be used as a surrogate to measure pest animal activity rates within the offset area.	An increase in the AI score for a pest animal species from baseline and subsequent monitoring events.	Step 1: Investigate cause of trigger within one month of detection of the trigger • Investigate the reasons that may have attributed to the increase in the AI score for the relevant pest animals. • Review adherence to pest animal control and management actions. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented within 3 months of detection of the trigger and may include: • Increase the frequency and intensity of pest animal control and management activities. • Third party review of pest animal control and management activities and identification of revised suitable methods.

Management action	Timing or frequency	Monitoring activity	Adaptive management trigger	Corrective action
				• Ensure coordination with neighbours and community, where suitable, to ensure a consistent approach to management.
Implement weed control actions in accordance with **Section 5.5** to minimise degradation and improve habitat quality.5.6	The timing and location for weed management will be informed by the results of weed monitoring and certified contractors engaged to undertake the control works.	Monitoring for weeds will be undertaken in accordance with **Section 6.5,** to determine the species richness and cover of weed species across the offset area.	An increase in % cover and richness of weed species at monitoring sites from baseline and subsequent monitoring events. A new prohibited or restricted matter species listed under the *Biosecurity Act 2014* (Qld) is identified in the offset area based on baseline and subsequent monitoring events	Step 1: Investigate cause of trigger within one month of detection of the trigger • Investigate the reasons that may have attributed to the increase in the species richness or relative abundance of weeds. • Investigate potential sources of new weed species occurrence. • Review adherence to weed control and management actions. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented within 3 months of detection of the trigger and may include: • Amend weed hygiene requirements and provide additional education/awareness to contractors and personnel entering the site to ensure restrictions are adhered to. • Increase the frequency and intensity of weed control and management activities. • Third party review of weed control and management activities and identification of revised suitable methods. • Ensure coordination with neighbours and community, where suitable, to ensure a consistent approach to management.
Restoration planting within regrowth and non-remnant management zones in accordance with **Section 5.7** to assist with the recovery of these communities and improve the habitat value of these communities for relevant MNES.	Plantings will be established within the first three years following approval of the OAMP to allow time for seed collection and propagation of tube stock and site preparation works to occur. Plantings will be undertaken to coincide with periods of high soil moisture, in southern Queensland this is generally from October to March. Subject to site conditions and availability of seeds and tube stock, planting may be undertaken in intervals to achieve the restoration planting performance criteria and meet the offset area completion criteria.	Monitoring will be undertaken in accordance with **Section 6.6** to assess the survival and stem density of planted species to inform the requirement for additional management including remedial plantings. The restoration plantings will also be monitored in as part of the broader offset area monitoring program outline in **Section 6**.	• Trees and plantings showing signs of reduced survival rates • Within management zone 2, there is >15% mortality in plantings across the total area at any time within the first five years of planting • Within management zone 3 stem density is less than 400 stem/ha or there is >15% mortality in plantings across the total area at any time within the first five years of planting that: • The ability of the plantings to achieve the site and species-specific attribute targets and interim milestones and completion criteria is compromised. • The plantings no longer reflect the structure and composition of the relevant local vegetation community or communities. • An increase in % cover and richness of weed species at monitoring sites from baseline and subsequent monitoring events. • A new prohibited or restricted matter species listed under the Biosecurity Act 2014 (Qld) is identified in the offset area based on baseline and subsequent monitoring events	Step 1: Investigate cause of trigger within one month of detection of the trigger • Investigate the cause of the trigger and mitigation measure/s to improve growing conditions • Engage a suitably qualified professional to identify the likely cause of plant failure. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented and may include: • Undertake supplementary planting within the next appropriate planting period. • Investigate the reasons that may have attributed to the increase in the species richness or relative abundance of weeds, within 3 months of detection of the trigger. • Amend weed hygiene requirements and provide additional education/awareness to contractors and personnel entering the site to ensure restrictions are adhered to, within 3 months of detection of the trigger. • Increase the frequency and intensity of weed control and management activities with additional follow up treatments during the next potential growth period, following detection of the trigger, to avoid further regeneration and potential seeding events. • Investigate the reasons that may have attributed to the increase in the presence of pest animals, invertebrates or native species, within 3 months of detection of the trigger. • Increase the frequency and intensity of pest animal and invertebrate control and management activities, within 3 months of detection of the trigger. • Third party review of pest animal control and management activities and identification of revised suitable methods, within 3 months of detection of the trigger.

Management action	Timing or frequency	Monitoring activity	Adaptive management trigger	Corrective action
			• Evidence of disturbance to plantings associated with pest animals, invertebrates or native species.	• Ensure coordination with neighbours and community, where suitable, to ensure a consistent approach to management. • Review, and where appropriate, improve the effectiveness of exclusion fencing to manage native species presence within the planting areas, within 3 months of detection of the trigger.

5.2 General restrictions

The following restrictions must be adhered to when implementing the OMP.

Table 5.3: Offset area restrictions

Restriction	Details
Weed hygiene	• All persons entering the offset area will be required to ensure vehicles and equipment are weed free to prevent movement of weed material into the offset area. • All contractors entering the offset area must hold a current weed hygiene certificate or equivalent for all vehicles and equipment and must be provided to the landholder upon request.
Livestock grazing	• Livestock will be excluded from the offset area at all times
Unauthorised access or use	• Signs will be installed at access locations noting the area is protected for conservation purposes and restricting access to authorised personnel only. • The offset area will be suitably fenced to restrict access and exclude cattle. • Vehicles permitted into the offset area must travel to track conditions, adhering to a maximum speed limit of 40km/h, to minimise risk of vehicle strike to fauna (e.g. koala) and maintain safety of personnel.
Vegetation clearing	• Clearing of native vegetation will not be permitted in the offset area except as part of necessary management and monitoring activities under the OMP including but not limited to: – Maintenance of access tracks and fire breaks – Fence construction and maintenance – Ensuring public safety or as directed by emergency response personnel in the event of an unplanned fire or other emergency. • Any permitted vegetation clearing activities must be appropriately planned, recorded and monitored.
Land uses that contravene the requirements of the OMP	• Legal security of the offset area on title will restrict the allowable land use activities on the offset area, imposing an obligation to not disturb, degrade, remove or clear such vegetation in contravention with the OMP that would result in the loss of the MNES offset values.

5.3 Livestock exclusion and other access

Livestock will be excluded from the offset area at all times. Fencing will be installed at the boundary of the offset area in the first year of management to support livestock exclusion and manage other unauthorised access.

New and existing fencing, within and bounding the offset area, will be upgraded and installed to adhere to best-practice fencing guidelines including alignment with the Queensland Government's *Koala-Sensitive Design Guideline - A guide to koala-sensitive design measures for planning and development activities* (DES 2022). This will facilitate the safe movement of fauna between the offset area and adjacent suitable habitat. To ensure fencing does not limit species movement the bottom strand of wire will be at least 300mm above the ground. The location of fencing will be scouted in Year 1 of management and utilising existing cleared areas and Bottle Tree Creek as a natural boundary, where suitable.

Existing tracks will be used to access the offset area for management and monitoring activities. Access tracks will be maintained to ensure they are safely accessible and will be prioritised over any new alternative track alignments. Existing and any new access tracks will be no wider than 5-10m.

Vegetation disturbance associated with track and fence establishment will be minimised to the greatest extent possible in accordance with **Table 5.3**.

5.4 Fire management

A site-specific Prescribed Burn Strategy will be developed and implemented to manage the risk of an unplanned, uncontrolled or catastrophic fire within the offset area and assist in improving habitat quality. The Prescribed Burn Strategy will be prepared, in consultation with a competent fire practitioner, in the first year of management to provide guidance on the timing and location of prescribed burns as well as identify any additional fire mitigation strategies (e.g. additional fire breaks, access routes and water supply) to support implementation of this OMP. It must also consider fire management strategies to protect restoration plantings from the impacts of bushfire. The Prescribed Burn Strategy will be included as part of the first annual progress report.

The Prescribed Burn Strategy will consider the current condition of the offset area, the results of habitat quality assessments, the latest version of the REDD fire management guidelines (**Table 5.4**; Queensland Herbarium, 2024), MNES conservation advice, regional fire plans and authorities and local knowledge of fire behaviour.

The Prescribed Burn Strategy will consider the species-specific requirements of the MNES offset values given frequent, high intensity fires have the potential to alter habitat extent and structure, reduce food availability and shelter habitat, as well as cause direct mortality and injury (DAWE 2022a; DCCEEW 2023a, DCCEEW 2022, DoE 2014, TSSC 2015, DoE 2026b). Several fires in close succession can also prevent plants and animals from returning to an area (particularly in fragmented landscapes), therefore the time between prescribed burn events as well measures to protect and provide safe refuge for any species on the property at the time of a prescribed burn will also be considered as part of the Prescribed Burn Strategy (DCCEEW 2023a). The Prescribed Burn Strategy will be developed and continually reviewed throughout the offset management period, to consider the latest research on MNES offset values and the effects of fire.

Establishment and regular maintenance of firebreaks will be undertaken as part of the Prescribed Burn Strategy to protect the offset area. Firebreaks will be maintained at least annually up to 10m wide. The location of firebreaks will be scouted in Year 1 of management, in conjunction with the identification of suitable offset boundary fence locations and subsequently established. The location of existing and new firebreaks will be included as part of the requirements and protocols outlined in the Prescribed Burn Strategy.

5.4.1 Implementing prescribed burns

Prescribed burns will be implemented in the offset area in accordance with the Prescribed Burn Strategy with the aim to manage excess fuel loads, reduce the risk of an unplanned or catastrophic fire event and initiate regeneration of eucalypt communities. Prescribed burning regimes will be determined by a competent fire practitioner with experience in the region and with implementing prescribed burns for hazard reduction and ecological purposes. The competent fire practitioner will hold the national competency of PUAFIR506 - Conduct complex prescribed burns or equivalent certification or experience. Prescribed burning regimes must consider:

- surrounding land uses
- fire history and intensity
- fire risk and fuel loads
- minimum fire frequencies for the landscape
- appropriate fire prescriptions for vegetation types (e.g. time of year to burn, frequency, targets for fuel reduction).

The results of biomass monitoring (**Section 6.2**) and fuel load monitoring (**Section 5.4.1**), will be used to support implementation of the Prescribed Burn Strategy.

Table 5.4: REDD fire management guidelines for the RE within the offset area (Queensland Herbarium 2024)

RE	Fire management guidelines
11.3.4	**Season**: Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **Intensity**: Low to moderate. **Interval**: 6-10 years (min 2 years, max 10 years). **Strategy**: Restrict to less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. Sometimes a small amount of wind may move the fire front quickly so that burn intensity is not too severe to destroy habitat trees. **Issues**: Burn interval for conservation purposes will differ from that for grazing purposes; the latter being much shorter. Management of this vegetation type should be based on maintaining vegetation composition, structural diversity, fauna habitats (in particular hollow-bearing trees and logs) and preventing extensive wildfire. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Fire can control shrub invasives (e.g., *Eremophila* spp. and *A. stenophylla* in the red soil country in particular). Fire will also control cypress. Low to moderate intensity burns with good soil moisture are necessary to minimise loss of hollow trees. Avoid burning riparian communities as these can be critical habitat for some species. Culturally significant (scar) trees may need protection, such as rake removal of ground fuels. Planned burns have traditionally been carried out in the winter dry season; further research required.
11.3.14	**Season**: Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **Intensity**: Low to moderate. **Interval**: 6-10 years. **Strategy**: Burn less than 10-30% in any year to achieve a mosaic. Burn under conditions of good soil moisture and when plants are actively growing. Protection relies on broad-scale management of surrounding country with numerous small fires throughout the year so that wildfires will be very limited in extent. **Issues**: Cypress is killed by fire and regenerates from canopy stored seed (obligate seeder). It reaches reproductive age at about 6 years. Fire frequency less than 6-8 years will reduce cypress, but long fire interval will lead to cypress dominance and eucalypt suppression. Fuel reduction burns will help restrict incursions by high intensity wildfires that kill cypress. Fire after good spring rain has the potential to burn severely if there is no follow-up rain and re-lights occur.
11.3.27	**Strategy**: Depending on position in the landscape, protection depends on broad-scale management of surrounding country, with numerous small fires throughout the year so that wildfires will be very limited in extent. **Issues**: If burning is to occur then implement when water level is deep enough to protect the bases of aquatic plants. Sedges are disadvantaged by repeated fires. Impact of fire on rare and threatened plants associated with mound springs that include *Arthraxon hispidus* and Dimeria sp. (Salvator Rosa R.J.Fensham RJF3643) should be considered. Boggomosses/springs can bounce back following fire but care should be taken where a dry peat layer has developed

RE	Fire management guidelines
	(particularly in degraded situations). Fire is an option for control of weeds (possibly in ungrazed situations). If riparian areas need to be burnt to reduce fuel loads then burning should occur when there is good soil moisture and active growth.
11.3.25	**Season**: Primarily early dry season. **Intensity**: Low. **Interval**: 3 - 5 years. **Strategy**: Protection relies on broad-scale management of surrounding country with numerous small fires throughout the year so that wildfires will be very limited in extent. c-g: Depending on position in the landscape, protection depends on broad-scale management of surrounding country, with numerous small fires throughout the year so that wildfires will be very limited in extent. **Issues**: Fringing communities are critical habitat. In some situations it may be best not to burn. Intense and extensive fires degrade vegetation structure and destroy fauna habitats. Restrict the extent and intensity of fires. Hollow trees are critical habitat. Green panic may be an issue and an intensive grazing regime for very short periods, may be necessary to limit potential of wildfire. c-g: If burning is to occur then implement when water level is deep enough to protect the bases of aquatic plants. Sedges are disadvantaged by repeated fires. Impact of fire on rare and threatened plants associated with mound springs that include *Arthraxon hispidus* and Dimeria sp. (Salvator Rosa R.J.Fensham RJF3643) should be considered. Boggomosses/springs can bounce back following fire but care should be taken where a dry peat layer has developed (particularly in degraded situations). Fire is an option for control of weeds (possibly in ungrazed situations). If riparian areas need to be burnt to reduce fuel loads then burning should occur when there is good soil moisture and active growth.
11.5.1	**Season**: Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **Intensity**: Low to moderate. **Interval**: 6 -10 years. **Strategy**: Restrict to less than 30-60% in any year. Rotate burns in mosaic patches. Maintain fire management of surrounding country so that wildfires will be very limited in extent. Burn under conditions of good soil moisture and when plants are actively growing. **Issues**: Maintaining a fire mosaic will ensure protection of fauna habitats (such as dense stands of *A. luehmannii*) and mitigate against wildfires. *Allocasuarina luehmannii* (bull oak) can be both killed by fire and regenerate from seed following fire. Bull oak thickening/creation of whipstick communities may be controlled with planned low intensity burns. Drought index will help deliver required guideline. Jewel butterfly is significant in this community, but the jewel butterfly needs thick leaf litter/mature bull oak; so high intensity fire (or fire that removes the litter layer) could be detrimental to survival. Allocasuarina is also an important food source for glossy-black cockatoo.
11.5.4	**Season**: Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **Intensity**: Low to moderate. **Interval**: 6-10 years.

RE	Fire management guidelines
	Strategy: Burn less than 10-30% in any year to achieve a mosaic. Burn under conditions of good soil moisture and when plants are actively growing. Protection relies on broad-scale management of surrounding country with numerous small fires throughout the year so that wildfires will be very limited in extent. **Issues**: Cypress is killed by fire and regenerates from canopy stored seed (obligate seeder). It reaches reproductive age at about 6 years. Fire frequency less than 6-8 years will reduce cypress, but long fire interval will lead to cypress dominance and eucalypt suppression. Fuel reduction burns will help restrict incursions by high intensity wildfires that kill cypress. Fire after good spring rain has the potential to burn severely if there is no follow-up rain and re-lights occur.
11.5.20	**Season**: Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **Intensity**: Various. **Interval**: 6-15 years. **Strategy**: Burn less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. All shrubby areas will carry fire after a good season. **Issues**: Management of this fire tolerant vegetation type should be based on maintaining vegetation composition, structural diversity, animal habitats and preventing extensive wildfire. Maintaining a fire mosaic will ensure protection of habitat and mitigate against wildfires. Planned burns have traditionally been carried out in the winter dry season; further research required.
11.5.21	**Season**: Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **Intensity**: Moderate. **Interval**: 3-5 years. **Strategy**: Burn less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. **Issues**: Young cypress are killed by fire. Planned burns have traditionally been carried out in the winter dry season; further research required.
11.7.7	**Season:** Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **Intensity:** Moderate to high. **Interval:** 6-10 years. **Strategy:** Burn less than 10-30% in any year. Burn surrounding vegetation under conditions of good soil moisture and when plants are actively growing throughout the year so that wildfires will be very limited in extent. Fire exclusion not necessary. **Issues:** Best protection from wildfires is probably the creation of a multi-aged mosaic in surrounding vegetation and perimeter burning. Planned burns have traditionally been carried out in the winter dry season; further research required.

5.5 Weed management

5.5.1 Management approach

Weed management within the offset area will follow best practice integrated weed management (IWM) for natural ecosystems which combines multiple strategies to effectively control weeds, whilst minimising the environmental impact of any single technique. This requires a long-term approach to weed management that identifies control techniques most suitable to the environmental weed, as well as the impact of the control technique on native flora and the broader ecosystem. The aim of IWM for natural ecosystems within the offset area is to achieve long-term weed control to support ecosystem stability and restoration and improve or maintain habitat quality for relevant MNES.

The weed management process follows the adaptive management approach illustrated in **Figure 5.2**. It involves the implementation of a range of activities that will:

- Identify & monitor weed species and extents across the offset area
- Prevent & minimise the introduction and spread of new weed species
- Control & reduce the extent of existing weed infestations across the offset area
- Report & review progress to achieving the objectives and outcomes



Figure 5.2: Weed management approach

5.5.2 Prevent and minimise

The following measures will be taken to prevent and minimise the introduction and/or spread of weeds within the offset area:

- All persons entering the offset will be required to ensure vehicles and equipment are weed free to prevent movement of weed material into the offset area.
- All contractors entering the offset must hold a current weed hygiene certificate or equivalent for all vehicles and equipment, and this must be provided upon request.
- All persons must enter the offset through dedicated entry points/gates only.
- All vehicles/plant must be driven on dedicated access tracks within the offset.

- Any matter (e.g. soil, mulch) entering the offset must be from a reputable supplier and must be certified free of weed material (especially weed seeds), fire ants and phytophthora. Certification must be provided upon request.

5.5.3 Priority species for management

Baseline weed cover surveys undertaken in September 2025 and August 2026 (see **Section 2.9**) indicate the presence of 11 non-native species within the offset area. Although weed cover across the offset area is generally low, several priority species have been identified for management. These weeds are either restricted plants under the *Biosecurity Act 2014* (Qld) or have a total cover score greater than 4% and are summarised in **Table 5.5**.

Priority species for management will be reviewed following each weed monitoring event (see **Section 6.4**), with a focus on prohibited and restricted matters listed under the *Biosecurity Act 2014* (Qld), Weeds of National Significance (WONS), or commonly observed species with the highest total weed cover scores. In addition, even where species are not listed as restricted or prohibited, landholders and managers are still required to take reasonable and practical steps to prevent its spread in accordance with the General Biosecurity Obligation (GBO) under the *Biosecurity Act 2014* (Qld).

Table 5.5: Priority weed species for management

Scientific Name	Common Name	Biosecurity Status in QLD	Number of sites observed at	Total % cover
Glandularia aristigera	Moss verbena	GBO applies	12	25
Megathyrsus maximus	Guinea grass	GBO applies	5	14
Melinis repens	Natal grass	GBO applies	6	10
Oxalis corniculata	Creeping woodsorrel	GBO applies	7	7

5.5.4 Priority areas for management

Results of baseline and ongoing weed surveys will be used to determine the priority areas for weed management. Weed control in areas where the baseline total weed cover score was greater than 4% will be prioritised in the first 2 years of management. Priority areas are listed in **Table 5.6** and the location of assessment sites are shown on **Figure 5.3**. Priority areas for management in years 1 and 2 total 63.4 ha in size and are associated with riparian vegetation directly adjacent to Bottle Tree Creek. Priority areas will be reviewed following the year 2 weed monitoring event as described in **Section 6.4**. Weed control will also be implemented for *Opuntia tomentosa* opportunistically.

Table 5.6: Priority assessment units for weed management in years 1 and 2

Management Zone	AU	RE	AU area (ha)	Assessment site reference
Zone 1	AU1	11.3.4 Remnant	20.9	G10, G11
	AU2	11.3.14 Remnant	5.8	G04, G05
	AU4	11.3.25 Remnant	8.1	G12, G13
	AU9	11.5.21 Remnant	20.5	G23, G24, G39
Zone 2	AU7	11.5.3 Regrowth	6.1	G03, G20
Zone 3	AU10	11.5.21 Non-Remnant	2.0	G21, G22
Total area (ha)			**63.4**	

SGP NORTH SOLAR FARM

Offset Management Plan

Figure 5.3
Weed survey

Bottle Tree Creek

31AU60

17AU199

32AU60

16AU38

G25 3
G26 0
G12 3
G10 3
G33 0
G38 0
G8 0
G3 2
G20 2
G4 4
G5 3
G7 1
G9 0
G13 6
G6 1
G11 1
G28 0
G39 1
G35 1
G23 0
G21 4
G22 4
G29 0
G18 0
G36 0
G37 0

0 ← Number of weed species within weed monitoring plot

Weed monitoring plot symbology & weed cover

G1 ← Weed monitoring plot number

Major Watercourse

Minor Watercourse

Girrahween Station

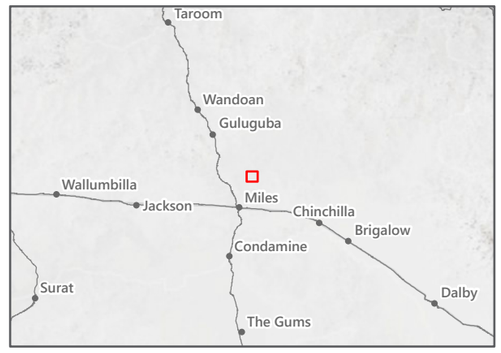
Offset Area (302.9 ha)

Total Weed Cover (%):

- 0%
- <5%
- 5-10%
- 10-50%
- 50-100%

DRAWN: KB
REVIEWED: MW

DATE: 11/09/2026
DWG No.: ARR-005_077[E]



N

0 Km 1

SCALE (A3): 1:22,500

Attexo

Data Source:© State of Queensland (Department of Resources), 2023, © State of Queensland (Department of Resources) 2024, Vantor, © OpenStreetMap contributors, © State of Queensland (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development) 2025, Sources: Esri, TomTom, Garmin, FAQ, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

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5.5.5 Control approach and techniques

Experienced weed management contractors will be engaged to undertake weed control in the offset area. They must have relevant experience in weed management, experience with weed control in native bushland settings, and have an Agricultural Chemicals Distribution Control (ACDC) license.

Weed control techniques will be species dependent and may include physical, mechanical, chemical, fire or biological techniques. Weed control techniques may vary over the life of the offset and any advancements in control techniques should be adopted where appropriate. Weed control activities may require primary, follow-up and maintenance activities:

- Primary – initial site works to control ground cover weeds, woody weeds in the understorey and vines. These works typically create large site disturbance stimulating growth of new native and weed species.
- Follow-up – multiple intervals of follow-up control will be required to treat newly germinating and resprouting weeds once primary works are completed.
- Maintenance – weed density, and treatment frequency, should be decreasing at this stage.

There are a wide range of publicly available resources providing guidance on best practice management techniques for WONS and restricted invasive plants. The following resources can be consulted to determine the most appropriate control techniques:

- Weed profiles - Weeds Australia
- https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/invasive/restricted
- Controlling weeds (invasive plants) on your property | Business Queensland

Section 5.3 of the *Southeast Queensland Ecological Restoration Framework: Manual*[1] (SEQERF) (Chenoweth EPLA & Bushland Restoration Services, 2012) provides guidance on weed control techniques and includes detailed guidance on herbicide use including chemical mixing rates. Appendix C of the SEQERF includes control techniques and herbicide application rates for particular weed species. These resources should be consulted prior to any herbicide application. All herbicide use must be in accordance with directions on the label and Material Safety Data Sheets (MSDS). Up-to-date product information is available on the Public Chemical Registration Information System: Public Chemical Registration Information System Search - portal.apvma.gov.au.

A summary of potential control techniques for the priority weed species is provided in **Table 5.7.** These techniques are intended as a guide only and alternative techniques may be adopted as recommendations and best practice approaches may change over time, with the frequency and intensity of subsequent control events informed by the results of regular monitoring (offset area inspections [**Section 6.1**] and weed monitoring [**Section 6.4**]).

[1] hlw.org.au/resources/downloads/guidelines/seq-ecological-restoration-framework/212-seq-ecological-restoration-framework-manual/file

Table 5.7: Weed management control techniques for priority species

Weed Species	Control Techniques	Timing	Management Outcome	Threat to Biodiversity
Glandularia aristigera (Moss verbena) QLD Biosecurity Act: GBO National Status: N/A	**Manual control** Small infestations can be hand-pulled and chipped out with hand tools and bagged and disposed of. This must remove the entire taproot and trailing stem network. **Chemical control** Apply a selective broadleaf herbicide or a non-selective option like glyphosate when the plant is actively growing before seed set	Chemical spraying when plants are actively growing and flowering, before they set seed (spring to early autumn).	No new weed infestations.	Moss verbena outcompetes native groundcovers for soil moisture and nutrients, impacting habitat and preventing regeneration of native species.
Megathyrsus maximus (Guinea grass) QLD Biosecurity Act: GBO National Status: N/A	**Manual control** Small infestations can be chipped out with hand tools and bagged and disposed of. **Chemical control** Fluazifop 212 g/L (e.g. Fusilade Post Emergence Selective Herbicide). 75–100 mL per 15 L water or 2–4 L per ha. Spray young vegetative growth with 3–6 leaves per shoot when growing actively. Use up to 4 L per ha for well established infestations or where greater control is required in one season.	Chemical spraying when plants are actively growing and flowering, before they set seed (spring to early autumn).	No new weed infestations.	Guinea grass is a coloniser of disturbed sites. It forms clumps and increases erosion in disturbed areas. It is fast growing, and has a high tolerance for drought conditions, out-competing native species if spread.
Melinis repens (Natal grass) QLD Biosecurity Act: GBO National Status: N/A	**Manual control** Small infestations can be chipped out with hand tools and bagged and disposed of. **Chemical control** Boom spray or foliar spray with glyphosate and Fluazifop are recommended for larger infestations. Spot spraying for smaller infestations. Refer label carefully	Chemical spraying should be undertaken before flowering / seeding. Generally, peak flowering time is during warmer months (Sept – June).	No new weed infestations.	Natal grass covers a dense groundcover layer and outcompetes natives.

Weed Species	Control Techniques	Timing	Management Outcome	Threat to Biodiversity
	before use. Add a wetting agent (surfactant) to help the herbicide penetrate and spread. Refer label carefully before use.			
Opuntia tomentosa (Velvety tree pear) QLD biosecurity Act: Cat 3 National status: N/A	**Physical control** Dig out plants completely and deep bury. Ensure that all tubers that can grow are removed and destroyed. Ploughing is not considered an effective means of control unless followed by annual cropping. **Manual control** Mechanical control using machinery can clear large areas, though this will likely need to be followed up later with other control methods due to stem segments re-establishing. **Biological control** Biological control includes two introduced insects: Cochineal bug (*Dactylopius opuntiae*) Cactoblastis moth (*Cactoblastis cactorum*) These insects have been proven to reduce fruiting of velvety tree pear and the abundance of seedlings in plants under 1 m high. Cactoblastis larvae and cochineal bug can kill young tree pear but have little impact on large plants. Older tree pear pads and stems contain tough, fibrous material that the insects cannot penetrate. The insects multiply in number when they are protected from the elements, forming a nursery that can spread to regrowth from cut stumps or pads in contact with the ground. Once established, adults reproduce creating new larvae which attack pear.	September to April. At least one control event per year, if required.	This species will only be actively managed in specific areas identified in the baseline weed survey (i.e. where biological control agents are not active). No new weed infestations.	Infestations compete with native vegetation, limiting the growth of small shrubs and groundcover species. The plant's sharp spines or barbs can cause injury to stock and native animals.

Weed Species	Control Techniques	Timing	Management Outcome	Threat to Biodiversity
	Chemical control Foliar spray, stem injection and cut stump with Triclopyr, Picloram, Aminopyralid. Refer label carefully before use.			
Oxalis corniculate (Creeping woodsorrel) QLD Biosecurity Act: GBO National Status: N/A	**Chemical control** Boom spray or foliar spray with glyphosate and Fluazifop are recommended for larger infestations. Spot spraying for smaller infestations. Refer label carefully before use. Add a wetting agent (surfactant) to help the herbicide penetrate and spread. Refer label carefully before use.	September to April. At least one control event per year, if required.	No new weed infestations.	Forms dense mats and outcompetes natives.

5.6 Pest animal management

5.6.1 Management approach and priority species

Managing invasive species requires a co-ordinated, landscape-level approach (DPI 2024) and pest animal numbers are likely to fluctuate over the life of the offset due to factors beyond Arrow CSG's control. Consequently, whilst pest animal control will be implemented within the offset area in accordance with the *Biosecurity Act 2014* (Qld), baseline scores are assumed to remain consistent over the management period and no conservation gain is proposed for this threat. Management approaches will follow best practice guidance published by Biosecurity Queensland, Department of Primary Industries, and utilise evidence-based control techniques for priority species.

Priority species for management include those identified as known threats to the MNES in the Project's MHQA method, or species known to impact habitat through degradation of environmental values. These are feral cats, dogs, foxes and pigs as listed in **Table 5.8**.

Table 5.8: Priority pest animals for management

Species	Threat to MNES
Felis catus (Feral Cat)*	Glossy black-cockatoo: Predation Dunmall's snake: Predation Squatter pigeon: Predation
Canis familiaris (Wild Dog)^	Koala: Encounter mortality with dogs Squatter pigeon: Predation
Vulpes vulpes (Fox)^	Glossy black-cockatoo: Predation Squatter pigeon: Predation
Sus scrofa (Feral pig)*	Feral pigs spread invasive weeds, degrade waterholes and wetlands, cause soil erosion and prey on native species

*Identified within the offset area; ^Known to occur in the region

5.6.2 Control approach and techniques

Species specific information and control techniques published by Biosecurity Queensland follow evidence-based, best practice guidance. Pest control will be undertaken in accordance with these recommendations, as updated from time to time, as well as in coordination with any regional pest management programs. Species specific control techniques for priority species are listed in **Table 5.9**. Pest animal control events will be undertaken annually for the first 5 years of offset management with the frequency and intensity of subsequent control events informed by the results of regular monitoring events (offset area inspections [**Section 6.1**] and pest animal monitoring [**Section 6.5**]).

Table 5.9: Species specific control methods for pest animals

Species	Biosecurity Classification	Control Techniques	Biosecurity Queensland Guidance
Felis catus (Feral Cat)	Restricted invasive animal – Category 3, 4 and 6	• Night shooting • Poisoning • Trapping	https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/animals/invasive/restricted/feral-cat
Canis familiaris (Wild Dog)	Restricted invasive animal – Category 3, 4 and 6	• Requires collaborative regional, landscape-level approach • Shooting	https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/animals/invasive/restricted/wild-dog

Species	Biosecurity Classification	Control Techniques	Biosecurity Queensland Guidance
		• Trapping • Baiting	
Vulpes vulpes (Fox)	Restricted invasive animal – Category 3, 4, 5 and 6	• Shooting • Trapping • Baiting	https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/animals/invasive/restricted/fox
Sus scrofa (Feral pig)	Restricted invasive animal – Category 3, 4 and 6	• Trapping • Poisoning • Shooting	https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/animals/invasive/restricted/feral-pig

5.7 Restoration planting

5.7.1 Overview

Planting will be undertaken within areas of regrowth and non-remnant vegetation (management zones 2 and 3) to actively support restoration and habitat creation to achieve the offset area completion criteria. **Table 5.10** provides an overview of the management zones and the planting strategy for each zone, which includes targeted infill planting of 84.8 ha and broadscale revegetation of 2.0 ha. **Plate 1** provides an example of regrowth vegetation for targeted infill planting, and **Plate 2** provides an example of a non-remnant area for broad scale revegetation.

Table 5.10: Restoration strategy for management zones 2 and 3

Management zone	AU and RE	Area (ha)	Restoration strategy
2	Regrowth RE 11.5.1	78.7 ha	Targeted infill planting
	Regrowth RE 11.5.4	6.1 ha	
3	RE 11.5.21	2.0 ha	Broad scale revegetation



Plate 1: Example of regrowth vegetation (RE 11.5.1) that will be improved through infill planting



Plate 2: Example of non-remnant vegetation (RE 11.5.21) that will be improved through broad scale revegetation

Targeted infill planting and revegetation will be undertaken utilising locally sourced and grown native species with the aim to re-establish the vegetation communities in structure, composition, and diversity compared to that of the benchmark of the ground-truthed RE for each assessment unit.

Plantings will consist of a mix of trees, shrubs and ground cover species and will be carried out through direct seeding, broadcast seeding, the establishment of a tube stock or a combination of these methods.

Regular maintenance and monitoring will be undertaken to ensure plant establishment is successful, with mortalities appropriately rectified to ensure the achievement of the respective RE density and species composition.

Seed collection, propagation, planting and maintenance must be undertaken by a suitably qualified revegetation contractor. The restoration planting methodology presented in this OMP will be finalised by the suitably qualified revegetation contractor and tailored to meet the site conditions of the offset area at the time of planting to ensure the offset area outcomes and requirements of this OMP are achieved.

The following sections provide details of the restoration planting approach including species selection (**Section 5.7.2**), planting density and design (**Section 5.7.3**), seed collection and propagation (**Section 5.7.4**), planting procedures (**Section 5.7.5**), post planting maintenance and monitoring requirements (**Section 5.7.6**), and performance criteria and corrective actions (**Section 5.7.7**).

5.7.2 Species selection

Species will be selected to align with the ground-truthed RE for the relevant assessment unit within management zones 2 and 3. A summary of the tree, shrub and ground cover species that comprise each RE, derived from the Regional Ecosystem Technical Descriptions, is provided in **Table 5.11**. Species selection will also prioritise species known to support and align with specific habitat requirements for the MNES offset values. The final species planting palette will be selected in consideration of the following:

- Species included in the RE description for each vegetation community and their dominance within the composition of the community.
- Species that align with the habitat requirements of the MNES offset values.
- Expert advice from suitably qualified revegetation specialist preferencing species with a known history of being successfully propagated and planted in southern Queensland.
- Seed availability to meet the required planting densities outlined in **Section 5.7.3**.
- Includes an appropriate combination of species from the canopy, mid-storey and ground layer that are collectively capable of achieving the offset area completion criteria and composition, structure and diversity of a the RE benchmark.

5.7.3 Planting density and design

The required planting density in both regrowth and non-remnant areas is to mimic natural conditions and align with the relevant RE benchmark and technical description. In general, species density should align with the following spacings, with the final density to be confirmed following site inspection and assessment by the suitably qualified contractor:

- Ground cover plantings established at ~1/1 m^2 (1 m spacing)
- Shrubs plantings established at ~1/9 m^2 (3 m spacing)
- Tree plantings established at ~ 1/25m^2 (5 m spacing)

Within regrowth areas (management zone 2), targeted infill planting is proposed to enhance the existing structure, composition and diversity of tree, shrub and ground cover species. Stem density assessments will be undertaken in the regrowth RE 11.5.1 and regrowth RE 11.5.4 assessment units, prior to planting, to establish the baseline density of trees, shrubs and ground cover species and inform the required number of species to be planted.

Within non-remnant areas (management zone 3), revegetation will be designed so that tree and shrub plantings are no more than 5 m apart, measured from stem-stem and a minimum stocking density of at least 400 stems per hectare is established. Groundcover species are not included in stem counts; however, should be planted based on the suggested spacings provided above and to align with the species composition, structure and diversity of a the RE benchmark.

Table 5.11: Planting species selection based on suitability for relevant MNES values

	Priority Number[2]	Corben's long-eared bat	Diamond firetail Habitat	Glossy black-cockatoo	Koala	Dunmall's snake	Squatter Pigeon
RE 11.5.1							
Canopy and subcanopy							
*Allocasuarina luehmannii**	1	Yes - general	Yes - general	Yes - Feed tree	Dispersal only	Yes - general	Yes - general
*Angophora leiocarpa**	2	Yes - general	Yes - general	Potential nesting	Dispersal only	Yes - general	Yes - general
Callitris glaucophylla	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
*Eucalyptus crebra**	1	Yes - general	Yes - general	Possibly nesting	Yes - LIKT	Yes - general	Yes - general
*Eucaluptus populnea**	1	Yes - general	Yes - general	Possibly nesting	Yes - LIKT	Yes - general	Yes - general
Shrub/subcanopy							
*Allocasuarina luehmannii**	1	Yes - general	Yes - general	Yes - Feed tree	Dispersal only	Yes - general	Yes - general
Callitris glaucophylla	2	Yes - general	Yes - general	No	Dispersal only	Yes - general	Yes - general
Jacksonia scoparia	2	Yes - general	Yes - general	No	Dispersal only	Yes - general	Yes - general
*Acacia leiocalyx subsp. leiocalyx**	2	Yes - general	Yes - general	No	Dispersal only	Yes - general	Yes - general
*Acacia conferta**	2	Yes - general	Yes - general	No	Dispersal only	Yes - general	Yes - general
Ground Layer							
*Gahnia aspera**	2	Ground layer flora species have not been incorporated into habitat descriptions for these species.					No
*Aristida caput-medusae**	1						Yes – grass sp.
Allocasuarina luehmannii	2						No
*Chrysocephalum apiculatum**	2						No
*Panicum effusum**	1						Yes – grass sp.

[2] Provides a priority order for species selection. 1 = Species that provide specific habitat features to at least one MNES value, 2 = May not provide specific habitat features but is considered general habitat for at least one MNES value and is listed as a dominant species for the relevant RE.
* Species has been recorded within the Offset area.

	Priority Number[2]	Corben's long-eared bat	Diamond firetail Habitat	Glossy black-cockatoo	Koala	Dunmall's snake	Squatter Pigeon
RE 11.5.4							
Canopy and subcanopy							
*Allocasuarina luehmannii**	1	Yes - general	Yes - general	Yes - Feed tree	Dispersal only	Yes - general	Yes - general
*Angophora leiocarpa**	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
*Callitris glaucophylla**	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
*Eucalyptus chloroclada**	1	Yes - general	Yes - general	Possibly nesting	Yes - LIKT	Yes - general	Yes - general
Eucalyptus crebra	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
Shrub/subcanopy							
*Allocasuarina luehmannii**	1	Yes - general	Yes - general	Yes - Feed tree	Dispersal only	Yes - general	Yes - general
Callitris glaucophylla	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
Ground Layer							
*Aristida caput-medusae**	1	Ground layer flora species have not been incorporated into habitat descriptions for these species.					Yes – grass sp.
Aristida ramosa	1						Yes – grass sp.
Gahnia aspera	2						No
Eragrostis elongata	1						Yes – grass sp.
Ancistrachne uncinulata	1						Yes – grass sp.
RE 11.5.21							
Canopy and subcanopy							
Allocasuarina luehmannii	1	Yes - general	Yes - general	Yes - Feed tree	Dispersal only	Yes - general	Yes - general
Angophora leiocarpa	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
*Callitris glaucophylla**	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
Corymbia bloxsomei	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
Eucalyptus crebra	1	Yes - general	Yes - general	Possibly nesting	Yes - LIKT	Yes - general	Yes - general

	Priority Number[2]	Corben's long-eared bat	Diamond firetail Habitat	Glossy black-cockatoo	Koala	Dunmall's snake	Squatter Pigeon
Shrub/subcanopy							
Acacia conferta	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
*Allocasuarina luehmannii**	1	Yes - general	Yes - general	Yes - Feed tree	Dispersal only	Yes - general	Yes - general
Callitris glaucophylla	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
Jacksonia scoparia	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
Lysicarpus angustifolius	2	Yes - general	Yes - general	Possibly nesting	Dispersal only	Yes - general	Yes - general
Ground Layer							
Aristida jerichoensis var. jerichoensis	1	Ground layer flora species have not been incorporated into habitat descriptions for these species.					Yes – grass sp.
*Themeda triandra**	1						Yes – grass sp.
Eulalia aurea	1						Yes – grass sp.
Hypericum gramineum	2						No
Leucopogon biflorus	2						No

5.7.4 Seed collection and propagation

Species for planting will be native to the local area and sourced from seeds from within the natural distribution of the species; and that are appropriate to the biophysical characteristics of the offset area.

Species for planting will be sourced through a combination of seed collection, established seed banks and/or propagation of tube-stock through local nurseries.

Appropriate records and spatial data will be collected for all seed collection and propagation activities, in accordance with appropriate best practice guidelines and protocols, to demonstrate seed provenance.

To maximise the survival of plantings, particularly within the initial establishment period (i.e. first two years following planting), in addition to the above criteria the following will be considered when sourcing species for planting:

- Understanding the provenance of the seed to verify the quality and viability of propagated seedlings.
- Consideration of future climate modelling when sourcing seed and seedlings for the planting area. For example, including seed from lower altitude and drier sites than the local native provenance.
- Sourcing an appropriate number of seedlings to meet the desired stem densities and accounting for potential supplementary planting requirements.
- Sourcing seedlings from a reputable nursery with a successful track record providing seedlings for broad scale revegetation.
- Ensuring seedlings are of a suitable size and quality for planting.
- Ensuring seedlings are appropriately hardened off prior to planting.
- Ensuring that timing for seedling propagation and the hardening off period is appropriately aligned with site preparation and the seasonal planting window for the offset area.

5.7.5 Planting procedure

A suitably qualified revegetation specialist will be engaged to undertake planting works and will oversee final species selection, planting design to inform the planting works and ongoing maintenance requirements.

Planting will be undertaken through the establishment of a tube stock and supplemented with direct and/or broadcast seeding. The planting program will commence in the first year following approval of the OMP, with planting proposed to be complete within the first three years of the OMP to allow time for seed collection and propagation of tube stock and site preparation works to occur. Plantings will be undertaken to coincide with periods of high soil moisture, in southern Queensland this is generally from October to March. Subject to site conditions and availability of seeds and tube stock, planting may be undertaken in intervals to achieve the restoration planting performance criteria and meet the offset area completion criteria.

Site and ground preparation works will be undertaken across management zones 2 and 3, prior to planting to ensure adequate soil moisture and control competition (weeds and browsing animals). The revegetation contractor will determine the required site preparation activities, based on assessment of site conditions at the time of planting. Site preparation will include, but not be limited to:

- Weed control will be undertaken prior to planting to ensure there are no weed infestations present that will impact the successful establishment of the plantings.
- Ground preparation will be undertaken to soften the soil and increase water infiltration, root area and soil aeration. The approach will vary between the regrowth and non-remnant areas to ensure there is no impact to existing native vegetation should additional ripping or cultivation be required. Soil treatments such as water crystals, gypsum, compost, coconut fibre can be added to improve the structure and water-holding capacity of the soil.
- Pest animal control in conjunction with the pest animal management measures outlined in **Section 5.6** to manage browsing and trampling of seedlings.
- Establishment of temporary exclusion fencing to manage browsing and trampling of seedlings during the establishment period (i.e. first two years), if required.

5.7.6 Post planting maintenance and monitoring

Following planting site inspections will be conducted by the suitably qualified revegetation contractor regularly for the first two years following planting during the establishment period to assess the condition of the planting areas (e.g. fencing condition, fuel loads, firebreaks, access tracks, weeds, pest animal activity), monitor the health of the plants and undertake the required maintenance activities. Follow up site inspections of the plantings will continue annually up until 5 years following planting.

Post planting maintenance activities will include but are not limited to:

- Regular watering of plants for a period of 12 weeks or as deemed necessary by the contractor to ensure establishment is successful or until sufficient rainfall is received. Supplementary watering will be undertaken, as required, beyond the 12-week period should the trees and plantings show signs of reduced survival rates or experience dry conditions.
- Controlling weed infestations and/or high fuel loads within the planting areas in conjunction with the weed management measures outlined in **Section 5.5**.
- Controlling pest animals within the planting areas to manage browsing and/or trampling of seedlings in conjunction with the pest animal management measures outlined in **Section 5.6**. Invertebrate pests will also be monitored and managed where necessary in accordance with all applicable Commonwealth and State laws and any pesticide manufacturer instructions.

Monitoring will also be undertaken in accordance with **Section 6.6** to assess the survival and stem density of planted species to inform the requirement for additional management including remedial plantings should the density and composition of species no longer meet the performance criteria outlined in **Section 5.7.7**. The restoration plantings will also be monitored as part of the broader offset area monitoring program outline in **Section 6**.

The annual progress report will provide details of the planting and maintenance procedure, final species selection and density as well as progress of the planting areas in achieving the objectives and performance criteria.

5.7.7 Planting schedule

The planting program will commence in Year 1 following approval of the OMP based on the schedule outlined in **Table 5.12** below. **Table 5.12** outlines the key steps Arrow CSG will undertake based on the approach to restoration planting described above, including the indicative timing for each activity. Progress on completing the identified steps, including compliance with the indicative timing, will be included as part of the annual progress reports (**Section 7.1**).

Table 5.12: Proposed schedule for restoration planting program

Activity	Description	Indicative timing	Indicative completion date
Engagement and onboarding of suitability qualified revegetation contractor	Following approval of the OMP Arrow CSG will engage a suitably qualified revegetation contractor to undertake the restoration plantings.	Procurement and onboarding of contractor is anticipated to occur within 6 months of approval of the OMP.	Year 1
Confirmation of target areas for restoration planting, species composition and planting density and design	Following engagement, the revegetation contractor will undertake a site visit to confirm species selection (**Section 5.7.2**) and final planting density and design (**Section 5.7.3**).	Anticipated to be completed by the revegetation contractor within approximately 3 months of successful onboarding.	Year 1

Activity	Description	Indicative timing	Indicative completion date
Procurement of seedlings	Based on the site visit the revegetation contractor will procure seedlings from local nurseries for planting subject to species and seedling availability (**Section 5.7.4**). If required, additional seedlings may need to be propagated to meet species composition and density requirements (**Section 5.7.4**). The key considerations that will influence the timing for procurement of seedlings include: • Availability and quality of existing seedlings at local nurseries, • Availability, quality and origin of seeds from seedbanks for additional propagation, • Seasonal requirements for seed collection and propagation, • Propagation success and timing to ensure seedlings are of a suitable size and quality to ensure best case of survival following planting.	Subject to the availability of seedlings, it is anticipated that propagation may take up to 18 months.	Year 1-2
Site preparation (e.g. weed control, ripping or cultivation, soil treatments)	Prior to planting, on-ground works will be undertaken to prepare the sites (**Section 5.7.5**).	Timing for this work will depend on site conditions and seasonal window for planting.	Year 2-3
Planting	The ideal planting period is generally between October and March where the soil moisture is at its highest, but this can vary based on seasonal conditions (**Section 5.7.5**).	October and March	Year 2 (October)- Year 3 (March)
Post-planting maintenance and monitoring	Site inspection will be undertaken regularly within the first two years following planting during the establishment period to assess the condition of the planting areas, monitor the health of the plants and undertake the required maintenance activities. Follow up site inspections of the plantings will continue annually up until 5 years following planting. Monitoring will also be undertaken in accordance with **Section 6.6** to assess the survival and stem density of planted, every 6 months for the first 12 months, then annually up to year 5. Following year 5, the plantings will be monitored as part of habitat quality assessments (**Section 6.7**)	Regularly for the first two years following planting and then annually up until Year 5 following planting. Habitat quality assessments continue to be undertaken up until Year 20.	Year 3 - 20

5.7.8 Performance criteria and corrective actions

Based on the results of regular maintenance inspections (**Section 6.1**) and monitoring events (**Section 6.6**) the following triggers and corrective actions, outlined in **Table 5.13,** will be implemented in instances of non-compliance or a lack of progression towards the achievement of the site and species-specific attribute targets (**Table E**.1: Justifications for proposed improvements in site-specific and species-specific attributes

) and the interim milestones and completion criteria (**Table 3.1**). While the triggers and corrective actions presented in **Table 5.13** relate to the management zones 2 and 3, they will be reviewed and implemented to align with management across the broader offset area.

Table 5.13: Triggers and corrective actions to assess success of restoration plantings

Trigger	Corrective action
Trees and plantings show signs of reduced survival rates	Engage a suitably qualified professional to review the plantings and advise on methods to increase growth rates through other interventions following detection of the trigger. Apply recommended mitigation measure/s to improve growing conditions by the suitably qualified professional within 3 months of detection of the trigger and consideration of seasonal windows for any supplementary plantings including but not limited to: • increase watering schedule • additional weed and/or pest control • use of soil ameliorants or fertilizers • review alternative species for planting • undertake any remediation works and re-establishment plantings.
Within management zone 2, there is >15% mortality in plantings across the total area at any time within the first five years of planting that: • negatively impacts the potential of the offset area to achieve the site and species-specific attribute targets and interim milestones and completion criteria. • results in the planting no longer reflecting the structure and composition of the relevant local vegetation community or communities.	• Engage a suitably qualified professional to identify the likely cause of plant failure following detection of the trigger. • Apply recommended mitigation measure/s to improve growing conditions (as recommended by the suitably qualified professional) within 3 months of detection of the trigger. • Undertake supplementary planting within the next appropriate planting period.

Trigger	Corrective action
Within management zone 3 stem density is less than 400 stem/ha or there is >15% mortality in plantings across the total area at any time within the first five years of planting that: • negatively impacts the potential of the offset area to achieve the site and species-specific attribute targets and interim milestones and completion criteria. • results in the *planting* no longer reflecting the structure and composition of the relevant local vegetation community or communities.	• Engage a suitably qualified professional to identify the likely cause of plant failure following detection of the trigger. • Apply recommended mitigation measure/s to improve growing conditions (as recommended by the suitably qualified professional) within 3 months of detection of the trigger. • Undertake supplementary planting within the next appropriate planting period.
An increase in % cover and richness of weed species at monitoring sites from baseline and subsequent monitoring events. A new prohibited or restricted matter species listed under the Biosecurity Act 2014 (Qld) is identified in the offset area based on baseline and subsequent monitoring events	• Investigate the reasons that may have attributed to the increase in the species richness or relative abundance of weeds within one month of detection of the trigger. • Amend weed hygiene requirements and provide additional education/awareness to contractors and personnel entering the site to ensure restrictions are adhered to within 3 months of detection of the trigger. • Increase the frequency and intensity of weed control and management activities with additional follow up treatments during the next potential growth period to avoid further regeneration and potential seeding events.
Evidence of disturbance to plantings associated with pest animals, invertebrates or native species.	• Investigate the reasons that may have attributed to the increase in the presence of pest animals, invertebrates or native species within one month of detection of the trigger. • Increase the frequency and intensity of pest animal and invertebrate control and management activities within 3 months of detection of the trigger. • Third party review of pest animal control and management activities and identification of revised suitable methods within 3 months of detection of the trigger. • Ensure coordination with neighbours and community, where suitable, to ensure a consistent approach to management. • Review, and where appropriate, improve the effectiveness of exclusion fencing to manage native species presence within the planting areas within 3 months of detection of the trigger.

6. Monitoring Program

The outcomes of the monitoring program described below will be used to inform progress of the offset area in achieving the offset area outcomes in **Section 3**, including the site- and species-specific attribute targets, interim milestones and completion criteria.

The monitoring results will also inform ongoing management decisions as part of the adaptive management process including the requirement to implement corrective actions. The monitoring methods described below have been designed to be measurable, repeatable and enforceable to allow comparison between the results of monitoring events to assess changes in the offset area over the life of the OMP.

6.1 Offset area inspections

Offset area inspections will be undertaken biannually to provide a general assessment of the offset area and identify any risks that may require action to be undertaken. Offset area inspections will assess the following, at a minimum:

- condition of fencing, gates, signs, access tracks and firebreaks,
- compliance with restrictions for vegetation clearing associated with maintenance and establishment of access tracks, fencing and firebreaks,
- evidence of damage associated with pest animal activity,
- evidence of unauthorised access,
- incidental observations and location of weed and non-native species particularly within high trafficable areas (e.g. entry gates, creek crossings, stock watering points) to monitor potential introduction and/or irruptions,
- incidental fauna observations, and
- any additional risks to offset values not currently being managed.

6.2 Biomass monitoring

Biomass monitoring for fuel load and fire management will be undertaken at the end of the wet season to inform fuel load management requirements for the upcoming dry season, considering biomass is greatest at the end of wet season with fire risk being the highest during the dry season.

Biomass will be assessed using the Eucalypt woodland pasture photo standards[3] to determine the estimated dry matter yield (kg/ha of groundcover) within representative locations of the offset area. Survey sites are not required to be permanent or fixed and may vary from year to year depending on previous weed and fire management activities. The location and number of survey sites will be determined prior to each event by a suitably qualified person.

Should biomass be >2,500 kg/ha, fuel loads are to be managed in accordance with the requirements of **Section 5.4**. A subsequent round of biomass monitoring will be undertaken at the end of the dry season (or sooner) to confirm biomass levels have been reduced to <2,500 kg/ha.

6.3 Fuel load monitoring

Fuel load monitoring will be undertaken in accordance with the Overall Fuel Hazard Assessment Guide[4] (Hines et al. 2010). Fuel load monitoring will be undertaken at the end of the wet season to inform fuel load management requirements for the upcoming dry season, at the same time and location as biomass monitoring (**Section 6.2**).

Monitoring will provide an assessment of the key structural layers of the fine fuels that burn in bushfires, including bark, elevated fuels, near-surface fuels and surface fuels. The monitoring method provides for a rapid assessment of

[3] https://futurebeef.com.au/resources/brigalow-belt-pasture-photo-standards/
[4] https://www.ffm.vic.gov.au/__data/assets/pdf_file/0005/21110/Report-82-overall-fuel-assess-guide-4th-ed.pdf

each fuel layer, which in in turn is given a hazard rating and subsequently combined to provide an overall fuel hazard rating of low, moderate, high, very high or extreme.

The fuel hazard rating will be monitored to compare any changes from previous assessments. The fuel load assessment results will be used to support implementation of the Prescribed Burn Strategy in conjunction with the results of biomass monitoring, habitat quality assessments and offset area inspections.

6.4 Weed monitoring

Weed monitoring will be undertaken every two years for the first six years and then in Year 10, 15 and 20, post wet season, to determine the species abundance and richness of weeds within the offset area. The results of weed monitoring will be used to inform the timing and location of weed control methods (**Section 5.5**).

Weed monitoring will be undertaken at permanent sites established within the existing site condition assessment plots and additional site condition assessment plots to be established in year 1 within the offset area, as presented on **Figure 6.3** and listed in **Section 6.7.1**. Baseline surveys of the offset area were undertaken in September 2025 and August 2026 in accordance with the method below which will subsequently be used for future monitoring events. The results of the baseline assessment are presented in **Appendix D** and will be used to inform weed control activities during year 1 of management, as well as provide comparison with future weed monitoring events.

Incidental observations of weed presence and location will also be recorded as part of biannual offset area inspections (**Section 6.1**).

6.4.1 Weed cover survey

Weed cover surveys are to be undertaken within each 50 x 10 m BioCondition plot as follows:

- Establish a 50 x 10 m quadrat within the larger 100 x 50 m BioCondition plot. The location of this plot is to be recorded to allow for repeat survey effort and consistent comparison between monitoring events.
- Slowly traverse the quadrat in a systematic manner, and record weed species present and estimate the percentage of the quadrat occupied by each weed species using **Figure 6.1** (from McNaught et.al 2008) as a guide.
- Actual percentage cover estimates must be used (rather than using the modified Braun-Blanquet method), as actual values can be converted to these broader indices for mapping or can be analysed separately (Watson et.al 2021).
- The entire cover of each species is to be recorded irrespective of any overlap by a different species (i.e. the combined cover value of all target species may exceed 100%) (Watson et.al 2021).
- Record the assigned percentage cover for each weed species in the datasheet.

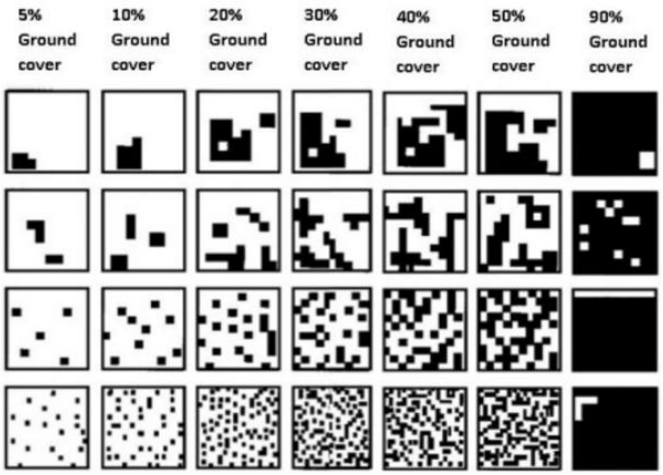


Figure 6.1: Distribution of ground cover to assist in determining percentage weed cover

6.4.2 Photo monitoring

Photo monitoring will provide a visual means to detect changes in weed cover as well as native vegetation composition, structure and integrity in areas of active management.

Images are to be captured at the centre point of each BioCondition transect in a north, east, south, west and ground direction based on best practice monitoring techniques in Appendix 4 of the *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual* (Eyre *et al*. 2015). Photo monitoring is to be undertaken as follows:

- Capture photos at 1.5 m height above ground level including a fixed reference object in the frame such as a distinctive tree, tree stump, fence post or water feature, to help compare changes over time.
- Enable geo-referencing settings to record the photo location data.
- Note that, for repeat photos, take the photo at the same time each year to enable meaningful comparison over time and have copies of the original photos for reference to help match the field of view.

6.5 Pest animal monitoring

Pest animal monitoring will be undertaken in Years 5, 10, 15 and 20, post wet season, to determine species presence and any changes to the Activity Index (AI). The results of pest animal monitoring will be used to inform the timing and location of pest control methods (**Section 5.6**).

Remote sensing cameras will be deployed throughout the offset area to assess pest animal activity, with a camera located within each assessment unit (at a minimum). **Figure 6.2** illustrates the location of camera traps deployed during baseline surveys in July and August 2025. The location of camera traps for future monitoring events is subject to change based on the results of previous monitoring indicating the key areas to target within the offset such as obvious fauna trails or focusing on areas where pest animals could traverse. It is recommended that subsequent monitoring events replicate the total trap hours assessed during the baseline event (e.g. 3,827 hours, equivalent to 12 cameras deployed over approximately 2 weeks) to ensure results are comparable over time.

Camera traps are not to be baited to avoid interference with predator behaviour. At each camera trap location, the following data is to be recorded:

- site ID
- survey type (i.e. camera)
- deployment date
- collection date.

An AI score will be calculated using this data, informed by methods in Jenks et al. (2011), and based on the following formula:

$$Activity\ Index\ (AI) = (\frac{Total\ number\ of\ detections}{Totalnumber\ of\ trap\ hours})\ x100$$

A detection is the positive identification of one of the target species within a 20-minute interval, with a maximum of three independent detections possible per hour. For example, if the maximum number of detections were observed (3 per hour), on a single trap day (24 hours), using a single camera, the AI would be 300 (72 detections ÷ 24 hours x 100 = 300).

The results of the baseline assessment are presented in **Appendix D** and will be used to inform pest animal control activities, as well as comparison with upcoming monitoring events. Incidental observations of pest animal presence and location will also be recorded as part of biannual offset area inspections (**Section 6.1**).

SGP NORTH SOLAR FARM

Offset Management Plan

Figure 6.2

Offset area pest monitoring locations

- Camera trap
- Major Watercourse
- Minor Watercourse
- Offset Area (302.9 ha)
- Girrahween Station

Bottle Tree Creek

31AU60

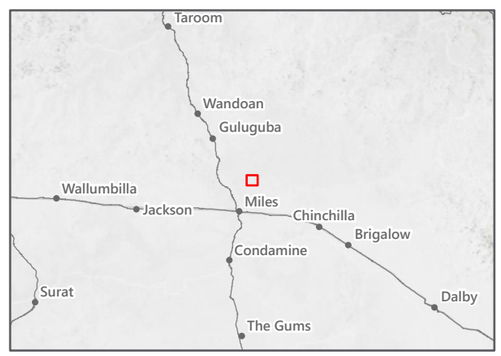
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6.6 Restoration planting monitoring

Restoration planting areas will be monitored to assess the survival and stem density of planted species to inform the requirement for additional management including remedial plantings. Given the different restoration strategies and performance criteria for management zones 2 and 3, two different monitoring methods will be undertaken to ensure the results of each monitoring event can be compared overtime. In conjunction with the outcomes of the broader offset area monitoring program, the results of restoration planting monitoring will be used to inform implementation of the corrective actions outlined in **Section 5.7.7.**

6.6.1 Infill planting areas

Within management zone 2, stem density plots (25m x 25m) will be established in the first year of management prior to planting and will be collocated with the monitoring plots described in **Section 6.7.1**.

An assessment of each plot will be undertaken in year 1 (prior to planting) to establish the baseline density and richness of existing trees, shrubs and ground layer species, estimated weed cover, and estimated bare ground. The results of the baseline density assessment and the year 1 site condition assessments (**Section 6.7.1**) will be reviewed to inform the required number of species to be planted within each of the strata layers.

Following planting, the assessment plots will be monitored every 6 months for the first 12 months, then annually up to year 5. The following information will be recorded:

- Density and richness of existing and planted trees, shrubs and ground layer species
- Average height and cover of existing and planted trees, shrubs and ground layer species
- Estimated weed cover and species
- Estimated bare ground
- Condition of the planted species including any evidence of low growth rates/ill health
- Evidence of threats to planting areas including but not limited to weed incursion, browsing and trampling, poor soil health.

As part of each monitoring event photo monitoring will be undertaken from the same point within each plot based on best practice monitoring techniques in Appendix 4 of the BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual (Eyre et al. 2015). These points should be aligned, where possible, with permanent photo monitoring required as part of **Section 6.4.2.**

Following year 5, the plantings will be monitored as part of habitat quality assessments, to assess the overall progress of the assessment unit in achieving the site and species-specific attribute targets and interim milestones and completion criteria.

6.6.2 Revegetation areas

Within management zone 3 a minimum of seven 25m x 25m stem density plots will be established in the first year of management prior to planting (representing over 20% of the revegetation area). Following planting the assessment plots will be monitored every 6 months for the first 12 months, then annually up to year 5. The following information will be recorded:

- Density and richness of planted trees, shrubs and ground layer species
- Average height and cover of planted trees, shrubs and ground layer species
- Estimated weed cover
- Condition of the planted species including any evidence of low growth rates/ill health
- Evidence of threats to planting areas including but not limited to weed incursion, browsing and trampling, poor soil health.

As part of each monitoring event, photo monitoring will be undertaken from the same point within each plot based on best practice monitoring techniques in Appendix 4 of the BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual (Eyre et al. 2015). These points should be aligned, where possible, with permanent photo monitoring required as part of **Section 6.4.2.**

Following year 5, the plantings will be monitored as part of habitat quality assessments, to assess the overall progress of the assessment unit in achieving the site and species-specific attribute targets and interim milestones and completion criteria.

6.7 Habitat quality assessments

Habitat quality assessments will be undertaken in Years 2, 5, 10, 15 and 20, in accordance with the project specific MHQA method outlined in **Appendix B**. The results of these assessments will be compared to the site- and species-specific targets, interim milestones and completion criteria to determine the progress of the offset area in achieving its required outcomes.

Habitat quality assessments will include two on ground assessment components:

- Site condition assessments, and
- Targeted fauna surveys.

6.7.1 Site condition assessments

Site condition assessments will be undertaken at fixed permanent monitoring points in the offset area established as part of the baseline assessments in September 2025 and August 2026. Site condition assessments will capture all BioCondition site attribute data as well as site-specific data required for each species as specified in the project specific MHQA method. **Figure 6.3** presents the location of the monitoring points assessed as part of the baseline surveys. **Table 6.1** lists the monitoring points, and their respective RE assessment unit including the proposed additional sites to be established as part of the first monitoring event.

As part of the first site condition monitoring event, monitoring points will be marked with a capped stake and a GPS location will be recorded.

Table 6.1: Site condition monitoring points

AU	Condition status	Status	Site ID
AU01	11.3.4	Remnant	G10
	11.3.4	Remnant	G11
AU02	11.3.14	Remnant	G04
	11.3.14	Remnant	G05
AU03	11.3.27f	Remnant	G08
	11.3.27f	Remnant	G09
AU04	11.3.25	Remnant	G12
	11.3.25	Remnant	G13
AU05	11.5.1	Remnant	G33
	11.5.1	Remnant	G35
	11.5.1	Remnant	G38
AU06	11.5.1	Regrowth	G18
	11.5.1	Regrowth	G36

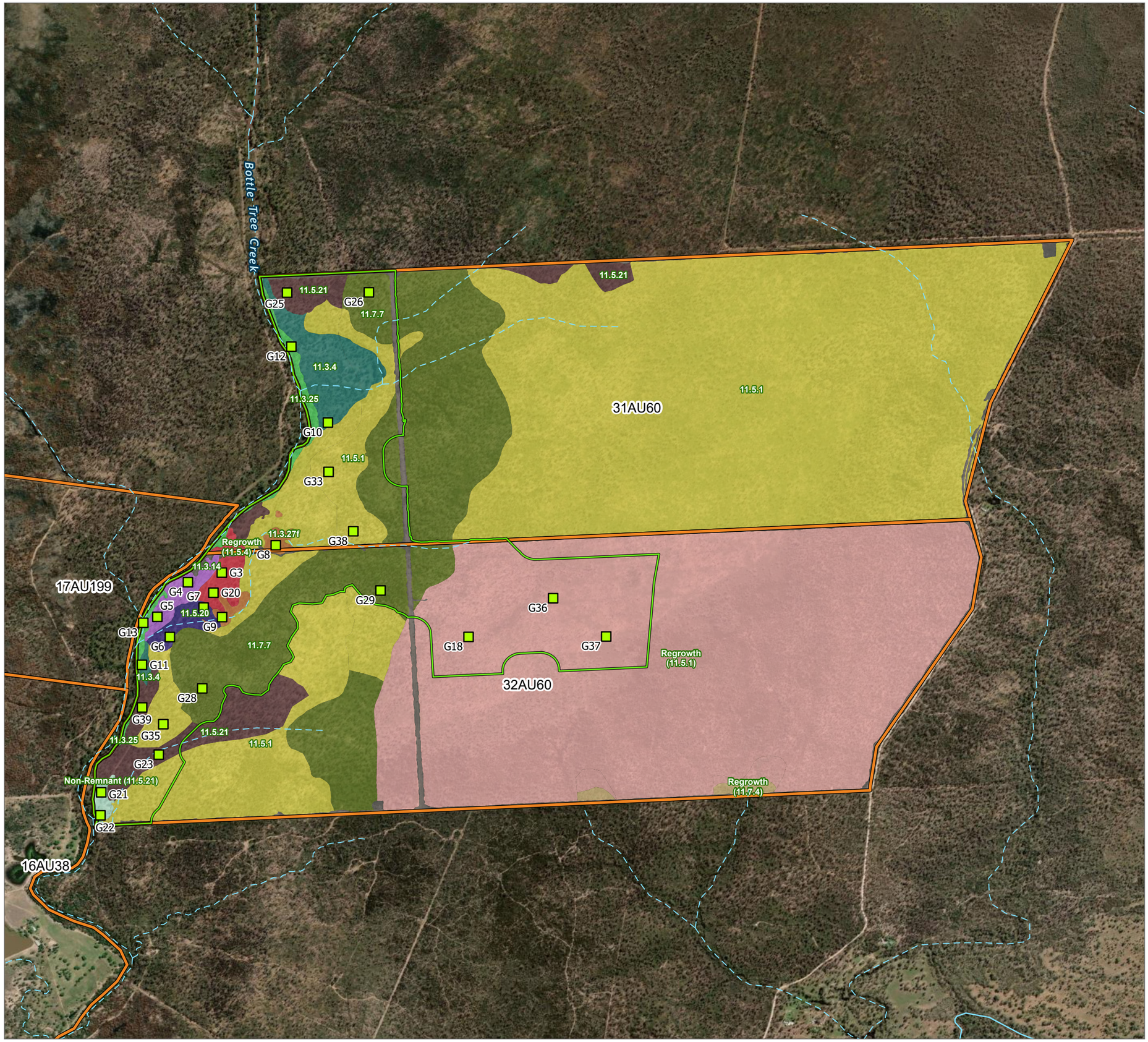
AU	Condition status	Status	Site ID
	11.5.1	Regrowth	G37
AU07	11.5.4	Regrowth	G03
	11.5.4	Regrowth	G20
AU08	11.5.20	Remnant	G06
	11.5.20	Remnant	G07
AU09	11.5.21	Remnant	G23
	11.5.21	Remnant	G25
	11.5.21	Remnant	G39
AU10	11.5.21	Non-Remnant	G21
	11.5.21	Non-Remnant	G22
AU12	11.7.7	Remnant	G26
	11.7.7	Remnant	G28
	11.7.7	Remnant	G29

SGP NORTH SOLAR FARM

Offset Management Plan

Figure 6.3

Habitat quality monitoring sites



Major Watercourse

Minor Watercourse

Girrahween Station

Offset Area (302.9 ha)

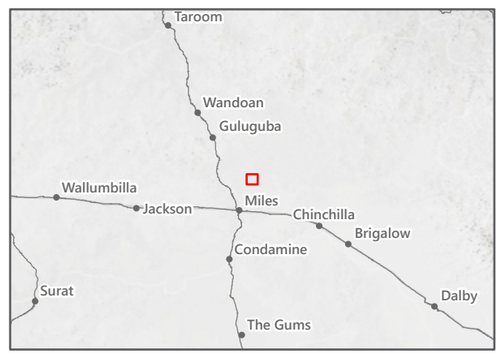
BioCondition sites

Ground-Truthed Regional Ecosystem Mapping:

- 11.3.14
- 11.3.25
- 11.3.27f
- 11.3.4
- 11.5.1
- 11.5.20
- 11.5.21
- 11.7.7
- Regrowth (11.5.1)
- Regrowth (11.5.4)
- Regrowth (11.7.4)
- Non-Remnant (11.5.21)
- Cleared

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REVIEWED: MW

DATE: 11/09/2026
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6.7.2 Targeted fauna surveys

Targeted fauna surveys will be undertaken to assess the presence and distribution of the MNES fauna offset values within the offset area. Fauna surveys will be conducted in Years 2, 5, 10, 15 and 20. The results of the fauna surveys will also inform calculation of the habitat quality scores in accordance with the project specific MHQA method.

Targeted fauna survey methods and timing will be informed by the recommended survey guidelines from the Queensland and Commonwealth or other reputable published guidelines including but not limited to:

- Targeted species survey guidelines for Glossy black-cockatoo, *Calyptorhynchus lathami* (Queensland Herbarium 2025).
- Survey guidelines for Australia's threatened bats (DEWHA 2010a).
- Queensland Terrestrial Vertebrate Fauna Survey Guidelines (Eyre *et al.* 2022)
- A review of koala habitat assessment criteria and methods (Youngentob *et al.* 2021)
- Survey guidelines for Australia's threatened birds (DEWHA 2010b)
- Draft Referral guidelines for the nationally listed Brigalow Belt reptiles (DCCEEW 2023b)

Table 6.2 provides an overview of the proposed survey methods for each MNES offset value, noting that the survey methods, location and effort will be reviewed prior to each event to ensure they adequately meet the species-specific requirements. Opportunistic observations of threatened fauna species will also be recorded during the survey events and as part of offset area inspections (**Section 6.1**).

Table 6.2: Fauna species survey methods

Survey method	Targeted MNES
Diurnal bird surveys: Either undertaken in the early morning (i.e. within 2-4 hours of sunrise) or late afternoon (within 2 hours of sunset) by 2 observers for 20 minutes.	South-eastern glossy black cockatoo; Diamond firetail; squatter pigeon
Active diurnal searches: Meandering through suitable habitat searching microhabitats, such as carefully turning woody debris, rocks and artificial debris, raking the soil surface or leaf litter beneath trees. Optimal survey time is during the coolest parts of the day. Microhabitat will be reinstated after searches have been completed as far as is practicable.	Dunmall's snake
Ort surveys/search for foraging signs: Active searching within suitable areas of foraging habitat for south-eastern glossy black cockatoo and/or through areas with Allocasuarina trees looking for discarded, chewed she-oak seed cones ('orts').	South-eastern glossy black cockatoo
Spotlighting surveys: Typically conducted by two observes (on foot) who walk through areas of suitable habitat and spotlight for nocturnal fauna species. Spotlighting surveys are conducted for around 30-60 minutes at different locations. Call playback and passive acoustic surveys during the koala mating season (late spring/early summer).	Koala; Dunmall's snake
Harp trapping surveys: Undertaken in areas of suitable habitat in response to the detection of *Nyctophilus* sp. (a genus of microbat) calls using passive acoustic detection. Species within this genus (which includes the threatened Corben's long-eared bat (*Nyctophilus corbeni*)) cannot be identified to species level using the call alone. Harp traps to be deployed in areas with a higher likelihood of bat activity such as along flyways, where they were deployed after sunset and collected before sunrise. Surveys best conducted on warmer nights from October through to April	Corben's long-eared bat

Survey method	Targeted MNES
Koala Spot Assessment Technique (SAT) Surveys: The SAT methodology to be undertaken in accordance with The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas *Phascolarctos cinereus* (Phillips and Callaghan 2011). This survey technique involves searching for koala scats around the base of suitable food trees at each survey site.	Koala

7. Reporting

7.1 Progress report

A report detailing the progress of the offset area in achieving the offset area outcomes will be prepared annually and submitted to the Commonwealth Government within 60 business days after the anniversary date of the approval of this OMP until the completion criteria are achieved. The report will include at a minimum:

- a description of the monitoring program undertaken for the management year including timing, personnel and methods,
- results of monitoring events conducted during the management year,
- an overview of the management actions implemented since the last report,
- a description of restoration planting works completed to date, results of survival assessments and monitoring and any corrective actions implemented,
- a description of any management triggers that have been exceeded and the corrective actions that were implemented,
- an indication of any additional risks or potential threats identified and activities to be undertaken to manage these threats and/or risks,
- progress towards achieving the site- and species-specific performance targets, interim milestones and completion criteria during the corresponding management years that habitat quality assessments are undertaken as part of the monitoring program,
- required updates and improvements to the OMP.

7.1.1 Review of OMP

The OMP will be reviewed as part of the progress report, and updated as required, to ensure the relevant management and monitoring programs remain current and effective in accordance with the adaptive management framework and are informed by up-to-date best practice information and species-specific conservation advice.

8. Implementation schedule

Table 8.1 presents a summary of the implementation schedule for all management, monitoring and reporting activities outlined in the OMP.

Table 8.1: Implementation schedule for management, monitoring and reporting

Activity		Management years ✓ Activity required ● Activity to be carried out as required																				Timing
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Management																						
Legal security (**Section 2.2**)	Legal security of the offset area	✓																				Year 1
General restrictions (**Section 5.2**)	Restrictions associated with weed hygiene, unauthorised access or use and vegetation clearing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	At all times
Livestock exclusion, fencing and access (**Section 5.3**)	Livestock exclusion	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	At all times
	Maintenance of access tracks	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	As required
	Establishment of fencing and ongoing maintenance	✓	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	Offset area fencing established in Year 1 and then maintained as required.
Fire management (**Section 5.4**)	Develop Prescribed Burn Strategy and implement as required	✓	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	Development of the Prescribed Burn Strategy in Year 1 will inform timing for burns across the management period.
Weed management (**Section 5.5**)	Undertake targeted weed control	✓	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	An initial control event will be undertaken in Year 1, with the results of ongoing monitoring to inform subsequent frequency of control events.
Pest management (**Section 5.6**)	Undertake targeted pest animal control	✓	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	An initial control event will be undertaken in Year 1, with the results of ongoing monitoring to inform subsequent frequency of control events
Restoration planting **(Section 5.7)**	Targeted infill planting and broadscale revegetation within	✓	✓	✓	✓	✓	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	The planting program will commence in the first year following approval of the OMP, with planting

Activity		Management years ✓ Activity required ● Activity to be carried out as required																				Timing
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	regrowth and non-remnant areas																					proposed to be complete within the first three years of the OMP to allow time for seed collection and propagation of tube stock and site preparation works to occur. Plantings will be undertaken to coincide with periods of high soil moisture, in southern Queensland this is generally from October to March.
Monitoring																						
Offset area inspections (**Section 6.1**)	Regular inspections to enable a general assessment of the offset area	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Biannually
Biomass monitoring (**Section 6.2**)	Biomass monitoring to inform fire management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Annually
Fuel load monitoring (**Section 6.3**)	Fuel load monitoring to support implementation of prescribed burns	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Annually
Weed monitoring (**Section 6.4**)	Ongoing weed surveys to assess the effectiveness of weed control		✓		✓		✓				✓					✓					✓	Every two years for the first six years and then in years 10, 15 and 20 of the management period.
Pest animal monitoring (**Section 6.5**)	Ongoing pest animal surveys to assess the effectiveness of pest animal control					✓					✓					✓					✓	Years 5, 10, 15 and 20 of the management period.
Restoration planting monitoring (**Section 6.6**)	Assessments of survival and stem density of planted species within restoration planting areas	✓	✓	✓	✓	✓																Following planting the assessment plots will be monitored every 6 months for the first 12 months, then annually up to year 5. Following year 5, the plantings will be monitored as part of habitat quality assessments
MNES habitat quality	Site condition assessments to inform		✓			✓					✓					✓					✓	

Activity		Management years ✓ Activity required ● Activity to be carried out as required																				Timing
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
assessments (**Section 6.7**)	habitat quality assessments																					In years 2, 5, 10, 15 and 20 of the management period.
	Targeted fauna surveys to inform habitat quality assessments		✓			✓					✓					✓					✓	
Reporting																						
Progress report (**Section 7.1**)	Reporting on the progress of the offset area in achieving its outcomes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Annually
Review of OAMP (**Section 7.1.1**)	Review and update OAMP as required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Annually

9. Reference

Atlas of Living Australia (ALA) (2025). Available at: https://www.ala.org.au/

Bureau of Meteorology (2025). *Climate data online*. Commonwealth of Australia, Canberra. Available at https://www.bom.gov.au/climate/data/.

Brown, G.W., Bennett, A.F. and Potts, J.M. (2008) Regional faunal decline–reptile occurrence in fragmented rural landscapes of south-eastern Australia. Wildlife Research, 35(1), pp.8-18.

Chenoweth EPLA, & Bushland Restoration Services. (2012). South East Queensland Ecological Restoration Framework: Manual. Brisbane: Prepared on behalf of SEQ Catchments and South East Queensland Local Governments.

Department of Agriculture, Water and the Environment (DAWE) (2022a). *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory*. Department of Agriculture, Water and the Environment, Canberra. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/85104-conservation-advice-12022022.pdf. In effect under the EPBC Act from 12-Feb-2022.

Department of Agriculture, Water and the Environment (DAWE) (2022b). *National Recovery Plan for the Koala Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory*. Canberra: Department of Agriculture, Water and the Environment. Available from: http://www.dcceew.gov.au/environment/biodiversity/threatened/publications/recovery/koala-2022. In effect under the EPBC Act from 08-Apr-2022.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022). *Conservation Advice for Calyptorhynchus lathami lathami (South-eastern Glossy Black Cockatoo)*. Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/67036-conservation-advice-10082022.pdf. In effect under the EPBC Act from 10-Aug-2022.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023a). *Conservation Advice for Stagonopleura guttata (diamond firetail)*. Canberra: Department of Climate Change, Energy, the Environment and Water. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/59398-conservation-advice-31032023.pdf. In effect under the EPBC Act from 31-Mar-2023.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023b) *Draft referral guidelines for the nationally listed Brigalow Belt reptiles*. *Environment Protection and Biodiversity Conservation Act 1999*.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2024a) *Threat abatement plan for predation by feral cats 2024*, Department of Climate Change, Energy, the Environment and Water, Canberra. CC BY 4.0. It should be considered in conjunction with: DCCEEW 2024, Background document for the threat abatement plan for predation by feral cats 2024, Department of Climate Change, Energy, the Environment and Water, Canberra. CC BY 4.0.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2024b) Environmental Management Plan Guidelines, Department of Climate Change, Energy, the Environment and Water, Canberra, March. CC BY 4.0.

Department of the Environment (DoE) (2014) Approved Conservation Advice for *Furina dunmallii* (Dunmall's Snake). Canberra.

Department of the Environment (DoE) (2026a). Geophaps scripta scripta in Species Profile and Threats Database. Canberra.

Department of the Environment (DoE) (2026b) *Furina dunmalli* in Species Profile and Threats Database. Canberra

Department of Environment and Science (DES) (2022) Koala Sensitive Design Guideline: Department of Environment and Science Government.

Department of Environment and Science (DES) (2026). Regional Ecosystem Technical Descriptions for the Brigalow Belt Land Zones 1-5.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2010a). *Survey guidelines for Australia's threatened bats. Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia, Canberra.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2010b). *Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia, Canberra.

Dique, DS, Thompson, J, Preece, HJ, et al. (2003). *Dispersal patterns in a regional koala population in south-east Queensland*. *Wildlife Research* 30(3), pp. 281–290.

Eyre TJ, Ferguson DJ, Smith GC, Mathieson MT, Venz MF, Hogan, LD, Hourigan CL, Kelly, AL & Rowland, J. (2022). *Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland, Version 4.0*. Brisbane: Department of Environment and Science, Queensland Government.

Eyre, T.J., Kelly, A.L, Neldner, V.J., Wilson, B.A., Ferguson, D.J., Laidlaw, M.J. and Franks, A.J. (2015*). BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2*. Department of Environment and Resource Management, Brisbane

Hines, F., Tolhurst, K. G., Wilson A. AG. and McCarthy, G. J. (2010). *Overall fuel hazard assessment guide*. Department of Sustainability and Environment, Victorian Government, Melbourne.

Jenks, Kate & Chanteap, Prawatsart & Damrongchainarong, Kanda & Cutter, Peter & Cutter, Passanan & Redford, Tim & Lynam, Antony & Howard, JoGayle & Leimgruber, Peter. (2011). *Using Relative Abundance Indices from Camera-Trapping to Test Wildlife Conservation Hypotheses – An Example from Khao Yai National Park, Thailand*. *Tropical Conservation Science*. 4. 113-131. 10.1177/194008291100400203.

Jones, G. (2005). *Is the management plan achieving its objectives?* pp555-567 in Worboys, G.; De Lacy, T. and Lockwood, M. (eds) Protected Area Management. Principles and Practices. Second Edition. Oxford University Press.Matthews, A, Lunney, D, Gresser, S, et al. (2016). *Movement patterns of koalas (Phascolarctos cinereus) in remnant forest after fire*. *Australian mammalogy* 38(1), pp. 91–104.

Lloyd, P., Williams, E.R., Hansen, C., van Osta, J.M., Agnew, L., Sanders, M., Meyer, E., Marston, S. and Dreis, B. (2025). Habitat Associations of the Southern Squatter Pigeon Geophaps scripta scripta in Queensland. Australian Jfield Ornithology 42: 156-167

Macartney, J. M., Gregory, P. T., and Larsen, K. W. (1988) A tabular survey of data on movements and home ranges of snakes. Journal of Herpetology 22:61–73.

McNaught, I., Thackway, R., Brown, L., and Parsons, M. (2008). *A field manual for surveying and mapping nationally significant weeds*. 2nd Edition. Bureau of Rural Sciences, Canberra.

Melzer, A. and Lamb, D. (1994). *Low density populations of the koala (Phascolarctos cinereus) in Central Queensland*. *Proceedings of the Royal Society of Queensland* 104, pp. 89–93.

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F, Richter, D., Addicott, E.P. and Appelman, C.N. (2023). *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0. Updated December 2023*. Queensland Herbarium, Queensland Department of Environment, Science and Innovation, Brisbane.

O'Gorman B. (1981). *A prolonged field study of the Diamond Firetail*. *Australian Aviculture* January 1981. pp. 14-27.

Phillips, S. & Callachan, P. (2011). *The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus*. Australian Zoologist, 35(3), 744-780.

Queensland Herbarium (2024). *Regional Ecosystem Description Database (REDD). Version 13.1 (May 2024)*. Department of Environment, Science and Innovation, Brisbane.

Queensland Herbarium (2025). *Targeted species survey guidelines. Glossy black-cockatoo, Calyptorhynchus lathami.* online at: https://www.qld.gov.au/__data/assets/pdf_file/0030/67953/glossy-blackcockatoo.pdf, accessed 9 July 2025.

Squatter Pigeon Workshop (2011). Proceedings from the workshop for the Squatter Pigeon (southern). 14-15 December 2011. Toowoomba Office of the Queensland Parks and Wildlife Service.

Threatened Species Scientific Committee (2015). *Conservation Advice Nyctophilus corbeni south-eastern long-eared bat*. Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/83395-conservation_advice-01102015.pdf. In effect under the EPBC Act from 01-Oct-2015.

Shine R. (1987) Intraspecific variation in thermoregulation, movements and habitat use by Australian blacksnakes, Pseudechis porphyriacus (Elapidae). J. Herpetol. 21, 165–77.

Squatter Pigeon Workshop (2011). Proceedings from the workshop for the Squatter Pigeon (southern). 14-15 December 2011. Toowoomba Office of the Queensland Parks and Wildlife Service.

Ward, M. S., Reside, A. E., & Garnett, S. T. (2021). Southern Squatter Pigeon Geophaps scripta scripta. In S. T. Garnett & G. B. Baker (Eds.), The Action Plan for Australian Birds 2020 (pp. 44–47). CSIRO Publishing.

Watson, GM., French, KO., Burley, AL., Brading, MB., and Hamilton, MA. (2021). *Monitoring manual for invasive and native flora: Guidance for field monitoring and reporting*. NSW Department of Planning, Industry and Environment.

Webb, J. K., and Shine, R. (1997). Out on a limb: conservation implications of tree-hollow use by a threatened snake species (Hoplocephalus bungaroides: Serpentes, Elapidae). Biological Conservation 81:21–33.

Wilson S. (2022) *A Field Guide to Reptiles of Queensland*. [online]. Available from: https://www.angusrobertson.com.au/books/a-field-guide-to-reptiles-of-queensland-stevewilson/p/9781925546842 [Accessed July 13, 2023].

White, NA. (1999). *Ecology of the koala (Phascolarctos cinereus) in rural south-east Queensland, Australia*. *Wildlife Research* 26(6), pp. 731–744.

Youngentob, K.N, Marsh, K.F., Skewes, J. (2021). *A review of koala habitat assessment criteria and methods*. Report prepared for the Department of Agriculture, Water and the Environment, Canberra, November.

Attexo
APEM Group

Appendix A

Offset area coordinates

Table A.1: Offset area boundary point coordinates, GDA 2020 Zone 56

ID	X	Y
1	150.2514769	-26.48083472
2	150.2514966	-26.48087881
3	150.2515422	-26.48085784
4	150.2515606	-26.48081448
5	150.2515755	-26.48077106
6	150.2516129	-26.480803
7	150.2516118	-26.48084981
8	150.2515934	-26.48089316
9	150.2515716	-26.48093645
10	150.2515532	-26.4809798
11	150.2515417	-26.48102641
12	150.2515233	-26.48106976
13	150.2515049	-26.48111312
14	150.2515004	-26.48115986
15	150.2514992	-26.48120667
16	150.2514981	-26.48125347
17	150.2514935	-26.48130022
18	150.2514922	-26.48135482
19	150.2514957	-26.48135489
20	150.2514946	-26.4814017
21	150.2514935	-26.48144851
22	150.2514716	-26.48149179
23	150.2514705	-26.4815386
24	150.2514903	-26.48158269
25	150.2515006	-26.48161062
26	150.251445	-26.48161318
27	150.2513625	-26.48161699
28	150.2513008	-26.48162155
29	150.2512702	-26.48162554
30	150.2512324	-26.48163096
31	150.2511542	-26.48164656
32	150.2510708	-26.48167024
33	150.2509899	-26.48170037
34	150.2509123	-26.48173673
35	150.2508385	-26.48177903
36	150.2507691	-26.48182697
37	150.2507046	-26.48188016
38	150.2506455	-26.48193821
39	150.2505922	-26.48200068
40	150.2505452	-26.48206709
41	150.2505048	-26.48213693
42	150.2504713	-26.48220967
43	150.250445	-26.48228477
44	150.2504261	-26.48236164
45	150.2504146	-26.48243971
46	150.2504108	-26.48251837
47	150.2504121	-26.48256456
48	150.2504634	-26.48346547
49	150.2504654	-26.48348709
50	150.2504659	-26.48349794
51	150.2504672	-26.4835064
52	150.2504685	-26.48352093
53	150.2504774	-26.483576
54	150.2504963	-26.48365288
55	150.2505226	-26.48372797
56	150.2505561	-26.48380072
57	150.2505965	-26.48387056
58	150.2506435	-26.48393697
59	150.2506968	-26.48399943
60	150.2507559	-26.48405749
61	150.2508204	-26.48411068
62	150.2508898	-26.48415862
63	150.2509636	-26.48420092
64	150.2510412	-26.48423728
65	150.2511221	-26.48426741
66	150.2512055	-26.48429109
67	150.2512909	-26.48430813
68	150.2513668	-26.48431712

ID	X	Y
69	150.2513777	-26.48431841
70	150.2514214	-26.48432013
71	150.2514651	-26.48432184
72	150.2515164	-26.48432066
73	150.2516925	-26.48431254
74	150.251692	-26.48433389
75	150.2516909	-26.48438069
76	150.2517002	-26.4844277
77	150.251699	-26.48447451
78	150.251691	-26.48452118
79	150.2516899	-26.48456799
80	150.2516888	-26.4846148
81	150.2516876	-26.48466161
82	150.2517039	-26.48470563
83	150.2517132	-26.48475264
84	150.2517156	-26.48479951
85	150.2517249	-26.48484652
86	150.2517238	-26.48489333
87	150.2517123	-26.48493993
88	150.2517042	-26.48498661
89	150.2517066	-26.48503348
90	150.2517054	-26.48508029
91	150.2517043	-26.48513022
92	150.2517066	-26.48517709
93	150.251709	-26.48522397
94	150.2517148	-26.48527091
95	150.2517276	-26.48531486
96	150.2517297	-26.48537266
97	150.2517331	-26.48537585
98	150.2517355	-26.48542272
99	150.2517239	-26.48546933
100	150.2517159	-26.485516
101	150.2517217	-26.48556294
102	150.2517345	-26.4856069
103	150.2517542	-26.48565411

ID	X	Y
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105	150.2517624	-26.48574792
106	150.2517613	-26.48579473
107	150.2517637	-26.48584161
108	150.2517695	-26.48588855
109	150.2517684	-26.48593535
110	150.2517673	-26.48598216
111	150.2517661	-26.48602897
112	150.251765	-26.48607578
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114	150.2517628	-26.48616939
115	150.2517651	-26.48621939
116	150.2517674	-26.48626626
117	150.2517733	-26.4863132
118	150.2517825	-26.48636021
119	150.2517729	-26.48640061
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121	150.251788	-26.48649456
122	150.2518078	-26.48653865
123	150.2518067	-26.48658546
124	150.2518021	-26.4866322
125	150.2518079	-26.48667914
126	150.2518207	-26.48672309
127	150.2518335	-26.48677017
128	150.2518393	-26.48681711
129	150.2518417	-26.48686399
130	150.2518406	-26.48691079
131	150.2518395	-26.4869576
132	150.2518628	-26.48699864
133	150.2519072	-26.48702447
134	150.2519096	-26.48707134
135	150.2519085	-26.48711815
136	150.2519248	-26.48716217
137	150.2519622	-26.48719411
138	150.2520068	-26.48721682

ID	X	Y
139	150.2520549	-26.48723336
140	150.2521068	-26.4872406
141	150.252155	-26.48725714
142	150.2522068	-26.48726751
143	150.2522586	-26.48727787
144	150.2523104	-26.48728511
145	150.2523624	-26.48728611
146	150.2524074	-26.48730155
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162	150.2534804	-26.48726397
163	150.2540919	-26.48724254
164	150.2549953	-26.48721089
165	150.2550045	-26.48720586
166	150.2550468	-26.48717857
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169	150.2551998	-26.48716279
170	150.2552519	-26.48716379
171	150.2553039	-26.48716479
172	150.255356	-26.48715955
173	150.2554081	-26.48715743

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175	150.255512	-26.48716567
176	150.255564	-26.48716667
177	150.255616	-26.48716767
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182	150.2558763	-26.48716331
183	150.2559286	-26.48715495
184	150.2559806	-26.48715595
185	150.2560328	-26.48715071
186	150.2560849	-26.48714859
187	150.2561369	-26.48714647
188	150.2561891	-26.48714123
189	150.2562413	-26.48713599
190	150.2562934	-26.48713075
191	150.2563559	-26.48713195
192	150.256408	-26.48712983
193	150.2564601	-26.48712459
194	150.2565122	-26.48712247
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196	150.2566163	-26.48712135
197	150.2566683	-26.48712235
198	150.2567204	-26.48712023
199	150.2567725	-26.48711811
200	150.2568247	-26.48711287
201	150.2568769	-26.48710451
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203	150.2569653	-26.48709251
204	150.2571681	-26.48729743
205	150.2575725	-26.487706
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207	150.2576354	-26.48776592
208	150.2576893	-26.48780971

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211	150.2577731	-26.48790533
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222	150.2585882	-26.48822675
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224	150.2611371	-26.48811972
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226	150.2648596	-26.48939906
227	150.2648506	-26.48946906
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230	150.2644668	-26.49395504
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234	150.2597762	-26.49392363
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237	150.2596975	-26.49369892
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239	150.2596101	-26.49356267
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247	150.259048	-26.49320855
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269	150.2567879	-26.49404751
270	150.2567841	-26.49412618
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272	150.256793	-26.49430676
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274	150.2530773	-26.49447691
275	150.2529444	-26.49214695
276	150.2529393	-26.49209153
277	150.2529305	-26.49203649
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281	150.2528113	-26.49174194
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283	150.2527111	-26.49161306
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285	150.2525874	-26.49150182
286	150.252518	-26.49145388
287	150.2524442	-26.49141158
288	150.2523666	-26.49137522
289	150.2522857	-26.49134509
290	150.2522023	-26.49132141
291	150.2521169	-26.49130437
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293	150.2520301	-26.49129409
294	150.2519427	-26.49129066
295	150.2518913	-26.49129184
296	150.2517684	-26.49129752
297	150.2517309	-26.49129925
298	150.2517144	-26.49130001
299	150.2517137	-26.49130004
300	150.2517119	-26.49130013
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306	150.2515328	-26.49116244
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308	150.2514031	-26.49109598
309	150.2514005	-26.49109477
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311	150.2513197	-26.49106464
312	150.2512926	-26.49105694
313	150.2512362	-26.49104096

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317	150.2505288	-26.4906816
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319	150.2494845	-26.49043833
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336	150.2483535	-26.48978268
337	150.2483449	-26.48981117
338	150.2483442	-26.4898398
339	150.2483433	-26.48987559
340	150.2483425	-26.48991139
341	150.2483417	-26.4899436
342	150.2483426	-26.48994788
343	150.2481609	-26.48992728
344	150.2477127	-26.49010362
345	150.2473823	-26.49013733
346	150.247151	-26.490539
347	150.246638	-26.490596
348	150.2462799	-26.49056595

ID	X	Y
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351	150.2454804	-26.49100625
352	150.2457027	-26.49133299
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354	150.245866	-26.49187855
355	150.2455254	-26.49235412
356	150.245296	-26.492823
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358	150.2456319	-26.49342275
359	150.2454763	-26.49367605
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365	150.2443026	-26.49517437
366	150.243916	-26.495456
367	150.2437982	-26.4954405
368	150.2435606	-26.49543532
369	150.2431896	-26.49538344
370	150.2429404	-26.49530563
371	150.24275	-26.49502
372	150.242355	-26.49492175
373	150.2420709	-26.49497363
374	150.2419318	-26.49510331
375	150.2419144	-26.49526931
376	150.2420376	-26.4954617
377	150.242038	-26.495462
378	150.2418182	-26.49593882
379	150.241755	-26.496325
380	150.24163	-26.49661
381	150.2414642	-26.49678423
382	150.2413751	-26.49684869
383	150.2413351	-26.49684395

ID	X	Y
384	150.2412476	-26.49684052
385	150.2411602	-26.49684395
386	150.2410735	-26.49685423
387	150.240988	-26.49687127
388	150.2409046	-26.49689495
389	150.2408237	-26.49692508
390	150.2407461	-26.49696144
391	150.2406723	-26.49700375
392	150.2406151	-26.49704322
393	150.2406125	-26.49704502
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403	150.2397056	-26.49796014
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405	150.2396627	-26.49803535
406	150.2396317	-26.49810273
407	150.2396114	-26.49816055
408	150.2396054	-26.49817782
409	150.2396019	-26.49819192
410	150.2395864	-26.49825469
411	150.2395814	-26.49828887
412	150.239575	-26.49833276
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Appendix B

MHQA Method

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SGP North Solar Farm

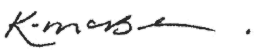
Modified Habitat Quality Assessment Method

Date: 18 September 2026

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Reviewed by	Kate McBean

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			Name/position	Signature
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2	16/01/2026	Incorporate methods for Dunmall's Snake	Kate McBean, Principal Consultant / Team Leader – Biodiversity Offsets	
3	03/06/2026	Updates based on comments from DCCEEW and incorporating methods for squatter pigeon	Kate McBean, Principal Consultant / Team Leader – Biodiversity Offsets	
4	18/09/2026	Update based on RFI from NEPA	Kate McBean, Principal Consultant / Team Leader – Biodiversity Offsets	

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1. Introduction

In accordance with the conditions outlined in the Preliminary Documentation (PD) for the Girrawheen Hybrid Power Facility (the Project) received from the Minister on the 19th March 2025, habitat quality scoring was undertaken in accordance with the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Modified Habitat Quality Assessment (MHQA) method, dated the 28 May 2025, herein referred to as the MHQA method (DCCEEW 2025).

The MHQA method is an adaptation of the Queensland Government's *Guide to determining terrestrial habitat quality v1.2* (DEHP 2017; herein referred to as the Guide). It provides repeatable methods for habitat quality scoring and for determining offset requirements for significantly impacted Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The scoring process evaluates habitat quality for MNES at both the impact and offset area, for input into the EPBC Offset Assessment Guide (the calculator).

Most scoring procedures for the MHQA method are prescribed in the Guide (DEHP 2017); however, some inputs require assessment of matter-specific parameters to ensure scoring accuracy and consistency. Scoring for these matter-specific parameters are undefined in the MHQA method and therefore scoring methods and metrics have been developed for the unique ecological requirements and/or identified threatening processes of the MNES under assessment.

The Project-associated MNES which have been assessed as having potential to experience a Significant Residual Impact (SRI), and therefore require detailed habitat quality scoring and offsets include:

- Glossy black-cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*) – Vulnerable
- Corben's long-eared bat (*Nyctophilus corbeni*) – Vulnerable
- Koala (combined populations of QLD, NSW and the ACT) (*Phascolarctos cinereus*) – Endangered
- Diamond firetail (*Stagonopleura guttata*) – Vulnerable
- Dunmall's snake (*Furina dunmalli*) – Vulnerable
- Squatter pigeon (*Geophaps scripta scripta*) – Vulnerable.

To ensure a consistent approach is undertaken at both the impact and offset area, for both baseline and future assessments, this document has been prepared to outline:

- how the MHQA method has been applied including specific scoring procedures for ***site condition***, ***site context*** and ***species stocking rate***, particularly where these differ from the Guide, and
- specific scoring procedures and metrics for selected parameters for each MNES where applicable (**Section 3**).

The scoring methodology has been consistently applied at both the impact and offset areas for each matter. Scores have been populated in the Assessment-template-MHQA-spreadsheet provided by DCCEEW (now known as the National Environmental Protection Agency [NEPA]) with the Preliminary Documentation (PD) Request for Information (RFI) received on the 16 March 2025, which has been modified to reflect the specific scoring approach outlined in this document.

2. MHQA methodology

2.1 Indicators and attributes

The MHQA method relies on detailed assessment of three indicators:

1. ***site condition***
2. ***site context***
3. ***species stocking rate*** (SSR) (fauna and flora only).

Each indicator comprises multiple scoring attributes that integrate both site-specific field data and spatially derived data. All indicators and attributes that are assessed as part of the MHQA method are summarised in **Table 2.1**. In some instances, attribute scoring also incorporates matter-specific parameters to ensure a more accurate assessment of habitat quality. Where parameters are required to be assessed, these are clearly defined in this document.

As per the MHQA method, two scales of assessment are applied when scoring each indicator: the Assessment Unit scale and the Matter Area scale. The Assessment Unit scale - referring to a subset of mostly homogenous sites (see Section 4.3 of the Guide) - is applied to ***site condition*** attributes, while all ***site context*** and ***SSR*** attributes are assessed at the Matter Area scale (covering the entire impact or offset area for each individual MNES value). This approach differs from both BioCondition Manual (Eyre *et al* 2015) and the Guide.

Section 2.3, **Section 2.4** and **Section 2.5** outline the scoring procedure for the ***site condition***, ***site context*** and ***species stocking rate*** indicators, respectively.

Table 2.1: MHQA assessment components – indicators and attributes

	Indicators		
	Site condition	**Site context**	**Species stocking rate**
Attributes	Recruitment of woody perennial species in EDL	Size of patch	Presence detected on or adjacent to site (neighbouring property with connecting habitat)
	Native plant species richness - trees	Connectedness	Species usage of the site (habitat type and evidenced usage)
	Native plant species richness - shrubs	Context	Approximate density (per ha)
	Native plant species richness - grasses	Ecological Corridors	Role/importance of species population on site
	Native plant species richness - forbs	Role of site location to species/TEC overall population in the State	
	Tree canopy height	Threats to the species	
	Tree canopy cover	Species mobility capacity (fauna only)	
	Shrub canopy cover		
	Native perennial grass cover		
	Organic litter		
	Large trees		

	Indicators		
	Site condition	**Site context**	**Species stocking rate**
	Coarse woody debris		
	Non-native plant cover		
	Quality and availability of food and foraging habitat (fauna only)		
	Quality and availability of shelter (fauna only)		
Scale	**Assessment Unit**	**Matter Area**	**Matter Area**

2.2 Score weighting

Scores generated for each indicator are weighted and combined to generate a final habitat quality score. This score is expressed as a value out of 10; following standard rounding procedures, the score is provided as the nearest whole number. Standard maximum indicator scores and weightings are specified according to matter type (e.g. fauna, flora or TEC) but the combined scores, once finalised and appropriately weighted, always result in a final habitat quality score out of 10. As the MNES values relevant to the project only include fauna values, a summary of the flora and TEC score weightings have not been included in this methodology document.

Table 2.2 summarises the maximum possible scores for each indicator alongside the standard or default weighting protocol. It worth noting that some of the Regional Ecosystems (REs) present within the impact and offset areas are classified as shrublands and have a different maximum score for site condition compared to the other woodland REs. These differences have also been included in **Table 2.2**. For the purpose of this assessment, standard weighting protocols have been amended to reflect species specific requirements and the revised weightings and justifications for each species is summarised in **Table 2.3**.

Table 2.2: Standard maximum indicator scores and weightings

Matter type	Site condition		Site context		Species stocking rate	
	Maximum score	Maximum weighted score	Maximum score	Maximum weighted score	Maximum score	Maximum weighted score
Fauna (woodland RE)	*100*	**3 (30%)**	*56*	**3 (30%)**	*70*	**4 (40%)**
Fauna (shrubland RE)	*80*	**3 (30%)**	*56*	**3 (30%)**	*70*	**4 (40%)**

Table 2.3: Proposed alternative maximum indicator scores and weightings

Matter	Site condition	Site context	Species stocking rate	Justification
	Maximum weighted score	Maximum weighted score	Maximum weighted score	
Glossy black-cockatoo	**4 (40%)**	**3 (30%)**	**3 (30%)**	This species feeds almost exclusively on seeds from sheoak trees (Casuarinaceae) and requires large tree hollows for nesting - factors strongly linked to its local presence (DCCEEW 2022a). These key

Matter	Site condition	Site context	Species stocking rate	Justification
	Maximum weighted score	Maximum weighted score	Maximum weighted score	
				ecological attributes have been incorporated into the **species habitat indices** (**Section 3.1.1**), which are nested within the ***site condition*** scoring framework. As such, the weighting of the ***site condition*** indicator has been increased by 1-point (10%), with a 1-point (10%) reduction from **species stocking rate**, to better reflect these requirements. While capable of powered flight, the species' strong mobility limits the ability to assess population dynamics at small spatial scales and complicates interpretation of landscape-scale factors. Accordingly, greater emphasis has been placed on ***site condition*** over ***site context*** and ***species stocking rate*** as a more reliable indicator of habitat quality.
Corben's long-eared bat	**5 (50%)**	**3 (30%)**	**2 (20%)**	This species can utilise a wide range of inland woodland habitats, and is more commonly recorded in larger, contiguous areas of habitat (DAWE 2015). It is also difficult to detect with capture required to confirm presence. As such, increased score weightings for ***site condition*** (5 points [50%]) and ***site context*** (3 points [30%]) have been applied to reflect the habitat associations and landscape scale features utilised by the species. Due to the poor detectability of the species, ***species stocking rate*** score weighting has been reduced to 2 points (20%).
Koala	**3 (30%)**	**3 (30%)**	**4 (40%)**	Although not clearly defined in the *Guidance on the use of the Modified Habitat Quality Assessment method* (DCCEEW 2025), the default indicator weighting is based on koala habitat requirements and therefore will be retained for scoring.
Diamond firetail	**4 (40%)**	**3 (30%)**	**3 (30%)**	This open woodland species relies primarily on grass seeds for foraging and is largely sedentary, although some localised movement may occur in response to seasonal conditions (DCCEEW 2023a). A minimum patch size of 200 ha is also required to maintain population viability (DCCEEW 2023a). While these factors all contribute to habitat quality, the species' mobility makes it difficult to accurately quantify population dynamics (**species stocking rate**). Although ***site context*** remains relevant, the multiple species-specific scoring parameters developed for the species habitat indices - nested within ***site condition*** scoring (see **Section 3.4.1**) - are considered more quantifiable. Consequently, the weighting of the ***site condition*** indicator has been increased by 1 point (10%), taken from the ***species***

Matter	Site condition	Site context	Species stocking rate	Justification
	Maximum weighted score	Maximum weighted score	Maximum weighted score	
				stocking rate, to better reflect the species' measurable ecological attributes.
Dunmall's snake	**5 (50%)**	**3 (30%)**	**2 (20%)**	This nocturnal reptile is known to utilise a broad range of habitats within the Brigalow Belt where it is thought to feed on skinks and geckos and seek shelter under fallen timber, ground litter and within soil cracks (DoE 2026b). Despite this, very little is actually known about the ecology of this cryptic species, and it is generally thought to be uncommon within its known distribution (DoE 2014). As such, increased score weightings for ***site condition*** (5 points [50%]) and ***site context*** (3 points [30%]) have been applied to reflect the habitat associations and landscape scale features utilised by the species. Due to the poor detectability of the species, ***species stocking rate*** score weighting has been reduced to 2 points (20%).
Squatter Pigeon	**4 (40%)**	**3 (30%)**	**3 (30%)**	This granivorous species occurs within open forest to sparse open woodland typically dominated in the overstory by *Eucalypt*, *Acacia*, *Callitris* and *Melaleuca* species (DoE 2026a). The squatter pigeon is heavily reliant on groundcover vegetation within proximity of a permanent water source for both suitable foraging and nesting habitat. As such, the weighting of the ***site condition*** indicator has been increased by 1-point (10%), with a 1-point (10%) reduction from ***species stocking rate*** to better reflect these requirements. While they are capable of powered flight, this species is largely thought to be sedentary although localised dispersal may occur in response to water availability and seasonal abundances of grass seeds. Accordingly, a greater emphasis has been placed on ***site condition*** over ***site context*** and ***species stocking rate*** as a more reliable indicator of habitat quality.

2.3 Site condition

The ***site condition*** indicator is primarily based on 13 pre-determined floristic and structural field attributes which are measured and assessed in accordance with Section 5 of the Guide (DEHP 2017). This involves the establishment of 100 x 50 m sample sites (0.5 ha plots) in relevant representative vegetation types within which the site-specific field attributes are measured (see section 4.4 of the Guide for how to determine the number and location of sample sites). Sub-plots and a central transect within the larger overall sample site are also used to measure specific data (**Table 2.4**). For offset sites, these plots are fixed and permanent.

Once field data is collected, scores are then derived through comparison to benchmarks for each RE (from the *BioCondition Benchmark Database, Version 3.6* [Queensland Herbarium and Biodiversity Science 2025]), as outlined in Table 2 of the Guide and replicated below in **Table 2.4** (noting there are some errors in Table 2 of the Guide which have been corrected below as per guidance in the MHQA method). Relevant RE benchmarks for the Project are presented in **Appendix A**, **Table A1**.

Table 2.4: Scoring for the 13 site condition attributes

Attribute	Attribute measurement area	Score categories and scales				
Recruitment of woody perennial species in EDL	100 x 50 m plot	**Score**	**0**	**3**		**5**
		Benchmark	<20%	>20-75%		>75%
Native plant species richness - trees	100 x 50 m plot	**Score**	**0**	**2.5**		**5**
		Benchmark	<25%	≥25-90%		≥90%
Native plant species richness - shrubs	50 x 10 m sub-plot	**Score**	**0**	**2.5**		**5**
		Benchmark	<25%	≥25-90%		≥90%
Native plant species richness - grasses	50 x 10 m sub-plot	**Score**	**0**	**2.5**		**5**
		Benchmark	<25%	≥25-90%		≥90%
Native plant species richness - forbs	50 x 10 m sub-plot	**Score**	**0**	**2.5**		**5**
		Benchmark	<25%	≥25-90%		≥90%
Tree canopy height	100 x 50 m plot	**Score**	**0**	**3**		**5**
		Benchmark	<25%	>25-70%		>70%
Tree canopy cover	100 m transect	**Score**	**0**	**2**	**3**	**5**
		Benchmark	<10%	>10%-<50%	>200%	>50%-<200%
Shrub canopy cover	100 m transect	**Score**	**0**	**3**		**5**
		Benchmark	<10%	≥10%–<50% or >200%		>50%–<200%
Native perennial grass cover	1 x 1 m sub-plots (x 5)	**Score**	**0**	**1**	**3**	**5**
		Benchmark	<10%	>10–50%	>50–90%	>90%
Organic litter	1 x 1 m sub-plots (x 5)	**Score**	**0**	**3**		**5**
		Benchmark	<10%	≥10%–<50% or >200%		>50%–<200%
Large trees	100 x 50 m plot	**Score**	**0**	**5**	**10**	**15**
		Benchmark	0%	0–50%	>50–100%	>100%
Coarse woody debris	50 x 20 m sub-plot	**Score**	**0**	**2**		**5**
		Benchmark	<10%	<50% or >200%		>50% or <200%

Attribute	Attribute measurement area	Score categories and scales				
Non-native plant cover	50 x 10 m sub-plot	**Score**	**0**	**3**	**5**	**10**
		% of weed cover	>50%	>25–50%	>5–25%	<5%

2.3.1 Species habitat indices

The MHQA method also incorporates two supplementary scoring attributes when assessing fauna species ***site condition***, collectively referred to as **species habitat indices (SHI)**, including:

- **Quality and availability of food and foraging habitat**
- **Quality and availability of shelter**

Assessment of these **SHI** is undertaken generally in accordance with Section 7 of the Guide, however, scoring for **SHI** relies on the development of species-specific parameters informed by the ecological requirements of each species. Examples include the *presence of micro-habitat features for shelter* or the *relative abundance of specific food resources*. Detailed **SHI** scoring parameters and their application for each relevant species are provided in **Section 3**. Although the scoring for **SHI** is consistent with Table 4 of the Guide (replicated in **Table 2.5**), a slight adjustment on scoring is made where multiple parameters are assessed. For example, where two or more parameters are used, scores are combined and transformed to a score out of 10 (e.g. summed score divided by the maximum possible score, then multiplied by 10).

Additionally, deriving appropriate scoring benchmarks for species-specific habitat parameters can be challenging. Where directly applicable, benchmarks provided in the Benchmark Database (Queensland Herbarium and Biodiversity Science 2025) were utilised. In cases where no suitable benchmarks were available, RE Technical Descriptions (Queensland Herbarium 2018) were used to derive scoring benchmarks. Specifically, data for relevant flora species listed under *Frequent species* in each technical description was used to develop benchmarks for REs to score some attributes. For example, when a species relies on a subset of flora species for foraging resources, the total cover across strata of these species within each applicable RE was summed to generate a benchmark. Similarly, where flora species richness was the relevant scoring parameter, benchmarks were derived by counting all relevant species listed in the applicable strata. The application of these benchmarks is discussed further in **Section 3**.

Table 2.5: Scoring for species habitat indices

Attribute	Parameter measurement area	Score categories			
Quality and availability of food and foraging habitat (fauna only)	Specified for each parameter in **Section 3**	Score	**1**	**5**	**10**
		Description	Poor	Moderate	High
Quality and availability of shelter (fauna only)	Specified for each parameter in **Section 3**	Score	**1**	**5**	**10**
		Description	Poor	Moderate	High

2.4 Site context

The ***site context*** attributes, and assessment scales, are summarised in **Table 2.6** in accordance with Section 6 and Section 7 of the Guide (DEHP 2017). The impact and offset areas are located within fragmented landscapes, therefore the ***site context*** scoring protocols follow those in a fragmented landscape (Brigalow Belt bioregion). Scoring methods for each attribute are described below from **Section 2.4.1** to **Section 2.4.7**.

Table 2.6: Site context scoring attributes and maximum scores

Attribute	Assessment Scale	Maximum Score
Size of patch	Matter Area	10
Connectedness	Matter Area	5
Context	Matter Area	5
Ecological Corridors	Matter Area	6
Role of site location to species/TEC overall population in the state	Matter Area	5
Threats	Matter Area	15
Species mobility capacity	Matter Area	10

2.4.1 Size of patch

Size of patch is assessed via a desktop spatial analysis to measure the size of the matter area for each MNES and all other directly connecting areas of mapped remnant or regrowth vegetation (i.e. Category B, C or R regulated vegetation) where these may support suitable habitat for the MNES.

The size of patch assessment is undertaken in accordance with Section 6.1.1 of the BioCondition Assessment Manual (Eyre *et al*. 2015), as opposed to the method outlined in the Guide. This approach is considered more robust as it incorporates the presence of both remnant and regrowth vegetation in the assessment. The scoring categories reflect those presented in Table 15 of the BioCondition Assessment Manual as replicated below in **Table 2.7**. Assessment of **size of patch** may utilise alternative spatial datasets representing species-specific habitat (only when available and relevant) within the matter area and directly connected areas of suitable habitat.

Where a matter area and its directly connected areas of remnant and regrowth vegetation comprises multiple, discrete polygons, each polygon will be individually scored using the categories in **Table 2.7** and then the average score across the different areas will be used as the **size of patch** score for the matter area.

Table 2.7: Scoring for size of patch

Description	Score
<5 ha of remnant AND/OR regrowth vegetation	0
≥5-25 ha of remnant AND/OR regrowth vegetation	2
≥25-100 ha remnant OR ≥25-200 ha remnant and regrowth OR ≥25-200 ha regrowth vegetation	5
≥100-200 ha remnant OR >200 ha remnant and regrowth OR >200 ha regrowth vegetation	7
≥200 ha remnant vegetation	10

2.4.2 Connectedness

Connectedness assesses how well the site is linked to surrounding habitat. It reflects the ability of species to move through the landscape between suitable habitat patches, which is essential for maintaining population viability. High connectedness enables fauna to move readily between habitats, while low connectedness increases the risk of population isolation (Eyre *et al.* 2015).

Connectedness assessments are undertaken in accordance with Section 6.1.2 of the BioCondition Assessment Manual (Eyre *et al.* 2015), as opposed to the method outlined in the Guide. This approach is considered more robust as it incorporates the presence of both remnant and regrowth vegetation (i.e. Category B, C or R regulated vegetation) in

the assessment. The scoring categories reflect those presented in Table 16 of the BioCondition Assessment Manual as replicated below in **Table 2.8**.

Assessment of **connectedness** may utilise alternative spatial datasets representing species-specific habitat (only when available and relevant) within the matter area and directly connected areas of suitable habitat.

Table 2.8: Scoring for connectivity in the landscape

Description	Score
The matter area is not connected using any of the below descriptions	0
The matter area is adjacent to remnant vegetation along >10% to <50% OR The matter area is adjacent to remnant vegetation along <10% of its perimeter AND is connected with adjacent regrowth vegetation along >25% of its perimeter	2
The matter area is connected with adjacent remnant along 50%-75% of its perimeter	4
The matter area is connected with adjacent remnant vegetation along >75% of its perimeter OR the matter area is >500 ha of remnant vegetation	5

2.4.3 Context

Context is assessed generally in accordance with Section 6 (Step 4) of the Guide (DEHP 2017) with the following modifications:

- the assessment approach outlined in the Guide may be modified by replacing remnant vegetation with alternative spatial datasets which represent species-specific habitat (only when available and relevant).
- where relevant, a matter-specific buffer distance should be applied rather than the standard 1 km buffer to 'better reflect the species mobility and utility of adjacent habitat'.

The buffer is to be applied from the boundary of the matter area using the buffer distances for each MNES listed in **Table 2.9**. **Context** is scored using four broad categories consistent with Table 3 of the Guide as replicated below in **Table 2.10**.

Table 2.9: Matter-specific context buffer distances

Matter	Buffer distance	Justification
Glossy black-cockatoo	15 km	This species is known to commute up to 14 km daily to forage (DCCEEW 2022a). As such, 15 km is a precautionary distance to allow for daily foraging or dispersal.
Corben's long-eared bat	5 km	This species is known to travel distances of up to 4 km each night between day roosts and may travel further as required (DAWE 2015). As such, 5 km is a precautionary distance to allow for daily foraging or dispersal events.
Koala	10 km	According to Dique *et al.* (2003), the mean straight-line distance between the natal and breeding home ranges for koalas ranged from 300 m to 10.6 km and averaged 3.4 km for females and 3.5 km for males. 10 km is well above the average but also accounts for the maximum home range size.
Diamond firetail	1 km	This species requires a minimum patch size of 200 ha to maintain a viable population (DCCEEW 2023a). The radius of a 200-ha circle is 800 m. This is well below the standard buffer distance and the species is largely sedentary. The

Matter	Buffer distance	Justification
		standard 1 km buffer distance (which equates to over 300 ha) has been used for this species as a precautionary approach.
Dunmall's snake	1 km	Very little is known about the ecology or movement patterns of Dunmall's snake (DoE 2026b). The lack of daily, monthly and yearly movement of similar sized elapids is well documented, with movements of a similar sized species of elapid less than 200 m per month (Webb and Shine 1997). Dunmall's snake is known to utilise a broad range of habitats within the Brigalow Belt, feed on skinks and geckos and seek shelter under fallen timber and ground litter (DoE 2026b). The relatively isolated nature of records throughout their known distribution in Queensland indicates that prior to European settlement, these populations were much more connected. It is possible that genetic exchange still occurs between these isolated populations. As such, a highly conservative and precautionary distance of 1 km has been assigned to this species to account for individuals dispersing during periods of low resource availability or in search of mates.
Squatter pigeon (southern)	10 km	Whilst there is some evidence to suggest that the squatter pigeon may move locally in response to seasonal resource availability and rainfall patterns, at the species level they are sedentary or locally nomadic (DoE 2026a). When localised dispersal does occur, the squatter pigeon may disperse along vegetated corridors to access permanent water sources elsewhere in the region. As such, a precautionary buffer distance of 10 km has been selected for this species to account for dispersal in response to lack of permanent water.

Table 2.10: Scoring for context

Description	Score
<10% remnant vegetation	0
>10% to 30% remnant vegetation	2
>30% to 75% remnant vegetation	4
>75% remnant vegetation	5

2.4.4 Ecological corridors

Proximity **to Ecological corridors** is assessed in accordance with Section 6.2 (Step 6) of the Guide (DEHP 2017). An 'ecological corridor' is represented as any 'Riparian' or 'Terrestrial' feature within the 'CORR_TYPE' attribute table of the 'Queensland statewide corridors' spatial layer. Scoring is consistent with Table 3 of the Guide as replicated in **Table 2.11**.

Table 2.11: Scoring for ecological corridors

Description	Score
Not within	0
Sharing a common boundary	4
Within (whole or part)	6

2.4.5 Role of site location for the population in the State

Assessment and scoring of the **role of site location for the population in the State** will be undertaken in accordance with Section 7.2 of the Guide (DEHP 2017). This attribute reflects the importance of the site for the overall population of the species in Queensland and is considered analogous to *Habitat critical to the survival of the species* (HCSS) as defined in the Commonwealth MNES Significant impact guidelines 1.1 (DoE 2013), or where available, in accordance with matter-specific statutory documentation. As per DoE (2013) the definition of habitat critical to the survival of a species or ecological community refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long-term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

Definitions of HCSS for each matter is summarised in **Table 2.12**. The scoring categories used for this attribute are consistent with Table 4 of the Guide as replicated in **Table 2.13**, however the approach has been modified slightly. In instances where HCSS obviously occurs within the impact area/offset area based on these definitions then the highest score (5) is awarded. In instances where no HCSS is present then the lowest score (1) is awarded. For all other instances where it is hard to define HCSS for the species, a conservative approach has been taken, and a moderate score (4) is awarded.

Table 2.12: Definitions of habitat critical to the survival of the species (HCSS)

Matter	HCSS definition
Glossy black-cockatoo	As per the species Conservation Advice (DCCEEW 2022a), there is no species-specific definition of HCSS for glossy black-cockatoo. As such, the standard definition in DoE (2013) has been applied.
Corben's long-eared bat	There is no species-specific definition of HCSS for Corben's long-eared bat (DAWE 2015). As such, the standard definition has been applied.
Koala	According to the species Conservation Advice (DCCEEW 2022b), HCCS is broadly defined as *areas that the species relies on to avoid or halt decline and promote the recovery of the species*. The following factors are to be considered when identifying HCSS: • whether the habitat is used during periods of stress (e.g. flood, drought or fire) • whether the habitat is used to meet essential life cycle requirements (e.g. foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes) • the extent to which the habitat is used by important populations • whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development

Matter	HCSS definition
	• whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements • whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation • any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.
Diamond firetail	As per the species Conservation Advice (DCCEEW 2023a), HCSS includes areas of: • eucalypt, Acacia or Casuarina woodlands, open forests and other lightly timbered habitats • low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding • Drooping she-oak (*Allocasuarina verticillata*) within the Mt Lofty Ranges.
Dunmall's snake	Whilst the Conservation Advice (DoE 2014) does not provide a definition for HCSS for the Dunmall's snake, the draft referral guidelines for brigalow reptiles (DCCEEW 2023b) regards any suitable habitat as important habitat. Important habitat for listed brigalow reptiles should incorporate any large patches of contiguous, suitable habitat and viable landscape corridors which are necessary for the purpose of breeding, dispersal or maintaining the genetic diversity of the species over successive generations (DCCEEW 2023b). Considering the location of the Project within the broader landscape, and the contiguous nature of the surrounding vegetation, suitable habitat identified within the Project area is likely to constitute 'habitat critical to the survival of the species'.
Squatter Pigeon	As per the species Conservation Advice (TSSC 2015), there is no species-specific definition of HCSS for the squatter pigeon. As such, the standard definition in DoE (2013) has been applied.

Table 2.13: Scoring for role of the site location to species overall population in the state

Description	Score
Not or unlikely to be critical to species' survival	1
Likely to be critical to species' survival	4
Critical to species survival	5

2.4.6 Threats

For each MNES, **Section 3** provides a detailed assessment of each species-specific threatening process, identified in relevant conservation and statutory documents, as well as a justification for its inclusion or exclusion from the habitat quality assessment process.

Using DCCEEW's threat risk matrix[1] (**Table 2.14**) and advice in species conservation documents, risk ratings have been assigned for each **threat** presented in **Section 3**. Risk ratings are low, moderate, high and very high considering the consequence and likelihood of occurrence across the range and extent of the species.

[1] As part of more recently developed MNES species conservation advice in the DCCEEW Species profiles and Threats database, DCCEEW has developed a risk matrix in consultation with list experts/community and in-house expertise using available literature. The same risk matrix has been adopted as part of this MHQA method.

Likelihood categories are defined as:

- Almost certain – expected to occur every year
- Likely – expected to occur at least once every 5 years
- Possible – might occur at some time
- Unlikely – such events are known to have occurred on a worldwide basis but only a few times
- Unknown – currently unknown how often the incident will occur

Consequence categories are defined as:

- Not significant – no long-term effect on individuals or populations
- Minor – individuals are adversely affected but no effect at population level
- Moderate – population recovery stalls or reduces
- Major – population decreases
- Catastrophic – population extirpation/extinction

The resulting risk rating for each **threat** is quantified as presented in **Table 2.14**. The five-point rating scale is derived from Table 2.4 of the Guide to determining terrestrial habitat quality Version 1.3 (DES 2020), noting that the consequence values have been ordered from 'not significant' to 'catastrophic' which is the inverse of DES 2020[2]. The quantified risk rating is also the 'threat multiplier' used to calculate the final weighted threats score for the ***site context*** assessment.

Table 2.14: DCCEEW's threat risk matrix and threat multipliers

Likelihood	Consequences				
	Not significant (1)	**Minor (2)**	**Moderate (3)**	**Major (4)**	**Catastrophic (5)**
Almost certain (5)	Low risk (5)	Moderate risk (10)	Very high risk (15)	Very high risk (20)	Very high risk (25)
Likely (4)	Low risk (4)	Moderate risk (8)	High risk (12)	Very high risk (16)	Very high risk (20)
Possible (3)	Low risk (3)	Moderate risk (6)	High risk (9)	Very high risk (12)	Very high risk (15)
Unlikely (2)	Low risk (2)	Low risk (4)	Moderate risk (6)	High risk (8)	Very high risk (10)
Unknown (1)	Low risk (1)	Low risk (2)	Moderate risk (3)	High risk (4)	Very high risk (5)

For some MNES, the species conservation advice includes an assessment of known threats and subsequent classification of each threat using the risk matrix. Where this is available, the nominated level of risk is used as part of this assessment. In instances where the risk associated with the identified threatening processes are not categorised in the species' conservation advice, a similar assessment process was undertaken using the DCCEEW risk matrix considering the relevant statutory documents for each species (see **Section 3** for each species assessment).

To calculate the final weighted **threat** score for the ***site context*** assessment, each identified threat in **Section 3** is independently scored based on Section 7.2 and Table 4 of the Guide (DEHP 2017), as replicated in **Table 2.15**. The resulting scores for each threat are subsequently weighted using the 'threat multiplier' (**Table 2.14**) to reflect their individual severity, and combined to determine a score out of 15, to incorporate into the broader assessment of site

[2] The approach to assessing threats to MNES as part of the Guide to determining terrestrial habitat quality Version 1.3 (DES 2020) uses a threat matrix to score each threat factor according to its scope and severity, adapted from IUCN-CMP (2007). While this MHQA Method has been developed based on the Guide (DEHP 2017), the five-point score scaling used as part of Guide to determining terrestrial habitat quality Version 1.3 (DES 2020) more closely aligns with the DCCEEW's threat risk matrix, compared to the 'Threats to species' assessment used as part of the Guide (DEHP 2017).

context. The combined threats score is calculated using the following formula (e.g. summed score divided by the maximum possible score, then multiplied by 15):

$$= \frac{(Threat\ 1\ score\ x\ Threat\ 1\ risk\ rating) + (Threat\ 2\ score\ x\ Threat\ 2\ risk\ rating)}{(Threat\ 1\ max.score\ x\ Threat\ 1\ risk\ rating) + (Threat\ 2\ max.score\ x\ Threat\ 2\ risk\ rating)} \times 15$$

Table 2.15: Scoring for threats

Description	Score
High threat level (i.e. likely to result in death, irreversible damage)	1
Moderate threat level	7
Low threat level (i.e. likely to survive)	15

2.4.7 Species mobility capacity

Species mobility capacity is only relevant for certain fauna species. Assessment and scoring for **species mobility capacity** is undertaken in accordance with Section 7.2 of the Guide (DEHP 2017). The Guide defines species mobility capacity as, "*the presence and severity of factors that would contribute to a reduction in the mobility of the species. For example, when a barrier to movement is created within or between habitats that is likely to result in a long-term reduction in genetic fitness or access to important resources.*"

For each MNES, **Section 3** provides a description of the site-specific factors that may be contributing to a reduction in the mobility of the species, and defines relevant parameters and scoring scales to assess these. Scoring for each parameter is consistent with Section 7.2 and Table 4 of the Guide (DEHP 2017), as replicated in **Table 2.16**. A slight modification on scoring is made where multiple parameters (i.e. factors impacting mobility capacity) are assessed. For example, where two or more parameters are used, scores are combined and transformed to a score out of 10 (e.g. summed score divided by the maximum possible score, then multiplied by 10).

Table 2.16: Scoring for species mobility capacity

Description	Score
Severely restricted (76–100% reduction)	1
Highly restricted (51–75% reduction)	4
Moderately restricted (26–50% reduction)	7
Minor restriction (0–25% reduction)	10

2.5 Species stocking rate

Assessment and scoring of the ***species stocking rate (SSR)*** indicator is exclusively based on the MHQA method and is only required for fauna and flora. Scoring inputs evaluate each species' broader distribution, abundance, and site use. The attributes assessed for fauna-specific ***SSR*** are:

- Presence detected on or adjacent to site (neighbouring property with connecting habitat)
- Species usage of the site (habitat type and evidenced usage)
- Approximate density (per ha)
- Role/importance of species population on site

Details of the methods and scoring for each ***SSR*** attribute is described in **Sections 2.5.1** to **Section 2.5.4**. Note, as no flora are expected to be significantly impacted by the Project, methods for assessing flora ***SSR*** are not described in this document.

2.5.1 Presence detected on or adjacent to site

This attribute was assessed for each MNES using observational data from site-specific field surveys and publicly available verified species records. A summary of the survey efforts undertaken across the impact area is presented in the Preliminary Documentation, whilst survey methodologies within the offset area are specified in the Projects Offset Management Plan (OMP).

The definitions of 'on site' and 'adjacent to site' are based on species-specific characteristics, particularly mobility and dispersal potential. These definitions align with the approach used to determine context scores (see **Section 2.4.3**), applying the same species-specific buffer distances. The definition of 'on-site' and 'adjacent to site' for each MNES are presented in **Table 2.17** below. Scoring for this attribute is consistent with the MHQA method as described in **Table 2.18**.

Table 2.17: Definitions of 'presence detected on or adjacent to site'

Matter	Definition of 'on-site'	Definition of 'adjacent to site'
Glossy black-cockatoo	Record or evidence within the MNES matter area	Record or evidence within 15 km of the MNES matter area
Corben's long-eared bat	Record or evidence within the MNES matter area	Record or evidence within 5 km of the MNES matter area
Koala	Record or evidence within the MNES matter area	Record or evidence within 10 km of the MNES matter area
Diamond firetail	Record or evidence within the MNES matter area	Record or evidence within 1 km of the MNES matter area
Dunmall's snake	Record or evidence within the MNES matter area	Record or evidence within 1 km of the MNES matter area

Table 2.18: Scoring for presence detected on or adjacent to site

Attribute		Scoring		
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	**Score**	**0**	**5**	**10**
	Criteria	No	Yes – adjacent to site	Yes – on-site

2.5.2 Species usage of the site (habitat type and evidenced usage)

This attribute was scored using species-specific habitat mapping defined as part of the Project's Preliminary Documentation in accordance with relevant statutory documentation. Scoring for this attribute is consistent with the MHQA method as described in **Table 2.19**. When species habitat categorisation deviated from the standard procedure, a precautionary scoring approach was applied. For instance, if foraging and breeding habitats were combined for a matter, the highest score of 15 was assigned.

Table 2.19: Scoring for species usage of the site

Attribute		Scoring			
Species usage of the site (habitat type and evidenced usage)	**Score**	**0**	**5**	**10**	**15**
	Description	Not habitat	Dispersal	Foraging	Breeding

2.5.3 Approximate density (per ha)

Estimating the density of wild populations is particularly challenging where survey areas are spatially limited or where species are cryptic or seasonal in their detectability. These limitations in estimating fauna density have been well documented (e.g. Duckworth 1998; Gilbert *et al.* 2020). Accordingly, **approximate density (per ha)** scoring varies between matters and may rely on quantitative data, qualitative data, or a combination of both. The specific methods applied for each matter are detailed in **Section 3**, however, overall scoring for this attribute is consistent with the MHQA method as described in **Table 2.20**.

Table 2.20: Scoring for approximate density

Attribute	Scoring				
Approximate density (per ha)	**Score**	**0**	**10**	**20**	**30**

2.5.4 Role/importance of species population on site

This attribute uses multiple parameters that each have a binary scoring protocol. All were assessed for each matter using the definitions described below and the standard MHQA scoring protocols presented in **Table 2.21**. The scores from each parameter are summed and used to derive the final score for this attribute (**Table 2.22**).

Key source population for breeding

The maximum score as per **Table 2.21** was applied for this parameter where:

- An important population defined for the species intersects the matter area, and
- Habitat present is known breeding habitat.

Otherwise, a score of 0 was applied.

Key source population for dispersal

The maximum score as per **Table 2.21** was applied for this parameter where:

- An important population defined for the species intersects the matter area, and
- Habitat present is known dispersal habitat.

Otherwise, a score of 0 was applied.

Near the limit of the species range

This attribute was scored using spatial analysis based on DCCEEW's *Species of National Environmental Significance* (SNES) distribution mapping. A species was considered near the limit of its range (and assigned the maximum score in **Table 2.21**) if the impact or offset area was located within 10 km of the SNES-defined distribution boundary, noting this data has been gridded to 1 km or 10 km, depending on species sensitivity.

Necessary for maintaining genetic diversity

The maximum score as per **Table 2.21** was applied for this parameter where:

- An important population defined for the species intersects the matter area, and
- There is available evidence to suggest that this population is necessary for maintaining genetic diversity.

Otherwise, a score of 0 was applied.

Table 2.21: Supplementary scoring for role/importance of species population on site

Attribute		Minimum	Maximum
Key source population for breeding	**Score**	**0**	**10**
	Determination	No	Yes
Key source population for dispersal	**Score**	**0**	**5**
	Determination	No	Yes
Near the limit of the species range	**Score**	**0**	**15**
	Determination	No	Yes
Necessary for maintaining genetic diversity	**Score**	**0**	**15**
	Determination	No	Yes

Table 2.22: Final scoring for role/importance of species population on site

Attribute	Scoring				
Role/importance of species population on site	**Score**	**0**	**5**	**10**	**15**
	Total score	0	5-15	20-35	40-45

3. Species-specific scoring parameters

3.1 Glossy black-cockatoo

Glossy black-cockatoos are highly dependent on the seeds of she-oaks (Casuarinaceae) as a primary foraging resource, often relying on a subset of species according to region (DCCEEW 2022a). Based on those listed within the species Conservation Advice (DCCEEW 2022a), up to six foraging she-oak species for the glossy black-cockatoo could occur in the region. These are summarised below in **Table 3.1**.

Table 3.1: Potential foraging tree species – glossy black-cockatoo

Regional she-oak species	
Allocasuarina inophloia	*Allocasuarina torulosa*
Allocasuarina littoralis	*Casuarina cristata*
Allocasuarina luehmannii	*Casuarina cunninghamiana*

3.1.1 Site condition – Species Habitat Indices

3.1.1.1 Quality and availability of food and foraging habitat

Due to their strong reliance on specific sheoak species, the presence and diversity of those species within areas of habitat are critical when determining the quality and availability of foraging resources and therefore foraging habitat quality (DCCEEW 2022a).

The first parameter, *availability of foraging trees*, measures the availability of foraging resources by assessing the canopy cover of the foraging tree species presented in **Table 3.1**, which is likely to correlate with potential seed production. Scoring benchmarks for this parameter were derived using RE Technical Description data (Queensland Herbarium 2018). This involved calculating total foraging tree cover values for four applicable strata: Emergent, T1 (tree canopy), T2, and T3 (tree subcanopy) for each RE present. The resulting benchmarks are presented in **Appendix A**, **Table A2**. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 6) and the total cover of relevant foraging trees present is compared to the benchmark and scored using **Table 3.2**. Score scaling presented in **Table 3.2** is based on Section 5.1 of the Guide (Table 2: Tree canopy cover), however, excludes scoring references to cover over 200% as it is not considered relevant for this assessment.

The second parameter, *foraging tree species richness*, measures the richness of preferred foraging species listed in **Table 3.1** at each site. Sites supporting higher richness are considered to provide more foraging opportunities and therefore higher-quality habitat. Benchmarks for this parameter were also derived from RE Technical Description data (Queensland Herbarium 2018) and are presented in **Appendix A**, **Table A2**. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 2) and the number of foraging tree species recorded is compared to the benchmark and scored using **Table 3.2**. Score scaling presented in **Table 3.2** is based on Section 5.1 of the Guide (Table 2: Native plant species richness – trees).

Table 3.2: Quality and availability of food and foraging habitat parameters – glossy black-cockatoo

Parameter	Parameter measurement area	Score		
		1	5	10
*Availability of foraging trees**	100 m transect	<10% of foraging tree cover benchmark	≥10 to 50% of foraging tree cover benchmark	>50% of foraging tree cover benchmark

Parameter	Parameter measurement area	Score		
		1	5	10
*Foraging tree species richness**	100 x 50 m plot	<25% of foraging tree species richness benchmark	≥25 to 90% of foraging tree species richness benchmark	>90% of foraging tree species richness benchmark

*See **Appendix A, Table A2** for species specific benchmarks

3.1.1.2 Quality and availability of shelter

Glossy black-cockatoos require eucalypt hollows with specific traits for nesting. Potential nest hollows may be >8 m above the ground, located in branches >30 cm in diameter at >45°, with an entrance diameter of >15 cm, however, further research is needed to better understand nesting habitats and habitats (DCCEEW 2022a).

Breeding habitat does not always overlap with foraging areas (sheoak occurrence is often patchy and sporadic) and therefore the species may undertake daily commutes (DCCEEW 2022a). According to the Conservation Advice (DCCEEW 2022a), the movements of the Kangaroo Island subspecies (*C. l. halmaturinus*) have undergone the most investigation and have been found to commute up to 14 km between nesting hollows and foraging areas without a reduction in reproductive success (DCCEEW 2022a). However, nesting hollows are typically located within 1 km of foraging resources and in relative proximity (<200 m) to permanent water (DCCEEW 2022a).

The first parameter is *proximity to permanent water* with scoring following the suggested daily commutes but with a lower threshold for the maximum score due the reduced preferred distance to surface water (200 m [DCCEEW 2022a]). As presented in **Table 3.3**, sites within 200 m are assigned the highest score. Permanent water is defined as permanent natural wetlands, lakes, farm dams and all major watercourses (stream order 3 and above).

As per Eyre *et al.* (2022), terrestrial hollow surveys are considered unreliable and tend to show observer-related bias, with large tree abundance a more accurate surrogate to determine hollow availability. Although the species shows preferences for highly specific hollows in very old trees (DCCEEW 2022a), a precautionary approach has been taken in the assessment of hollow availability by using the parameter, *number of eucalypt tree > 30cm DBH*. This approach counts all large trees which may support hollows as well as potential future hollow-bearing trees. All eucalypt trees with a DBH greater than 30 cm are counted within the 100 x 50 m plot and the total number (after being multiplied by 2) is compared to the RE benchmark "Large eucalypt per ha" presented in **Appendix A**, **Table A1**. The parameter is scored using **Table 3.3** Score scaling presented in **Table 3.3** was informed by Section 5.1 of the Guide (Table 2: Large trees). Note that, comparison with the RE benchmark "Large eucalypt per ha" is considered a reasonable surrogate benchmark given there is no available benchmark for the number of eucalypt trees greater than 30 cm DBH.

Table 3.3: Quality and availability of shelter habitat parameters – glossy black-cockatoo

Parameter	Parameter measurement area	Score		
		1	5	10
Proximity to permanent water (natural wetlands, lakes, farm dams and stream order 3 and above)	Transect centre point	>14 km from permanent water	14 km to 200 m from permanent water	Within 200 m of permanent water
*Number eucalypt tree > 30cm DBH**	100 x 50 m plot	0 to 50% of RE benchmark for large eucalypt trees	>50 to 100% of RE benchmark for large eucalypt trees	>100% of RE benchmark for large eucalypt trees

*See **Appendix A, Table A1** for RE benchmarks

3.1.2 Site context

3.1.2.1 Threats

3.1.2.1.1 Summary of relevant threats

A summary of the threats identified for the glossy black-cockatoo in the species Conservation Advice (DCCEEW 2022a) is provided in **Table 3.4**. Justifications for each threat's inclusion or exclusion in the threat assessment has also been provided. Several key threats are considered relevant for this species and have been included in the assessment, these are inappropriate fire regimes, clearing of suitable glossy black-cockatoo habitat, habitat degradation by livestock and predation by pest animals (feral cat and European red fox). For threats proposed to be included in the threat assessment, the parameter used to assess the threat is also identified. Risk ratings have been assigned for each threat based on the risk assessment in the species Conservation Advice (DCCEEW 2022a).

Table 3.4: Summary of threats – Glossy black-cockatoo

Threats	Assessment Proposed?	Justification	Assessment parameter	Risk Rating
Inappropriate fire regimes (DCCEEW 2022a)	Yes	The impact and offset areas contain habitat for this species that may be impacted by inappropriate fire regimes.	*Potential for inappropriate fire regimes*	Very high risk (20)
Clearing of native vegetation/timber harvesting (DCCEEW 2022a) and habitat fragmentation (DCCEEW 2022a)	Yes	Both the impact and offset sites are in areas where vegetation has been historically cleared to facilitate pastoral activities, and development of CSG infrastructure. Therefore, clearing of native vegetation and consequential habitat fragmentation are both potential threats at the impact and offset sites.	*Vegetation protection status*	Very high risk (20)
Habitat degradation caused by livestock grazing (DCCEEW 2022a)	Yes	The impact and offset sites are in areas where habitat has been historically impacted by domestic livestock grazing.	*Grazing intensity*	Moderate risk (6)
Predation by feral animals (DCCEEW 2022a)	Yes	Predation by feral animals (including cats and foxes) is listed as a threatening process for this species, and these species are likely to be present at the impact and offset site.	*Feral Cat Activity Index and European red fox Activity Index*	Moderate risk (8)
Invasive weeds (DCCEEW 2022a)	No	More research is required to understand the weed species which may impact south-eastern glossy black cockatoo feeding and breeding habitats, and the extent of this threat.	N/A	N/A

Threats	Assessment Proposed?	Justification	Assessment parameter	Risk Rating
Climate change (DCCEEW 2022a)	No	Climate change will increase and continue to increase the likelihood of extreme events such as wildfires, floods, droughts and heatwaves. It may also affect the temporal or spatial shift of foraging resource availability for species with specific foraging requirements. As climate change is a broader scale ecological threat, and is generally consistent between the impact and offset site, it has been excluded from the threat assessment.	N/A	N/A
Competition for nest hollows (DCCEEW 2022a)	No	The south-eastern glossy black-cockatoo is especially vulnerable to hollow loss as they often nest in loose aggregations, and nest areas have relatively high densities. This impact is a landscape scale threat, therefore, competition for hollows with other native species and has not been incorporated into this analysis.	N/A	N/A
Psittachine Beak and Feather Disease (PBFD) (DCCEEW 2022a)	No	Whilst glossy black-cockatoos are susceptible to PBFD the threat level is relatively low and is considered to be a landscape level threat.	N/A	N/A
Illegal avian trade of birds and eggs (DCCEEW 2022a)	No	The extent of this threat is not known and is considered to be a landscape level threat.	N/A	N/A

3.1.2.1.2 Threat assessment parameters and scoring

The assessment parameter for inappropriate fire regimes is *potential for inappropriate fire regimes*. As presented in **Table 3.5**, this parameter is scored by assessing the nature of bushfire management and mitigation in place across the matter area.

The assessment parameter for clearing of native vegetation and habitat fragmentation is *vegetation protection status*. As presented **Table 3.5**, matter areas containing non-remnant vegetation (Cat X) under the *Vegetation Management Act 1999* (VM Act) are typically not protected from broad scale clearing activities and receive the lowest score (1). Matter areas mapped as remnant (Cat B) or high-value regrowth (Cat C) under the VM Act have some level of protection but can be cleared subject to statutory approvals. These areas receive a moderate score (7). Areas mapped as Category A under the VM Act, or that are protected via a Statutory Covenant under the *Land Act 1994* or the *Land*

Title Act 1994, have the highest level of protection and receive the highest score (15). Where a matter area contains a mixture of these, the lowest relevant protection score will be awarded.

The assessment parameter for habitat degradation caused by livestock grazing is *grazing intensity*. As presented in **Table 3.5**, matter areas where grazing is excluded receive the highest score. Where rotational grazing is implemented (i.e. livestock are periodically moved between paddocks to prevent overgrazing) the moderate score (7) is applied. Areas that are continuously grazed receive the lowest score (1).

The assessment parameter for predation by feral cats and foxes is *pest animal Activity Index – feral cat and fox*. The presence of pest animals within the impact and offset areas is assessed using methods outlined in the OMP, focusing on the collection of unbaited camera trap data. An Activity Index (AI) is calculated using this data and informed by methods in Jenks et al. (2011) and based on the following formula:

$$Activity\ Index\ (AI) = (\frac{Total\ number\ of\ detections}{Total\ number\ of\ trap\ hours})\ x100$$

A detection is the positive identification of one of the target species within a 20-minute interval, with a maximum of three independent detections possible per hour. For example, if the maximum number of detections were observed (3 per hour), on a single trap day (24 hours), using a single camera, the AI would be 300 (72 detections ÷ 24 hours x 100 = 300).

The scoring categories defined in **Table 3.5** have been informed by the results of the baseline pest animal monitoring event (Attexo 2025) indicating the presence of a relatively low abundance of pest animals across the impact and offset area. The baseline surveys recorded a total of seven (7) pest animals (five (5) cats, one (1) rabbit and one (1) pig) over a combined survey effort of 3,827 trap hours (i.e. 12 cameras deployed for approximately 2 weeks).

The site-specific data is compared to the scoring categories in **Table 3.5**. These scoring categories have been developed based the following assumptions:

- Total trap hours = 3,827 hours which is equivalent to 12 cameras deployed over approximately 2 weeks (note that monitoring design in the OMP should replicate the 3,827 total trap hours to ensure results are comparable over time).
- < 5 detections per event indicates sporadic and/or incidental pest activity (Score of 15).
- 5 - 9 detections per event indicates moderate pest activity (Score of 7).
- ≥ 10 detections per event indicates frequent and/or resident-level pest activity (Score of 1).

Table 3.5: Parameters and scores for assessing threats – glossy black-cockatoo

Parameter	Score		
	1	7	15
Potential for inappropriate fire regimes	No bushfire management or mitigation measures are implemented within the matter area	Bushfire management measures are implemented within the matter area, but they do not address species specific requirements	A Bushfire Management Plan, incorporating species specific fire management requirements, is actively implemented within the matter area
Vegetation protection status	Non-remnant / Category X	Remnant (Category B) or High Value Regrowth (Category C)	Category A or Statutory Covenant
Grazing intensity	Continuous grazing	Rotational grazing	Grazing excluded
Feral cat Activity Index (AI)	AI ≥ 0.2613	AI ≥0.1306 and <0.2613	AI <0.1306
Fox Activity Index (AI)	AI ≥ 0.2613	AI ≥0.1306 and <0.2613	AI <0.1306

3.1.2.2 Species mobility capacity

As a species capable of flight, the glossy black-cockatoo has a strong mobility capacity. They can move large distances as required and may undertake daily commutes of more than 14 km between roosting or nesting sites to forage (DCCEEW 2022a). Therefore, the species is not typically considered to be limited by general barrier effects. As such, the **species mobility capacity** attribute was removed from the scoring procedure of this species and score weighting was adjusted to reflect this.

3.1.3 Species stocking rate – approximate density (per ha)

Approximate density (per ha) is the only attribute within the ***species stocking rate*** indicator that requires species-specific scoring. For scoring methods relating to the remaining three attributes refer to **Section 2.5**.

3.1.3.1 Population and density data

According to the species' conservation advice (DCCEEW 2022a), the estimated population size ranges from 6,000 to 10,500 mature individuals, with 7,500 individuals used to assess the species conservation status. Precautionary estimates were also used for the area of occupancy (AOO) and extent of occurrence (EOO), at 40,000 km^2 and 470,000 km^2 respectively (DCCEEW 2022a). Population density was estimated at one mature individual per 200 ha of 'ideal habitat' (DCCEEW 2022a), which equates to 0.005 mature individuals per hectare of ideal habitat (0.5 birds per 100 ha).

3.1.3.2 Assessing approximate density

Given the uncertainty surrounding population and density data, a precautionary proxy – *absolute records* – has been applied to score the **approximate density (per ha)** attribute. This parameter is assessed using the cumulative number of individuals identified within the matter area and species-specific **context** buffer (>70,000). Including the context buffer in the assessment area reflects the species' mobility and use of adjacent habitat (see **Section 2.4.3**). Due to the highly mobile nature of this species and the consequentially large context buffer, cumulative records as opposed to records per ha provides a more realistic proxy for density scoring. Score categories for this parameter have been presented in **Table 3.6**.

Table 3.6: Approximate density scoring – glossy black-cockatoo

Parameter	Parameter measurement area	Score			
		0 (no records)	10 (low)	20 (moderate)	30 (high)
Cumulative records	Matter area plus context buffer described in **Section 2.4.3**	0	1-10	11-20	20+

3.2 Corben's long-eared bat

Corben's long-eared bat is an insectivorous microbat that inhabits a wide range of inland woodland habitats, including those dominated by eucalypts, cypress, sheoaks and *Acacia* species (DAWE 2015). In some regions, it appears to favour box–ironbark–cypress associations and is more commonly recorded in larger, contiguous areas of habitat (DAWE 2015). It is typically associated with habitats that support a defined canopy and dense understorey layers (DAWE 2015). Recent investigations by Gonsalves *et al.* (2024) also show that the species selects older areas of vegetation and generally avoids thinned areas.

It forages on a wide variety of insects, capturing prey in flight, gleaning from foliage or hunting on the ground (DAWE 2015). Roosting is primarily associated with stags or partially dead branches, particularly within ironbarks (*Eucalyptus* spp.), buloke (*Allocasuarina luehmannii*) and belah (*Casuarina cristata*) (DAWE 2015; Gonsalves *et al.* 2022). Maternity colonies, usually comprising 10 to 20 individuals, use similar roosting sites (DAWE 2015). The species appears to rely on multiple roosts, many of which are only occupied for a single night (DAWE 2015).

Corben's long-eared bat is capable of travelling considerable distances, with typical movements of about 4 km recorded between consecutive day roosts (DAWE 2015), as well as larger movements of more than 20 km per night (Gonsalves *et al.* 2024). However, little is known about its localised habitat preferences, including potential differences between foraging and roosting habitat (Gonsalves *et al.* 2024).

3.2.1 Site condition – Species Habitat Indices

3.2.1.1 Quality and availability of food and foraging habitat

This species is strongly associated with large areas of woodland habitat that support a well-formed canopy and dense understorey layers (DAWE 2015). It has also been shown to avoid thinned habitat (Gonsalves *et al.* 2024). Accordingly, the parameters selected are based on structural vegetation composition, specifically canopy cover across multiple strata: *tree canopy cover (%)* and *shrub canopy cover (%)* (**Table 3.7**). Site specific field data for this parameter is collected in accordance with Section 5.1 of the Guide (Step 6), compared to the relevant RE benchmark and scored using **Table 3.7**. Score scaling presented in **Table 3.7**, is based on Section 5.1 of the Guide (Table 2: Tree canopy cover; Shrub canopy cover), however, excludes scoring references to cover over 200% as it is not considered relevant for this assessment.

Table 3.7: Quality and availability of food and foraging habitat parameters – Corben's long-eared bat

Parameter	Parameter measurement area	Score		
		1	5	10
*Tree canopy cover (%)**	100 m transect	<10% of RE benchmark	≥10 to 50% of RE benchmark	>50% of RE benchmark
*Shrub canopy cover (%)**	100 m transect	<10% of RE benchmark	≥10 to 50% of RE benchmark	>50% of RE benchmark

*See **Appendix A, Table A1** for RE benchmarks

3.2.1.2 Quality and availability of shelter

Corben's long-eared bat roosts, including colonial maternity roosts, in tree hollows or beneath decorticating bark, with a preference for large, tall trees (DAWE 2015; Gonsalves *et al.* 2022). A detailed investigation by Gonsalves *et al.* (2022) found that hollows (59.5%) and under bark (21.4%) were the most common types of roosts used by the species, together representing almost 80% of all roosts (the remaining 20% could not be verified). They also reported that roost trees were generally taller than locally available trees.

To reflect these habitat preferences, three parameters are used to measure quality and availability of shelter as presented in **Table 3.8**. The first parameter is *large tree abundance*, which serves as a proxy for the presence of hollows (Eyre *et al.* 2022). Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 2) and the number of large trees (eucalypts and non-eucalypts) recorded is compared to the RE benchmark and scored using **Table 3.8**. Score scaling for *large tree abundance* presented in **Table 3.8** is based on Section 5.1 of the Guide (Table 2: Large trees).

As the species appears to show a preference for tall hollow-bearing trees (Gonsalves *et al.* 2022), *tree canopy height* is the second parameter assessed. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 2), compared to the RE benchmark and scored using **Table 3.8**. Score scaling presented in **Table 3.8** for *tree canopy height* is based on Section 5.1 of the Guide (Table 2: Tree canopy height).

The final parameter is the *abundance of decorticating bark* which incorporates this species propensity to roost under hanging bark in addition to roosting within tree hollows. This parameter is measured as a total count of the number of trees within the 100 x 50 m plot currently (at the time of the survey) supporting decorticating bark to an extent that this microbat species could reasonably roost under it for a day without being easily detected. Some tree species may support year-round decorticating bark (e.g. *Eucalyptus camaldulensis* [river red gum]) as long strips while others may only occasionally support decorticating bark (e.g. *Callitris glaucophylla* [white cypress pine]) which can flake off

as chunks in response to changing climatic conditions. Three relative abundance categories have been developed for this parameter and are presented in **Table 3.8**, with higher abundance equating to a higher score.

Table 3.8: Quality and availability of shelter habitat parameters – Corben's long-eared bat

Parameter	Parameter measurement area	Score		
		1	5	10
*Large tree abundance (Eucalypt and non-eucalypt)**	100 x 50 m plot	0 to 50% of RE benchmark	>50 to 100% of RE benchmark	>100% of RE benchmark
*Tree canopy height**	100 x 50 m plot	<25% of RE benchmark	>25 to 70% of RE benchmark	>70% of RE benchmark
Abundance of decorticating bark	100 x 50 m plot	Rare (<5 trees per plot)	Occasional (5 to 10 trees per plot)	Common (>10 trees per plot)

*See **Appendix A, Table A1** for RE benchmarks

3.2.2 Site context

3.2.2.1 Threats

3.2.2.1.1 Summary of relevant threats

A summary of the threats identified for the Corben's long-eared bat in the species Conservation Advice (DAWE 2015) is provided in **Table 3.9**. Justifications for each threat's inclusion or exclusion in the assessment has also been provided. For threats proposed to be included in the threat assessment, the parameter used to assess the threat is also identified. Several key threats are considered relevant for this species and have been included in the assessment, these are habitat loss and fragmentation, reduction in hollow availability, loss of habitat and direct mortality due to bushfires, and habitat degradation caused by grazing.

Table 3.9: Summary of threats – Corben's long-eared bat

Threats	Assessment Proposed?	Justification	Assessment parameter
Habitat loss and fragmentation and reduction in hollow availability (DAWE 2015)	Yes	Based on the information presented in the species Conservation Advice (DAWE 2015), the key known threat to the Corben's long-eared bat is habitat loss and fragmentation. Both the impact and offset sites are in areas where vegetation has been historically cleared to facilitate pastoral activities, and development of CSG infrastructure. This has resulted in habitat loss and fragmentation, as well as a reduction in hollow availability, including existing mature hollow bearing trees or future potential hollow bearing trees.	*Vegetation protection status*
Loss of habitat and direct mortality due to bushfires (DAWE 2015)	Yes	Bushfires are a suspected threat to the species, particularly in uncleared habitat. The impact and offset areas contain	*Potential for inappropriate fire regimes*

Threats	Assessment Proposed?	Justification	Assessment parameter
		habitat for this species that can be impacted by bushfires.	
Habitat degradation caused by grazing (DAWE 2015)	Yes	Although this is only a suspected threat in uncleared habitat and further investigation regarding its relative impact is required, it has been included in the assessment as the impact and offset sites are in areas where habitat has been impacted by domestic livestock grazing.	*Grazing intensity*
Exposure to agrichemicals (DAWE 2015)	No	Whilst this species is insectivorous and may be prone to impacts from agricultural pesticides, the predominant land use in the region surrounding the impact and offset sites is pastoral not agricultural. The Conservation Advice also notes that additional research is needed to quantify the impact of this threat.	N/A
Predation by feral animals (DAWE 2015)	No	Predation by feral animals (including cats and foxes) has not been demonstrated for the species and the risk to the species is unknown, therefore it has been excluded from the assessment.	N/A

An assessment of the risk rating for the identified threats has been undertaken using the threat matrix (**Section 2.4.6**) and information provided in the Corben's long-eared bats Conservation Advice (DAWE 2015). A summary of the assessment including the assigned likelihood, consequence and risk rating is presented **Table 3.10**.

Table 3.10: Risk rating of the identified threats to Corben's long-eared bat

Threat	Likelihood	Consequence	Risk Rating
Habitat loss and fragmentation and reduction in hollow availability (DAWE 2015)	Almost certain	Major	Very high risk (20)
Loss of habitat and direct mortality due to bushfires (DAWE 2015)	Almost certain	Major	Very high risk (20)
Habitat degradation caused by grazing (DAWE 2015)	Almost certain	Minor	Moderate risk (10)

3.2.2.1.2 Threat assessment parameters and scoring

The assessment parameter for habitat loss and fragmentation, and reduction in hollow availability, is *vegetation protection status*. As presented in **Table 3.11**, matter areas containing non-remnant vegetation (Cat X) under the VM Act are typically not protected from broad scale clearing activities and receive the lowest score (1). Matter areas mapped as remnant (Cat B) or high-value regrowth (Cat C) under the VM Act have some level of protection but can be cleared subject to statutory approvals. These areas receive a moderate score (7). Areas mapped as Category A under the VM Act, or that are protected via a Statutory Covenant under the *Land Act 1994* or the *Land Title Act 1994*, have the highest level of protection and receive the highest score (15). Where a matter area contains a mixture of these, the lowest relevant protection score will be awarded.

The assessment parameter for loss of habitat and direct mortality due to bushfires is *potential for inappropriate fire regimes*. As presented in **Table 3.11**, this parameter is scored by assessing the nature of bushfire management and mitigation in place across the matter area.

The assessment parameter for habitat degradation caused by livestock grazing is *grazing intensity*. As presented in **Table 3.11**, matter areas where grazing is excluded receive the highest score. Where rotational grazing is implemented (i.e. livestock are periodically moved between paddocks to prevent overgrazing) the moderate score (7) is applied. Areas that are continuously grazed receive the lowest score (1).

Table 3.11: Parameters and scores for assessing threats – Corben's long-eared bat

Parameter	Score		
	1	7	15
Vegetation protection status	Non-remnant / Category X	Remnant (Category B) or High Value Regrowth (Category C)	Category A or Statutory Covenant
Potential for inappropriate fire regimes	No bushfire management or mitigation measures are implemented within the matter area	Bushfire management measures are implemented within the matter area, but they do not address species specific requirements	A Bushfire Management Plan, incorporating species specific fire management requirements, is actively implemented within the matter area
Grazing intensity	Continuous grazing	Rotational grazing	Grazing excluded

3.2.2.2 Species mobility capacity

As a species capable of flight, the Corben's long-eared bat has strong mobility attributes. It is known to regularly travel distances of up to 4 km each night and may travel up to 20 km in a single night when required (DAWE 2015; Gonsalves *et al.* 2024). However, a tracking investigation by Gonsalves *et al.* (2024) found that the species rarely cross cleared areas more than 2.3 km wide, typically less than 600 m, with most crossings occurring between large areas of habitat (>100 ha). Based on these data, two parameters are used to measure species mobility capacity.

The first parameter assesses potential movement restrictions due to *habitat fragmentation* within the matter area. Using GIS spatial analysis the distance between patches of remnant and regrowth vegetation within the matter area are measured and the results compared to the scores in **Table 3.12**, with score scaling based on Gonsalves *et al.* (2024).

The second parameter, *contiguous habitat area (ha),* assesses restrictions due to the size of the habitat area. Scoring assumes that the smaller areas of isolated habitat contribute to a reduction in the mobility of the species. Scores and scaling summarised in **Table 3.12** are informed by Gonsalves *et al.* (2024). Gaps between patches of suitable habitat more than 100 m are considered to be breaks in contiguous habitat.

Table 3.12: Species mobility capacity scoring – Corben's long-eared bat

Parameter	Score			
	1 (severely restricted)	4 (highly restricted)	7 (moderately restricted)	10 (minor restriction)
Habitat fragmentation (i.e. gaps between patches of remnant/regrowth vegetation)	Any gap >2,000 m	Largest gap >1,000–2,000 m	Largest gap 500–1,000 m	All gaps <500 m

Contiguous habitat area (ha)	<25	25-50	50-100	>100

3.2.3 Species stocking rate – approximate density (per ha)

This species cannot be reliably distinguished from sympatric *Nyctophilus* species (up to two other species in the southern Brigalow Belt) using echolocation calls (DAWE 2015; Gonsalves *et al.* 2024). Consequently, it is more difficult to detect than other microbat species and requires capture and biometric assessment (DAWE 2015). Detection is further constrained by seasonal distributional changes, variable (e.g. different according to sex) home range size (450 to >31,000 ha), and poorly understood local movements (DAWE 2015; Gonsalves *et al.* 2024). Due to these challenges, this attribute has not been scored for this species, and score weightings have been adjusted accordingly.

3.3 Koala

Koalas are obligate folivores, primarily feeding upon the leaves of eucalypts (the genera of *Eucalyptus*, *Corymbia* [*Blakella*], *Angophora*, *Syncarpia* and *Lophostemon*) (DCCEEW 2022b). They exhibit strong preferences for certain species depending on the region (DCCEEW 2022b). As identified by Youngentob *et al.* (2021), these regionally preferred species are referred to as locally important koala trees (LIKT). LIKTs are defined as tree species that are frequently browsed by koalas and constitute a significant proportion of the diet for local populations within each defined Koala Management Bioregion (KMB). All LIKTs recorded from within the Brigalow Belt bioregion are summarised below in **Table 3.13**.

Table 3.13: LIKT recorded in the Brigalow Belt bioregion (Youngentob *et al.* 2021).

Species			
Eucalyptus brownii	*Eucalyptus drepanophylla*	*Eucalyptus longirostrata*	*Eucalyptus orgadophila*
Eucalyptus camaldulensis	*Eucalyptus dura*	*Eucalyptus major*	*Eucalyptus populnea*
Eucalyptus chloroclada	*Eucalyptus exserta*	*Eucalyptus melanophloia*	*Eucalyptus punctata*
Eucalyptus conica	*Eucalyptus fibrosa*	*Eucalyptus microcarpa*	*Eucalyptus saligna*
Eucalyptus coolabah	*Eucalyptus laevopinea*	*Eucalyptus moluccana*	*Eucalyptus sideroxylon*
Eucalyptus crebra	*Eucalyptus largiflorens*	*Eucalyptus ochrophloia*	*Eucalyptus tereticornis*

3.3.1 Site condition – Species Habitat Indices

3.3.1.1 Quality and availability of food and foraging habitat

Due to the koala's reliance on specific LIKTs (Youngentob *et al.* 2021), the availability of these species is critical in assessing the quality of koala food and foraging habitat. Therefore, the parameter selected to score this attribute is the *availability of LIKT*. This parameter is assessed by measuring the canopy cover of LIKTs and comparing the results to benchmarks derived from RE Technical Description data (Queensland Herbarium 2018). These benchmarks were developed by calculating total LIKT tree cover values across four applicable strata: Emergent, T1 (tree canopy), T2, and T3 (tree subcanopy) for each RE present. The resulting benchmarks are presented in **Appendix A**, **Table A2**. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 6) and the total cover of LIKTs is compared to the benchmark and scored using **Table 3.14**. Scores for this parameter increase as the canopy cover of LIKTs increases. Score scaling presented in **Table 3.14** is based on Section 5.1 of the Guide (Table 2: Tree canopy cover), however, excludes scoring references to cover over 200% as it is not considered relevant for this assessment.

Since koalas do not require diverse forests if available tree species provide sufficient foraging resources (Youngentob *et al.* 2021), the richness of LIKT is not included in the scoring process for this attribute.

Table 3.14: Quality and availability of food and foraging habitat parameters – koala

Parameter	Score		
	1	5	10
Availability of LIKT (using LIKT canopy cover as a proxy)*	<10% of LIKT cover benchmark	≥10 to 50% of LIKT cover benchmark	>50% of LIKT cover benchmark

*See **Appendix A, Table A2** for species specific benchmarks

3.3.1.2 Quality and availability of shelter habitat

Landscape features such as sheltered gullies, closed-canopy forests, and vegetated watercourses provide important koala refuges (DCCEEW 2022b). Although koalas regularly utilise and feed in trees across a wide range if size and age classes, there appears to be a significant relationship between their preferred tree size and the time of day, with behaviours being shifted towards larger trees during the daytime for shelter and smaller trees at night for foraging (Youngentob *et al.* 2021). In addition, koalas preferentially use larger trees, which provide stable structures during storms and aid thermoregulation during hot weather through higher transpiration rates (DCCEEW 2022b).

Based on the above, the first parameter selected to assess the quality and availability of shelter habitat for the koala is *tree canopy cover (%)*, which incorporates the canopy cover of not only larger trees, which the literature suggests is their preference for shelter, but also smaller trees that this species is known to utilise for foraging. Site specific field data for this parameter is collected in accordance with Section 5.1 of the Guide (Step 6), compared to the relevant RE benchmark and scored using **Table 3.15**. Score scaling presented in **Table 3.15** is based on Section 5.1 of the Guide (Table 2: Tree canopy cover), however, excludes scoring references to cover over 200% as it is not considered relevant for this assessment.

The second parameter selected to assess the quality and availability of koala shelter habitat is *number of large trees (eucalypt and non-eucalypt)*. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 2) and the number of large trees recorded is compared to the RE benchmark and scored using **Table 3.15**. Score scaling presented in **Table 3.15** was informed by Section 5.1 of the Guide (Table 2: Large trees).

Table 3.15: Quality and availability of shelter habitat parameters – koala

Parameter	Parameter measurement area	Score		
		1	5	10
*Tree canopy cover (%)**	100 m transect	<10% of RE benchmark	≥10 to 50% of RE benchmark	>50% of RE benchmark
*Number of large trees (eucalypt and non-eucalypt)**	100 x 50 m plot	0 to 50% of RE benchmark for large eucalypt trees	>50 to 100% of RE benchmark for large eucalypt trees	>100% of RE benchmark for large eucalypt trees

*See **Appendix A, Table A1** for RE benchmarks

3.3.2 Site context

3.3.2.1 Threats

3.3.2.1.1 Summary of relevant threats

A summary of the threats identified for koala in the species Conservation Advice (DCCEEW 2022b), Recovery Plan (DAWE 2022) and the Threat abatement plan for predation by feral cats (DCCEEW 2024) has been provided in **Table 3.16**. Justifications for each threat's inclusion or exclusion in the threat assessment has also been provided. For threats proposed to be included in the threat assessment, the parameter used to assess the threat is also identified.

Several key threats are considered relevant for this species and have been included in the assessment, these are altered fire regimes including prescribed burns, clearing and degradation of koala habitat, habitat loss and

fragmentation, encounter mortality with vehicles and encounter mortality with dogs. For threats proposed to be included in the threat assessment, the parameter used to assess the threat is also identified. Risk ratings have been assigned for each threat based on the risk assessment in the species Conservation Advice (DCCEEW 2022b).

Table 3.16: Summary of threats - koala

Threats	Assessment Proposed?	Justification	Assessment parameter	Risk rating
Altered fire regimes including prescribed burning (DAWE 2022)	Yes	The impact and offset areas contain habitat for this species that may be impacted by inappropriate fire regimes.	*Potential for inappropriate fire regimes*	Very high risk (20)
Clearing and degradation of koala habitat, habitat loss and fragmentation (DCCEEW 2022b; DAWE 2022)	Yes	Both the impact and offset sites are in areas where vegetation has been historically cleared to facilitate pastoral activities and the development of CSG infrastructure.	*Vegetation protection status*	Very high risk (25)
Encounter mortality with vehicles (DCCEEW 2022b)	Yes	Interactions with vehicles within the impact and offset areas is likely a minor potential threat and will be managed through site access restrictions and speed. However, it has been included in the assessment as a precautionary approach.	*Vehicle strike*	Very high risk (10)
Encounter mortality with dogs (DCCEEW 2022b; DAWE 2022)	Yes	Attacks by domestic or wild dogs has been included in the assessment as a precautionary approach as dogs are likely to be present at the impact and offset sites.	*Pest animal Activity Index – dog*	Very high risk (10)
Predation by feral cats (DCCEEW 2024)	No	Whilst the conservation advice (DCCEEW 2022b) for the Koala lists predation by feral cats as a potential threatening process, the threat abatement plan for predation by feral cats (DCCEEW 2024) states that the susceptibility of this species to cats is low. This threatening process has therefore been excluded from this assessment.	N/A	N/A

Threats	Assessment Proposed?	Justification	Assessment parameter	Risk rating
Climate Change – loss of climatically suitable habitat, increased intensity/frequency of drought and increased intensity and frequency of heatwaves and bushfire (DCCEEW 2022b; DAWE 2022)	No	Loss of climatically suitable habitat as a result of climate change driven processes and drivers is a known risk to the species and may outpace habitat losses from land use change in the next 10 years. As climate change is a broad scale ecological threat, and is generally considered consistent between the impact and offset site, it has been excluded from the threat assessment.	N/A	N/A
Declining nutritional value of foliage (DCCEEW 2022b)	No	Additional research is required to assess how elevated levels of CO_2 affect nitrogen and available nitrogen (which integrates the effects of tannins). As declining nutritional value is a broader scale ecological threat, and is generally considered consistent between the impact and offset site, it has been excluded from the threat assessment.	N/A	N/A
Disease (DCCEEW 2022b; DAWE 2022)	No	Koala populations are known to be impacted by Koala Retrovirus (KoRV) and Chlamydia (*Chlamydia percorum*). Assessing and managing the threat of disease in koala populations is beyond the scope of the offset management plan and therefore it is not included in the threat assessment.	N/A	N/A
Genetic effects (DAWE 2022)	No	Whilst koala populations are under threat from habitat loss, high levels of genetic diversity exist within these populations (DAWE 2022). Further research is needed to determine whether there is any loss of genetic	N/A	N/A

Threats	Assessment Proposed?	Justification	Assessment parameter	Risk rating
		diversity due to habitat loss. This potential threat has not been included in the threat assessment.		

3.3.2.1.2 Threat assessment parameters and scoring

The assessment parameter for altered fire regimes is *potential for inappropriate fire regimes*. As presented in **Table 3.17**, this parameter is scored by assessing the nature of bushfire management and mitigation in place across the matter area.

The assessment parameter for clearing and degradation of koala habitat/habitat loss and fragmentation is *vegetation protection status*. As presented in **Table 3.17**, matter areas containing non-remnant vegetation (Cat X) under the VM Act are typically not protected from broad scale clearing activities and receive the lowest score (1). Matter areas mapped as remnant (Cat B) or high-value regrowth (Cat C) under the VM Act have some level of protection but can be cleared subject to statutory approvals. These areas receive a moderate score (7). Areas mapped as Category A under the VM Act, or that are protected via a Statutory Covenant under the *Land Act 1994* or the *Land Title Act 1994*, have the highest level of protection and receive the highest score (15). Where a matter area contains a mixture of these, the lowest relevant protection score will be awarded.

The assessment parameter for encounter mortality with vehicles is *vehicle strikes*. The *vehicle strike* parameter presented in **Table 3.17** uses vehicle track classifications as a proxy to estimate the predicted mortality risk based on likely vehicle speeds.

The assessment parameter for predation by feral dog is *pest animal Activity Index – dog*. The presence of pest animals within the impact and offset areas is assessed using methods outlined in the OMP, focusing on the collection of unbaited camera trap data. An Activity Index (AI) is calculated using this data and informed by methods in Jenks et al. (2011) and based on the following formula:

$$Activity\ Index\ (AI) = (\frac{Total\ number\ of\ detections}{Total\ number\ of\ trap\ hours})\ x100$$

A detection is the positive identification of one of the target species within a 20-minute interval, with a maximum of three independent detections possible per hour. For example, if the maximum number of detections were observed (3 per hour), on a single trap day (24 hours), using a single camera, the AI would be 300 (72 detections ÷ 24 hours x 100 = 300).

The scoring categories defined in **Table 3.17** have been informed by the results of the baseline pest animal monitoring event (Attexo 2025) indicating the presence of a relatively low abundance of pest animals across the impact and offset area. The baseline surveys recorded a total of seven (7) pest animals (five (5) cats, one (1) rabbit and one (1) pig) over a combined survey effort of 3,827 trap hours (i.e. 12 cameras deployed for approximately 2 weeks).

The site-specific data is compared to the scoring categories in **Table 3.17**. These scoring categories have been developed based the following assumptions:

- Total trap hours = 3,827 hours which is equivalent to 12 cameras deployed over approximately 2 weeks (note that monitoring design in the OMP should replicate the 3,827 total trap hours to ensure results are comparable over time).
- < 5 detections per event indicates sporadic and/or incidental pest activity (Score of 15).
- 5 - 9 detections per event indicates moderate pest activity (Score of 7).
- ≥ 10 detections per event indicates frequent and/or resident-level pest activity (Score of 1).

Table 3.17: Parameters and scores for assessing threats – koala

Parameter	Score		
	1	7	15
Potential for inappropriate fire regimes	No bushfire management or mitigation measures are implemented within the matter area	Bushfire management measures are implemented within the matter area, but they do not address species specific requirements	A Bushfire Management Plan, incorporating species specific fire management requirements, is actively implemented within the matter area
Vegetation protection status	Non-remnant / Category X	Remnant (Category B) or High Value Regrowth (Category C)	Category A or Statutory Covenant
Vehicle strike	High risk of mortality from vehicle strike: Maintained gravel or sealed roads (proxy for regular vehicle speeds of up to 70 km/h) within the site	Moderate risk of mortality from vehicle strike: Unmaintained tracks e.g. farm tracks (proxy for regular vehicle speeds of up to 50 km/h) within the site	Low risk of mortality from vehicle strike: No vehicle formed tracks associated within the site or maximum mandated speeds of 40 km/h
Pest animal Activity Index – dog	AI ≥ 0.2613	AI ≥0.1306 and <0.2613	AI <0.1306

3.3.2.2 Species mobility capacity

Koalas are primarily arboreal but often travel on the ground, particularly at night, when moving between foraging and sheltering habitats. These movements typically increase during the breeding season (DCCEEW 2022b). The species has been recorded crossing cleared areas for hundreds of metres between trees, and dispersing over even greater distances (Youngentob *et al.* 2021). While traversing, isolated trees (including ancillary habitat trees [AHT]) and small patches of vegetation provide important refuges and stepping stones that connect larger areas of habitat (Youngentob *et al.* 2021).

During such movements, koalas prefer natural, undisturbed, and contiguous habitats. On the ground, their movement can be impeded by barriers such as fences, buildings, water bodies or other structures, as well as threats such as predation by feral or domestic animals (Beale *et al.* 2022). Dense infestations of weeds such as lantana may also impede movement.

Based on these factors, two parameters have been selected to assess koala mobility capacity – *presence of koala friendly fences* and *average lantana cover*. Predation by dogs has not been included as this threat is already assessed as part of the threat assessment presented in **Table 3.17**.

Presence of koala friendly fences is assessed across the entire matter area and is scored using the score scales presented in **Table 3.18**, with only two score scales proposed (severely restricted or minor restriction). Koala friendly fences must not prevent the movement of koalas between the offset property and directly connected habitats nor within the offset property itself. Fencing at the impact and offset area should be assessed in accordance with the Queensland Government's *Koala-Sensitive Design Guideline - A guide to koala-sensitive design measures for planning and development activities*[3] (DES 2022). An example of a severely restrictive fence that is not conducive to the movement of koalas may include:

- A wild dog barrier fence or any other high density fence that koalas cannot climb through or would struggle to climb over (i.e. without koala movement structures)

[3] https://www.detsi.qld.gov.au/_global/policy-register/policy-register-pdf?getdoc=5154&name=koala-sensitive-design-guideline.pdf

- A multistring barbed wire fence line that may inhibit or deter the movement of koalas

A koala friendly fence line should meet the requirements of the Queensland Government's *Koala-Sensitive Design Guideline - A guide to koala-sensitive design measures for planning and development activities*[3] (DES 2022).

Average lantana cover is assessed by undertaking weed cover surveys in accordance with the method outlined in the OMP. The average cover (%) is determined (all sites combined) and is scored using the score scales presented in **Table 3.18**, which were informed by Section 5.1 of the Guide (Table 2: Non-native plant cover).

Table 3.18: Species mobility capacity parameters – koala

Parameter	Score			
	1 (severely restricted)	4 (highly restricted)	7 (moderately restricted)	10 (minor restriction)
Presence of koala friendly fences	Not all fences within and bordering the matter area are koala-friendly fence	-	-	All fences within and bordering the matter area are koala-friendly fences
Average lantana cover (across all survey sites)	>50%	>25–50%	>5–25%	<5%

3.3.3 Species stocking rate – approximate density (per ha)

Approximate density (per ha) is the only attribute within the ***species stocking rate*** indicator that requires species-specific scoring. For scoring methods relating to the remaining three attributes refer to **Section 2.5**.

3.3.3.1 Population and density data

According to the species Conservation Advice (DCCEEW 2022b), koalas are widespread across Queensland, occurring in patchy and often low-density populations across different bioregions. In many areas, koala populations are considered to be low-density, widespread, and fragmented (DCCEEW 2022b). Surveys in north-western Queensland have found koalas to be patchily distributed, typically associated with creek-lines, areas of higher tree species richness, and locations where leaf moisture content is greater (DCCEEW 2022b).

State-wide estimates of population size remain limited, with survey effort and available data concentrated in south-east Queensland (DCCEEW 2022b). In response to this limitation and the lack of peer-reviewed estimates of koala numbers noted in earlier listing assessments, an expert elicitation exercise was undertaken in 2012 (DCCEEW 2022b). The results of this exercise are now widely recognised as the most robust baseline for koala population estimates across Queensland's bioregions and form the reference point for the current Conservation Advice. Based on this exercise, it was estimated that there were approximately 79,264 koalas in Queensland in 2012, distributed across eight bioregions. The highest population estimates were for Brigalow Belt North, Mulga Lands, and South East Queensland, with koalas also present in Central Mackay Coast, Desert Uplands, Einasleigh Uplands and Wet Tropics, Mitchell Grass Downs, and South Brigalow. These eight bioregions together cover a total area of 1,489,650 km^2 (148,965,000 ha), equating to a mean density of approximately 0.0005 koalas per hectare. Low-density populations are particularly characteristic of regions west of the Great Dividing Range (GDR), and this trend is even more pronounced in semi-arid environments.

3.3.3.2 Assessing approximate density

Given the uncertainty surrounding population and density data, a precautionary proxy parameter - *number of records per 100 ha* - has been applied to score the **approximate density (per ha)** attribute. This parameter is assessed using the total number of species records within the matter area and species-specific **context** buffer (>31,000 ha) (see **Section 2.4.3**). Including the context buffer in the assessment area reflects the species' mobility and use of adjacent

habitat. Only those species records observed after the year 2000 have been incorporated into this calculation. These observations are thought to be representative of the species current distribution and where they are more likely to occur. Under this approach, sites with higher numbers of records are precautionarily assumed to represent greater relative value to the species.

To generate a score, records per ha is calculated and then converted to records per 100 ha using the following formula:

$$\text{Records per 100 ha} = \frac{\text{Records}}{\text{Area (ha)}} \times 100$$

This parameter is then assigned a score following **Table 3.19**. Score scaling is informed by the state's mean density of 0.05 koalas per 100 ha whereby ≥1 record per 100 ha will generate the low score. As the impact and offset area lies well west of the GDR, the use of the state's mean density is considered conservative.

Table 3.19: Approximate density scoring – koala

Parameter	Parameter measurement area	Score			
		0 (no records)	10 (low)	20 (moderate)	30 (high)
Number of records per 100 ha	Matter area plus context buffer described in **Section 2.4.3**	0	≥1-2	≥2-5	>5

3.4 Diamond firetail

The diamond firetail is primarily a woodland bird, typically occurring in habitats dominated by eucalypt, *Acacia* or *Casuarina*. It prefers open areas with a low density of scattered canopy trees, including altered landscapes such as farmland and roadsides (DCCEEW 2023a). Within these habitats, the species strongly favours areas with dense grass cover, as seeds from a variety of native grasses form the bulk of its diet (DCCEEW 2023a). Diamond firetails are predominately low-level foragers and are frequently observed on the ground (DCCEEW 2023a).

The species is largely sedentary, although some localised movements may occur in response to seasonal conditions (DCCEEW 2023a). For roosting, they utilise dense shrubs and may construct dedicated roosting nests. For breeding, they build a distinctive bottle-shaped nest out of grasses (DCCEEW 2023a). These nests are often situated within or at the base of large stick nests constructed by birds of prey, though they may also nest in dense shrubs or small trees that provide spiny foliage or fine branches offering protection from predators (DCCEEW 2023a).

3.4.1 Site condition – Species Habitat Indices

3.4.1.1 Quality and availability of food and foraging habitat

This species is highly reliant on the presence and availability of native grass seeds, which form the bulk of its diet (DCCEEW 2023). Accordingly, both parameters selected to assess the quality and availability of food and foraging habitat relate to grass availability.

The first parameter assessed is *native grass richness*, considered a suitable proxy for seasonal grass seed availability. Greater species richness is likely to reflect a wider range of reproductive strategies and phenologies, thereby supporting more continuous seed availability throughout the year. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 3), compared to the relevant RE benchmark and scored using **Table 3.20**. Score scaling presented in **Table 3.20** is based on Section 5.1 of the Guide (Table 2: Native plant species richness - grasses).

The second parameter assessed is *native grass cover*, used as a proxy for general resource abundance - more grass is assumed to correlate with higher seed yield. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 5), compared to the relevant RE benchmark and scored using **Table 3.20**. Score scaling presented in **Table 3.20** is based on Section 5.1 of the Guide (Table 2: Native perennial grass cover).

Table 3.20: Quality and availability of food and foraging habitat parameters – diamond firetail

Parameter	Parameter measurement area	Score		
		1	5	10
*Native grass richness**	50 x 10 m plot	<25% of RE benchmark	≥25% to 90% of RE benchmark	>90 of RE benchmark
*Native grass cover (%)**	1 x 1 m plots	0 to 50% of RE benchmark	>50% to 90% of RE benchmark	>90% of RE benchmark

*See **Appendix A, Table A1** for RE benchmarks

3.4.1.2 Quality and availability of shelter

The species typically nest within or at the base of large stick nests constructed by birds of prey, though they may also roost in dense shrubs or small trees that provide spiny foliage or fine branches offering protection from predators (DCCEEW 2023a). Accordingly, the parameters selected to assess the quality and availability of shelter for diamond firetail are based on structural vegetation composition, specifically cover densities across multiple strata: *tree canopy cover (%)* and *shrub canopy cover (%)*. These parameters serve as a proxy for both breeding and sheltering (e.g. roosting) opportunities. Areas with higher tree or shrub canopy cover are considered more likely to provide suitable sites for these behaviours.

To assess these parameters, site specific field data is collected in accordance with Section 5.1 of the Guide (Step 6), compared to the relevant RE benchmark and scored using **Table 3.21**. Score scaling presented in **Table 3.21** is based on Section 5.1 of the Guide (Table 2: Tree canopy over and Shrub canopy cover), however, excludes scoring references to cover over 200% as it is not considered relevant for this assessment.

Table 3.21: Quality and availability of shelter habitat parameters – diamond firetail

Parameter	Parameter measurement area	Score		
		1	5	10
*Shrub canopy cover (%)**	100 m transect	<10% of RE benchmark	≥10 to 50% of RE benchmark	>50% of RE benchmark
*Tree canopy cover (%)**	100 m transect	<10% of RE benchmark	≥10 to 50% of RE benchmark	>50% of RE benchmark

* See **Appendix A, Table A1** for RE benchmarks

3.4.2 Site context

3.4.2.1 Threats

3.4.2.1.1 Summary of relevant threats

A summary of the threats identified for the diamond firetail in the species Conservation Advice (DCCEEW 2023a) and the Threat abatement plan for predation by feral cats (DCCEEW 2024) is provided in **Table 3.22**. Justifications for each threat's inclusion or exclusion in the threat assessment has also been provided.

Several key threats are considered relevant for this species and have been included in the assessment, these are habitat loss caused by land clearing, invasive weeds, habitat degradation caused by livestock grazing, increase in frequency and scale or intensity of fire. For threats proposed to be included in the threat assessment, the parameter used to assess the threat is also identified. Risk ratings have been assigned for each threat based on the risk assessment in the species Conservation Advice (DCCEEW 2023a).

Table 3.22: Summary of threats – diamond firetail

Threats	Assessment Proposed?	Justification	Assessment parameter	Risk rating
Habitat loss caused by land clearing (DCCEEW 2023a)	Yes	Both the impact and offset sites are in areas where vegetation has been historically cleared to facilitate pastoral activities and the development of CSG infrastructure.	*Vegetation protection status*	Very high risk (20)
Invasive weeds (particularly exotic annual grasses) (DCCEEW 2023a)	Yes	Invasive weeds within the impact and offset areas can change the floristic and structural characteristics of habitat and consequently alter resource availability for the species, as well as potentially increasing bushfire risk.	*Average non-native plant cover*	Very high risk (20)
Habitat degradation caused by livestock grazing (DCCEEW 2023a)	Yes	The impact and offset sites are in areas where habitat has been impacted by domestic livestock grazing.	*Grazing intensity*	Very high risk (20)
Increase in frequency, scale or intensity of fire (DCCEEW 2023a)	Yes	The impact and offset areas contain habitat for this species that may be impacted by inappropriate fire regimes.	*Potential for inappropriate fire regimes*	Moderate risk (3)
Predation by feral cats (DCCEEW 2024)	No	Whilst the conservation advice (DCCEEW 2023a) for the diamond firetail lists predation by feral cats as a potential threatening process, the threat abatement plan for predation by feral cats (DCCEEW 2024) states that the susceptibility of this species to cats is low. This threatening process has therefore been excluded from this assessment.	N/A	N/A
Habitat degradation by rabbits (DCCEEW 2023a)	No	As listed in the Conservation Advice (DCCEEW 2023) the confidence in this threat for diamond firetail is low, therefore it has not been included in the threat assessment.	N/A	N/A
Climate Change – increased likelihood of extreme events (DCCEEW 2023a)	No	Climate change will increase and continue to increase the likelihood of extreme events such as wildfires, heatwaves, and droughts, adversely impacting habitat and resource availability, and overwhelming birds physiological limits. As climate change is a broad scale ecological threat, and is generally considered	N/A	N/A

Threats	Assessment Proposed?	Justification	Assessment parameter	Risk rating
		consistent between the impact and offset site, it has been excluded from the threat assessment.		
Territorial competition with noisy miners and predation by pied currawongs (DCCEEW 2023a)	No	Two native species (noisy miner *Manorina melanocephala* and Pied currawong *Strepera graculina*) are listed as threatening process for the diamond firetail. Impacts from native species have not been included in the threat assessment as control of these native species is beyond the scope of the OMP.	N/A	N/A

3.4.2.1.2 Threat assessment parameters and scoring

The assessment parameter for habitat loss caused by land clearing is *vegetation protection status*. As presented in **Table 3.23**, matter areas containing non-remnant vegetation (Cat X) under the VM Act are typically not protected from broad scale clearing activities and receive the lowest score (1). Matter areas mapped as remnant (Cat B) or high-value regrowth (Cat C) under the VM Act have some level of protection but can be cleared subject to statutory approvals. These areas receive a moderate score (7). Areas mapped as Category A under the VM Act, or that are protected via a Statutory Covenant under the *Land Act 1994* or the *Land Title Act 1994*, have the highest level of protection and receive the highest score (15). Where a matter area contains a mixture of these, the lowest relevant protection score will be awarded.

The assessment parameter for invasive weeds is *average non-native plant cover*. Non-native plant cover is assessed in accordance with Section 5.1 of the Guide (Step 3) at each assessment site individually and then the average across all assessment sites is determined to define a single cover score for the entire matter area. The average cover is then compared to the score scales presented in **Table 3.23**, which are based on Section 5.1 of the Guide (Table 2: Non-native plant cover).

The assessment parameter for habitat degradation caused by livestock grazing is *grazing intensity*. As presented in **Table 3.23**, matter areas where grazing is excluded receive the highest score. Where rotational grazing is implemented (i.e. livestock are periodically moved between paddocks to prevent overgrazing) the moderate score (7) is applied. Areas that are continuously grazed receive the lowest score (1).

The assessment parameter for inappropriate fire regimes is *potential for inappropriate fire regimes*. As presented in **Table 3.23**, this parameter is scored by assessing the nature of bushfire management and mitigation in place across the matter area.

Table 3.23: Parameters and scores for assessing threats – diamond firetail

Parameter	Score		
	1	7	15
Vegetation protection status	Non-remnant / Category X	Remnant (Category B) or High Value Regrowth (Category C)	Category A or Statutory Covenant
Average non-native plant cover (%)	>50% average cover	5-50% average cover	<5% average cover
Grazing intensity	Continuous grazing	Rotational grazing	Grazing excluded

Parameter	Score		
	1	7	15
Potential for intense bushfires	No bushfire management or mitigation measures are implemented within the matter area	Bushfire management measures are implemented within the matter area, but they do not address species specific requirements	A Bushfire Management Plan, incorporating species specific fire management requirements, is actively implemented within the matter area

3.4.2.2 Species mobility capacity

Whilst described as sedentary, some populations are known to move locally between areas of suitable habitat (DCCEEW 2023a). Their flights are described as low and direct in long lines with slight undulations and as such are considered to have a strong mobility capacity. Considering the lack of physical barriers that could impede the movement of this species throughout the surrounding landscape, the species mobility capacity attribute has been removed from the scoring procedure for this species and score weightings have been adjusted accordingly.

3.4.3 Species stocking rate – approximate density (per ha)

Approximate density (per ha) is the only attribute within the ***species stocking rate*** indicator that requires species-specific scoring. For scoring methods relating to the remaining three attributes refer to **Section 2.5**.

3.4.3.1 Population and density data

According to the species' Conservation Advice (DCCEEW 2023a), the current population of the diamond firetail is estimated at 68,000 mature individuals, with a broad range from 68,000 to 272,000. However, the reliability of this estimate is considered to be very low (DCCEEW 2023a). The estimate is based on the species' area of occupancy (AOO) and bird densities recorded during 20-minute, 2 ha area-search surveys (DCCEEW 2023a).

Population size was calculated by multiplying the AOO by an average density of 1.36 birds per hectare (2.72 birds per 2 ha survey, ±2.99 SD), based on BirdLife Australia survey data, with each 2x2 km AOO grid cell assumed to contain 16 ha of suitable habitat (DCCEEW 2023a). This estimate is highly conservative and relies on several key assumptions: that not all occupied areas have been recorded; that at least 4 ha of habitat exists in each grid cell with a record; and that some cells may be only partially occupied (DCCEEW 2023a). Additionally, the number of individuals recorded during surveys is highly variable, and some records may no longer represent currently occupied habitat (DCCEEW 2023a).

3.4.3.2 Assessing approximate density

Due to the uncertainties in both population size and density, a precautionary proxy parameter - *number of records per 100 ha* - has been applied to score the **approximate density (per ha)** attribute. This measure is based on the total number of species records within the matter area and species-specific **context** buffer (>300 ha). Including the context buffer in the assessment area reflects the species' mobility and use of adjacent habitat (see **Section 2.4.3**). Only those species records observed after the year 2000 have been incorporated into this calculation. These observations are thought to be representative of the species current distribution and where they are more likely to occur. Under this approach, sites with higher numbers of records are precautionarily assumed to represent greater relative value to the species.

To generate a score, records per ha is calculated and then converted to records per 100 ha using the following formula:

$$\text{Records per 100 ha} = \frac{\text{Records}}{\text{Area (ha)}} \times 100$$

This parameter is then assigned a score following **Table 3.24**. Score scaling is deliberately conservative and informed by the national density estimate of 136 birds per 100 ha. The highest score is assigned where more than 100 records per 100 ha over the five-year period is recorded.

Table 3.24: Approximate density scoring – diamond firetail

Parameter	Parameter measurement area	Score			
		0 (no records)	10 (low)	20 (moderate)	30 (high)
Number of records per 100 ha	Matter area plus context buffer described in **Section 2.4.3**	0	>0-50	>50-100	>100

3.5 Dunmall's Snake

The Dunmall's snake is a venomous snake in the Elapidae family. It is primarily nocturnal, docile and terrestrial, typically occurring in habitats associated with black cracking clays dominated by *Acacia*, *Callitris* or *Allocasuarina* species. It can also occur on sandstone derived soils dominated by *Eucalyptus*, *Corymbia*, *Callitris* and *Allocasuarina* (DoE 2026b). Whilst little is known about the ecological requirements of this cryptic species, they are known to shelter under fallen timber, ground litter and within cracks in alluvial clay soils (DoE 2026b, DoE 2014) and possibly prefer habitats between 200 and 500 m above sea level (DoE 2026b).

Given the species' need to shelter during seasonally hot and dry conditions, the species is restricted to areas supporting microhabitat features and is considered largely sedentary, although some localised movement may occur in response to seasonal conditions (DoE 2026b). The diet of Dunmall's snake primarily consists of small skinks and geckos (DoE 2014, DoE 2026b) with one specimen's stomach contents containing remnants of the tree skink (*Egernia striolata*) (Shine 1981).

3.5.1 Site condition – Species Habitat Indices

3.5.1.1 Quality and availability of food and foraging habitat

The diet of Dunmall's snake primarily consists of small skinks and geckos (DoE 2014, DoE 2026b). It is well documented that structural complexity of vegetation and other ground-level microhabitat components are important to skinks (Downey and Dickman 1993, Hutchinson 1993), legless lizards (Rauhala 1993), geckos (Smith et al. 1996) and elapid snakes (Shine 1987, Greer 1997). Reptile species richness and abundance increases with greater structural heterogeneity in the ground and shrub layer, particularly generalist skink species (Brown et al. 2008). Accordingly, the two parameters selected to assess the quality and availability of food and foraging habitat are *native grass cover (%)* and *shrub cover (%)*.

The first parameter assessed is *native grass cover (%)*. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 5), compared to the relevant RE benchmark and scored using **Table 3.25**. Score scaling presented in **Table 3.25** is based on Section 5.1 of the Guide (Table 2: Native perennial grass cover).

The second parameter assessed is *shrub cover (%)*. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 6), compared to the relevant RE benchmark and scored using **Table 3.25**. Score scaling presented in **Table 3.25** is based on Section 5.1 of the Guide (Table 2: Shrub canopy cover).

Table 3.25 Quality and availability of food and foraging habitat parameters - Dunmall's snake

Parameter	Parameter measurement area	Score		
		1	5	10
*Native grass cover (%)**	1 x 1 m plots	<10% of RE benchmark	≥10% and <50% of RE benchmark	>50% of RE benchmark

*Shrub canopy cover**	100 m transect	<10% of RE benchmark	≥10% and <50% of RE benchmark	>50% of RE benchmark

*See **Appendix A, Table A1** for RE benchmarks

3.5.1.2 Quality and availability of shelter

The species is found almost exclusively under fallen timber and ground litter but may also use cracks in clay soils (DoE 2014, DCCEEW 2026b), as well as rocks or artificial materials on or within topsoil (DCCEEW 2023b). Accordingly, the parameters selected to assess the quality and availability of shelter for Dunmall's snake are availability of *coarse woody debris* and *organic litter*. The presence and availability of these serve as a proxy for sheltering opportunities.

To assess *coarse woody debris*, site specific field data is collected in accordance with Section 5.1 of the Guide (Step 4), compared to the relevant RE benchmark and scored in accordance with **Table 3.26**. Score scaling presented in **Table 3.26** is based on Section 5.1 of the Guide (Table 2: Coarse woody debris) however, excludes scoring references to cover over 200% as it is not considered relevant for this assessment.

To assess *organic litter*, site specific field data is collected in accordance with Section 5.1 of the Guide (Step 5), compared to the relevant RE benchmark and scored in accordance with **Table 3.26**. Score scaling presented in **Table 3.26** is based on Section 5.1 of the Guide (Table 2: Organic litter) however, excludes scoring references to cover over 200% as it is not considered relevant for this assessment.

Table 3.26 Quality and availability of shelter habitat parameters - Dunmall's snake

Parameter	Parameter measurement area	Score		
		1	5	10
*Coarse woody debris**	1 x 1 m plots	<10% of RE benchmark	≥10% - <50% of RE benchmark	>50% of RE benchmark
*Organic litter**	1 x 1 m plots	<10% of RE benchmark	≥10% - <50% of RE benchmark	>50% of RE benchmark

*See **Appendix A, Table A1** for RE benchmarks

3.5.2 Site context

3.5.2.1 Threats

3.5.2.1.1 Summary of relevant threats

A summary of the threats identified for the Dunmall's snake in the species Conservation Advice (DoE 2014), species profile (DoE 2026b), draft referral guidelines for the nationally listed Brigalow Belt reptiles (DCCEEW 2023b) and the Threat abatement plan for predation by feral cats 2024 (DCCEEW 2024) is provided in **Table 3.27**. Justifications for each threat's inclusion or exclusion in the threat assessment has also been provided. For threats proposed to be included in the threat assessment, the parameter used to assess the threat is also identified.

Several key threats are considered relevant for this species and have been included in the assessment, these are habitat loss and fragmentation, habitat degradation caused by livestock grazing, inappropriate fire regimes, predation by feral animals and invasive weeds.

Table 3.27 Summary of threats - Dunmall's snake

Threats	Assessment Proposed?	Justification	Assessment parameter
Habitat loss and fragmentation (DoE 2014,	Yes	Both the impact and offset sites are in areas where vegetation has been historically cleared to facilitate grazing	*Vegetation protection status*

Threats	Assessment Proposed?	Justification	Assessment parameter
DoE 2026b, DCCEEW 2023b)		and agriculture, as well as CSG development.	
Habitat degradation caused by livestock grazing (DoE 2014, DoE 2026b, DCCEEW 2023b)	Yes	The impact and offset sites are in areas where habitat has been impacted by domestic livestock grazing.	*Grazing intensity*
Inappropriate fire regimes (DCCEEW 2023b)	Yes	The species utilises fallen timber and ground litter for shelter and foraging. The impact and offset areas contain habitat for this species that may be impacted by inappropriate fire regimes which can result in the loss of fallen timber and ground litter.	*Potential for inappropriate fire regimes*
Predation by feral animals (DCCEEW 2024)	Yes	The Threat abatement plan for predation by feral cats 2024 is adopted for this species and predation by feral cats to the threatened Brigalow Belt reptiles is referenced in the draft referral guidelines (DCCEEW 2023b). The presence of feral cats at the impact and offset sites is likely hence this threat has been included in the assessment.	*Pest animal Activity Index – feral cat*
Invasive weeds (DCCEEW 2023b)	Yes	Habitat degradation caused by invasive weeds is an indirect threat to the species and has been included in the threat assessment.	*Average non-native plant cover*

An assessment of the risk rating for the identified threats has been undertaken using the threat matrix (**Section 2.4.6**) and information provided in the conservation advice (DoE 2014) and threat abatement plan for predation by feral cats (DCCEEW 2024). A summary of the assessment including the assigned likelihood, consequence and risk rating is presented **Table 3.28**.

Table 3.28: Risk rating of the identified threats to Dunmall's snake

Threat	Likelihood	Consequence	Risk rating
Habitat loss and fragmentation (DoE 2014, DoE 2026b, DCCEEW 2023b)	Almost certain	Major	Very high risk (20)
Habitat degradation caused by livestock grazing (DoE 2014, DoE 2026b, DCCEEW 2023b)	Almost certain	Moderate	Very high risk (15)
Inappropriate fire regimes (DCCEEW 2023b)	Likely	Moderate	High risk (12)
Predation by feral animals (DCCEEW 2024)	Likely	Minor	Moderate risk (8)

Threat	Likelihood	Consequence	Risk rating
Invasive weeds (DCCEEW 2023b)	Almost certain	Minor	Moderate risk (10)

3.5.2.1.2 Threat assessment parameters and scoring

The assessment parameter for habitat loss caused by land clearing and habitat modification is *vegetation protection status*. As presented in **Table 3.29**, matter areas containing non-remnant vegetation (Cat X) under the VM Act are typically not protected from broad scale clearing activities and receive the lowest score (1). Matter areas mapped as remnant (Cat B) or high-value regrowth (Cat C) under the VM Act have some level of protection but can be cleared subject to statutory approvals. These areas receive a moderate score (7). Areas mapped as Category A under the VM Act, or that are protected via a Statutory Covenant under the *Land Act 1994* or the *Land Title Act 1994*, have the highest level of protection and receive the highest score (15). Where a matter area contains a mixture of these, the lowest relevant protection score will be awarded.

The assessment parameter for habitat degradation caused by livestock grazing is *grazing intensity*. As presented in **Table 3.29**, matter areas where grazing is excluded receive the highest score. Where rotational grazing is implemented (i.e. livestock are periodically moved between paddocks to prevent overgrazing) the moderate score (7) is applied. Areas that are continuously grazed receive the lowest score (1).

The assessment parameter for inappropriate fire regimes is *potential for inappropriate fire regimes*. As presented in **Table 3.29**, this parameter is scored by assessing the nature of bushfire management and mitigation in place across the matter area.

The assessment parameter for predation by feral cat is *pest animal Activity Index – feral cat*. The presence of pest animals within the impact and offset areas is assessed using methods outlined in the OMP, focusing on the collection of unbaited camera trap data. An Activity Index (AI) is calculated using this data and informed by methods in Jenks et al. (2011) and based on the following formula:

$$Activity\ Index\ (AI) = (\frac{Total\ number\ of\ detections}{Total\ number\ of\ trap\ hours})\ x100$$

A detection is the positive identification of one of the target species within a 20-minute interval, with a maximum of three independent detections possible per hour. For example, if the maximum number of detections were observed (3 per hour), on a single trap day (24 hours), using a single camera, the AI would be 300 (72 detections ÷ 24 hours x 100 = 300).

The scoring categories defined in **Table 3.29** have been informed by the results of the baseline pest animal monitoring event (Attexo 2025) indicating the presence of a relatively low abundance of pest animals across the impact and offset area. The baseline surveys recorded a total of seven (7) pest animals (five (5) cats, one (1) rabbit and one (1) pig) over a combined survey effort of 3,827 trap hours (i.e. 12 cameras deployed for approximately 2 weeks).

The site-specific data is compared to the scoring categories in **Table 3.29**. These scoring categories have been developed based the following assumptions:

- Total trap hours = 3,827 hours which is equivalent to 12 cameras deployed over approximately 2 weeks (note that monitoring design in the OMP should replicate the 3,827 total trap hours to ensure results are comparable over time).
- < 5 detections per event indicates sporadic and/or incidental pest activity (Score of 15).
- 5 - 9 detections per event indicates moderate pest activity (Score of 7).
- ≥ 10 detections per event indicates frequent and/or resident-level pest activity (Score of 1).

The assessment parameter for *invasive weeds* is average non-native plant cover. Non-native plant cover is assessed in accordance with Section 5.1 of the Guide (Step 3) at each assessment site individually and then the average across all assessment sites is determined to define a single cover score for the entire matter area. The average cover is then

compared to the score scales presented in **Table 3.29**, which are based on Section 5.1 of the Guide (Table 2: Non-native plant cover).

Table 3.29 Parameters and scores for assessing threats - Dunmall's snake

Parameter	Score		
	1	7	15
Vegetation protection status	Non-remnant / Category X	Remnant (Category B) or High Value Regrowth (Category C)	Category A or Statutory Covenant
Grazing intensity	Continuous grazing	Rotational grazing	Grazing excluded
Potential for intense bushfires	No bushfire management or mitigation measures are implemented within the matter area	Bushfire management measures are implemented within the matter area, but they do not address species specific requirements	A Bushfire Management Plan, incorporating species specific fire management requirements, is actively implemented within the matter area
Pest animal Activity Index – feral cat	AI ≥ 0.2613	AI ≥0.1306 and <0.2613	AI <0.1306
Average non-native plant cover (%)	>50% average cover	5-50% average cover	<5% average cover

3.5.2.2 Species mobility capacity

Very little is known about the home range, dispersal activity and movement patterns of Dunmall's snake (DoE 2026b). However, the spatial ecology of Australian elapids that are similar in size and share habitat characteristics with Dunmall's snake (i.e. prey on small vertebrates including geckos and skinks and shelter under rocks and logs), has been well documented (Shine 1987, Macartney et al. 1988, Webb and Shine 1997, Whittaker and Shine 2003). Movement patterns of similar Australian elapids are limited naturally, with daily, monthly and even yearly movements between 3-300 m reported (Shine 1987, Webb and Shine 1997, Whittaker and Shine 2003). Typical movements of broad-headed snake (*Holocephalus bungaroides*), which is a smaller elapid that is closer in size and ecology to Dunmall's snake, rarely moved with average distances moved per month <200 m (Webb and Shine 1997).

Barriers to movement for smaller elapid species are likely attributed to fragmentation of suitable habitat and inherently increased habitat degradation from edge effects (DCCEEW 2023b). In vegetated habitats, broad-headed snakes moved significantly further (mean distance moved 159 m) between shelter sites compared to non-vegetated areas (mean distance moved 37 m) (Webb and Shine 1997). As threats are more prevalent in unvegetated areas and movement of smaller elapid species is inhibited in these environments, fragmentation is likely to limit the mobility capacity in Dunmall's snake. As such, *habitat fragmentation* has been selected as the only parameter to measure the species mobility capacity.

Score scaling was developed based on the range of recorded daily movement distances of broad-headed snake as the species is similar in size and ecological requirements as Dunmall's snake (i.e. both forage for geckos and skinks). As such, the minimum width between fragmented areas of habitat the species is likely to traverse is assumed to be <20 m. This assumes that the species mobility capacity would be restricted to some degree in areas where the width between habitat is more than 20 m. As presented in **Table 3.30**, a width of <20 m represents the maximum score (10), with scores decreasing in increments.

Using GIS spatial analysis, the distance between patches of all remnant and regrowth vegetation within the matter area are measured and the results compared to the scores in **Table 3.30**.

Table 3.30 Species mobility capacity parameter - Dunmall's snake

Parameter	Score			
	1 (severely restricted)	4 (highly restricted)	7 (moderately restricted)	10 (minor restriction)
Habitat fragmentation (m) (i.e. distance between patches of remnant/regrowth vegetation)	Any gap is >50m	Largest gap is 40 to 50m	Largest gap is 20 to 40m	All gaps are <20m

3.5.3 Species stocking rate – approximate density (per ha)

This species needs to utilise shelter habitats such as fallen timber, ground litter and cracks that form in clay soils during extended dry periods, to survive typically hot, dry conditions (DCCEEW 2023b) which makes it difficult to detect even in optimal conditions. The species is cryptic in nature and existing records are sparse. Detection is further constrained by poorly understood ecology and local movements (DoE 2014). Due to these challenges, this attribute has not been scored for this species, and score weightings have been adjusted accordingly.

3.6 Squatter Pigeon (southern)

The squatter pigeon is a ground foraging granivore which can utilise a wide range of open-forest to sparse open-woodland and scrub habitats, typically dominated by eucalypts but which may also be dominated by *Acacia*, *Callitris*, and *Melaleuca* species, or tussock grasses (DoE 2026a; Lloyd et al 2025).

Suitable foraging and breeding habitat for this subspecies is typically associated with gentle slopes (Lloyd et al. 2025). Areas of suitable foraging habitat were previously linked to flat to undulating plains and foothills (land zone 5) (Wilson 2012) and lateritic (duplex) soils on low 'jump-ups' and escarpments (land zone 7) (DoE 2026a). Recent evidence suggests foraging habitat is more strongly associated with alluvial plains across all bioregions (land zone 3) (Lloyd et al. 2025). Similarly, suitable breeding habitat was previously linked to land zone 5 and 7, however, recent analysis of records confirmed that breeding can occur across several land zones (3, 5, 8, 11) (Lloyd et al. 2025). Consequently, it is likely that this subspecies can nest within any land zone that is located close to foraging habitat and a permanent water source. Despite this, their known preference for sandy soils suggests that they are less likely to use land zone 4 (clay plains) for foraging and nesting.

Like other granivorous birds inhabiting arid to semi-arid environments, squatter pigeons must drink regularly, possibly daily, and are described as being found nearly always near permanent water (Lloyd et al. 2025). Previous advice suggested that foraging habitat was likely located within 3 km of permanent water and breeding habitat was located within 1 km (DoE 2026a), however, a recent analysis of records suggests this is more likely to be within 1.7 km and 500 m of permanent water, respectively (Lloyd et al. 2025). Squatter pigeon nests consist of a shallow depression scraped into the ground and sparsely lined with grass, typically underneath grasses, shrubs or other microhabitat features (DoE 2026a).

Groundcover vegetation in suitable foraging and breeding habitat is patchy, consisting of native perennial tussock grasses or a mixture of perennial tussock grasses and low shrubs and/or forbs (DoE 2026a). Previous estimates of preferred groundcover vegetation rarely exceeded 33% (DoE 2026a), whereas more recent estimates suggest that the quantity of groundcover vegetation is likely to vary depending on the type of vegetation community (remnant vs regrowth) and floristic composition, and can range anywhere between approximately 20% and 60%, and occasionally higher (Lloyd et al 2025). Furthermore, squatter pigeons are commonly observed foraging along the sides of roads, tracks, within stock yards and around cattle troughs where they also drink (DoE 2026a).

It is estimated that approximately 95% of the squatter pigeons diet consists of seeds (primarily from low vegetation such as grasses, herbs and shrubs) (DoE 2026a). Given that foraging resource availability is likely to be influenced by rainfall patterns from year to year, the southern subspecies is likely to be sedentary where water and foraging resources are reliable in the local region (DoE 2026a). When these resources become unavailable, the subspecies may disperse locally or regionally along vegetated corridors in search of other foraging resources. There is also some

evidence to suggest that this subspecies may migrate (either locally or regionally), however, this is difficult to substantiate (DoE 2026a).

3.6.1 Site condition – Species Habitat Indices

3.6.1.1 Quality and availability of food and foraging habitat

The squatter pigeon is strongly reliant on the presence and availability of native perennial grass seeds in proximity to perennial water sources (DoE 2026a). Grass seeds make up 95% of their diet. The three parameters selected to assess the quality and availability of food and foraging habitat therefore relate to native grass species richness, grass species abundance and proximity to perennial water source.

The first parameter assessed is *native grass richness*. Higher species richness is likely to reflect a wider range of reproductive strategies and phenologies, thereby supporting more continuous seed availability throughout the year. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 3), compared to the relevant RE benchmark and scored using **Table 3.31**. Score scaling presented in **Table 3.31** is based on Section 5.1 of the Guide (Table 2: Native plant species richness – grasses).

The second parameter assessed is *native grass cover (%)*, a suitable proxy for resource abundance, whereby increased grass cover is assumed to correlate with higher seed yield. Site specific field data is collected in accordance with Section 5.1 of the Guide (Step 5), compared to the relevant RE benchmark and scored using **Table 3.31**. Score scaling presented in **Table 3.31** is based on Section 5.1 of the Guide (Table 2: Native perennial grass cover).

The third parameter assessed is *distance to perennial water source (km)*. A recent analysis undertaken by Lloyd et al. (2025) identified that 95% of squatter pigeon records are located within 1.7 km of a perennial water source, suggesting that suitable food and foraging is more likely to occur within proximity to permanent water sources. This parameter has therefore been included as another indicator for the availability of suitable foraging habitat. Sites located within 1.7 km of a perennial water source receive the highest score (10), while sites located further away receive the lowest score (1). No intermediate scores are proposed for this attribute. Score scaling for this parameter is presented in **Table 3.31**.

Table 3.31: Quality and availability of food and foraging habitat parameters – squatter pigeon

Parameter	Parameter measurement area	Score		
		1	5	10
*Native grass richness**	50 x 10 m plot	<25% of RE benchmark	≥25% to 90% of RE benchmark	>90 of RE benchmark
*Native grass cover (%)**	1 x 1 m plots	0 to 50% of RE benchmark	>50% to 90% of RE benchmark	>90% of RE benchmark
Distance to perennial water source (km)	Centre point of BioCondition plot	Site > 1.7 km from perennial water source	-	Site < 1.7 km from perennial water source

*See **Appendix A**, **Table A1** for RE benchmarks

3.6.1.2 Quality and availability of shelter

The squatter pigeon is strongly reliant on groundcover vegetation in proximity to perennial water sources for shelter as it spends most of its time foraging on the ground (DoE 2026; Lloyd et al. 2025). Two parameters have therefore been selected to assess the quality and availability of shelter habitat, including groundcover vegetation (%) and distance to perennial water source (km).

The first parameter assessed is *groundcover vegetation (%)*. Site specific field data for this attribute is collected generally in accordance with Section 5.1 of the Guide (Step 5) and must combine individual covers within the 1 x 1 m plot of the following vegetation categories: native grasses, native forbs, non-native grasses, non-native forbs and shrub cover (up to 1 m). Score scaling for this parameter was developed based on Lloyd, et al. (2025), acknowledging

that optimal cover is likely to be between 24% and 73%, which receives the highest score (10). The resulting score categories for this parameter are provided in **Table 3.32**.

The second parameter assessed is *distance to perennial water source (km)*. A recent analysis undertaken by Lloyd et al. (2025) identified that 95% of squatter pigeon records are located within 1.7 km of a perennial water source, suggesting that suitable shelter habitat is more likely to occur within proximity to permanent water sources. This parameter has therefore been used as an indicator for the quality and availability of shelter habitat. Sites located within 1.7 km of a perennial water source receive the highest score (10), while sites located further away receive the lowest score (1). No intermediate scores are proposed for this attribute. Score scaling for this parameter is presented in **Table 3.32**.

Table 3.32: Quality and availability of shelter parameters – squatter pigeon

Parameter	Parameter measurement area	Score		
		1	5	10
Groundcover vegetation (%)	1 x 1 m plots	0% groundcover vegetation	>0% to <24% or >73% groundcover vegetation	24% to 73% groundcover vegetation
Distance to perennial water source (km)	Centre point of BioCondition plot	Site > 1.7 km from perennial water source	-	Site < 1.7 km from perennial water source

3.6.2 Site context

3.6.2.1 Threats

3.6.2.1.1 Summary of relevant threats

A summary of the threats identified for the squatter pigeon in its Species Profile and Threats Database (DoE 2026a), Conservation Advice (TSSC 2015) and the threat abatement plan for predation by feral cats (DCCEEW 2024) is provided in **Table 3.33**. Justifications for each threat's inclusion or exclusion in the threat assessment has also been provided.

Several key threats are considered relevant for this species and have been included in the assessment, these are habitat loss caused by land clearing, invasive weeds, habitat degradation caused by livestock grazing, inappropriate fire regimes, and predation by feral cats, and foxes. For threats proposed to be included in the threat assessment, the parameter used to assess the threat is also identified.

Table 3.33: Summary of threats – squatter pigeon

Threats	Assessment Proposed?	Justification	Assessment parameter
Habitat loss caused by land clearing (DoE 2026a; TSSC 2015)	Yes	Both the impact and offset sites are in areas where vegetation has been historically cleared to facilitate pastoral activities and the development of CSG infrastructure.	*Vegetation protection status*
Invasive weeds (especially buffel grass) (DoE 2026a; TSSC 2015)	Yes	Invasive weeds within the impact and offset areas can change the floristic and structural characteristics of habitat and consequently alter resource availability for the species, as well as potentially increasing bushfire risk.	*Average non-native plant cover (%)*

Threats	Assessment Proposed?	Justification	Assessment parameter
Habitat degradation caused by livestock grazing (DoE 2026a; TSSC 2015)	Yes	The impact and offset sites are in areas where habitat has been impacted by domestic livestock grazing.	*Grazing intensity*
Inappropriate fire regimes (DoE 2026a; TSSC 2015)	Yes	The impact and offset areas contain habitat for this species that may be impacted by inappropriate fire regimes.	*Potential for inappropriate fire regimes*
Predation by feral cats (DoE 2026a; TSSC 2015)	Yes	Ground-dwelling and ground-nesting birds are likely to be preyed upon by feral cat populations. Due to this species primarily foraging and breeding on the ground, and the likely presence of feral cats at the impact and offset sites, this threat has been included in the assessment.	*Pest animal Activity Index – feral cat*
Predation by European red foxes (DoE 2026a; TSSC 2015)	Yes	Ground-dwelling and ground-nesting birds are likely to be preyed upon by European red fox populations. Due to this species primarily foraging and breeding on the ground, and the likely presence of foxes at the impact and offset sites, this threat has been included in the assessment.	*Pest animal Activity Index – fox*
Predation by feral dog (DoE 2026a)	No	Whilst listed as a current threat in the species profile (DoE 2026a), predation by feral dog is not a listed threat in the species Conservation Advice (TSSC 2015), and is therefore not included in the threat assessment.	N/A
Habitat degradation by rabbits (TSSC 2015)	No	Whilst the threat of habitat degradation by rabbits was listed in the Conservation Advice (TSSC 2015) for this species, it is difficult to determine the severity of this threat, therefore it has not been included in the threat assessment.	N/A
Climate Change – increased likelihood of extreme events (DoE 2026a)	No	Climate change will increase and continue to increase the likelihood of extreme events such as wildfires, heatwaves, and droughts, adversely impacting habitat and resource availability, and overwhelming birds physiological limits. As climate change is a broad scale complex ecological threat, and is generally considered consistent between the impact and offset site, it has been excluded from the threat assessment.	N/A
Illegal hunting (DoE 2026a; TSSC 2015)	No	This species was extensively hunted by early settlers but this is no longer considered to be a 'current' threatening process despite occasional hunting being recorded. This	N/A

Threats	Assessment Proposed?	Justification	Assessment parameter
		species has been fully protected in Queensland since the late 1990s.	
Predation by native species such as birds of prey (DoE 2026a)	No	Native birds of prey are listed as a threatening process for the squatter pigeon (southern). Impacts from these species have not been included in the threat assessment as control of these native species is beyond the scope of the OMP.	N/A

An assessment of the risk rating for the identified threats has been undertaken using the threat matrix (**Section 2.4.6**) and information provided in the squatter pigeon Species Profile and Threats Database (DoE 2026a), Conservation Advice (TSSC 2015) and threat abatement plan for predation by feral cats (DCCEEW 2024). A summary of the assessment including the assigned likelihood, consequence and risk rating is presented **Table 3.20**.

Table 3.34: Risk rating of the identified threats to squatter pigeon

Threat	Likelihood	Consequence	Risk rating
Habitat loss caused by land clearing (DoE 2026a; TSSC 2015)	Almost certain	Major	Very high risk (20)
Invasive weeds (especially buffel grass) (DoE 2026a; TSSC 2015)	Almost certain	Minor	Very high risk (10)
Habitat degradation caused by livestock grazing (DoE 2026a; TSSC 2015)	Almost certain	Major	Very high risk (20)
Inappropriate fire regimes (DoE 2026a; TSSC 2015)	Almost certain	Moderate	Very high risk (15)
Predation by feral cats (DoE 2026a; TSSC 2015)	Almost certain	Moderate	Very high risk (15)
Predation by European red foxes (DoE 2026a; TSSC 2015)	Almost certain	Moderate	Very high risk (15)

3.6.2.1.2 Threat assessment parameters and scoring

The assessment parameter for habitat loss caused by land clearing is vegetation protection status. As presented in **Table 3.35**, matter areas containing non-remnant vegetation (Cat X) under the VM Act are typically not protected from broad scale clearing activities and receive the lowest score (1). Matter areas mapped as remnant (Cat B) or high-value regrowth (Cat C) under the VM Act have some level of protection but can be cleared subject to statutory approvals. These areas receive a moderate score (7). Areas mapped as Category A under the VM Act, or that are protected via a Statutory Covenant under the *Land Act 1994* or the *Land Title Act 1994*, have the highest level of protection and receive the highest score (15). Where a matter area contains a mixture of these, the lowest relevant protection score will be awarded.

The assessment parameter for invasive weeds (particularly buffel grass) is average non-native plant cover (%). Non-native plant cover is assessed in accordance with Section 5.1 of the Guide (Step 3) at each assessment site individually and then the average across all assessment sites is determined to define a single cover score for the entire matter

area. The average cover is then compared to the score scales presented in **Table 3.35**, which are based on Section 5.1 of the Guide (Table 2: Non-native plant cover).

The assessment parameter for habitat degradation caused by livestock grazing is grazing intensity. As presented in **Table 3.35**, matter areas where grazing is excluded receive the highest score. Where rotational grazing is implemented (i.e. livestock are periodically moved between paddocks to prevent overgrazing) the moderate score (7) is applied. Areas that are continuously grazed receive the lowest score (1).

The assessment parameter for inappropriate fire regimes is potential for inappropriate fire regimes. As presented in **Table 3.35**, this parameter is scored by assessing the nature of bushfire management and mitigation in place across the matter area.

The assessment parameter for predation by feral cat and foxes is *pest animal Activity Index – feral cat and fox*. The presence of pest animals within the impact and offset areas is assessed using methods outlined in the OMP, focusing on the collection of unbaited camera trap data. An Activity Index (AI) is calculated using this data and informed by methods in Jenks et al. (2011) and based on the following formula:

$$Activity\ Index\ (AI) = (\frac{Total\ number\ of\ detections}{Total\ number\ of\ trap\ hours})\ x100$$

A detection is the positive identification of one of the target species within a 20-minute interval, with a maximum of three independent detections possible per hour. For example, if the maximum number of detections were observed (3 per hour), on a single trap day (24 hours), using a single camera, the AI would be 300 (72 detections ÷ 24 hours x 100 = 300).

The scoring categories defined in **Table 3.35** have been informed by the results of the baseline pest animal monitoring event (Attexo 2025) indicating the presence of a relatively low abundance of pest animals across the impact and offset area. The baseline surveys recorded a total of seven (7) pest animals (five (5) cats, one (1) rabbit and one (1) pig) over a combined survey effort of 3,827 trap hours (i.e. 12 cameras deployed for approximately 2 weeks).

The site-specific data is compared to the scoring categories in **Table 3.35**. These scoring categories have been developed based the following assumptions:

- Total trap hours = 3,827 hours which is equivalent to 12 cameras deployed over approximately 2 weeks (note that monitoring design in the OMP should replicate the 3,827 total trap hours to ensure results are comparable over time).
- < 5 detections per event indicates sporadic and/or incidental pest activity (Score of 15).
- 5 - 9 detections per event indicates moderate pest activity (Score of 7).
- ≥ 10 detections per event indicates frequent and/or resident-level pest activity (Score of 1).

Table 3.35: Parameters and scores for assessing threats – squatter pigeon

Parameter	Score		
	1	7	15
Vegetation protection status	Non-remnant / Category X	Remnant (Category B) or High Value Regrowth (Category C)	Category A or Statutory Covenant
Average non-native plant cover (%)	>50% average cover	5-50% average cover	<5% average cover
Grazing intensity	Continuous grazing	Rotational grazing	Grazing excluded
Potential for inappropriate fire regimes	No bushfire management or mitigation measures are	Bushfire management measures are	A Bushfire Management Plan, incorporating species specific fire management

Parameter	Score		
	1	7	15
	implemented within the matter area	implemented within the matter area, but they do not address species specific requirements	requirements, is actively implemented within the matter area
Pest animal Activity Index – feral cat	AI ≥ 0.2613	AI ≥0.1306 and <0.2613	AI <0.1306
Pest animal Activity Index – fox	AI ≥ 0.2613	AI ≥0.1306 and <0.2613	AI <0.1306

3.6.2.2 Species mobility capacity

Whilst thought to be mostly sedentary, the squatter pigeon is capable of flight and may locally disperse in response to seasonal rainfall patterns and resource availability (DoE 2026a). This species is therefore considered to have a strong mobility capacity. Considering the lack of physical barriers that could impede the movement of this species throughout the surrounding landscape, the species mobility capacity attribute has been removed from the scoring procedure for this species and score weightings have been adjusted accordingly.

3.6.3 Species stocking rate – approximate density (per ha)

Approximate density (per ha) is the only attribute within the ***species stocking rate*** indicator that requires species-specific scoring. For scoring methods relating to the remaining three attributes refer to **Section 2.5**.

3.3.3.1 Population and density data

The conservation advice for the squatter pigeon does not provide a specific population density estimate. However, the Action Plan for Australian Birds (Garnett & Baker 2021) estimates a total population of 220,000 mature individuals in a 4,400km^2 area of occupancy. Based on these figures, the mean population density used to inform the scoring for this attribute is calculated as 0.5 individuals per hectare (**Table 3.36**).

3.3.3.2 Assessing approximate density

Due to the uncertainties in both population size and density, a precautionary proxy parameter – number of records per 100 ha - has been applied to score the approximate density attribute. This measure is based on the total number of species records within the matter area and species-specific buffer (>300 ha) (see **Section 2.4.3**. Including the buffer in the assessment area reflects the species' mobility and use of adjacent habitat (see **Section 2.4.3**). Only those species records observed after the year 2000 are incorporated into this calculation. These observations are thought to be representative of the species current distribution and where they are more likely to occur. Under this approach, sites with higher numbers of records are precautionarily assumed to represent greater relative value to the species.

To generate a score, records per ha is calculated and then converted to records per 100 ha using the following formula:

$$\text{Records per 100 ha} = \frac{\text{Records}}{\text{Area (ha)}} \times 100$$

This parameter is then assigned a score following **Table 3.36**. Score scaling is deliberately conservative and informed by the density estimate of 0.5 birds per ha (50 birds per 100 ha) provided in the Action Plan for Australian Birds (Garnett & Baker 2021). The highest score is assigned where more than 100 records per 100 ha over the five-year period is recorded.

Table 3.36: Approximate density scoring – squatter pigeon

Parameter	Parameter measurement area	Score			
		0 (no records)	10 (low)	20 (moderate)	30 (high)
Number of records per 100 ha	Matter area plus context buffer described in **Section 2.4.3**.	0	>0-50	>50-100	>100

4. References

Beale, P., Marsh, K.J., Youngentob, K.N., 2022, *Revegetating Koala Habitat*, report prepared for the Department of Climate Change, Energy, the Environment and Water, Canberra, October. CC BY 4.0.

Brown, G.W., Bennett, A.F. and Potts, J.M., 2008. Regional faunal decline–reptile occurrence in fragmented rural landscapes of south-eastern Australia. Wildlife Research, 35(1), pp.8-18.

DAWE (Department of Agriculture, Water and the Environment) 2015, *Conservation Advice Nyctophilus corbeni south-eastern long-eared bat,* Commonwealth of Australia, available online: https://www.environment.gov.au/biodiversity/threatened/species/pubs/83395-conservation_advice-01102015.pdf

DAWE 2022, National Recovery plan for the Koala: Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory). Department of Agriculture, Water and the Environment, Canberra. Marh 2022. CCBY 4.0.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2022a. Conservation advice for *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo), Commonwealth of Australia, Canberra, viewed 14 April 2025, http://www.environment.gov.au/biodiversity /threatened/species/pubs/67036-conservation-advice-10082022.pdf.

DCCEEW 2022b, Conservation advice for *Phascolarctos cinereus* (Koala) – combined populations of Queensland, New South Wales and the Australian Capital Territory, Commonwealth of Australia, Canberra, viewed 14 April 2025, https://www.environment.gov.au/biodiversity/threatened/species/pubs/85104-conservation-advice-12022022.pdf.

DCCEEW 2023a, *Conservation advice for Stagonopleura guttata (Diamond Firetail)*, Commonwealth of Australia, Canberra, viewed 14 April 2025, http://www.environment.gov.au/biodiversity/threatened/species/pubs/59398-conservation-advice-31032023.pdf

DCCEEW 2023b, Draft Referral guidelines for the nationally listed Brigalow Reptiles. *Environment Protection and Biodiversity Conservation Act 1999*.

DCCEEW 2024, *Threat abatement plan for predation by feral cats 2024*, Department of Climate Change, Energy, the Environment and Water, Canberra. CC BY 4.0. It should be considered in conjunction with: DCCEEW 2024, Background document for the threat abatement plan for predation by feral cats 2024, Department of Climate Change, Energy, the Environment and Water, Canberra. CC BY 4.0

DCCEEW 2025, Guidance on the use of the Modified Habitat Quality Assessment method. Last updated 28/05/2025.

Department of Environment and Heritage Protection (DEHP), 2017. Guide to determining terrestrial habitat quality, A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy, Version 1.2 April 2017, available from: https://environment.des.qld.gov.au/__data/assets/pdf_file/0015/90312/habitat-quality-assessment-guide.pdf

Department of Environment and Science (DES), 2020. Guide to determining terrestrial habitat quality. Methods for assessing habitat quality under the Queensland Environmental Offsets Policy. Version 1.3.

DES 2022, Koala Sensitive Design Guideline: Department of Environment and Science Government.

Dique, DS, Thompson, J, Preece, HJ, DL, de Villiers & FN, Carrick ,2003, Dispersal patterns in a regional koala population in south-east Queensland. Wildlife Research 30(3), pp. 281–290.

DoE, 2013, *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999,* Commonwealth of Australia, Canberra.

DoE 2014, Approved Conservation Advice for *Furina dunmallii* (Dunmall's Snake). Canberra. Available at: https://www.environment.gov.au/biodiversity/threatened/species/pubs/59254-conservation-advice.pdf

DoE 2026a, *Geophaps scripta scripta* in Species Profile and Threats Database. Available at: https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=64440

DoE 2026b. *Furina dunmalli* in Species Profile and Threats Database, Department of the Environment, Canberra. Available at: https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59254

Downey, F. J., and Dickman, C. R. (1993). Macro- and microhabitat relationships among lizards of sandridge desert in central Australia. In 'Herpetology in Australia. A Diverse Discipline'. (Eds D. Lunney and D. Ayers.) pp. 133–138. (Royal Zoological Society of New South Wales: Sydney.)

Duckworth, JW 1998, *The difficulty of estimating population densities of nocturnal forest mammals from transect counts of animals*, *Journal of Zoology*, 246, pp. 466-468.

Eyre, TJ, Kelly, AL, Neldner, VJ, Wilson, BA, Ferguson, DJ, Laidlaw, MJ and Franks, AJ 2015, *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual Version 2.2*, Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts, Brisbane.

Garnett, S.T. and Baker G.B (eds) (2021) The action plan for Australian Birds. CSIRO Publishing, Melbourne.

Gilbert, NA, Clare, JDJ, Stenglein, JL, and Zuckerberg, B 2020, *Abundance estimation of unmarked animals based on camera-trap data*, *Conservation Biology*, 35(1), pp. 88-100.

Gonsalves, L, Law, B, Brassil, T, Kerr, I and O'Loughlin, C 2022, *Roost Selection in Relation to a Patchy, Mosaic Management Burn by a Threatened Clutter-Adapted Bat*, *Forests*, 13, 1327, https:// doi.org/10.3390/f13081327.

Gonsalves, L, Law, B, Brassil, T, O'Loughlin, C, and Kerr, I 2024, *Miniature GPS tags reveal extensive movements by a threatened narrow-space bat and highlight sensitivity to forest clearing*, *Austral Ecology*, 49(12), https://doi.org/10.1111/aec.70012.

Greer, A. (1997). 'The Biology and Evolution of Australian Snakes.' (Surrey Beatty: Sydney.)

Hutchinson, M. N. (1993). Family Scincidae. In 'Fauna of Australia. Vol. 2A. Amphibia & Reptilia'. (Eds C. J. Glasby, G. J. B. Ross and P. L. Beesley.) pp. 261–279. (Australian Government Printing Service: Canberra.)

Jenks, K.E., Chanteap, P., Damrongchainarong, K., Cutter, P., Cutter, P., Redford, T., Lyanm, A.J., Howard, J. and Leimgruber, P. (2011). Using relative abundance indices from camera-trapping to test wildlife conservation hypothesis – an example from Khao Yai National Park, Thailand. Tropical Conservation Science 4(**2**): 113-131.

Lloyd, P., Williams, E.R., Hansen, C., van Osta, J.M., Agnew, L., Sanders, M., Meyer, E., Marston, S. and Dreis, B. (2025). Habitat Associations of the Southern Squatter Pigeon *Geophaps scripta scripta* in Queensland. Australian Jfield Ornithology 42: 156-167

Macartney, J. M., Gregory, P. T., and Larsen, K. W. (1988). A tabular survey of data on movements and home ranges of snakes. Journal of Herpetology 22:61–73.

Queensland Herbarium 2018, *Technical Descriptions of Regional Ecosystems*, Department of the Environment, Tourism Science and Innovation (DETSI), available online: https://www.publications.qld.gov.au/dataset/re-technical-descriptions.

Queensland Herbarium and Biodiversity Science 2025, *BioCondition Benchmark Database. Version 3.6,* DETSI, available online: https://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks.

Rauhala, M. A. (1993). Above ground movements and new information on habitat of Aprasia parapulchella revealed by pitfall trapping. Herpetofauna 23, 30–31.

Shine, R. (1981). Ecology of Australian Elapid Snakes of the Genera Furina and Glyphodon. Journal of Herpetology. 15 (2):219-224.

Shine R. (1987) Intraspecific variation in thermoregulation, movements and habitat use by Australian blacksnakes, Pseudechis porphyriacus (Elapidae). J. Herpetol. 21, 165–77.

Smith, G. T., Arnold, G. W., Sarre, S., Abensperg-Traun, M., and Steven, D. E. (1996). The effects of habitat fragmentation and livestock-grazing on animal communities in remnants of gimlet Eucalyptus salubris woodland in the Western Australian wheatbelt. II. Lizards. Journal of Applied Ecology 33, 1302–1310. doi:10.2307/2404771.

TSSC (Threatened Species Scientific Committee) (2015). Conservation Advice *Geophaps scripta scripta* squatter pigeon (southern). Canberra: Department of the Environment.

Webb, J. K., and Shine, R. (1997). Out on a limb: conservation implications of tree-hollow use by a threatened snake species (*Hoplocephalus bungaroides*: Serpentes, Elapidae). Biological Conservation 81:21–33.

Whitaker, P. B., & Shine, R. (2003). A radiotelemetric study of movements and shelter-site selection by free-ranging brownsnakes (Pseudonaja textilis, Elapidae). Herpetological Monographs, 17, 130–144.

Wilson, P.R. (2012). Land Zones of Queensland. Queensland Herbarium. Department of Science, Information Technology, Innovation and the Arts.

Youngentob, KN, Marsh, KF and Skewes, J 2021, *A review of koala habitat assessment criteria and methods*, report prepared for the Department of Agriculture, Water and the Environment, Canberra.

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Appendix A

Regional Ecosystem and Species-Specific Benchmarks

Table A1: Regional Ecosystem benchmarks

RE	Recruitment	Non-native plant cover	Tree species richness	Shrub species richness	Grass species richness	Forb/other species richness	Emergent canopy height	Tree canopy height	Tree subcanopy height	Emergent canopy cover	Tree canopy cover	Tree subcanopy cover	Large tree threshold-Euc	Large tree threshold-Non euc	Total large trees-Euc	Total large trees-Non-Euc	Shrub canopy cover	Native grass %	Litter cover	Coarse woody debris
11.3.14	100	0	5	7	7	19	na	16	8	na	53	18	40	32	7	39	8	18	48	544
11.3.25	100	0	4	4	8	13	na	23	11	na	34	12	53	26	19	13	7	35	21	473
11.3.27f	100	0	1	2	5	9	na	20	na	na	44	na	74	na	24	na	na	5	11	770
11.3.4	100	0	4	3	11	17	na	24	14	na	30	15	53	na	19	na	3	55	37	509
11.5.1	100	0	5	5	8	10	na	20	9	na	25	20	44	24	7	10	6	23	45	135
11.5.20	100	0	3	4	7	13	na	23	10	na	43	38	46	23	14	10	5	8	57	178
11.5.21	100	0	6	10	7	16	na	19	9	na	41	32	43	28	6	37	40	9	46	738
11.5.4	100	0	4	3	13	18	na	21	10	na	30	24	49	28	7	10	7	30	58	204
11.7.2	100	0	3	4	5	8	19	14	7	5	50	10	38	24	11	24	12	29	39	823
11.7.4	100	0	4	6	7	9	na	18	9	na	29	8	46	26	14	7	7	12	50	320
11.7.5	100	0	2	12	3	4	9	na	na	4	na	na	na	na	na	na	46	3	19	na
11.7.7	100	0	5	9	4	9	na	19	9	na	40	20	49	28	11	15	15	4	68	288

Table A2: Species specific benchmarks derived from RE Technical Descriptions

Regional ecosystem	Glossy Black Cockatoo		Koala	
	Foraging tree cover benchmark	Foraging tree species richness benchmark	Locally important Koala tree (LIKT) cover benchmark	LIKT species richness benchmark
11.3.14	27	2	14	1
11.3.25	36	2	119	6
11.3.27f	5	1	103	3
11.3.4	0	0	114	5
11.5.1	42	2	47	4
11.5.20	23	1	120	3
11.5.21	23	2	21	4
11.5.4	24	2	25	3
11.7.2	0	0	44	4
11.7.4	0	1	105	4
11.7.5	0	0	42	3
11.7.7	27	2	67	2

A-1 Example of how LIKT benchmarks were calculated

Due to the koala's reliance on specific LIKTs (Youngentob et al. 2021), the availability of these species is critical in assessing the quality of koala food and foraging habitat. The overall canopy cover of LIKT species was used to calculate the **quality and availability of food and foraging habitat** for the koala (which forms a component of the overall ***site condition*** score). While benchmarks for this attribute have not been formerly developed, the presence of LIKT species within each RE has been described in detail in each RE's respective Technical Description (DES 2018).

The following example steps through how this benchmark was generated for RE 11.3.25.

The Technical Description for RE 11.3.25 (page 80 of DES 2018) provides a detailed summary of tree species that occur in the 4 strata (emergent, T1, T2 and T3) of this vegetation community. Using the list of known LIKT species provided by Youngentob et al. (2021), a table summarising the canopy cover (not relative cover) for each LIKT species within each strata was made and is provided below in **Table A3**. The total LIKT cover for this RE was calculated by summing all the canopy cover values for each LIKT in each stratum. A benchmark value of 119% LIKT cover was generated using this method. Whilst this value is >100%, we believe that this is representative of the available foraging resources that could be available to the koala, as they can forage within any stratum. Limiting Total LIKT Cover to 100% would underrepresent the availability of foraging resources available to this species.

Table A3: Summary of LIKT species cover for RE 11.3.25

LIKT Species (Youngentob *et al.* 2021)	Canopy Cover*				Total LIKT Cover (%)
	E	T1	T2	T3	
Eucalyptus brownii	-	-	-	-	119
Eucalyptus camaldulensis	2	25	6	1	
Eucalyptus chloroclada	-	-	-	-	
Eucalyptus conica	-	-	-	-	
Eucalyptus coolabah	-	15	3	2	
Eucalyptus crebra	-	3	-	-	
Eucalyptus drepanophylla	-	-	-	-	
Eucalyptus dura	-	-	-	-	
Eucalyptus exserta	-	-	-	-	
Eucalyptus fibrosa	-	-	-	-	
Eucalyptus laevopinea	-	-	-	-	
Eucalyptus largiflorens	-	-	-	-	
Eucalyptus longirostrata	-	-	-	-	
Eucalyptus major	-	-	-	-	
Eucalyptus melanophloia	-	5	-	-	
Eucalyptus microcarpa	-	-	-	-	
Eucalyptus moluccana	-	-	-	-	
Eucalyptus ochrophloia	-	-	-	-	
Eucalyptus orgadophila	-	-	-	-	

LIKT Species (Youngentob *et al.* 2021)	Canopy Cover*				Total LIKT Cover (%)
	E	T1	T2	T3	
Eucalyptus populnea	-	7	17	-	
Eucalyptus punctata	-	-	-	-	
Eucalyptus saligna	-	-	-	-	
Eucalyptus sideroxylon	-	-	-	-	
Eucalyptus tereticornis	6	23	2	2	

* An "-" indicates that the respective LIKT species is not listed in that strata for this RE.

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Appendix C

Risk assessment

C-1 Risk Assessment Method

The qualitative risk assessment methodology outlined in the Commonwealth's Environmental Management Plan Guidelines 2014 (DCCEEW 2024b) has been followed to assess qualitive measures of likelihood, consequence and the risk level for each identified risk for the offset area. The key risks have been assessed using qualitative likelihood (Table C1) and qualitative consequence ratings (Table C2) with the interaction of likelihood and consequence determining the overall resultant risk (Table C3).

Table C4 presents the results of the risk assessment. The initial ratings assume that the risks are untreated, i.e. have not been addressed by specific risk mitigation measures outlined in the OMP. The residual risk resulting from the application of mitigation measures is then determined. Corrective actions are also identified for each risk event.

Table C.1: Qualitative measures of likelihood

Qualitative measure of likelihood	How likely is it that this event/issue will occur after control strategies have been put in place
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

Table C.2: Qualitative measures of consequences

Qualitative measure of consequences	What will be the consequence/result if this issue does occur rating
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

Table C.3: Risk rating

	Consequence				
	Minor	**Moderate**	**High**	**Major**	**Critical**
Highly Likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

Table C.4: Risk assessment

Risk	Initial risk rating			Actions to minimise risk	Residual risk rating			Corrective actions if risk occurs
	Likelihood	Consequence	Rating		Likelihood	Consequence	Rating	
Performance targets, interim milestones or completion criteria are not achieved within the designated timeframe.	Highly likely	High	High	Implementation of the management actions and adaptive management framework outlined in this OMP.	Rare	High	Low	Step 1: Investigate cause of trigger • Investigate reasons why the performance targets, interim milestones or completion criteria were not achieved within the specified timeframes. • Re-evaluate the suitability of the relevant management measures in the OMP and identify appropriate corrective actions. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented and may include: • Third party review the OMP to advise on the effectiveness of the management actions and where appropriate identify additional management interventions. • Increase frequency and intensity of pest animal and weed control measures and/or revise the type of measures to be implemented. • If it is considered that the completion criteria cannot be achieved Arrow CSG will notify the Commonwealth Government and, if required, provide alternative offset areas to acquit the required offset requirements
Clearing of native vegetation within the offset area.	Possible	Major	High	The offset area will be legally secured within 12 months of Project commencement. The offset area will be legally secured through a suitable protective mechanism available to Arrow CSG under Queensland legislation. The legal protective mechanism will remain on title for at least the duration of the impact to preserve native vegetation within the offset area restricting the disturbance, degradation, removal or clearing of such vegetation in contravention with the OMP, ensuring the long term protection of the MNES habitat values. The restrictions outlined in **Table 5.3** will remain in place for the life of the OMP.	Rare	Major	Medium	Step 1: Investigate cause of trigger • Investigate how and why unauthorised access and/or clearing occurred. • Assess the extent of unauthorised clearing and identify appropriate corrective actions. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented and may include: • Installation of additional fencing and/or signage and security for the offset area. • Additional habitat quality assessments to assess any damage and progress toward recovery to meet the next interim milestones or completion criteria. • Restoration of the impacted/cleared area as required to ensure completion criteria can be achieved.
Increased presence of pest animals in the offset area from baseline and subsequent monitoring events	Likely	Moderate	Medium	Implement control actions for pest animals in accordance with **Section 5.6**. Monitoring for pest animals will be undertaken in accordance with **Section 6.5**. Remote sensing camera will be deployed throughout the offset area to assess pest animal activity. An Activity Index (AI) will be calculated based on positive identification of a species and informed by methods in Jenks et al. (2011) and is to be used as a surrogate to measure pest animal activity rates within the offset area.	Unlikely	Moderate	Low	Step 1: Investigate cause of trigger • Investigate the reasons that may have attributed to the increase in the score AI for the relevant pest animals • Review adherence to pest animal control and management actions. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented and may include: • Increase the frequency and intensity of pest animal control and management activities

Risk	Initial risk rating			Actions to minimise risk	Residual risk rating			Corrective actions if risk occurs
	Likelihood	Consequence	Rating		Likelihood	Consequence	Rating	
								• Third party review of pest animal control and management activities and identification of revised suitable methods. • Ensure coordination with neighbours and community, where suitable, to ensure a consistent approach to management.
Increase in % cover and richness of weed species at monitoring sites from baseline and subsequent monitoring events	Likely	Moderate	Medium	Implement weed control actions in accordance with **Section 5.5**. Monitoring for weeds will be undertaken in accordance with **Section 6.5** to determine the species richness and cover of weed species across the offset area.	Unlikely	Moderate	Low	Step 1: Investigate cause of trigger • Investigate the reasons that may have attributed to the increase in the species richness or relative abundance of weeds. • Investigate potential sources of new weed species occurrence. • Review adherence to weed control and management actions. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented and may include: • Amend weed hygiene requirements and provide additional education/awareness to contractors and personnel entering the site to ensure restrictions are adhered to. • Increase the frequency and intensity of weed control and management activities. • Third party review of weed control and management activities and identification of revised suitable methods. • Ensure coordination with neighbours and community, where suitable, to ensure a consistent approach to management.
Inappropriate fire regime or unplanned fire event occurs	Highly likely	Major	Severe	Fire management activities to be undertaken in accordance with **Section 5.4** through the implementation of: • Weed control and prescribed burns to manage fuel loads • Maintained firebreaks Fuel loads and the requirements for management will be assessed based on the results of monitoring events including: • Offset area inspections (**Section 6.1**) • Biomass monitoring (**Section 6.2**) • Fuel load monitoring (**Section 6.3**) • Habitat quality assessments (**Section 6.7**)	Unlikely	Major	High	Step 1: Investigate cause of trigger • Investigate the reasons why the fire management activities have resulted in a decrease to the habitat quality scores. • Review adherence to fire management protocols and activities. Step 2: Implementation of corrective action/s Appropriate corrective actions are to be implemented and may include: • Increase the frequency of biomass monitoring. • Increase the frequency of weed control measures. • Review the effectiveness of firebreaks and if required establish additional fire breaks and/or widen existing firebreaks. • Review the timing, frequency and intensity of prescribed burns for the particular offset value and vegetation communities. • Third party review of fire management protocols and activities, to advise on amendments or additional measures required.

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Appendix D

Baseline weed and pest animal results

D-1 Baseline pest animal survey

Table D.1: Baseline pest animal survey results 2025

Species	ATT 133 SD 18	ATT 147 SD Micro	ATT 150 SD BC11	ATT 196 SD 10	ATT 204 SD BC09	ATT 205 SD BC01	ATT 206 SD BC08	ATT 209 SD BC07	ATT 211 SD BC02	ATT 9 SD BC04	ATT 130 SD12	NTO SD AR01	Total count	AI score
Cat	1							3				1	5	0.1306
European hare				1									1	0.0261
Pig												1	1	0.0261
Dog													0	0
Fox													0	0
Total Trap Hours	343	339	271	310	316	268	343	334	294	316	356	337	3827	

D-2 Baseline weed surveys

Table D.2: Baseline weed survey results 2025

Site	% Cover											Number of Non-Native Species	Total Weed Cover (%)
	Bidens pilosa	*Calyptocarpus vialis*	*Chamaecrista rotundifolia*	*Erigeron bonariensis*	*Glandularia aristigera*	*Heliotropium amplexicaule*	*Megathyrsus maximus*	*Melinis repens*	*Oxalis corniculata*	*Panicum spp.*	*Silybum marianum*		
G03					1			1				2	2
G04	1	1			2				1			4	5
G05					6	1			1			3	8
G06					1							1	1
G07					1							1	1
G08												0	0
G09												0	0
G10		1			6				1			3	8

Site	% Cover											Number of Non-Native Species	Total Weed Cover (%)
	Bidens pilosa	*Calyptocarpus vialis*	*Chamaecrista rotundifolia*	*Erigeron bonariensis*	*Glandularia aristigera*	*Heliotropium amplexicaule*	*Megathyrsus maximus*	*Melinis repens*	*Oxalis corniculata*	*Pannicum spp.*	*Silybum marianum*		
G11					1							1	1
G12					1		10		1			3	12
G13				1	1	2	1		1		1	6	7
G18												0	0
G20					3				1			2	4
G21					1		1	1		1		4	4
G22			1		1		1	2				4	5
G23												0	0
G25							1	2	1			3	4
G26												0	0
G28												0	0
G29												0	0
G35								1				1	1
G36												0	0
G37												0	0
G38												0	0
G39								3				1	3
Cover (%)	**1**	**2**	**1**	**1**	**25**	**3**	**14**	**10**	**7**	**1**	**1**		**66**
Count	**1**	**2**	**1**	**1**	**12**	**2**	**5**	**6**	**7**	**1**	**1**		**12**

Site G03



Site G03 – North



Site G03 – East



Site G03 – South



Site G03 - West

Site G04



Site G04 – North



Site G04 – East



Site G04 – South



Site G04 - West

Site G05



Site G05 – North



Site G05 – East



Site G05 – South



Site G05 - West

Site G06



Site G06 – North



Site G06 – East

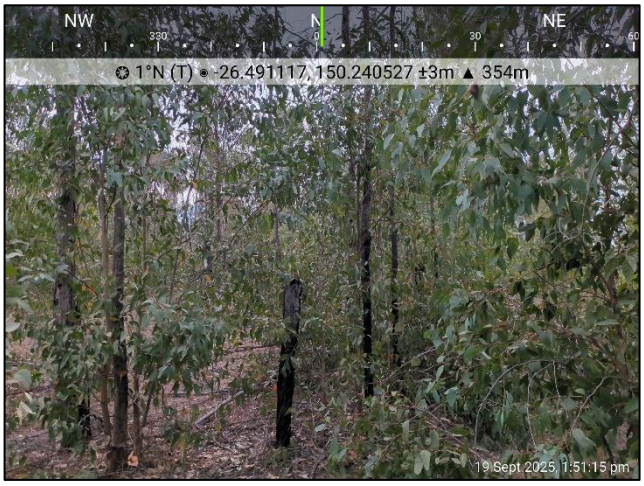


Site G06 – South



Site G06 - West

Site G07



Site G07 – North



Site G07 – East



Site G07 – South



Site G07 - West

Site G08



Site G08 – North



Site G08 – East



Site G08 – South



Site G08 - West

Site G09



Site G09 – North



Site G09 – East



Site G09 – South



Site G09 - West

Site G10



Site G10 – North



Site G10 – East



Site G10 – South



Site G10 - West

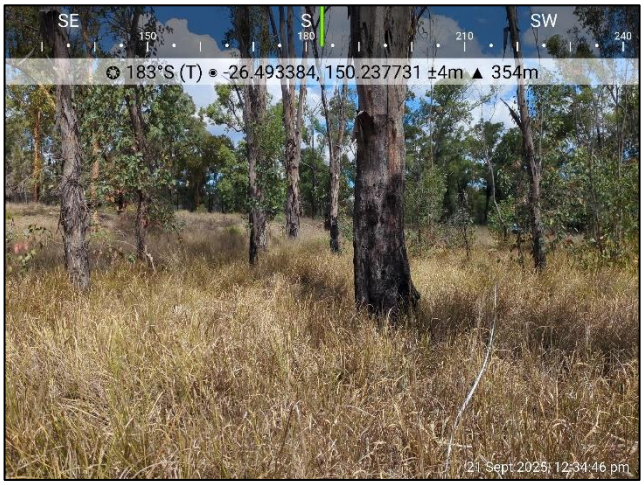
Site G11



Site G11 – North



Site G11 – East



Site G11 – South



Site G11 - West

Site G12



Site G12 – North



Site G12 – East



Site G12 – South



Site G12 - West

Site G13



Site G13 – North



Site G13 – East



Site G13 – South



Site G13 - West

Site G18



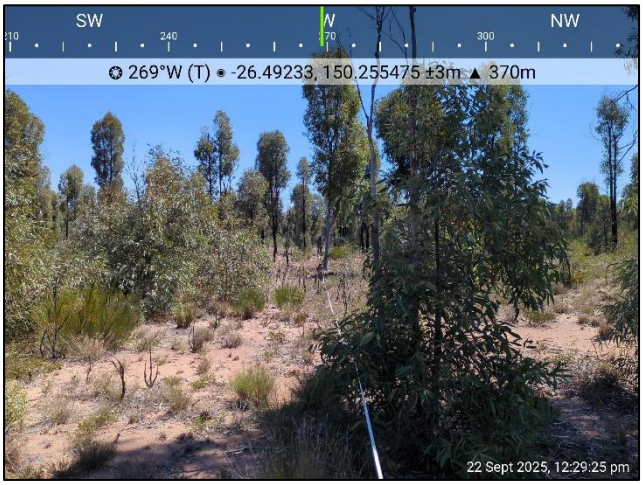
Site G18 – North



Site G18 – East



Site G18 – South



Site G18 - West

Site G20



Site G20 – North



Site G20 – East



Site G20 – South



Site G20 - West

Site G21



Site G21 – North



Site G21 – East



Site G21 – South



Site G21 - West

Site G22



Site G22 – North



Site G22 – East



Site G22 – South



Site G22 - West

Site G23



Site G23 – North



Site G23 – East



Site G23 – South



Site G23 - West

Site G25



Site G25 – North



Site G25 – East



Site G25 – South



Site G25 - West

Site G26



Site G26 – North



Site G26 – East



Site G26 – South



Site G26 - West

Site G28



Site G28 – North



Site G28 – East



Site G28 – South



Site G28 - West

Site G29



Site G29 – North



Site G29 – East



Site G29 – South



Site G29 - West

Site G33



Site G33 – North



Site G33 – East



Site G33 – South



Site G33 - West

Site G35



Site G35 – North



Site G35 – East



Site G35 – South



Site G35 - West

Site G36



Site G36 – North



Site G36 – East



Site G36 – South



Site G36 - West

Site G37



Site G37 – North



Site G37 – East



Site G37 – South



Site G37 - West

Site G38



Site G38 – North



Site G38 – East



Site G38 – South



Site G38 - West

Site G39



Site G39 – North



Site G39 – East



Site G39 – South



Site G39 - West

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Appendix E

Site and species-specific attributes: indicative targets

The following tables present the site-specific and species-specific attributes for each Assessment Unit and their predicted improvements over the life of the offset, specifically for years 5, 10, 15 and 20. This information provides a guide to track the progress of the offset area to achieving the overall interim milestones and completion criteria set for each MNES as presented in this OMP. The overall justifications to support the improvements for each attribute is summarised in **Table E-1**.

Table E.1: Justifications for proposed improvements in site-specific and species-specific attributes

Attribute/metric	Max score	Justification
Site specific attributes[5]		
Recruitment of woody perennial species in EDL	5	The offset area has already achieved a maximum score for this attribute. This score will be maintained.
Native plant species richness - trees	5	Improvement in average tree, shrub, grass and forb species richness through exclusion of livestock from the offset area, reducing competition with weed species where present, minimising pest animal degradation and protection against unplanned fire events. Within remnant areas, these management activities will enhance natural regeneration of these communities from the recent bushfire sites as the regeneration of the seed bank matures to improve species richness. Species richness will also be improved through targeted infill planting and revegetation within regrowth and non-remnant areas, respectively. The aim of planting within these areas will be re-establishment of vegetation communities in structure, composition, and diversity compared to that of the benchmark of the ground-truthed RE. A combination of tree, shrub and ground cover species will be selected for planting based on the RE benchmark description for each vegetation community and their dominance within the composition of the community.
Native plant species richness - shrubs	5	
Native plant species richness - grasses	5	
Native plant species richness - forbes	5	
Tree canopy height	5	Improvement in canopy height can be achieved through the long-term protection of the offset area against unplanned fire events. It is anticipated that all remnant and regrowth vegetation communities with an established canopy layer (i.e. emergent, T1 or T2) will continue to grow over the life of the offset.
Tree canopy cover	5	Improvement in canopy cover can be achieved through the long-term protection of the offset area against unplanned fire events. Considering the impacts of the recent bushfire it is anticipated that all remnant and regrowth vegetation communities with an established canopy layer will continue to grow and recover over the life of the offset. Tree canopy cover will also be improved as targeted infill planting and revegetation within regrowth and non-remnant areas, respectively, matures throughout the offset management period contributing to the overall structure, composition, and diversity of the vegetation community.

[5] Calculated as an average score across all habitat quality sites

Attribute/metric	Max score	Justification
Shrub canopy cover	5	Improvement in shrub canopy cover is expected over the life of the offset through exclusion of livestock from the offset area, reducing competition with weed species where present, minimising pest animal degradation and protection against unplanned fire events. Post bushfire, some monitoring sites established within the offset area recorded shrub canopy layers >200%, with other sites exhibiting a low shrub canopy cover, which has a negative impact on this attribute's score. It is anticipated that as these communities continue to recover and grow, and through restoration planting within areas of low shrub cover, the communities will mature to reflect the overall structure, composition and diversity of the benchmark RE.
Native grass cover	5	Improvement in native grass cover is expected over the life of the offset through exclusion of livestock from the offset area, reducing competition with weed species where present, minimising degradation associated with pest animal activity and protection against unplanned fire events.
Organic litter	5	Most monitoring sites are already scoring well for this attribute. Some improvement may be gained through exclusion of livestock from the offset area, reducing competition with weed species where present, minimising degradation associated with pest animal activity and protection against unplanned fire events.
Large trees (euc and non-euc)	15	Considering the impacts of the recent bushfire, and the abundance of trees that could reach "Large Tree" status (measured as a component of the **quality and availability of shelter habitat** for glossy black-cockatoo and koala), this attribute will be improved over the life of the offset. This improvement will be achieved through targeted infill planting and revegetation within regrowth and non-remnant areas, respectively. Tree species will be selected for planting that align with the RE benchmark description for each vegetation community as well as prioritising species that support habitat for MNES offset values. The long-term protection of the offset area against unplanned fire events will help to achieve this improvement.

Attribute/metric	Max score	Justification
Coarse woody debris	5	Some improvement in CWD is expected over the life of the offset. Post bushfire, many of the monitoring sites established within the offset area recorded CWD values >200% which has a negative impact on this attribute's score. It is anticipated that as these communities continue to grow and this detritus decomposes that this score will slowly improve. Long-term protection of the offset area from future unplanned fire events, as well as exclusion of livestock, will assist with this process. Where appropriate, additional coarse woody debris (>10cm DBH) will be dispersed throughout the offset area to provide habitat resources for MNES. This may include importation of felled native timber from known (approved) impact areas where it would ordinarily be mulched and sent to landfill.
Non-native plant cover	10	Most monitoring sites are already scoring well for this attribute. Some weed presence was observed in sites adjacent to Bottle Tree Creek and ongoing weed control actions, as well as weed hygiene protocols will help to improve this attribute. Maintaining/decreasing the current low weed abundance across the offset site will be key to improving this attributes score.
Corben's long-eared bat		
Quality and availability of food and foraging habitat		
Tree canopy cover (%)	10	Most sites are already scoring relatively well for this attribute; however, some improvements are likely to be achieved over the life of the offset. Improvements in this attribute are derived directly from corresponding improvements in the **Tree Canopy Cover (%)** and **Shrub Canopy Cover (%)** attributes discussed above. Considering the impacts of the recent bushfire all remnant, regrowth and non-remnant vegetation communities will improve through targeted infill planting and revegetation works, as well as active management of the offset area to support these vegetation communities to regenerate and grow over the life of the offset.
Shrub canopy cover (%)	10	
Quality and availability of shelter habitat		
Large tree abundance (Euc and non-euc)	10	Most sites are already scoring relatively well for this attribute; however, some improvements are likely to be achieved over the life of the offset. Improvements in this attribute are derived directly from corresponding improvements in **Large Trees** and **Canopy Height**. These attributes will be improved through targeted infill planting and revegetation works, as well as active management of the offset area to support these vegetation communities to regenerate and grow over the life of the offset. As these trees mature **Abundance of decorticating bark** is also anticipated to increase.
Tree canopy height	10	
Abundance of decorticating bark	10	

Attribute/metric	Max score	Justification
Diamond Firetail		
Quality and availability of food and foraging habitat		
Native grass richness	10	Most sites are already scoring relatively well for this attribute; however, some improvements are likely to be achieved over the life of the offset. Improvements in this attribute are derived directly from corresponding improvements in **Native Grass Richness** and **Native Grass Cover (%)** attributes discussed above. Active restoration and management of the offset area, through livestock exclusion, fire management and restoration planting, will enhance regeneration of native grass richness and cover, and recovery of the seed bank.
Native grass cover (%)	10	
Quality and availability of shelter habitat		
Shrub canopy cover (%)	10	Most sites are already scoring relatively well for this attribute; however, some improvements are likely to be achieved over the life of the offset. Improvements in this attribute are derived directly from corresponding improvements in **Shrub Canopy Cover (%)** and **Tree Canopy Cover (%)**. Considering the impacts of the recent bushfire all remnant, regrowth and non-remnant vegetation communities will improve through targeted infill planting and revegetation works, as well as active management of the offset area to support these vegetation communities to regenerate and grow over the life of the offset.
Tree canopy cover (%)	10	
Glossy black-cockatoo		
Quality and availability of food and foraging habitat		
Availability of foraging trees	10	The availability of suitable foraging habitat for the glossy black-cockatoo within the offset area is tied directly to the availability of *Allocasuarina luehmannii*, which is the only known food tree recorded for this species during the baseline surveys across the offset area. Whilst suitable food trees for this species were only recorded in 9/24 monitoring sites, active restoration through infill planting and revegetation will directly improve the availability of *Allocasuarina luehmannii* by prioritising species that contribute to habitat for MNES offset values as well meet the requirements of the RE benchmark. The long-term protection of the offset area against unplanned fire events as well as active management to support the growth and recovery of vegetation communities over the life of the offset.
Foraging tree Species richness	10	
Quality and availability of shelter habitat		
Proximity to permanent water	10	Most sites are already scoring relatively well for this attribute; however, some improvements are likely to be achieved over the life of the offset. Improvements in this attribute are derived directly from the **Number of Eucalypt Trees >30 cm DBH**. Active restoration through infill planting and revegetation will
Number of eucalypt trees (>30cm DBH)	10	

Attribute/metric	Max score	Justification
		directly improve number of eucalypt trees >30 cm DBH as the planting areas mature over the life of the offset. Changes in score for the **Proximity to permanent water** parameter are not anticipated over the life of the offset.
Koala		
Quality and availability of food and foraging habitat		
Availability of LIKT (%)		The availability of suitable foraging habitat for the koala within the offset area is tied directly to the **canopy cover of locally important koala trees (LIKT)**. Active restoration through infill planting and revegetation will directly improve the availability of LIKT by prioritising species that contribute to habitat for MNES offset values as well meet the requirements of the RE benchmark. As the planting areas mature over the life of the offset area, and through the implementation of active fire management, it is anticipated that the abundance of **LIKT canopy cover** will increase, proportionate to the **Canopy Cover** attribute.
Quality and availability of shelter habitat		
Tree canopy cover (%)	10	The availability of suitable shelter habitat for the koala within the offset area is tied directly to the **Tree Canopy Cover (%)** and the **Number of large trees (euc + non-euc)**, which together represent areas that koalas could find shelter. Potential improvements in Tree Canopy Cover have already been discussed above. As the planting areas mature over the life of the offset, and through the implementation of active fire management, it is anticipated that there will be an improvement in these attributes.
Number of large trees (Euc and non-euc)	10	
Species Mobility Capacity	10	The mobility of the koala within and between the offset site and surrounding vegetation is currently impacted by the presence of barbed wire fences. Through the replacement and/or installation of koala friendly fencing that aligns with the Queensland Government's *Koala-Sensitive Design Guideline - A guide to koala-sensitive design measures for planning and development activities*[6] (DES 2022) the mobility capacity of locally occurring koala populations will improve.
Dunmall's Snake		
Quality and availability of food and foraging habitat		
Native grass cover (%)	10	The availability of suitable foraging habitat for the Dunmall's snake within the offset area is tied directly to **Native grass cover (%)** and **Shrub canopy cover (%)** which are surrogates for microhabitat features that support their primary food source (i.e. skinks and geckos). As the planting areas mature over the life of the offset, and through the implementation of active management activities including exclusion of livestock from the offset area, reducing competition with weed species where present, minimising pest animal degradation and protection
Shrub canopy cover (%)	10	

[6] www.detsi.qld.gov.au/_global/policy-register/policy-register-pdf?getdoc=5154&name=koala-sensitive-design-guideline.pdf

Attribute/metric	Max score	Justification
		against unplanned fire events, it is anticipated that grass and shrub cover will increase, resulting in more suitable foraging habitat.
Quality and availability of shelter habitat		
Coarse woody debris	10	The availability of suitable shelter habitat for the Dunmall's snake within the offset area is tied directly to **Coarse woody debris** and **Organic litter (%)**, which provide suitable microhabitat features for this species to seek shelter under/within. This species is found almost exclusively under fallen timber but is also known to use cracks in clay soils, as well as rocks or other artificial materials to shelter within. The presence or availability of these parameters have been selected as a suitable surrogate for available shelter habitat. As the planting areas mature over the life of the offset, and through the implementation of active management activities including exclusion of livestock from the offset area, reducing competition with weed species where present, minimising pest animal degradation and protection against unplanned fire events, it is anticipated that most sites will achieve some level of improvement in these attributes over the life of the offset, particularly organic litter, as it matures and recovers from the recent bushfire.
Organic litter (%)	10	
Squatter Pigeon		
Quality and availability of food and foraging habitat		
Native Grass Richness	10	The availability of foraging resources for the squatter pigeon (i.e. grass seeds) is tied directly to **Native grass richness** and **Native grass cover (%)** attributes. As the planting areas mature over the life of the offset, and through the implementation of active management activities including exclusion of livestock from the offset area, reducing competition with weed species where present, minimising pest animal degradation and protection against unplanned fire events, it is anticipated that grass richness and cover will increase, resulting in more suitable foraging resources for the squatter pigeon. Given the offset area is located within 1.7km of multiple permanent water sources, there are no improvements proposed for the scoring parameter assessing '*Distance to perennial water source*' as part of the MHQA Method.
Native Grass Cover (%)	10	
Distance to perennial water source (km)	10	
Quality and availability of shelter habitat		
Groundcover vegetation (%)	10	The availability of suitable shelter habitat for the squatter pigeon has been strongly linked to groundcover vegetation in which they spend most of their time foraging on the ground. Whilst this attribute has not been measured directly**, Groundcover vegetation** (%) has been determined by cumulating the various vegetation categories assessed as part of the groundcover plots,
Distance to perennial water source (km)	10	

Attribute/metric	Max score	Justification
		such as native grass cover (%), native forb cover (%), non-native cover (%) and shrub cover (%) (up to 1 m). As the planting areas mature over the life of the offset, and through the implementation of active management activities including exclusion of livestock from the offset area, reducing competition with weed species where present, minimising pest animal degradation and protection against unplanned fire events, it is anticipated that most sites will achieve some level of improvement in **groundcover vegetation** (%) over the life of the offset, particularly native grass cover (%) as it matures and recovers from the recent bushfire. Given the offset area is located within 1.7km of multiple permanent water sources, there are no improvements proposed for the scoring parameter assessing '*Distance to perennial water source*' as part of the MHQA Method.
Threats		
Inappropriate fire regime	15	Whilst Arrow CSG does currently have a bushfire management plan for their broader CSG properties, it is not tailored to the specific needs of the MNES offset values and the site-specific attributes of the offset area. To support delivery of this OMP, Arrow CSG will implement a strategic fire management strategy to minimise the risk of an unplanned fire event within the offset area that could result in further degradation to habitat quality and availability to the MNES offset values. The risk of an unplanned fire event will be mitigated through establishment and regular maintenance of firebreaks, management of fuel loads and implementation of prescribed burns to manage the time between fire events in the offset area.
Vegetation protection status	15	The offset area will be legally secured on title to provide in perpetuity protection from any future development or land use that would result in the disturbance, degradation, removal or clearing of native vegetation. Legal security of the offset area will also prevent future, unrestricted clearing of vegetation within mapped Cat X areas on the Regulated Vegetation Management Map that comprise approximately 42% (127.8 ha) of the offset area.
Grazing intensity	15	The offset area, like much of the surrounding landscape, has been previously subject to livestock grazing. Arrow CSG propose to exclude cattle from the offset area at all times to improve these vegetation communities by avoid ongoing degradation associated with grazing and decreasing the risk of outbreaks of non-native weed species occurring.
Feral Cat Activity Index (AI)	15	Whilst dedicated pest survey efforts undertaken across the offset area did confirm the presence of feral cats, AI calculations identified that they are not particularly active within this area. Pest animal control will be undertaken across the offset area to

Attribute/metric	Max score	Justification
		ensure this activity level is maintained or reduced further to help manage this threat for relevant MNES values.
European Red Fox AI	15	Dedicated pest survey efforts undertaken across the offset area did not detect the presence of European red fox, indicating that they are unlikely to be very active within this area. To ensure that their level of activity does not increase, pest animal control will be undertaken across the offset area to help maintain this level of activity for relevant MNES values.
Feral Dog AI	15	Dedicated pest survey efforts undertaken across the offset area did not detect the presence of feral dogs, indicating that they are unlikely to be very active within this area. To ensure that their level of activity does not increase, pest animal control will be undertaken across the offset area to help maintain this level of activity for relevant MNES values.
Vehicle Strike	15	Vehicle speeds within the offset area are currently 60 km/h along partially maintained and constructed access tracks. With the implementation of a 40 km/h speed limit across the offset area, Arrow CSG will significantly reduce the risk of vehicle strikes on relevant MNES values (especially koalas).
Average Non-Native Plant Cover (%)	15	Most monitoring sites are already scoring well for this attribute. Some weed presence was observed in sites adjacent to Bottle Tree Creek and ongoing weed control actions, as well as weed hygiene protocols will help to improve this attribute. Maintaining the current low weed abundance across the offset site will be key to improving this attribute score.

Table E.2: Assessment Unit 01: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	3.75	4.06	4.38	4.69	5.00
Native plant species richness - shrubs	5	3.75	4.06	4.38	4.69	5.00
Native plant species richness - grasses	5	3.75	3.75	3.75	3.75	3.75
Native plant species richness - forbes	5	1.25	1.56	1.88	2.19	2.50
Tree canopy height	5	4.50	4.63	4.75	4.88	5.00
Tree canopy cover	5	2.75	3.31	3.88	4.44	5.00
Shrub canopy cover	5	2.50	2.88	3.25	3.63	4.00
Native grass cover	5	3.00	3.50	4.00	4.50	5.00

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Organic litter	5	5.00	5.00	5.00	5.00	5.00
Large trees (euc and non-euc)	15	7.50	8.00	8.50	10.50	12.50
Coarse woody debris	5	3.50	3.88	4.25	4.63	5.00
Non-native plant cover	10	7.50	8.13	8.75	9.38	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	6.25	7.19	8.13	9.06	10.00
Shrub canopy cover (%)	10	5.50	6.00	6.50	7.00	7.50
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	3.00	4.13	5.25	6.38	7.50
Tree canopy height	10	8.75	9.06	9.38	9.69	10.00
Abundance of decorticating bark	10	10.00	10.00	10.00	10.00	10.00
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	7.50	7.50	7.50	7.50	7.50
Native grass cover (%)	10	5.50	6.63	7.75	8.88	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	5.50	6.00	6.50	7.00	7.50
Tree canopy cover (%)	10	6.25	7.19	8.13	9.06	10.00
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	10	1.00	1.00	1.00	1.00	1.00
Foraging tree Species richness	10	1.00	1.00	1.00	1.00	1.00
Quality and availability of shelter habitat						
Proximity to permanent water	10	10.00	10.00	10.00	10.00	10.00
Number of eucalypt trees (>30cm DBH)	10	10.00	10.00	10.00	10.00	10.00
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	5.00	5.63	6.25	6.88	7.50
Quality and availability of shelter						

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Tree canopy cover (%)	10	6.25	7.19	8.13	9.06	10.00
Number of large trees (Euc and non-euc)	10	3.00	4.13	5.25	6.38	7.50
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	5.50	6.63	7.75	8.88	10.00
Shrub canopy cover (%)	10	5.50	6.00	6.50	7.00	7.50
Quality and availability of shelter						
Coarse woody debris	10	7.50	8.13	8.75	9.38	10.00
Organic litter (%)	10	10.00	10.00	10.00	10.00	10.00
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	7.50	8.13	8.75	9.38	10.00
Native Grass Cover (%)	10	5.50	6.63	7.75	8.88	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	10.00	10.00	10.00	10.00	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00

Table E.3: Assessment Unit 02: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	3.75	4.06	4.38	4.69	5.00
Native plant species richness - shrubs	5	1.25	2.19	3.13	4.06	5.00
Native plant species richness - grasses	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - forbes	5	2.50	2.81	3.13	3.44	3.75
Tree canopy height	5	5.00	5.00	5.00	5.00	5.00
Tree canopy cover	5	2.25	2.75	3.25	3.75	4.25
Shrub canopy cover	5	2.50	2.88	3.25	3.63	4.00
Native grass cover	5	5.00	5.00	5.00	5.00	5.00
Organic litter	5	5.00	5.00	5.00	5.00	5.00
Large trees (euc and non-euc)	15	2.50	3.00	3.50	5.50	7.50
Coarse woody debris	5	2.00	2.75	3.50	4.25	5.00
Non-native plant cover	10	5.00	6.25	7.50	8.75	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	5.25	6.13	7.00	7.88	8.75
Shrub canopy cover (%)	10	5.50	6.00	6.50	7.00	7.50
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Tree canopy height	10	10.00	10.00	10.00	10.00	10.00
Abundance of decorticating bark	10	10.00	10.00	10.00	10.00	10.00
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	10.00	10.00	10.00	10.00	10.00
Native grass cover (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	5.50	6.00	6.50	7.00	7.50
Tree canopy cover (%)	10	5.25	6.13	7.00	7.88	8.75

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	10	1.00	1.00	1.00	1.00	1.00
Foraging tree Species richness	10	1.00	1.00	1.00	1.00	1.00
Quality and availability of shelter habitat						
Proximity to permanent water	10	10.00	10.00	10.00	10.00	10.00
Number of eucalypt trees (>30cm DBH)	10	10.00	10.00	10.00	10.00	10.00
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Tree canopy cover (%)	10	5.25	6.13	7.00	7.88	8.75
Number of large trees (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	10.00	10.00	10.00	10.00	10.00
Shrub canopy cover (%)	10	5.50	6.00	6.50	7.00	7.50
Quality and availability of shelter						
Coarse woody debris	10	5.00	5.00	5.00	5.00	5.00
Organic litter (%)	10	10.00	10.00	10.00	10.00	10.00
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	10.00	10.00	10.00	10.00	10.00
Native Grass Cover (%)	10	10.00	10.00	10.00	10.00	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	10.00	10.00	10.00	10.00	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00

Table E.4: Assessment Unit 03: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - shrubs	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - grasses	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - forbes	5	5.00	5.00	5.00	5.00	5.00
Tree canopy height	5	5.00	5.00	5.00	5.00	5.00
Tree canopy cover	5	3.50	3.88	4.25	4.63	5.00
Shrub canopy cover	5	0.00	0.75	1.50	2.25	3.00
Native grass cover	5	2.50	3.13	3.75	4.38	5.00
Organic litter	5	5.00	5.00	5.00	5.00	5.00
Large trees (euc and non-euc)	15	2.50	2.75	3.00	4.00	5.00
Coarse woody debris	5	3.50	3.88	4.25	4.63	5.00
Non-native plant cover	10	10.00	10.00	10.00	10.00	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	7.50	8.13	8.75	9.38	10.00
Shrub canopy cover (%)	10	1.00	2.00	3.00	4.00	5.00
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Tree canopy height	10	10.00	10.00	10.00	10.00	10.00
Abundance of decorticating bark	10	10.00	10.00	10.00	10.00	10.00
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	10.00	10.00	10.00	10.00	10.00
Native grass cover (%)	10	5.50	6.63	7.75	8.88	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	1.00	2.00	3.00	4.00	5.00
Tree canopy cover (%)	10	7.50	8.13	8.75	9.38	10.00

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	N/A	N/A	N/A	N/A	N/A	N/A
Foraging tree Species richness	N/A	N/A	N/A	N/A	N/A	N/A
Quality and availability of shelter habitat						
Proximity to permanent water	N/A	N/A	N/A	N/A	N/A	N/A
Number of eucalypt trees (>30cm DBH)	N/A	N/A	N/A	N/A	N/A	N/A
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	5.00	5.00	5.00	5.00	5.00
Quality and availability of shelter						
Tree canopy cover (%)	10	7.50	8.13	8.75	9.38	10.00
Number of large trees (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	5.50	6.63	7.75	8.88	10.00
Shrub canopy cover (%)	10	1.00	2.00	3.00	4.00	5.00
Quality and availability of shelter						
Coarse woody debris	10	7.50	7.50	7.50	7.50	7.50
Organic litter (%)	10	10.00	10.00	10.00	10.00	10.00
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	10.00	10.00	10.00	10.00	10.00
Native Grass Cover (%)	10	5.50	6.63	7.75	8.88	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	10.00	10.00	10.00	10.00	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00

Table E.5: Assessment Unit 04: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - shrubs	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - grasses	5	2.50	3.13	3.75	4.38	5.00
Native plant species richness - forbes	5	2.50	2.81	3.13	3.44	3.75
Tree canopy height	5	5.00	5.00	5.00	5.00	5.00
Tree canopy cover	5	3.75	3.75	3.75	3.75	3.75
Shrub canopy cover	5	0.00	0.75	1.50	2.25	3.00
Native grass cover	5	3.00	3.50	4.00	4.50	5.00
Organic litter	5	5.00	5.00	5.00	5.00	5.00
Large trees (euc and non-euc)	15	10.00	10.25	10.50	11.50	12.50
Coarse woody debris	5	3.50	3.50	3.50	3.50	3.50
Non-native plant cover	10	5.00	6.25	7.50	8.75	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	7.75	8.00	8.25	8.50	8.75
Shrub canopy cover (%)	10	1.00	2.00	3.00	4.00	5.00
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	5.00	5.00	5.00	5.00	5.00
Tree canopy height	10	10.00	10.00	10.00	10.00	10.00
Abundance of decorticating bark	10	7.50	8.13	8.75	9.38	10.00
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	5.00	6.25	7.50	8.75	10.00
Native grass cover (%)	10	5.50	6.63	7.75	8.88	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	1.00	2.00	3.00	4.00	5.00
Tree canopy cover (%)	10	7.75	8.00	8.25	8.50	8.75

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	10	1.00	1.00	1.00	1.00	1.00
Foraging tree Species richness	10	1.00	1.00	1.00	1.00	1.00
Quality and availability of shelter habitat						
Proximity to permanent water	10	10.00	10.00	10.00	10.00	10.00
Number of eucalypt trees (>30cm DBH)	10	10.00	10.00	10.00	10.00	10.00
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	3.00	3.00	3.00	3.00	3.00
Quality and availability of shelter						
Tree canopy cover (%)	10	7.75	8.00	8.25	8.50	8.75
Number of large trees (Euc and non-euc)	10	5.00	5.00	5.00	5.00	5.00
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	5.50	6.63	7.75	8.88	10.00
Shrub canopy cover (%)	10	1.00	2.00	3.00	4.00	5.00
Quality and availability of shelter						
Coarse woody debris	10	7.50	7.50	7.50	7.50	7.50
Organic litter (%)	10	10.00	10.00	10.00	10.00	10.00
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	5.00	6.25	7.50	8.75	10.00
Native Grass Cover (%)	10	5.50	6.63	7.75	8.88	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	10.00	10.00	10.00	10.00	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00

Table E.6: Assessment Unit 05: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	3.33	3.75	4.17	4.58	5.00
Native plant species richness - shrubs	5	4.17	4.38	4.58	4.79	5.00
Native plant species richness - grasses	5	4.17	4.17	4.17	4.17	4.17
Native plant species richness - forbes	5	3.33	3.75	4.17	4.58	5.00
Tree canopy height	5	5.00	5.00	5.00	5.00	5.00
Tree canopy cover	5	3.67	4.00	4.33	4.67	5.00
Shrub canopy cover	5	3.33	3.58	3.83	4.08	4.33
Native grass cover	5	3.00	3.33	3.67	4.00	4.33
Organic litter	5	5.00	5.00	5.00	5.00	5.00
Large trees (euc and non-euc)	15	5.00	5.50	6.00	8.00	10.00
Coarse woody debris	5	4.00	4.25	4.50	4.75	5.00
Non-native plant cover	10	10.00	10.00	10.00	10.00	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	8.33	8.75	9.17	9.58	10.00
Shrub canopy cover (%)	10	7.00	7.33	7.67	8.00	8.33
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	1.00	1.33	1.67	2.00	2.33
Tree canopy height	10	10.00	10.00	10.00	10.00	10.00
Abundance of decorticating bark	10	1.00	2.00	3.00	4.00	5.00
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	8.33	8.33	8.33	8.33	8.33
Native grass cover (%)	10	5.00	5.42	5.84	6.25	6.67
Quality and availability of shelter						
Shrub canopy cover (%)	10	7.00	7.33	7.67	8.00	8.33
Tree canopy cover (%)	10	8.33	8.75	9.17	9.58	10.00

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	10	1.00	1.00	1.00	1.00	1.00
Foraging tree Species richness	10	1.00	1.33	1.67	2.00	2.33
Quality and availability of shelter habitat						
Proximity to permanent water	10	8.33	8.33	8.33	8.33	8.33
Number of eucalypt trees (>30cm DBH)	10	10.00	10.00	10.00	10.00	10.00
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Tree canopy cover (%)	10	8.33	8.75	9.17	9.58	10.00
Number of large trees (Euc and non-euc)	10	1.00	1.33	1.67	2.00	2.33
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	5.00	5.83	6.67	7.50	8.33
Shrub canopy cover (%)	10	7.00	7.33	7.67	8.00	8.33
Quality and availability of shelter						
Coarse woody debris	10	10.00	10.00	10.00	10.00	10.00
Organic litter (%)	10	10.00	10.00	10.00	10.00	10.00
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	8.33	8.75	9.17	9.58	10.00
Native Grass Cover (%)	10	5.00	5.83	6.67	7.50	8.33
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	5.00	5.83	6.67	7.50	8.33
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00

Table E.7: Assessment Unit 06: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	2.50	3.13	3.75	4.38	5.00
Native plant species richness - shrubs	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - grasses	5	3.33	3.75	4.17	4.58	5.00
Native plant species richness - forbes	5	1.67	2.29	2.92	3.54	4.17
Tree canopy height	5	2.50	2.58	2.67	2.75	2.83
Tree canopy cover	5	1.50	2.00	2.50	3.00	3.50
Shrub canopy cover	5	3.00	3.50	4.00	4.50	5.00
Native grass cover	5	4.33	4.33	4.33	4.33	4.33
Organic litter	5	3.00	3.33	3.67	4.00	4.33
Large trees (euc and non-euc)	15	1.67	2.00	2.33	3.67	5.00
Coarse woody debris	5	2.33	2.75	3.17	3.58	4.00
Non-native plant cover	10	10.00	10.00	10.00	10.00	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	3.83	4.54	5.25	5.96	6.67
Shrub canopy cover (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Tree canopy height	10	4.33	4.54	4.75	4.96	5.17
Abundance of decorticating bark	10	2.33	3.42	4.50	5.59	6.67
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	6.67	7.50	8.34	9.17	10.00
Native grass cover (%)	10	8.33	8.75	9.17	9.58	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	10.00	10.00	10.00	10.00	10.00
Tree canopy cover (%)	10	3.83	4.75	5.67	6.58	7.50

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	10	2.33	3.00	3.67	4.33	5.00
Foraging tree Species richness	10	2.33	4.25	6.17	8.08	10.00
Quality and availability of shelter habitat						
Proximity to permanent water	10	5.00	5.00	5.00	5.00	5.00
Number of eucalypt trees (>30cm DBH)	10	1.00	2.00	3.00	4.00	5.00
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	6.67	7.09	7.50	7.92	8.33
Quality and availability of shelter						
Tree canopy cover (%)	10	3.83	4.75	5.67	6.58	7.50
Number of large trees (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	8.33	8.75	9.17	9.58	10.00
Shrub canopy cover (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Coarse woody debris	10	5.33	5.67	6.00	6.34	6.67
Organic litter (%)	10	5.00	5.83	6.67	7.50	8.33
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	6.67	7.50	8.34	9.17	10.00
Native Grass Cover (%)	10	8.33	8.33	8.33	8.33	8.33
Distance to perennial water source (km)	10	7.00	7.00	7.00	7.00	7.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	8.33	8.75	9.17	9.58	10.00
Distance to perennial water source (km)	10	7.00	7.00	7.00	7.00	7.00

Table E.8: Assessment Unit 07: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	3.75	4.06	4.38	4.69	5.00
Native plant species richness - shrubs	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - grasses	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - forbes	5	3.75	4.06	4.38	4.69	5.00
Tree canopy height	5	4.00	4.13	4.25	4.38	4.50
Tree canopy cover	5	3.00	3.31	3.63	3.94	4.25
Shrub canopy cover	5	3.00	3.50	4.00	4.50	5.00
Native grass cover	5	3.00	3.50	4.00	4.50	5.00
Organic litter	5	4.00	4.00	4.00	4.00	4.00
Large trees (euc and non-euc)	15	5.00	5.00	5.00	5.00	5.00
Coarse woody debris	5	2.50	2.75	3.00	3.25	3.50
Non-native plant cover	10	10.00	10.00	10.00	10.00	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	6.50	7.06	7.63	8.19	8.75
Shrub canopy cover (%)	10	7.50	8.13	8.75	9.38	10.00
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Tree canopy height	10	7.50	7.81	8.13	8.44	8.75
Abundance of decorticating bark	10	5.50	6.00	6.50	7.00	7.50
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	10.00	10.00	10.00	10.00	10.00
Native grass cover (%)	10	5.50	6.63	7.75	8.88	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	7.50	8.13	8.75	9.38	10.00
Tree canopy cover (%)	10	6.50	7.06	7.63	8.19	8.75

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	10	1.00	2.00	3.00	4.00	5.00
Foraging tree Species richness	10	3.00	4.75	6.50	8.25	10.00
Quality and availability of shelter habitat						
Proximity to permanent water	10	7.50	7.50	7.50	7.50	7.50
Number of eucalypt trees (>30cm DBH)	10	5.50	6.00	6.50	7.00	7.50
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Tree canopy cover (%)	10	6.50	7.06	7.63	8.19	8.75
Number of large trees (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	5.50	6.63	7.75	8.88	10.00
Shrub canopy cover (%)	10	7.50	7.50	7.50	7.50	7.50
Quality and availability of shelter						
Coarse woody debris	10	5.50	6.00	6.50	7.00	7.50
Organic litter (%)	10	7.50	7.50	7.50	7.50	7.50
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	10.00	10.00	10.00	10.00	10.00
Native Grass Cover (%)	10	5.50	6.63	7.75	8.88	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	7.50	8.13	8.75	9.38	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00

Table E.9: Assessment Unit 08: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - shrubs	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - grasses	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - forbes	5	2.50	2.50	2.50	2.50	2.50
Tree canopy height	5	5.00	5.00	5.00	5.00	5.00
Tree canopy cover	5	2.75	3.31	3.88	4.44	5.00
Shrub canopy cover	5	4.00	4.25	4.50	4.75	5.00
Native grass cover	5	5.00	5.00	5.00	5.00	5.00
Organic litter	5	5.00	5.00	5.00	5.00	5.00
Large trees (euc and non-euc)	15	0.00	0.50	1.00	3.00	5.00
Coarse woody debris	5	2.00	2.75	3.50	4.25	5.00
Non-native plant cover	10	10.00	10.00	10.00	10.00	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	6.25	7.19	8.13	9.06	10.00
Shrub canopy cover (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Tree canopy height	10	10.00	10.00	10.00	10.00	10.00
Abundance of decorticating bark	10	10.00	10.00	10.00	10.00	10.00
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	10.00	10.00	10.00	10.00	10.00
Native grass cover (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	10.00	10.00	10.00	10.00	10.00
Tree canopy cover (%)	10	6.25	7.19	8.13	9.06	10.00

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	10	1.00	1.00	1.00	1.00	1.00
Foraging tree Species richness	10	1.00	1.00	1.00	1.00	1.00
Quality and availability of shelter habitat						
Proximity to permanent water	10	7.50	7.50	7.50	7.50	7.50
Number of eucalypt trees (>30cm DBH)	10	3.00	4.13	5.25	6.38	7.50
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	5.00	5.00	5.00	5.00	5.00
Quality and availability of shelter						
Tree canopy cover (%)	10	6.25	7.19	8.13	9.06	10.00
Number of large trees (Euc and non-euc)	10	1.00	1.00	1.00	1.00	1.00
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	10.00	10.00	10.00	10.00	10.00
Shrub canopy cover (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Coarse woody debris	10	10.00	10.00	10.00	10.00	10.00
Organic litter (%)	10	10.00	10.00	10.00	10.00	10.00
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	10.00	10.00	10.00	10.00	10.00
Native Grass Cover (%)	10	10.00	10.00	10.00	10.00	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	5.00	6.25	7.50	8.75	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00

Table E.10: Assessment Unit 09: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	4.33	4.50	4.67	4.83	5.00
Native plant species richness - trees	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - shrubs	5	4.17	4.38	4.58	4.79	5.00
Native plant species richness - grasses	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - forbes	5	2.50	2.92	3.33	3.75	4.17
Tree canopy height	5	5.00	5.00	5.00	5.00	5.00
Tree canopy cover	5	3.17	3.50	3.83	4.17	4.50
Shrub canopy cover	5	1.00	1.83	2.67	3.50	4.33
Native grass cover	5	5.00	5.00	5.00	5.00	5.00
Organic litter	5	3.67	3.83	4.00	4.17	4.33
Large trees (euc and non-euc)	15	6.67	7.00	7.33	8.67	10.00
Coarse woody debris	5	4.00	4.25	4.50	4.75	5.00
Non-native plant cover	10	10.00	10.00	10.00	10.00	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	6.83	7.42	8.00	8.59	9.17
Shrub canopy cover (%)	10	2.33	3.00	3.67	4.33	5.00
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	2.33	2.33	2.33	2.33	2.33
Tree canopy height	10	10.00	10.00	10.00	10.00	10.00
Abundance of decorticating bark	10	5.33	6.08	6.83	7.58	8.33
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	10.00	10.00	10.00	10.00	10.00
Native grass cover (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	2.33	3.83	5.33	6.83	8.33
Tree canopy cover (%)	10	6.83	7.42	8.00	8.59	9.17

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	10	2.33	2.33	2.33	2.33	2.33
Foraging tree Species richness	10	5.00	5.00	5.00	5.00	5.00
Quality and availability of shelter habitat						
Proximity to permanent water	10	8.33	8.33	8.33	8.33	8.33
Number of eucalypt trees (>30cm DBH)	10	10.00	10.00	10.00	10.00	10.00
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	2.33	2.67	3.00	3.34	3.67
Quality and availability of shelter						
Tree canopy cover (%)	10	6.83	7.42	8.00	8.59	9.17
Number of large trees (Euc and non-euc)	10	2.33	2.33	2.33	2.33	2.33
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	10.00	10.00	10.00	10.00	10.00
Shrub canopy cover (%)	10	2.33	3.83	5.33	6.83	8.33
Quality and availability of shelter						
Coarse woody debris	10	8.33	8.33	8.33	8.33	8.33
Organic litter (%)	10	6.67	7.50	8.34	9.17	10.00
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	10.00	10.00	10.00	10.00	10.00
Native Grass Cover (%)	10	10.00	10.00	10.00	10.00	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	10.00	10.00	10.00	10.00	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00

Table E.11: Assessment Unit 10: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	3.75	4.06	4.38	4.69	5.00
Native plant species richness - shrubs	5	0.00	1.25	2.50	3.75	5.00
Native plant species richness - grasses	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - forbes	5	2.50	3.13	3.75	4.38	5.00
Tree canopy height	5	5.00	5.00	5.00	5.00	5.00
Tree canopy cover	5	1.00	1.63	2.25	2.88	3.50
Shrub canopy cover	5	0.00	0.75	1.50	2.25	3.00
Native grass cover	5	5.00	5.00	5.00	5.00	5.00
Organic litter	5	4.00	4.25	4.50	4.75	5.00
Large trees (euc and non-euc)	15	7.50	7.50	7.50	7.50	7.50
Coarse woody debris	5	2.00	2.38	2.75	3.13	3.50
Non-native plant cover	10	7.50	8.13	8.75	9.38	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	3.00	4.13	5.25	6.38	7.50
Shrub canopy cover (%)	10	1.00	2.00	3.00	4.00	5.00
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	3.00	3.00	3.00	3.00	3.00
Tree canopy height	10	10.00	10.00	10.00	10.00	10.00
Abundance of decorticating bark	10	10.00	10.00	10.00	10.00	10.00
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	10.00	10.00	10.00	10.00	10.00
Native grass cover (%)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	1.00	2.00	3.00	4.00	5.00
Tree canopy cover (%)	10	3.00	4.13	5.25	6.38	7.50

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	N/A	N/A	N/A	N/A	N/A	N/A
Foraging tree Species richness	N/A	N/A	N/A	N/A	N/A	N/A
Quality and availability of shelter habitat						
Proximity to permanent water	N/A	N/A	N/A	N/A	N/A	N/A
Number of eucalypt trees (>30cm DBH)	N/A	N/A	N/A	N/A	N/A	N/A
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	5.50	6.00	6.50	7.00	7.50
Quality and availability of shelter						
Tree canopy cover (%)	10	3.00	4.13	5.25	6.38	7.50
Number of large trees (Euc and non-euc)	10	3.00	3.00	3.00	3.00	3.00
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	N/A	N/A	N/A	N/A	N/A	N/A
Shrub canopy cover (%)	N/A	N/A	N/A	N/A	N/A	N/A
Quality and availability of shelter						
Coarse woody debris	N/A	N/A	N/A	N/A	N/A	N/A
Organic litter (%)	N/A	N/A	N/A	N/A	N/A	N/A
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	N/A	N/A	N/A	N/A	N/A	N/A
Native Grass Cover (%)	N/A	N/A	N/A	N/A	N/A	N/A
Distance to perennial water source (km)	N/A	N/A	N/A	N/A	N/A	N/A
Quality and availability of shelter						
Groundcover vegetation (%)	N/A	N/A	N/A	N/A	N/A	N/A
Distance to perennial water source (km)	N/A	N/A	N/A	N/A	N/A	N/A

Table E.12: Assessment Unit 12: Site and species-specific attribute targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Site specific attributes						
Recruitment of woody perennial species in EDL	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - trees	5	4.17	4.38	4.58	4.79	5.00
Native plant species richness - shrubs	5	3.33	3.75	4.17	4.58	5.00
Native plant species richness - grasses	5	5.00	5.00	5.00	5.00	5.00
Native plant species richness - forbes	5	3.33	3.75	4.17	4.58	5.00
Tree canopy height	5	5.00	5.00	5.00	5.00	5.00
Tree canopy cover	5	2.67	3.13	3.58	4.04	4.50
Shrub canopy cover	5	3.67	4.00	4.33	4.67	5.00
Native grass cover	5	3.67	4.00	4.33	4.67	5.00
Organic litter	5	5.00	5.00	5.00	5.00	5.00
Large trees (euc and non-euc)	15	6.67	7.17	7.67	9.67	11.67
Coarse woody debris	5	4.00	4.25	4.50	4.75	5.00
Non-native plant cover	10	10.00	10.00	10.00	10.00	10.00
Corben's long eared bat						
Quality and availability of food and foraging habitat						
Tree canopy cover (%)	10	6.00	6.79	7.59	8.38	9.17
Shrub canopy cover (%)	10	6.67	7.09	7.50	7.92	8.33
Quality and availability of shelter						
Large tree abundance (Euc and non-euc)	10	4.00	4.33	4.67	5.00	5.33
Tree canopy height	10	10.00	10.00	10.00	10.00	10.00
Abundance of decorticating bark	10	10.00	10.00	10.00	10.00	10.00
Diamond Firetail						
Quality and availability of food and foraging habitat						
Native grass richness	10	10.00	10.00	10.00	10.00	10.00
Native grass cover (%)	10	7.00	7.75	8.50	9.25	10.00
Quality and availability of shelter						
Shrub canopy cover (%)	10	6.67	7.09	7.50	7.92	8.33
Tree canopy cover (%)	10	6.00	6.79	7.59	8.38	9.17

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Glossy black-cockatoo						
Quality and availability of food and foraging habitat						
Availability of foraging trees	10	1.00	1.00	1.00	1.00	1.00
Foraging tree Species richness	10	1.00	1.00	1.00	1.00	1.00
Quality and availability of shelter habitat						
Proximity to permanent water	10	5.00	5.00	5.00	5.00	5.00
Number of eucalypt trees (>30cm DBH)	10	10.00	10.00	10.00	10.00	10.00
Koala						
Quality and availability of food and foraging habitat						
Availability of LIKT (%)	10	6.67	7.09	7.50	7.92	8.33
Quality and availability of shelter						
Tree canopy cover (%)	10	6.00	6.79	7.59	8.38	9.17
Number of large trees (Euc and non-euc)	10	4.00	4.33	4.67	5.00	5.33
Dunmall's snake						
Quality and availability of food and foraging habitat						
Native grass cover (%)	10	7.00	7.75	8.50	9.25	10.00
Shrub canopy cover (%)	10	6.67	7.09	7.50	7.92	8.33
Quality and availability of shelter						
Coarse woody debris	10	10.00	10.00	10.00	10.00	10.00
Organic litter (%)	10	10.00	10.00	10.00	10.00	10.00
Squatter Pigeon						
Quality and availability of food and foraging habitat						
Native Grass Richness	10	10.00	10.00	10.00	10.00	10.00
Native Grass Cover (%)	10	7.00	7.75	8.50	9.25	10.00
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00
Quality and availability of shelter						
Groundcover vegetation (%)	10	8.30	8.31	8.32	8.32	8.33
Distance to perennial water source (km)	10	10.00	10.00	10.00	10.00	10.00

Table E.13: Mobility capacity and threat parameter targets contributing to the achievement of the overall completion criteria

Attribute/metric	Max score	Offset Area Interim Performance Targets				
		Baseline	Year 5	Year 10	Year 15	Year 20
Mobility Capacity						
Koala	10	5.50	6.63	7.75	8.88	10.00
Threats						
Inappropriate fire regime	15	1	15	15	15	15
Vegetation protection status	15	1	15	15	15	15
Grazing intensity	15	7	15	15	15	15
Feral Cat Activity Index (AI)	15	7	7	7	7	7
European Red Fox AI	15	15	15	15	15	15
Feral Dog AI	15	15	15	15	15	15
Vehicle Strike	15	1	15	15	15	15
Average Non-Native Plant Cover (%)	15	15	15	15	15	15