# Appendix N Draft Offset Management Plan

# Kumbarilla Renewable Energy Park

## Offset Management Plan

31/07/2023

Job Number: VS0389

Evolve Environmental Solution Pty. Ltd.

# Document Control

Document: *Kumbarilla Renewable Energy Park – Offset Management Plan*

## Document Issue

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## Acronyms

AOG – Offset Assessment Guide
AU – Assessment Unit
BBBQ – Black-Breasted Button Quail
BPA – Biodiversity Planning Assessment
BVG – Broad Vegetation Group
SKOALA – Southern Koala
DCCEEW – Department of Climate Change, Energy, the Environment and Water
DCDB – Digital Cadastral Database
DES – Department of Environment and Science
DNRME – Department of Natural Resources, Mines and Energy
EOPA – Environmental Offset Protection Area
EPBC – Environment Protection and Biodiversity Conservation
HQS – Habitat Quality Score
K-REP – Kumbarilla Renewable Energy Park
LGA – Local Development Area
MHQA – Modified Habitat Quality Assessment
NJKHT – Non Juvenile Koala Habitat Trees
OMP – Offset Management Plan
RE – Regional Ecosystem
REDD – Regional Ecosystem Description Database
SEQ – South-East Queensland
SOIC – Strategic Offset Investment Corridor
SPRAT – Species Profile and Threats Database
SRI – Significant Residual Impact
VMA – Vegetation Management Act 1999

# 1 Introduction and Purpose

Evolve Environmental Solutions (**Evolve**) were engaged by Elecseed Pty Ltd (Elecseed) (herein described as the Proponent) to prepare an Offset Management Plan (OMP) to describe a suitable offset for the significant residual impact on a prescribed Matter of National Environmental Significance (MNES) – the Koala (*Phascolarctos cinereus*).

The Proponent is proposing to develop, build and operate the Kumbarilla Renewable Energy Park (K-REP). K-REP is a photovoltaic (PV) Power Station encompassing an approximately 191 ha development layout on a 400 ha property, connected by an associated Access Corridor (22 ha development footprint) on a crown road named Forest Road. The impact site, legally described as Lot 4 DY457 (Estate in fee Simple/freehold) is situated approximately 40 km west of Dalby, Queensland and located within the Western Downs Regional Council (WDRC) Local Government Area (LGA).

The effective total disturbance footprint, assessed and outlined in *Kumbarilla Renewable Energy Park – EPBC Act Draft Preliminary Documentation* [1] of the impact site, encompasses 207ha of Koala habitat – the prescribed matter.

## 1.1 Background

The Project was referred to the Commonwealth Government Department of Agriculture, Water and the Environment, now known as the Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 30 August 2021. DCCEEW deemed the proposal a 'controlled action' in accordance with section 75 and 87 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This OMP is to inform on the required offset actions from a Significant Residual Impact (SRI) on the impacted prescribed matter under the EPBC Act.

## 1.2 Purpose

The purpose of this OMP is to ensure a conservation outcome is achieved for the prescribed environmental matter, the Koala, and to adequately offset for the associated significant residual impacts on its habitat. The Koala is listed as an Endangered species (Listed as Vulnerable under the time referral) under the EPBC Act and listed as a MNES.

This OMP sets out the strategy to achieve a conservation outcome by ensuring the site subject to this plan (the offset site) is selected, designed, secured, and managed in a way that maintains the viability of the matter concerned. The purpose is to deliver measurable benefits that counterbalance the loss of habitat and ecosystem services at the impact site based on approved scientific methods and management actions, aiming to improve the condition of the offset site over a 20-year timeframe. The conservation outcome (environmental uplift) is measured against a predicted environmental condition of the selected offset site.

In general, the OMP supports this approach by:

- Ensuring the offset site is of an appropriate scale and representative environmental condition, relative to the size and condition of the impact site, ensuring feasibility to achieve offsetting actions and;
- Conducting scientific baseline surveys and measuring changes in condition over time;
- Providing a schedule of customised management actions to combat specific threatening processes;

[1] 1000525_K-REP_PrelimDocumentation_Final Draft_Rev3_11072023 prepared for Elecseed Pty Ltd (11 July 2023)

- Developing strategies and mitigation measures to minimise potential risks to offset delivery;
- Providing detailed monitoring reports and adaptive management strategies based on actual outcomes over time; and
- Legally securing the offset site for protection of the duration of the prescribed significant residual impact (SRI) on the impact site.

## 1.3 Significant Residual Impact (SRI) at the Impact Site

SRI impact assessments were undertaken on potential MNES. These assessments determined that there is a SRI on the Koala (then listed as Vulnerable). The associated Significant Residual Impact encompasses a total of **207 ha of suitable koala habitat.** This habitat was assigned a habitat quality score of 7.79 (8) out of 10 (MHQA). (Refer **Table 1**).

*Table 1. Matter of impact and the associated SRI to Koala habitat*

| Matter of impact attributes | Details | Rationale |
|---|---|---|
| **Common name** | Koala | |
| **Species** | *Phascolarctos cinereus* | |
| **Conservation Status (at the time of referral** | Vulnerable | EPBC Act |
| **Impact Site:** | | |
| **Area Impacted** | 207 ha | SRI as per the HQA Report and includes combined PV Power Station and Access Corridor footprint |
| **Habitat quality score** | 7.79 | As a weighted average of all Assessment Units as described per the MHQA Assessment |
| **Offset Site:** | | |
| **Offset Area** | 712.1 | Designated within and partially encompassing areas of Rehabilitation Groups 1, 3 and 4, out of a total available area. |
| **Offset Site habitat quality score**<br><br>**OMZ-1**<br>**OMZ-3**<br>**OMZ-4** | <br><br>6.81<br>7.70<br>7.08 | As per MHQA scoring subject to the updated offset strategy of the offset site - baseline values. |
| **Future Quality**<br>**OMZ-1**<br>**OMZ-3**<br>**OMZ-4** | <br>8.58<br>8.59<br>8.56 | Confidence level: 80% |

## 1.4 Impact Site Scoring (MHQA)

The Modified Habitat Quality Assessment (MHQA) divides the impact site into 3 separate components being:

- **Site Condition** –the condition of the site in terms of flora density richness and size as compared against the Qld Benchmark;
- **Site Context** –the sites size and connectivity in the broader landscape; and
- **Species Stocking Rate** – the ability of the site to provide suitable habitat currently to support a population of the impacted species based on site evidence collected.

# 2 Impact Site Survey

A desktop assessment and field assessments have been undertaken to establish the existing ecological values of the Project site and determine the level of likely impact from the Project. Various ecological surveys have been completed across the PV Power Station component of the Project area (and partly outside). The surveys were carried out by Paul Fox (Principal Environmental Scientist/ Project Manager – Fox & Co Environmental) and Dave Moore (Principal Botanist - Fox & Co Environmental), Bruce McLennan (Arcadian Ecology Pty Ltd) and Ben Nottidge (GreenLeaf Ecology).

The preparation of the relevant MHQA scoring of the impact site is compiled to support the OMP strategy of this report and refers to all preceding Ecological Surveys. Therefore, where further information on the impact site values is required, this report is to be read in conjunction with the Kumbarilla Renewable Energy Park – EPBC Act Draft Preliminary Documentation (20 June - 2023)

The Modified Habitat Quality Assessment (MHQA) methodology in general sets out guidelines to:

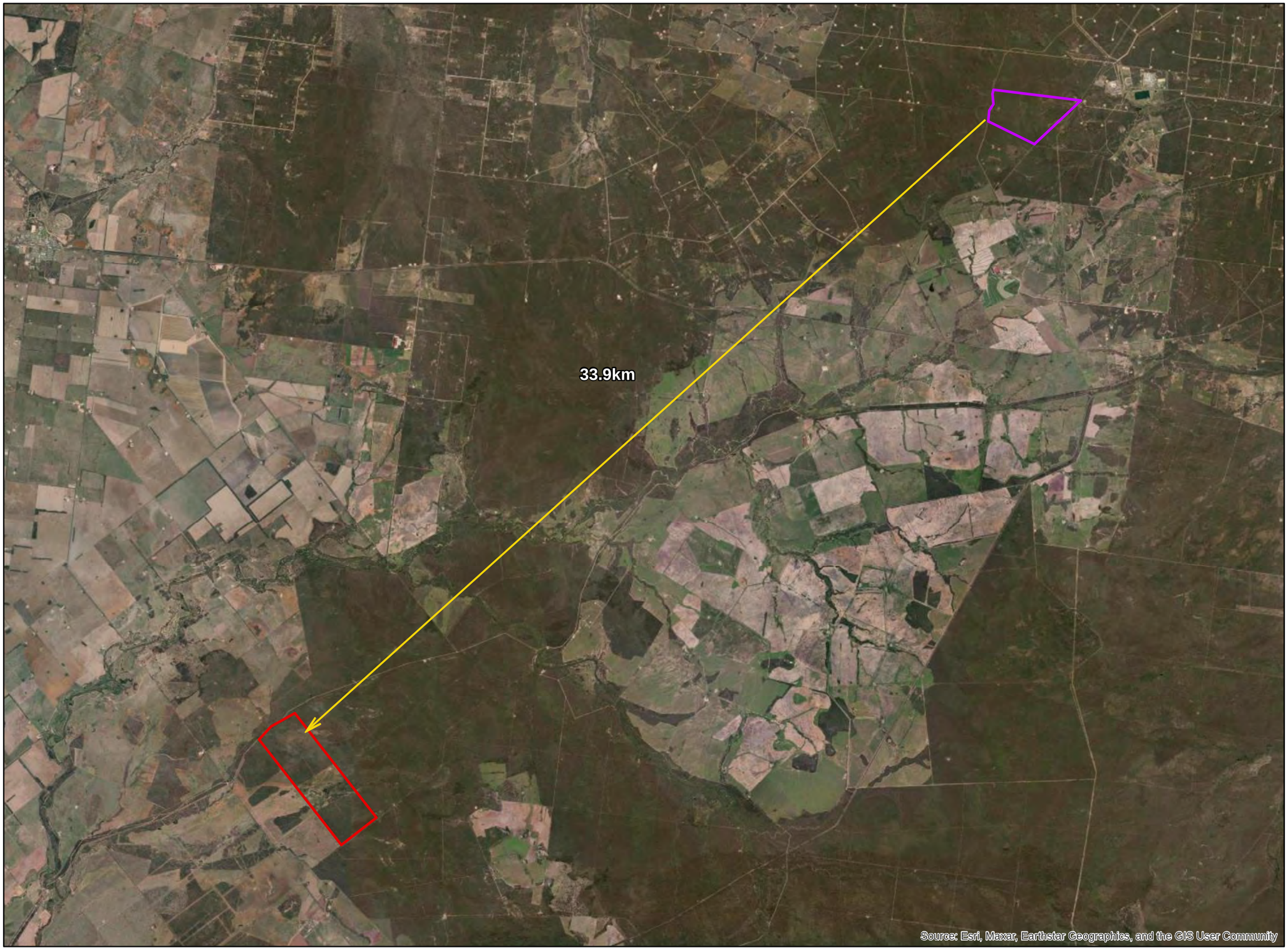
1. Assess the potential species-specific impact as per the preliminary documentation determination, and;
2. Assess the modified habitat baseline values of the selected Offset Site to inform the environmental offset calculations for uplift of the site.

## 2.1 Impact Site Context

The Impact site is located within the Brigalow Belt South Bioregion, approximately 40km west of Dalby, Queensland. The PV Power Station area is currently vacant and contains mapped remnant and regrowth woody vegetation covering most of the 400 ha property, with the exception of several farm tracks, access roads and a small dam (refer **Figure 1**).

Queensland Gas Company (now owned by Shell) owns an existing 132 kilovolt (kV) Substation fed by the Powerlink Kumbarilla Park 275/132kV Substation, located adjacent the proposed Project. The high voltage transmission line supplies QGC's Gas Compression Facility and the Powerlink Kumbarilla Park 275/132kV Substation is the proposed point of connection for Project.

# **Figure 1**: Site Relationship




Legend

- Impact Site
- Offset Site

N

0 875 1,750 3,500 5,250 7,000
m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

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## K**umbarilla** Solar Project

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| A | 19/08/2022 | Preliminary | RH | AH |

Date: 19/08/2022
Plan 2 Site Relationship A

## 2.2 Modified Habitat Quality Assessment (MHQA) Methodology

The offset sites have been assessed using a modified version of the Queensland State Governments *"Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy"* Version 1.2 April 2017. The purpose of this guideline is to provide a methodology for proponents to determine the habitat quality of a site under the Queensland Environmental Offsets framework. The guideline is a step-by-step methodology explaining how to measure habitat quality for land-based offsets. This methodology has been adopted and tailored/modified to assess the impacts and offsets relating to Matters of National Environmental Significance (MNES).

The traditional terrestrial habitat quality assessment assesses three (3) core indicators—site condition, site context and species habitat index.

The modified habitat quality assessment (MHQA) combines the three (3) core indicators into two (2) (site condition and site context) with each Site Condition being weighted 40% of the final score and Site Context being weighted 30% of the final score. The balance of the weighting (30%) has been attributed to the third indicator which is independent of the traditional habitat quality assessment, being species stocking rate. The species stocking rate has been added to the MHQA to better incorporate MNES, and for the purpose of this preliminary documentation, the vulnerable-listed Koala MNES. The following section details the methodology utilised to assess the site condition, site context and species stocking rate under the MHQA.

*Site Condition (40 %)*

Assessing site condition is an integral step in determining specific quantification of impacts, while also determining whether an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset. The on-site condition is a key element of habitat quality and has a direct influence on the biodiversity it supports. Site condition is assessed using a suite of attributes to describe the structure and function of the vegetation community, and is benchmarked against the expected range for a relatively undisturbed community.

The site condition assessment under the MHQA is assessed using fifteen (15) condition characteristics being:

- recruitment of woody perennial species in EDL;
- native plant species richness – trees;
- native plant species richness – shrubs;
- native plant species richness – grasses;
- native plant species richness – forbs;
- tree canopy height;
- Sub-canopy cover;
- tree canopy cover;
- native grass cover;
- organic litter;
- large trees;
- coarse woody debris;
- non-native plant cover;
- quality and availability of food and foraging habitat; and

- quality and availability of shelters.

Assessment methodology of the above condition characteristics do not differ from the traditional habitat quality assessment. In developing the MHQA to better incorporate MNES, two (2) species habitat index characteristics, being, quality and availability of food and foraging habitat and quality and availability of shelters have been added to the site condition indicator.

*Site Context (30 %)*

The site context assessment deals with the site and its adjacent surroundings. Site context is measured using a suite of attributes to describe the location of the habitat within the surrounding landscape and the influence of its associated threats. This assessment also considers the influence of adjacent vegetated areas and ecological corridors. Under the MHQA, site context is measured using the following seven (7) characteristics:

- size of patch;
- connectedness;
- context;
- ecological corridors;
- role of site location to species overall population in the state;
- threats to the species; and
- species mobility capacity.

Unlike the traditional habitat quality assessment methodology where site connectedness is assessed against the surrounding remnant vegetation only, the MHQA site connectedness is assessed against the surrounding MNES habitat, in this instance, Koala habitat. Whilst remnant eucalypt forest vegetation is critical habitat for Koala, equally Koalas can utilise areas of non-remnant vegetation or high value regrowth vegetation that does not yet achieve remnant status. Therefore, site context under the MHQA accounts for surrounding Koala habitat rather than remnant vegetation.

In developing the MHQA, three (3) species habitat index characteristics were nominated—role of site location to overall species population in the state, threats to the species and species mobility capacity.

*Species Stocking Rate (30 %)*

The MHQA incorporates species stocking rate as an attribute not discussed under the traditional terrestrial habitat assessment methodology. Species stocking rates are estimates of the Koala carrying capacity of the site at the time of undertaking the survey. Given the discreet nature of the Koala and limited to no published literature on habitat carrying capacity of the species, the species stocking rate scoring methodology has been derived through the collation of site specific surveys and surrounding contextual habitat analysis.

# 3 Impact Site Koala Habitat Quality Results

Impact site scoring has been listed in the current site scoring as an 8 under the MHQA. This section of the report expands on how the current scoring of the impact site was attained. The MHQA divides the site into 3 separate components being:

- Site Condition –the condition of the site in terms of flora density richness and size as compared against the Queensland Benchmark;
- Site Context –the sites size and connectivity in the broader landscape; and
- Species Stocking Rate – the ability of the site to provide suitable habitat currently to support a population of the impacted species based on site evidence collected.

## 3.1 Impact Site Condition

The site condition of the impact size has been divided into 5 assessment units (AU's) based on the different regional ecosystem characteristics. These scores have then been weighted based on the patch size of the floristic characteristics. The native vegetation types that would be cleared by the Project include:

- approximately 40.23 ha of eucalypt dry woodlands on Cainozoic sand plains corresponding to remnant RE 11.5.1;
- approximately 60.66 ha of eucalypt woodlands on laterite soils corresponding to RE 11.7.4;
- approximately 50.07 ha of eucalypt dry woodlands on Cainozoic sand plains corresponding to RE 11.5.1 advanced regrowth;
- approximately 1.57 ha of eucalypt woodlands on laterite soils corresponding to RE 11.7.4 advanced regrowth; and
- approximately 23.94 ha of shrublands on laterite scalds corresponding to remnant RE 11.7.5.

Habitat Quality scoring per each AU is provided below in **Table 2**.

*Table 2: Site Condition Scores - Impact Site*

| Final habitat quality score (weighted) | AU1 | AU2 | AU3 | AU4 | AU5 | Average/Total |
|---|---|---|---|---|---|---|
| **Site Condition score (out of 3)** | 2.78 | 2.44 | 2.65 | 2.64 | 2.65 | 2.63 |
| **Assessment Unit Area (ha)** | 23.94 | 60.66 | 50.07 | 1.57 | 40.23 | 176.47 |

## 3.2 Koala Terrestrial Habitat Quality

### 3.2.1 Koala habitat

The koala has one of the largest distributions of any terrestrial threatened species listed under the EPBC Act (DotE 2014). It occupies a variety of vegetation types across this large distribution, can move long distances, and is variably affected by a range of threats (DotE 2014). Koala habitat is defined by the vegetation community present and the vegetation structure; koalas do not necessarily have to be present (DotE 2014). Any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees can be considered as 'potential koala habitat' (DotE 2014). This can include remnant and non-remnant vegetation in natural, agricultural, urban and peri-urban environments. Koala food trees can generally be those of the genus *Angophora, Corymbia, Eucalyptus, Lophostemon* and *Melaleuca* (DotE 2014).

Within the Project area the koala was recorded on a number of occasions within BioCondition survey sites and within the wider area. Recordings included identification of scats and scratches and koala remains. Within the impact area, potential koala habitat is located within the areas mapped as

eucalypt dry woodlands on Cainozoic sand plains, eucalypt woodlands on laterite soils and shrublands on natural scalds on deeply weathered landscapes. The potential habitat contributes to remnant linkages through existing remnant blocks including areas of state forest.

Terrestrial habitat quality assessments for potential koala habitat indicates an average score of eight (8). There were 10 sites assessed including two in RE 11.5.1, two in RE 11.5.1 regrowth, two in RE 11.7.5, three in RE 11.7.4 and one in RE 11.7.4 regrowth.

## 3.3 Site Context

Site context landscape attributes have been utilised over the whole site and not per regional ecosystem assessment unit, as the whole of site has been determined in the field studies as suitable Koala habitat. The scoring reflects the importance of large patches in the landscape and is based on the size of a patch of suitable Koala habitat. The site and surrounds constitute a patch size of greater than 200ha, therefore a maximum score of 10 is provided to the impact size.

As a landscape level attribute, connectedness (refer **Plan 1**) aims to assess the degree to which the assessment unit connects with adjacent native Koala vegetation. Connectivity relates to the capacity of the impact species to be able to disperse through the landscape between suitable patches of habitat. The impact site was deemed to have 94% of its perimeter connected to suitable Koala Habitat and scored a maximum score of 5 for this scoring attribute.

The context attribute refers to the amount of native vegetation that is retained in the landscape proximal to the site being assessed. This normally works over a 1km radius, due to the size of the blocks and Koala movement patterns. Evolve has broadened the radius to an area of 5km from the boundary and the Context Attribute scored a maximum score of 5 as 92% of the surrounding area is Koala Habitat (refer **Plan 2**).

The last attribute that can be assessed on a landscape scale is Ecological Corridors. As the impact site does not fall into a State mapped corridors technically the site should be assigned a score of 0 (refer **Plan 3**). However, discussion with the department have led to a score of 4 as the habitat in relation to the mapped corridor is approximately 5m adjacent which the department considers bordering the Boundary for Koala.

Threats to species has been noted as a score of 10 out of 15. There has been a major increase in dog threat in the Western Downs in the past few years due to near perfect breeding conditions. This is not just isolated to the Western Downs but has been noted throughout many Regional Councils in Queensland. Whilst Council and private baiting programs only go so far to combat the issue, they are not as rigorous as specifically designed vertebrate pest management programs for environmental offsets.

Wild dogs are highly mobile, and research has shown that they can move up to 560kms in 30 days in rangeland environments and up to 75kms in a week in forested environments on the Great Dividing Range. Therefore, it is not plausible to accept that there is no risk of wild dog threats in the vicinity of either the impact or offset sites. Wild dogs are notorious for destroying livestock and alike, and this includes Koalas. One wild dog on the Moreton Bay Rail project was responsible for the death of what is estimated to be 30 Koalas. It is for this reason that the threats to species have been reduced from a 15 to a 10 as risk is prevalent without a dedicated vertebrate pest management program. Further feral cat, dogs, and foxes have been noted as being known or present on the impact site and the offset site, all are considered potential predatory species and have been known to attack, maim and kill Koalas.

Average species mobility scores were high ranging from 17.5 to 20. Shrub coverage scores were generally high with scores ranging from 20 to 25 out of 25, this is due to a sparse shrub layer throughout all assessment units. Vegetation structure had generally high grass species diversity, however, the ground layer coverage was generally dominated by introduced species in many cases and canopy layers were generally degraded leading each AU to have an average score for the criteria of presence of open grassy woodland vegetation structure to be 15.

Refer to **Table 3** for the Impact 'Site Context' score review.

*Table 3: Impact Site Context Score Review*

| Site Context | Overall Site Level |
|---|---|
| Size of patch | 10 |
| Connectedness | 4 |
| Context | 5 |
| Ecological Corridors | 4 |
| Role of site location to species overall population in the state | 5 |
| Threats to the species | 10 |
| Species mobility capacity | 10 |
| TOTALS (/56) | **49** |
| TOTALS (/3) | **2.57** |

## 3.4 Species Stocking Rate

The current site species stocking rate has been provided as 2.57 / 4. Of the data collected on the impact site, only Fauna Habitat locations 15 and 16 shows signs of Koala presence. Furthermore, there is no evidence in any report that states there is any evidence of Koala breeding on the impact site. Normally Koala breeding is evidenced by the presence of 'pap', actual Koala breeding or a Koala 'snore' call produced by a male Koala. Since none of this evidence has been noted in the ecological reporting on the impact site, the species stocking rate score needs to be reduced to reflect the evidence (or lack thereof) that was collected.

The approximate density per hectare of Koala is low. Only two locations with Koala occupation evidence in Fauna Habitat location 15 and 16 were noted during the ecological surveys. It should be noted that Brigalow Belt densities of Koala are historically low. Further the Department's publication entitled "Assessment of the sensitivity of estimates of the trend in the national Koala population to uncertainty in estimates of the populations at State level" predicts that the Koala population in the Brigalow Belt is quite low estimated at 0.008 Koala per hectare. A score of low (10) has been assigned to the Approximate Density Score.

Species usage of the site was noted at Fauna Habitat Location 15 and 16. As it is not possible in most surveys to distinguish between foraging and breeding of the species a score of 15 out of 15 has been chosen for this parameter.

As the Koala was noted on site in the form of scats and skull, a score of 10 out of 10 was assigned to the detection the species onsite.

Based on the information collected on the offset site, the site has the ability to provide dispersal and may be considered important in providing genetic diversity as the Koala is currently in decline. It is for these reasons the importance of the site has been scored 10 / 15. The impact site is not a key source population for breeding or near the geographical limit of the species range.

**Table 4** presents the Species Stocking Rate to a level that is both supported by onsite evidence and the Department's own literature.

*Table 4: Impact site species stocking rate*

| Species Stocking Rate | Reviewed Score |
|---|---|
| **Presence detected on or adjacent to site (neighboring property with connecting habitat)** | Score |
| | 10 |
| **Species usage of the site (habitat type & evidenced usage** | Score |
| | 15 |
| **Approximate density (per ha)** | Score |
| | 10 |
| **Role/importance of species population on site*** | Score |
| | 10 |
| **Species Stocking Rate Scores** | 45 (2.57) |

Refer to **Table 5** for the impact site final habitat quality score.

*Table 5: Impact Site MHQA Score Adjustment*

| Final habitat quality score (weighted) | AU1 | AU2 | AU3 | AU4 | AU5 | Average/Final |
|---|---|---|---|---|---|---|
| **Site Condition score (out of 3)** | 2.78 | 2.44 | 2.65 | 2.64 | 2.65 | 2.63 |
| **Site Context Score (out of 3)** | 2.63 | 2.63 | 2.63 | 2.63 | 2.63 | 2.63 |
| **Species Stocking Rate Score (out of 4)** | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 |
| **Habitat Quality score (out of 10)** | *7.98* | *7.64* | *7.85* | *7.84* | *7.85* | *7.83* |
| **Assessment Unit area (ha) in disturbance footprint** | 23.9 | 58.4 | 58.5 | 2.7 | 47.9 | 191.4 |
| **Total impact area (ha) for this MNES** | 23.9 | 58.4 | 58.5 | 2.7 | 47.9 | 191.4 |
| **Size Weighting** | 0.12 | 0.31 | 0.31 | 0.01 | 0.25 | 100.00 |
| ***Weighted Habitat Quality Score*** | ***0.96*** | ***2.37*** | ***2.43*** | ***0.07*** | ***1.96*** | ***7.79*** |

# Plan 1: Impact Site Connectedness

Legend

- Impact Extent
- Solar Project site DCDB
- Boundary Connectivity (93.54%)
- Koala Habitat Coverage

N

0 62.5 125 250 375 500 m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

EVOLVE environmental solutions

## Kumbarilla Solar Project

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| A | 19/08/2022 | Preliminary | RH | AH |

Date: 19/08/2022
Plan 4 Impact Site Connectivity

# Plan 2: Impact Site 5km Context

Legend

- Impact Extent
- Impact Site DCDB 5km Buffer
- Solar Project site DCDB
- Koala Habitat Coverage within 5km (81.11%)

N

0 375 750 1,500 2,250 3,000 m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

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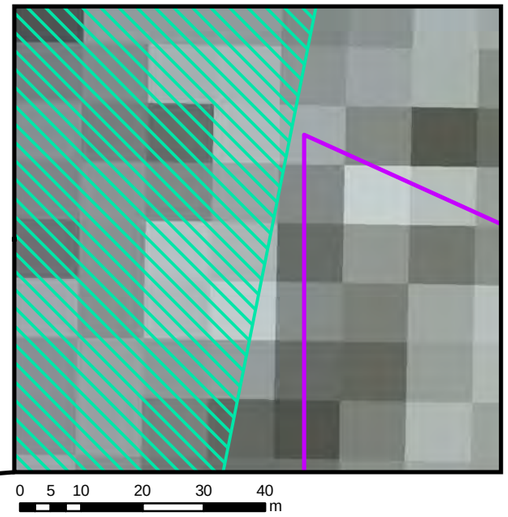
## Kumbarilla Solar Project

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| A | 19/08/2022 | Preliminary | RH | AH |

Date: 19/08/2022
Plan 2 Impact Site 5km Context

# Plan **3**: Impact Site Ecological Corridors




Inset A: the extent of disturbance does not intersect with the mapped corridor buffer

Legend

- Disturbance Extent
- Solar Project Site DCDB
- Statewide Corridor Terrestrial Centrelines
- Statewide Corridor Buffers

N

0 150 300 600 900 1,200
m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| A | 19/08/2022 | Preliminary | RH | AH |

EVOLVE environmental solutions

# Kumbarilla Solar Project

Date: 19/08/2022
Plan 8 Impact Site Ecological Corridors

# 4 Offset Policy and Principles

The following section of this OMP highlights the adequacy of this offset for Koala habitat values against the EPBC Environmental Offsets Policy's 10 key principles.

## 4.1 Principle 1

*Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action.*

**Response:**
The offset for the K-REP development proposal has been designed to offset the significant residual impact on habitat for the Koala. Sections 6 - 8 of this report have specifically highlighted how and where the conservation outcomes or environmental uplift will be achieved across the 20-year lifecycle of the offsets project. With the use of the MHQA tool and the conservation measures highlighted throughout this report, uplift of the chosen site will be achieved to offset the proposed impact. Uplift coupled with legal securement of suitable land close to the impact site, allows this offset to adequately meet the intent of Principle 1 in the offsets policy. Further, the modest gain of one to two points in overall scoring is both achievable and realistic. Based on the calculations performed on the proposed site improvement offset management actions and securement of the site, the proposed offset site will **compensate 104.75% of the calculated impact** (as per EPBC Calculator).

## 4.2 Principle 2

*Suitable offsets must be built around direct offsets but may include other compensatory measures.*

**Response:**
As per the offset policy, it is dictated that the chosen offset site provides suitable habitat for offsetting of the prescribed SRI and **facilitates compensation of 104.75% of the total proposed impact**. This is considered in line with the requirements of Principle 2. No compensatory measures have been used as per this OMP report.

## 4.3 Principle 3

*Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.*

**Response:**
The offset site will be locked down under a Voluntary Declaration (VDec) as per the Vegetation Management Act (VMA).

The VMA has always contained a process for the Minister or Governor in Council to make a declaration over an area to protect high nature conservation values and areas vulnerable to land degradation. However, a VDec is a separate mechanism which is declared by the chief executive and subject to different processes. The VDec process is provided for in sections 19E to 19L of the VMA under subdivision 2—Declarations by chief executive. The VDec process provides a simplified and streamlined procedure for landholders seeking to voluntarily protect native vegetation on their land. It also enhances the vegetation management framework by providing a voluntary protection mechanism and helps deliver other components of the VMA. This streamlined protection process makes it easier and more cost-effective for landholders to protect native vegetation for a range of purposes, such as:

- Participating in conservation incentive programs
- Providing legal security for offset areas required under the under the Environmental Offset Act 2014 (the Offsets Act) and exchange area required under the VMA
- Providing legal security for an exchange area under an accepted development vegetation clearing code
- Rehabilitating areas subject to land degradation
- Addressing Commonwealth offset requirements under the Australian Government's *Carbon Credits (Carbon Farming Initiative) Act 2011* or EPBC Act
- Other conservation purposes.

One of the strengths of a declaration is that it provides greater protection to areas of land containing environmentally valuable native vegetation. A declaration will remain in place until the outcomes in the management plan have been achieved, or in perpetuity should that be a condition of the approval. The declaration and management plan will be noted on the land title, which informs prospective buyers of current declarations and management plans and where copies are available. This information is important to the property market as future owners will be bound by the plan and declaration.

The use of the VDec under the VMA is considered suitable and therefore meets the requirements of Principle 3.

## 4.4 Principle 4

*Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.*

**Response:**

Under Principle 4 the following aspects are assessed:

- Level of statutory protection applied to the matter – already discussed in Principle 3
- Attributes that are being impacted.

The attributes being impacted have been discussed in the preliminary documentation as impact on potential foraging and breeding habitat for the Koala. As a part of the offset land site assessment, the following aspects where utilised to select an appropriate offset site:

    - The distance to the impact site;
    - The suitability of Koala habitat through MQHA surveys;
    - The likelihood of occurrence for Koala – Confirmed onsite through SAT surveys; and
    - The ability to improve and secure the offset land (see Sections 9 and 12)

- Level of threat a potential offset site is under

The offset site will be under as minimal degree of threat as possible, regarding both human induced impact due to the protection measures under the VDec, and biological and ecological threats due to the measures that are to be conducted on the offset site, which are found in the management section of this OMP.

- Time it will take for an offset to be delivered, and the extent to which an offset site might be improved

Scores have conservatively been increased **by 1 to 2 points of habitat quality score** in terms of uplift over the management areas. It is important to note that the site has provided surplus land to what is required and that the gains highlighted in the document are extremely achievable. Management timing has been provided as 20 years.

As per the above the offset meets the requirements of Principle 5.

## 4.5 Principle 5

*Suitable offsets must effectively account for and manage the risks of the offset not succeeding.*

**Response:**

The OMP has written into its framework adaptive management measures and risk mitigation strategies which are coupled with an additional surplus of offset land. The surplus results in an 'over and above' approach, providing sufficient bandwidth to adjust for any potential offset issue, if this would happen to occur.

The offset meets the requirements of Principle 5.

## 4.6 Principle 6

*Suitable offsets must be additional to what is already required, determined by law, planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action).*

**Response:**

The management actions that have been tabled in this OMP are above and beyond the legal obligations of the landowner. This land has been purchased specifically for the implementation of this offset and no competing interests exists on the offset site. Refer to Section 8 of this report for the additional measures that are being taken on this offset site to improve the quality of the habitat within the offset.

## 4.7 Principle 7

*Suitable offsets must be efficient, effective, timely, transparent, scientifically robust, and reasonable.*

**Response:**

Determination of what is efficient, effective, timely, transparent, scientifically robust and reasonable, is described and defined throughout this document. Treatment of the offset area along with legal securement is stipulated to be well above and beyond the requirements for land management practice in Australia. Effectiveness is measured in the environmental gain of the offset site uplift. This uplift has been assured by scientifically robust land rehabilitation and management practices that will increase the suitability of Koala habitat in an area where Koala are known to inhabit (confirmed onsite through SAT surveys).

The OMP and Offsets meets Principle 7.

## 4.8 Principle 8

*Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited, and enforced.*

**Response:**

Site monitoring is to occur on biannual progress increments, which will chart the improvement of the site. It is important to note the site is to be managed by a rehabilitation professional, to ensure immediate and significant risk reduction of the project and in meeting the objectives. The use of the annual compliance report (ACR) will ensure transparent reporting and allow for the department to review and question outcomes. It also allows for adaptive management measures to occur timely and effectively and keep track of target milestones along the offset procedure. The ACR coupled with the use of measurable KPI's fulfills Principle 8.

## 4.9 Principle 9

*In assessing the suitability of an offset, government decision-making will be informed by scientifically robust information and incorporate the precautionary principle in the absence of scientific certainty.*

**Response:**

As discussed in this section, the information used to guide this OMP has been derived from scientifically generated resources, offset industry knowledge and previously approved offset management strategies for the Koala. This, together with the fact that the project will be managed and conducted by environmental rehabilitation and offset professionals, underpins the adequate and appropriate implementation and achievement of the offset objectives and with regard to meeting the requirements of an offset under the EPBC Act.

## 4.10 Principle 10

*In assessing the suitability of an offset, government decision-making will be conducted in a consistent and transparent manner.*

**Response:**

At the stage of preparing this OMP, Evolve are unable to comment on the assessment of the OMP by Commonwealth Government Assessors.

# 5 Offset Site Assessment

An Offset Site was selected following comprehensive desktop searches (*Offset Suitability Report Kumbarilla Renewable Energy Park*, 08 February 2022, Arcadian Ecology) within the vicinity (< 100 km radius) of the impact site and nominated in collaboration with the proponent. To assess the suitability of the nominated offset site, for offsetting of the prescribed SRI on Koala habitat, a combination of further desktop analysis and on-ground field investigations were undertaken. Desktop analysis and field surveys focused on the below attributes for assessment of suitability:

- Site Context (bioregion and land zones)
- Proximity to Impact Site
- Existing remnant and non-remnant vegetation (RE's)
- Accessibility
- Water security
- Ecological connectivity
- Land tenure
- Historic land use and disturbance
- Suitability for revegetation
- Suitability to matters (MNES) for offsetting

## 5.1 Desktop Suitability Assessment of Offset Site

### 5.1.1 Offset Site Context

The offset site has historically been used for cattle and sheep farming, including sections of the site cleared for agricultural use. The offset site borders the Kumbarilla State Forest which is approximately 86,000 hectares in size. Kumbarilla State Forest adjoins Dunmore State Forest which is a further 20,000 hectares in size.

The offset site consists of five Regional Ecosystems (RE's) and seven RE Categories under the VMA. For the purpose of the Modified Habitat Quality Assessment (MHQA), the different vegetation communities were depicted as nine different Assessment Units (AU). Five RE's are spatially mapped as regrowth, two as remnant and one as old cultivation. The offset site survey area is situated across one freehold land parcel, legally known as Lot 10 DY167. Within this area, field surveys were undertaken to assess and allocate the most suitable land-based offsetting habitat for environmental uplift.

Five mapped waterways traverse through the site, flowing in a generally south-western direction. Two waterways consist of two reaches merging within the offset site into one stream reach. The waterways are identified as stream order 1 (two reaches), stream order 2 (four reaches) and stream order 3 (one reach). All waterways are considered ephemeral stream sections and when consisting of water flow, all waterways ultimately discharge into the Moonie River, a permanent waterway.

### 5.1.2 Proximity to Impact Site

The offset site is located approximately 75km west of Dalby, 20km south of Tara and 34km southwest of the proposed impact site. Both the Impact and the Offset Site are situated within the Western Downs Governmental Region and share Regional Ecosystem qualities.

### 5.1.3 Bioregional and Land Zone

The offset site persists within the Brigalow Belt South Bioregion (Region 11) and is predominantly situated on an *old loamy and sandy plains* land zone (5). A smaller extent of the site is situated on *alluvium river and creek flats* land zone (3) and is mapped across the centre to lower southern aspect of the site, following the main waterways. Within the most south-eastern aspect of the site a small section of *ironstone jump-ups* land zone (7) is situated on a patch of 11.36 ha. The offset site suitably features both the same bioregion (11) and two out of three land zones (land zone 5 and 7) as the impact site.

### 5.1.4 Remnant and Non-Remnant Regional Ecosystems

The offset area comprises a mix of Eucalyptus woodland forests communities with high prevalence of *Callitris glaucophylla and Allocasuarina luehmannii.* None of the mapped and ground truthed RE's are of threatened biodiversity status. Refer to **Table 6** for the RE's on site.

The offset site consists of one RE also present on the impact site: 11.5.1 *Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa, Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces. This RE is, in both remnant and non-remnant form, the most dominant RE on both impact and offset sites.

*Table 6: Offset Site Regional Ecosystems*

| RE | VM Act Status | Biodiversity Status | Description |
|---|---|---|---|
| 11.5.1 | Least Concern | No concern at present | *Eucalyptus crebra* and/or *E. populnea, Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces |
| 11.3.18 | Least Concern | No concern at present | *Eucalyptus populnea, Callitris glaucophylla, Allocasuarina luehmann*nii shrubby woodland on alluvium. |
| 11.5.20 | Least Concern | No concern at present | *Eucalyptus moluccana and/or E. microcarpa and/or E. woollsiana +/- E. crebra* woodland on Cainozoic sand plains |
| 11.7.7 | Least Concern | No concern at present | *Eucalyptus fibrosa subsp. nubilis +/- Corymbia spp. +/- Eucalyptus* spp. woodland on Cainozoic lateritic duricrust |
| Non-remnant | None | None | None |

The ground truthed RE layer is close to the state mapped REs with some key changes which included:

- Areas previously mapped as RE 11.5.1 (*Eucalyptus crebra and/or E. populnea, Callitris glaucophylla, Angophora leiocarpa, Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces) were determined to be RE 11.5.1 remnant. Historical aerial imagery suggested that those areas had not been cleared in the previous 70 years which was confirmed by field verification.
- RE 11.5.1 remnant has been divided into two assessment units: Assessment Unit 1 – RE 11.5.1 in good condition and Assessment Unit 2 – RE 11.5.1 in poor condition. Assessment Unit 2 also includes a small area of previously mapped non-remnant woodland which largely meets remnant characteristics.
- A small area of the mapped RE 11.5.1 vegetation was determined to be consistent with RE 11.7.7 (*Eucalyptus fibrosa subsp. nubilis +/- Corymbia spp. +/- Eucalyptus spp*. woodland on Cainozoic lateritic duricrust). This vegetation was in average to good condition and assigned to Assessment Unit 9. One BioCondition transect was recorded in this Assessment Unit due to size constraints;
- Woodland in the centre of the property was mapped as non-remnant, however, was assessed as advanced regrowth of RE 11.3.18 (*Eucalyptus populnea, Callitris glaucophylla, Allocasuarina luehmannii* shrubby woodland on alluvium) which was approaching remnant characteristics. This vegetation was pre-clear mapped as RE 11.3.25 (*Eucalyptus tereticornis or E. camaldulensis woodland* fringing drainage lines). Elements of this RE (11.3.25) are present with both *E. camaldulensis and E. tereticornis* present as a very narrow fringe around waterholes in the drainage system, however too narrow to map as a separate

ecosystem and too narrow to conduct BioCondition assessments. Historical photos indicate that the regrowth is up to 40 years old. The RE 11.3.18 ecosystem was assigned to Assessment Unit 3.

- Woodland to the south of the property (mapped as non-remnant) was assessed as being advanced regrowth vegetation of RE 11.5.1, some of which is close to remnant characteristics. Historical photos indicate that the regrowth is up to 40 years old. This area was of variable condition with considerable dieback with the loss of canopy and subcanopy species. This area was assigned to Assessment Unit 4;
- Areas of regrowth (pre-clear mapped RE 11.5.1) to the north of the property were found to be young recovering vegetation corresponding to RE 11.5.1 and RE 11.5.20 (*Eucalyptus moluccana and/or E. microcarpa and/or E. woollsiana +/- E. crebra woodland* on Cainozoic sand plains). Historical photos indicate that the regrowth is up to 20 years old. This vegetation had a canopy that was sparse and below 5m in height. The young regrowth RE 11.5.1 was assigned to Assessment Unit 5 and the young regrowth 11.5.20 was assigned to Assessment Unit 7;
- An area of regrowth on the western boundary was assessed to be advanced regrowth of RE 11.5.20 and assigned to Assessment Unit 6. Historical photos indicate that the regrowth is up to 30 years old. One BioCondition transect was recorded in this AU due to size constraints; and
- Areas of old cultivation with only sparse regrowth of *Callitris glaucophylla and Eucalyptus populnea* in the centre of the property were assigned to Assessment Unit 8. Most of this area is clear of woody vegetation but would ideally suit assisted revegetation. The area consists of deposited sand drifts associated with the watercourse.

Therefore, the compensation of impacted habitat can be suitably achieved through uplift of corresponding regional ecosystem communities. Refer to **Plan 4** for Vegetation assessment locations.

### 5.1.5 Accessibility

The offset site is located in the vicinity of Cambridge Crossing Road and is accessible through both adjacent sites and connecting rural road (Old Moonie Road). Multiple well maintained former farm tracks provide good accessibility throughout the offset site. However, it should be noted that these internal tracks are subject to temporary flooding.

In addition, multiple maintenance tracks surrounding Kumbarilla State Forest facilitate alternative entry to the offset south from the south and the east.

### 5.1.6 Water Security

The Offset Site survey area consists of several drainage features, including two permanent water bodies, formerly used as farm dams. The largest dam, situated just south of the homestead, encompasses approximately 6,000 $m^2$ at average 3m depth. The water capacity of this dam is estimated at 1.800 Kilo litres (1.800.000 L) at any given time. The second farm dam measures 10.000 $m^2$ (1 ha) at an average 2m depth. The estimated capacity equates to 2.000 kilo litres (2.000.000 L) and is situated just north of the homestead. All waterways and drainage features flow in a generally southwestern direction, ultimately discharging into the Moonie River. Water capacities are subject to precipitation levels and periods of drought. The water resources are considered secure year-round water provision and suitably located in the centre of the site. Year-round water security benefits both offset reconstruction and infill planting establishment Additionally, two bores are in operational use at the property.

### 5.1.7 Ecological Connectivity

A contiguous block of remnant and high-value regrowth woodland forest greater than 200 ha provides high connectivity value across the eastern and southern border, of which partially is Kumbarilla State Forest. Further (remnant) vegetation connectivity existing at the northern and north-eastern aspect, of which partially crosses the unsealed Old Moonie Road.

None of the sites are located within a mapped biodiversity corridor, however a state biodiversity corridor is within 1.5km of the eastern boundary of Lot 10. This is the same corridor that runs adjacent to the K-REP Project site. A small, mapped riparian corridor associated with Paget Creek is within 20 metres of the northern boundary of the proposed offset area.

Connectivity with waterways is provided through several drainage channels, classified as ephemeral streams discharging approximately 10km west of the site into the Moonie River.

Further opportunity exists to promote connectivity through the sparse and fragmentated vegetation, as ground truthed within the centre of the site, through reconstruction planting within alluvial terraces and infill planting within areas of regrowth, to create a greater contiguous vegetation community across the site.

### 5.1.8 Land Tenure

The nominated offset site survey area consists of one freehold parcel. Surrounding land is either State owned forest or privately owned freehold land.

## 5.2 Field Assessment

### 5.2.1 Field Survey Timing

Koala activity has been surveyed utilising the SAT approach during a period of four days, from the 24th to 27th October 2022 (inclusive). During this survey period, 8 SAT meanders were conducted. Koala preferential tree species are defined by the Queensland Government Environmental Offsets Regulation 2014 as Non-Juvenile Koala Habitat Trees (NJKHT), being a tree of any of the following genera -

a) *Angophora*
b) *Corymbia*
c) *Eucalyptus*
d) *Lophostemon*
e) *Melaleuca*

The weather conditions for the assessment dates are provided below in **Table 7**.

*Table 7: Weather conditions during site surveys (Source: www.bom.gov.au)*

| Date | Day | Min Temp (°C) | Max Temp (°C) | Relative Humidity (9am) | Wind speed (9am) | Rainfall (mm) |
|---|---|---|---|---|---|---|
| **24/10/2022** | Monday | 15.7 | 31.5 | 64% | 9 | 0 |
| **27/10/2022** | Tuesday | 17.3 | 31.4 | 70% | 13 | 2.4 |
| **27/10/2022** | Wednesday | 13.6 | 31.6 | 44% | 4 | 0 |
| **27/10/2022** | Thursday | 17.5 | 34.8 | 42% | 11 | 0 |

Climatic records are drawn from the closest BOM station to the survey area, located in Miles.

### 5.2.2 Field Survey Methodologies

The field surveys involved ground truthing of the spatially mapped remnant and non-remnant vegetation (Regional Ecosystems), assessment of existing Koala habitat by way of conducting Modified Habitat Quality Assessments, utilisation assessment of the Koala through SAT surveys and inventory of general ecological foraging and habitat features, such as: surveying of landscape connectivity, regional ecosystem context, recorded threats present and the availability of water resources through assessment of waterways and drainage features.

Motion sensor cameras were deployed for 3-week period during on-site survey works. Fauna observations, and waterway and vegetation assessments were conducted over the entirety of the survey period 6th to 10th February 2023.

#### *5.2.2.1 Spot Assessment Technique (SAT Approach)*

To assess if Koala usage is occurring on the existing vegetation on the offset site, habitat surveys were conducted following the Spot Assessment Technique (SAT) approach[2].

[2] January 2011., Stephen S. Phillips: The Spot Assessment Technique: A tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus

The SAT approach has been developed to provide a universal approach to assess Koala habitat utilisation by free ranging *P. Cinereus* applicable across all states while also resolving matters of reliability (by eliminating the factor of assumptions) and inconsistency regarding identification of Koala preferential tree species. The SAT approach, which is used to quantify the activity of Koalas on the offset site, aims to provide a uniform assessment methodology based on a point-based, tree sampling methodology. The SAT methodology utilises the presence/absence of Koala faecal pellets within a prescribed search area. The outcome of the SAT methodology results in a percentage of trees that recorded faecal pellet evidence in the ground layer. This percentage refers to no, low, medium (normal) or high use of the habitat. Activity levels are then compared to geographic regions and representative population and activity level.

To achieve a meaningful confidence interval for the activity level of a given SAT site, the following SAT methodology guidelines were followed:

- A minimum of thirty (30) trees must be sampled, starting with one NJKHT, followed by the 29 nearest trees that are considered preferential trees for habitat by *P. cinereus*, or otherwise considered to be of some significance for *P. cinereus* conservation and/or management purposes.
- A tree should have a minimum DBH of 100 mm. Multi-stemmed trees should have at least consist of one live stem greater than 100 mm DBH (Phillips et al.2000);.
- The SAT involves a radial assessment of P. cinereus “activity” within the immediate area surrounding a tree of any species that is known to have been utilised by the species, or otherwise considered to be of some importance for *P. cinereus* conservation and/or management purposes. In the field the technique is applied as follows:
- Report on tree species and their faecal pellet records.
- Strictly adhere to the 100 cm search area, a fundamental component of the SAT methodology, as this optimises the probability of finding faecal pellets. Smaller search area significantly reduces the probability due to misrepresenting the activity area of Koalas up in the trees and larger search areas affects justifiability with regards to faecal pellets potentially originating from Koala activity in surrounding trees.
- Allow approximately two minutes per tree search. The search may be concluded once a pellet is found or upon completion of the 2-minute search duration.
- Where the faecal pellets is recorded in overlapping search areas of trees situated in close proximity of one another, both tree search areas should count as a positive recording within each area

Note: Sat surveys were only conducted post the successful location of a Koala Scat during scat meanders surveys.

#### *5.2.2.2 SAT calculation*

SAT results are calculated as the percentage equivalent of the proportion of surveyed trees within the site that recorded a *P. cinereus* faecal pellet within the prescribed search area. E.g., when 15 out of 30 identified trees recorded faecal pellets around the base of the tree within the allocated search radius area, the SAT result would be 50 per cent.

The SAT survey found that the vegetation on the offset site is utilised by Koalas as habitat. All SAT survey plots (Plot 1 – 8) recorded one or more trees with Koala scat presence within the 1-metre radius floor strata surrounding the trunks of Koala preferential trees.

#### *5.2.2.3 Camera Trapping*

Thirteen (13) motion sensor cameras were deployed for four (4) nights during the survey week. The following methodology was employed during the camera trapping surveys:

- Cameras were installed in key locations on site;
- Cameras securely attached 10 – 50 cm from the ground on a tree or post;
- Cameras were not baited; and
- Cameras were set on the burst function of 3 photos per trigger.

## 5.3 Site Condition

The site condition of the offset site has been divided into 9 assessment units based on the different regional ecosystem characteristics. These scores have then been weighted based on the patch size of the floral characteristics (Refer **Table 8**).

*Table 8: Site Condition Scores - Impact Site*

| Final habitat quality score (weighted) | AU 1 | AU 2 | AU 3 | AU 4 | AU 5 | AU 6 | AU 7 | AU 8 | AU 9 | Average/Final |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site Condition score (out of 3)** | 2.39 | 1.75 | 2.56 | 1.87 | 1.69 | 2.1 | 1.56 | 1.09 | 2.61 | 1.96 |

The site condition scores match that of the raw data spreadsheets that have been collected by the field ecologist of the time. Therefore, it is fair to assume that the data provided is true and accurate and provides an average weighted site condition score of 1.96 / 3 or 65% of the impact sites benchmarks.

## 5.4 Site Context

Similar to the impact site, the offset site context scores have been scored to match the impacted species habitat.

Patch size of the site has given the highest score possible as the site is part of a contiguous landscape greater than 200ha (10/10). The connectedness score has been evaluated as a score of 4/5 as the site's perimeter is connected with Koala habitat for 82% of the total perimeter (**Plan 5**). The offset site is part of a contiguous area which is considered 61% connected over the 5km radius and has therefore attracted a score of 5 (**Plan 6**). And like the impact site, the offset site is adjoining an ecological corridor (4) (**Plan 7**).

Due to the proximity of the offset site from the impact site, and the evidence that has been noted on the motion sensor cameras and surveys, which identified fox, cat and wild dog presence, the threat to species has been scored at 10/15. Due to connectedness and context the species mobility is high and has therefore been scored at 10/10.

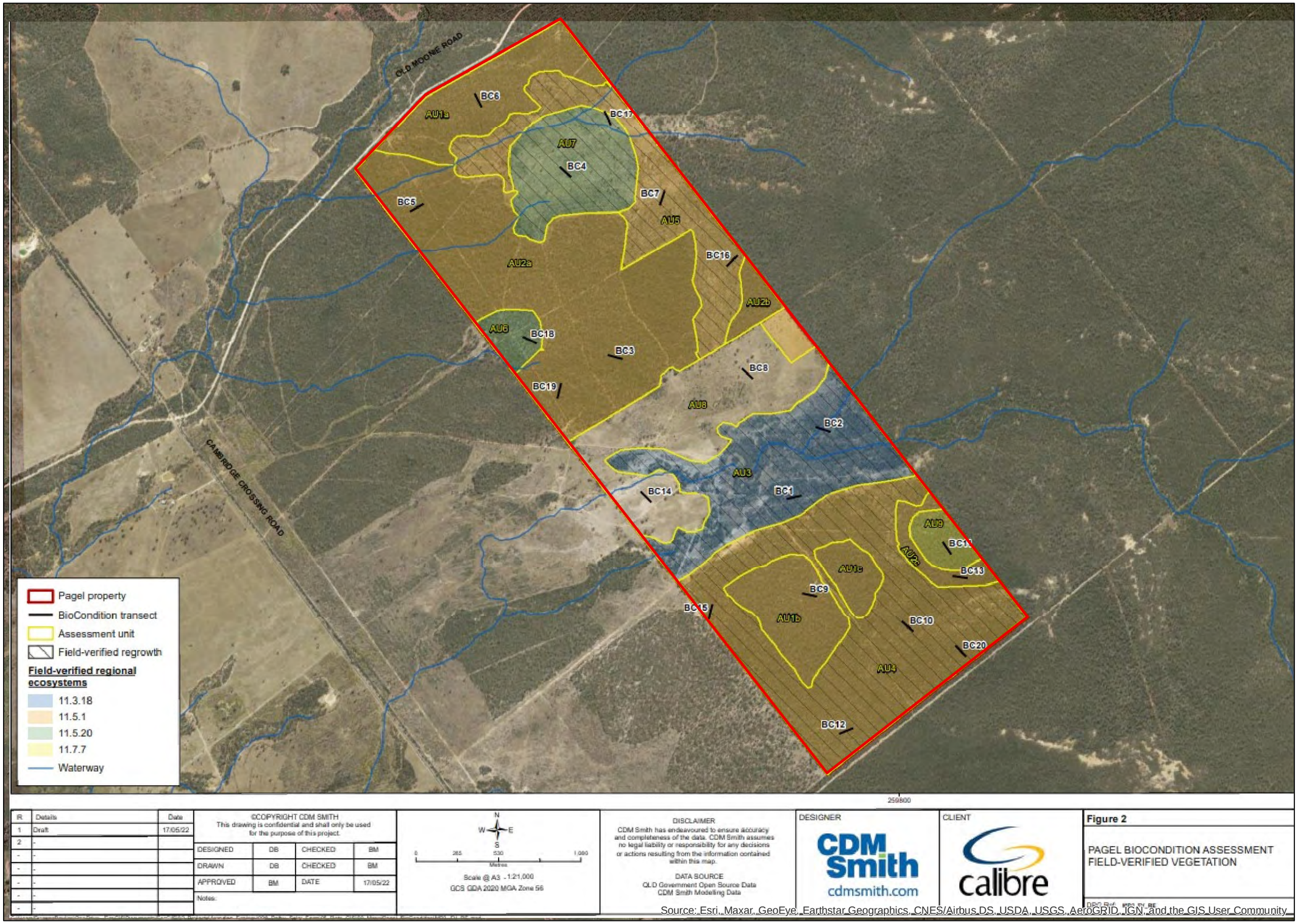
Refer to **Table 9** for the Offset 'Site Context' score review.

*Table 9: Offset Site Context Score Review*

| Site Context | Overall Site Level |
|---|---|
| Size of patch (/10) | 10 |
| Connectedness (/5) | 4 |
| Context (/5) | 5 |
| Ecological Corridors (/6) | 4 |
| Role of site location to species overall population in the state (/5) | 4 |
| Threats to the species (/15) | 10 |

| | |
|---|---|
| Species mobility capacity (/10) | 10 |
| TOTALS (/56) | **48** |
| TOTALS (/3) | **2.57** |

# Plan **4**: Biocondition Assessments




Legend

Site DCDB

N

0 120 240 480 720 960 1,200 m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

| R | Details | Date |
|---|---|---|
| 1 | Draft | 17/05/22 |
| 2 | - | |
| - | - | |
| - | - | |
| - | - | |
| - | - | |
| - | - | |

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| | | | |
|---|---|---|---|
| DESIGNED | DB | CHECKED | BM |
| DRAWN | DB | CHECKED | BM |
| APPROVED | BM | DATE | 17/05/22 |

Notes:

N W E S

0 265 530 1,060 Metres

Scale @ A3 - 1:21,000
GCS GDA 2020 MGA Zone 56

DISCLAIMER
CDM Smith has endeavoured to ensure accuracy and completeness of the data. CDM Smith assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.

DATA SOURCE
QLD Government Open Source Data
CDM Smith Modelling Data

DESIGNER CDM Smith cdmsmith.com

CLIENT calibre

**Figure 2**

PAGEL BIOCONDITION ASSESSMENT
FIELD-VERIFIED VEGETATION

DRG Ref: [illegible] BE

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

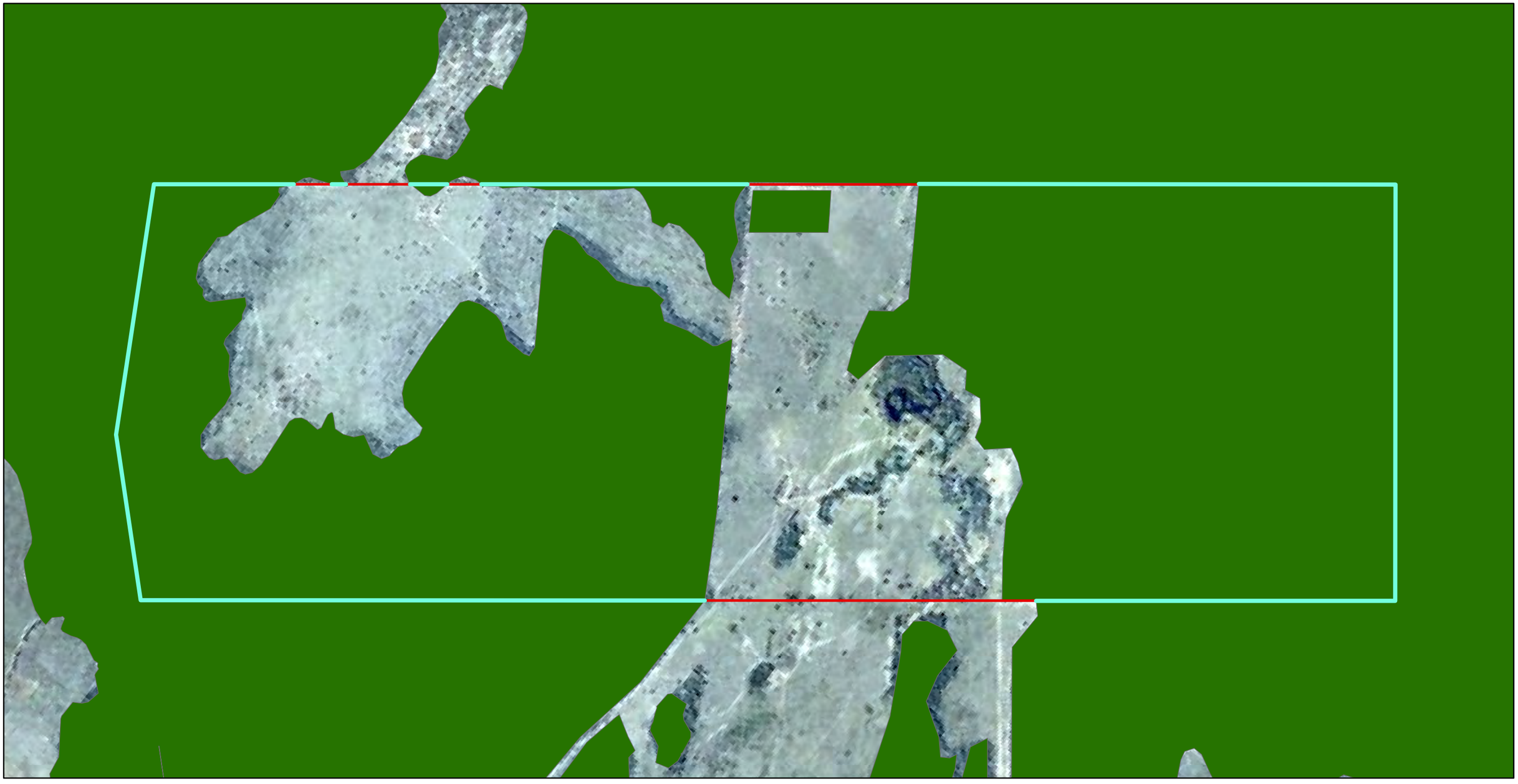
EVOLVE environmental solutions

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| A | 13/06/2022 | Preliminary | AL | AH |

# Kumbarilla Renewable Energy Park

Date: 13/06/2022
Plan 2 Biocondition Kumbarilla A

# Plan 5: Offset Site Boundary Connectedness



Legend

- Boundary Connectivity (80.85%)
- Offset site DCDB
- Offset Site DCDB 5km Buffer
- Koala Habitat Coverage within 1km (82.75%)

N

0 95 190 380 570 760 m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

EVOLVE environmental solutions

## Kumbarilla Solar Project

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| A | 19/08/2022 | Preliminary | RH | AH |

Date: 19/08/2022
Plan 7 Offset Site Boundary Connectivity

# Plan 6: Offset Site Habitat Quality Context 5km

Legend

- Offset site
- Offset Site DCDB 5km Buffer
- Koala Habitat Coverage within 5km (61.15%)

N

0 405 810 1,620 2,430 3,240 m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

EVOLVE environmental solutions

## Kumbarilla Solar Project

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| A | 19/08/2022 | Preliminary | RH | AH |

Date: 19/08/2022
Plan 5 Offset Site 5km Context

# Plan 7: Offset Site Ecological Corridors

Legend

- Offset site
- Statewide Corridor Terrestrial Centrelines
- Statewide Corridor Riparian Centrelines
- Statewide Corridor Buffers

N

0 125 250 500 750 1,000 m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

EVOLVE environmental solutions

## Kumbarilla Solar Project

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Date: 19/08/2022
Plan 9 Offset Site Ecological Corridors

## 5.5 Species Stocking Rate

The species stocking rate has been provided as 2.57/3. From reviewing the data provided this score is not representative of the current offset stocking rate. This reviewed result has been derived from the following data.

### 5.5.1 Field Survey Results

The results derived from each survey technique are outlined and described in the subsections below.

### 5.5.2 SAT Survey results

All eight (8) SAT survey plots recorded Koala faecal pellets, refer to Plan 7 for GIS tracked locations (Refer to **Appendix 1** for full SAT survey results). Both the individual and the overall test results equate to a low use level of Koala activity in accordance with the Categorisation of Koala activity as per Table 10 below (East Coast (low) density category), which has been extracted from *The Spot Assessment Technique a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus* (January 2011, Stephen S. Phillips).

*Table 10. Koala activity means of activity levels*

Table 2. Categorisation of Koala activity into Low, Medium (normal) and High use categories based on use of mean activity level ± 99 per cent confidence intervals (nearest percentage equivalents) from each of the three area/population density categories indicated in Table 1.

| Activity category | Low use | Medium (normal) use | High use |
|---|---|---|---|
| Area (density) | | | |
| East Coast (low) | - | ≥ 3.33% but ≤ 12.59% | > 12.59% |
| East Coast (med – high) | < 22.52% | ≥ 22.52% but ≤ 32.84% | > 32.84% |
| Western Plains (med – high) | < 35.84% | ≥ 35.84% but ≤ 46.72% | > 46.72% |

Based on the information provided from the on-site ecological surveys the presence of Koala has been confirmed in the form of scats and therefore a score of 10 for species presence is warranted.

### 5.5.3 Species usage of the site (habitat type & evidenced usage)

Based on the SAT habitat findings and the fact that it is not possible to distinguish between foraging and breeding habitat it is the advice of the department to include the site as potential breeding habitat. The site scores 15/15 for species usage.

### 5.5.4 Approximate Density

Similar to the impact site, the approximate density per hectare of Koala is low. Eight SAT surveys recorded low koala usage in the form of a Koala scats. It should be noted that Brigalow Belt densities of Koala are historically low. Further The Department's publication entitled "Assessment of the sensitivity of estimates of the trend in the national Koala population to uncertainty in estimates of the populations at State level" predicts that the Koala population in the Brigalow Belt is quite low estimated at 0.008 Koala per hectare. A score of low (10) has been assigned to the Approximate Density Score.

### 5.5.5 Role of Importance

Based on the information collected on the offset site, the site has the ability to provide dispersal and may be considered important in providing genetic diversity as the Koala is currently in decline. It is for these reasons the importance of the site has been score and 20/45 or 10/15. The offset site is neither a key source population for breeding or is it near the geographical limit of the species range.

**Table 11** presents the Species Stocking Rate to a level that is both supported by onsite evidence and the Department's own literature.

*Table 11: Adjusted SSR Table*

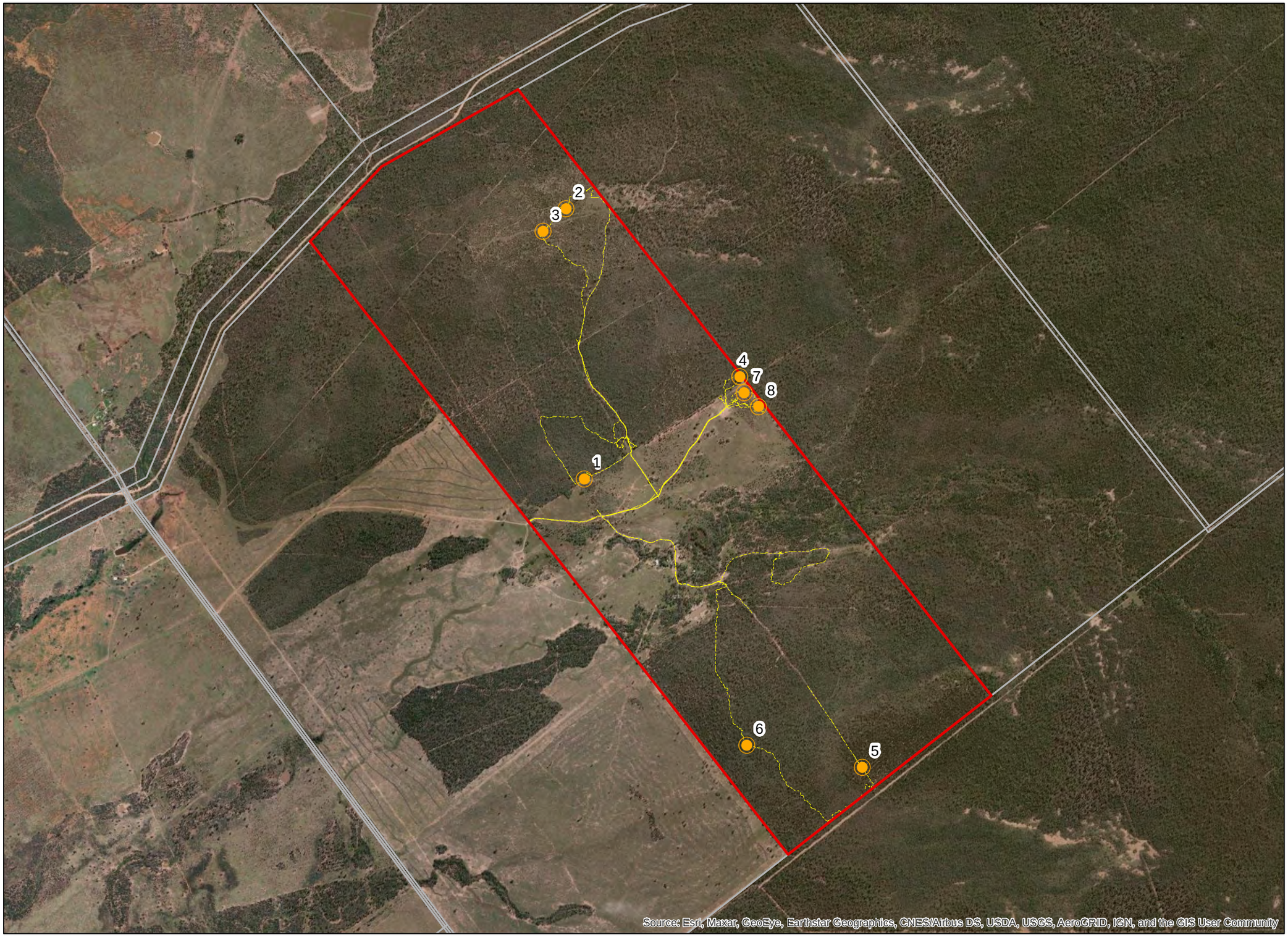
| Species Stocking Rate | Reviewed Score |
|---|---|
| Presence detected on or adjacent to site (neighboring property with connecting habitat) | Score |
| | 10 |
| Species usage of the site (habitat type & evidenced usage | Score |
| | 15 |
| Approximate density (per ha) | Score |
| | 10 |
| Role/importance of species population on site | Score |
| | 10 |
| Species Stocking Rate Scores | 45 (2.57) |

Refer to **Table 12** for an overview of the offset site's final habitat quality scores.

*Table 12. Overview of Relevant Assessment Units allocated for offsetting area and their Habitat Scoring for the Koala.*

| **MHQA Score** | **OMZ - 1** | | | | **OMZ - 2** | **OMZ - 3** | **OMZ - 4** | | |
|---|---|---|---|---|---|---|---|---|---|
| **Final habitat quality score (weighted)** | **AU1** | **AU9** | **AU4** | **AU2** | **AU8** | **AU3** | **AU5** | **AU6** | **AU7** |
| Site Condition score (out of 3) | 2.39 | 2.61 | 1.87 | 1.75 | 1.09 | 2.56 | 1.69 | 2.10 | 1.56 |
| Site Context Score (out of 3) | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 |
| Species Stocking Rate Score (out of 4) | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 |
| Habitat Quality score (out of 10) | *7.53* | *7.75* | *7.01* | *6.89* | *6.23* | *7.70* | *6.83* | *7.24* | *6.70* |
| Assessment Unit area (ha) | 96.9 | 11.36 | 162.59 | 206.35 | 89.31 | 98.27 | 73.64 | 11.26 | 51.73 |
| Total offset area (ha) for this MNES | 477.2 | 477.2 | 477.2 | 477.2 | 89.31 | 98.27 | 136.63 | 136.63 | 136.63 |
| Size Weighting | 0.2031 | 0.0238 | 0.3407 | 0.4324 | 1.0000 | 1.0000 | 0.5390 | 0.0824 | 0.3786 |
| ***Weighted Habitat Quality Score*** | ***1.53*** | ***0.18*** | ***2.39*** | ***2.98*** | ***6.23*** | ***7.70*** | ***3.68*** | ***0.60*** | ***2.54*** |
| | ***7.08*** | | | | **6.23** | **7.70** | ***6.81*** | | |
| | ***7.00*** | | | | 6.00 | 8.00 | ***7.00*** | | |

# Plan 8: **SAT Surveys**




Legend

- Site DCDB
- Western Downs Regional DCDB
- Survey GPS track log
- SAT survey location

N

0 120 240 480 720 960 1,200 m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

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| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| A | 31/07/2023 | Preliminary | AL | AH |

## Kumbarilla Renewable Energy Park

Date: 31/07/2023
Plan 1 Field Survey Effort Kumbarilla A

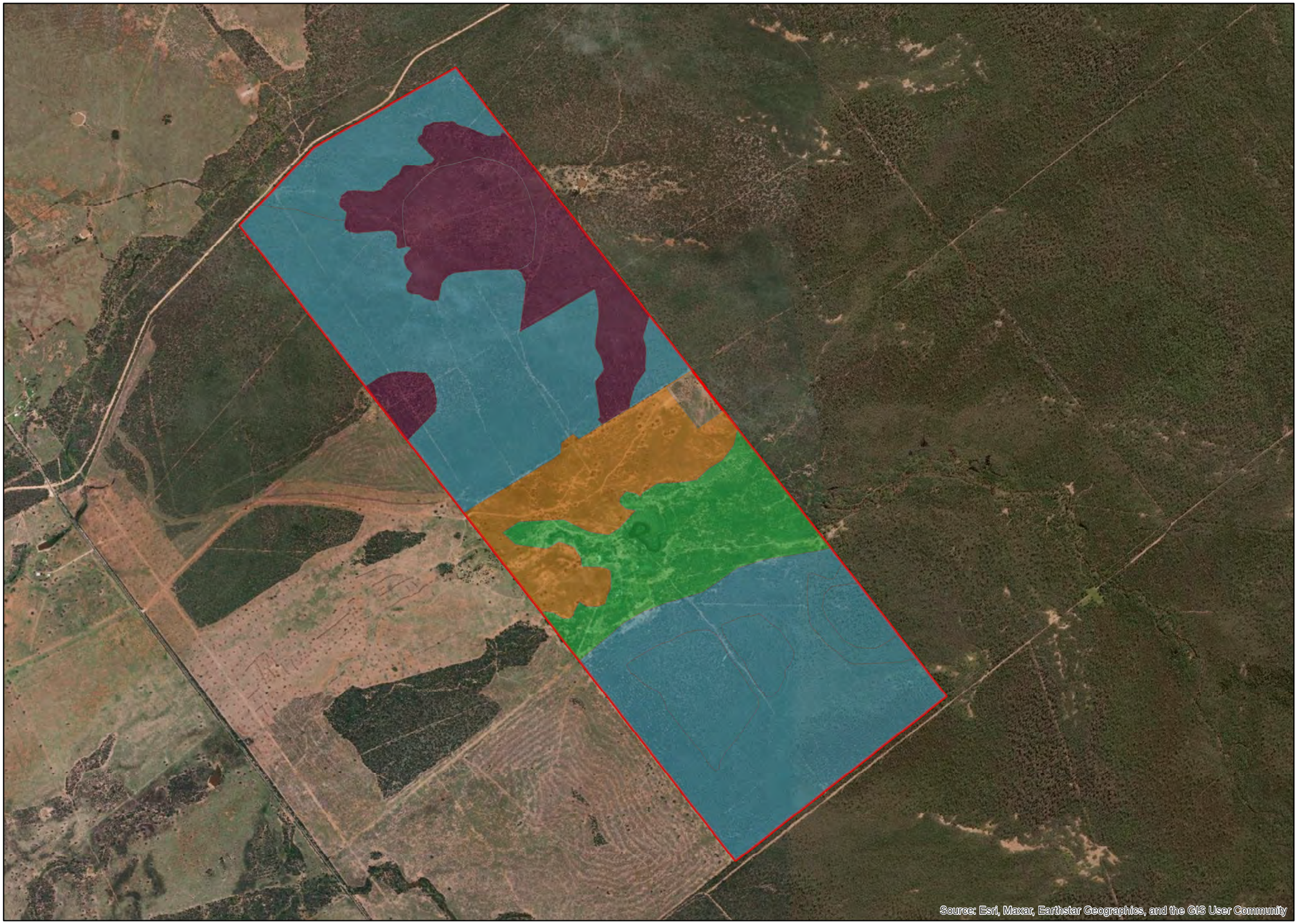
# 6 Offset Site

## 6.1 Suitable Area for Offsetting

Based on the results of both desktop and field assessments, OMZ-1, OMZ-3 and OMZ-4 are considered most suitable for offsetting of impacted Koala habitat and are utilised to calculate environmental uplift (Refer to **Plan 9**).

As one of the offset activities to achieve habitat quality gain, the OMZ's will receive a combination of reconstructive planting and assisted natural regeneration, subject to the availability of deadwood and exotic species cover in the understorey. A decision tree mechanism will be applied to decide whether selected areas within the OMZ's undergo reconstructive revegetation.

# Plan 9: Offset Site **Offset Management Zones (OMZ)**




Legend

**OMZ**

- 1
- 2
- 3
- 4
- Site DCDB

N

0 115 230 460 690 920 1,150 m

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator

EVOLVE environmental solutions

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# Kumbarilla Solar Project

Date: 19/08/2022

Plan 7 Offset Site Rehabilitation Groups Kumbarilla A

## 6.2 Suitability for Offset Management

In addition to representativeness of existing vegetation communities and the similarity in land zones with regard to the impact site, further suitability criteria for offsetting of prescribed SRI are:

- the degree of mobility across the site;
- the availability of water resources; and
- the manageable presence of existing threats to habitat quality and the livelihood of the Koala itself.

### 6.2.1 Offset Site Accessibility and Mobility

Both accessibility via adjacent Old Moonie Road and over maintenance tracks from adjacent Kumbarilla State Forest and the mobility across the offset area is considered suitable for implementation of offset activities.

Mobility of the Koala is considered unconstrained within the safe enclosure of the proposed dog proof fencing. Vegetation connectivity and land zones are also considered favourable for mobility of the Koala in, out and across the offset site. Upon improvement of access tracks, temporary flooding is considered as manageable.

### 6.2.2 Soil Saturation and Water Tables

An alluvial plain, situated north to south across the centre of the site, recorded saturated soil conditions during the field surveys, which followed a severe rain event. These areas are for both practical offset management and plant establishment purposes deemed ideal to support reconstruction and infill planting activities across the site. In addition, the existing waterbodies surrounding the homestead at the centre of the site receive stormwater influx and depend on the current hydrology regime. During extended periods of drought, two existing water bores can be relied on for water security.

### 6.2.3 Existing Threats to the Koala at the Offset Site

Existing threats to koala habitat are assessed and recorded within the offset area, such as pressures of exotic plants on NJKHT, predation of pest animals on the Koala, and the risk of bushfires destroying the habitat and associated Koala mortality in general.

The exotic plant cover within the OMZ's and the identified threats of predator pest animals are deemed significant risks for the prescribed matter. As part of the offsetting strategy, a tailored pest animal control program will aim to reduce the risk of predation by shooting, trapping and exclusion of predator animals, and a RE appropriate revegetation strategy will achieve uplift of Koala foraging and shelter habitat.

The imminent risk of bushfire on the conservation of koala habitat within the offset area, can have a potentially catastrophic impact on the offset area. This can be managed by, the existing fire tracks, planned cool burning weed control and bushfire management of biofuel and the existing control of bushfire management on adjacent state forest land.

## 6.3 Suitability to Matters for Offsetting

The depicted area for offsetting (OMZ - 1, OMZ - 3 and OMZ - 4) within the offset site provides the following suitable conditions to facilitate offset of impacted Koala habitat.

### 6.3.1 Proximity to Impact Site

The offset site is situated within close proximity (34 km) of the impact site and indirectly connected through remnant vegetation, state forests (Kumbarilla SF, Vickery SF and Braemar SF) and within the same Bioregion and Government Jurisdiction (Western Downs).

### 6.3.2 Existing remnant and non-remnant vegetation (RE's)

Regional Ecosystem located on both the impact and offset sites match in both landform and vegetation communities and structure. The selection of the offset site provides a true like for like reflection. By providing like for like vegetation and landform structure, the offset will meet the principles set out in DCCEEW's offset principles and provide a true and fully compliant offset.

### 6.3.3 Recorded Presence of Koala at the Offset Site

Koala scats have been recorded within the in the offset. The presence itself underpins that the offset site is utilised by koala as habitat and justifies the entire offset for Koala habitat uplift, conservation and protection.

## 6.4 Offset Site Management Zones

To facilitate measurable offset activities, the results of the MHQA Assessment Units have been categorised under four Offset Management Zones (OMZ). These OMZ's consist of shared ecological features, condition, habitat attributes, RE's, environmental conditions and geographical location within the offset site. Following, three of the four OMZ's have been nominated as suitable land-based offset zones, providing sufficient baseline values and land-based offset area, in order to facilitate the calculated offset activities. These OMZ's are:

- OMZ-1: Consisting of RE 11.5.1 and RE 11.7.7 - AU1, AU2, AU4, AU9
- OMZ-3: Consisting of RE 11.3.18 - AU3
- OMZ-4: Consisting of RE 11.5.1 and RE 11.5.20 - AU5, AU6, AU7

The purpose of the OMZ's is to bundle offset management actions and apply these to a particular geographical area representing similar MHQA baseline scores across its extent and allowing for consistent measuring of offset management activities and adequate management of offset progress.

Further considerations were made regarding the depiction of Offset Management Zones, such as:

- The minimum required land based offset areas to achieve adequate environmental gain as per EPBC offset calculator;
- Sufficient offset potential in assessed habitat quality scores of the site;
- Representativeness of the mapped RE and appropriate uplift potential;
- Accessibility to OMZ via existing maintenance and farm tracks;
- Suitability to weed management and revegetation activities;
- Suitability to cool burning initial and follow up weed control activities subject to deadwood availability;
- Suitability of existing vegetation composition:
    - Suitable areas providing intact fragments of the RE with considerable canopy cover and suitable area for infill planting
    - Suitable growing conditions, such as free draining soil, no rock or heavily saturated land
    - Opportunity to improve vegetation connectivity; and
    - Proximity to water resources
- Providing large, contiguous, and where deemed feasible connected offset management areas;
- Proximity to permanent water resources for both koala habitat quality requirements and offset management purposes (plant maintenance watering regimes; and
- Connectivity with adjacent state forest.

### 6.4.1 OMZ – 1:

OMZ-1 provides for the largest land-based offset management zone, encompassing two RE's and two land zones, equating to 477.2 ha of land. The vegetation of this OMZ consists of three remnant vegetation AU and one advanced regrowth AU.

### 6.4.2 OMZ – 3:

OMZ-3 provides suitable land-based offsetting area for uplift within RE 13.3.18 advanced regrowth vegetation on alluvium, ensuring connectivity and uplift will be achieved surrounding the primary drainage features and water resources on site. The OMZ encompasses 98.27 ha of alluvial land and has been assessed containing the highest habitat quality scoring on site, based on the availability of high-quality food and foraging and shelter habitat. This habitat scoring is largely underpinned by the highest native species richness and native vegetation cover, recorded across all AU's.

### 6.4.3 OMZ – 4:

OMZ-4 scored the lowest habitat quality score across all three OMZ's. Probable causes for the lack in canopy cover in OMZ – 4 is the highest level of historic disturbance across all three OMZ's and therefore, provides a primary opportunity for reconstruction planting and subsequent improved connectivity and habitat values. During and shortly after heavy rain events, OMZ – 4 (136.63 ha) also consists of several drainage features facilitating additional water resources. Environmental uplift will improve hydrology within the OMZ.

# 7 Offset Site Future Values

## 7.1 Offset Site – Future Scoring Without an Offset

Analysis of historic land use and environmental disturbance at the offset site has provided indication that during cattle and sheep farming practices, the vegetation composition has gradually degraded over time.

Currently, there is no existing weed management regime. As such, inadequate land management has led to unconstrained introduction and competition of exotic grasses and environmental weeds. Although current coverage of weed species is considered low, without an adequate weed management approach, it is expected that the offset site will be subject to further, gradual degradation of habitat quality.

Wildlife camera recordings have revealed that several predator and pest animals occupy the site, such as feral cats, wild dogs, foxes and feral pigs (Refer **Plate 1-3** for evidence from camera trapping of these species on site).

*Plate 1-3: Feral cats, pigs and dingoes captured by motion camera on site*

The habitat quality scores of the offset site are:

- OMZ-1: **7 (7.08)**
- OMZ-3: **8 (7.70)**
- OMZ-4: **7 (6.81)**

It is expected that through increased exotic vegetation dominance, ongoing pressures from pest animals and probable risk of bushfires, the habitat quality scoring for the Koala would decrease with one (1) full point over a period of 20 years' time - to 6.08, 6.70 and 5.81 across OMZ-1, OMZ-3 and OMZ-4, respectively. This estimate is based on the current site condition and the lack of resources currently available to effectively manage the land for

environmental uplift or maintain the land-based offset area against identified threats, such as bushfires and predation by feral dogs, cats, foxes and pigs.

## 7.2 Offset Site – Management Gains through an Offset

To offset the 207 ha of the prescribed impact on Koala food and foraging habitat, shelter and breeding ground, this section will set out proposed offset management actions applying to carefully selected OMZ's and their proportionate effect in achieving a net environmental gain. To illustrate this, several habitat gain tables (tables 16 -19) have been provided to show how raw, adjusted and net environmental gain is achieved and what extent of land based offset area is required. In conclusion, this section will justify the offset management actions and parameters applying a conservative management forecast approach.

## 7.3 Measuring Offset Benefits Using the EPBC Calculator Methodology

To determine whether the proposed offset sites are of a proportionate size and scale to account for the loss (total quantum of impact – impact area x impact condition) of these values elsewhere in the landscape, the Commonwealth 's EPBC calculator methodology was applied in this instance to help measure offset benefits against each associated impact site under Commonwealth legislation (refer **Appendix C**).

This was done using a habitat quality score of **7.79x (8) out of 10** for the impact site, combined with actual current baseline scores from each proposed Offset Management Zone and estimated future gains based on proposed management intervention at the offset site over a minimum 20-year offset management timeframe.

## 7.4 Additionality

The ineffectiveness of current pest animal control and the lack of weed management is believed to sustain the ongoing degradation of the vegetation quality at the site. **Table 13**, showing the Priority Outcomes/Objectives and the Performance Indicators, provide insight into additionality of the proposed management activities in comparison to the existing vegetation and habitat quality, which is subject to the current pest plant and pest animal management regimes, or lack thereof.

The MHQA results of the offset site evidently show that existing pest animal management actions that have been applied to the site prior to the survey period, have little to no effect. The proposed offset management actions and their associated frequencies are designed to provide distinctive, additional, and site focused environmental gain in accordance with proven and recommended vegetation management methodologies.

# 8 Offset Management Actions

The Koala habitat offset will achieve a conservation outcome for the impacted matter by improving both shelter and foraging habitat for the impacted species. This will be achieved by reconstructive planting, assisted regeneration of remnant vegetation areas and through management of the identified threatening processes, such as bushfire, invasive exotic plants, pest (predator) animals and entrance by both stock and the public.

Furthermore, the ongoing progress and safeguarding of the offset management actions will be assured through legal protection of the offset site, to constrain any land use or development activities that could impede on the offset activities. To achieve the conservation outcome, a particular emphasis will be applied to eradication of environmental weeds and pest animals and ongoing control post reconstructive planting activities.

## 8.1 Management Approach

The offset will be located within the same southern aspect of the Western Downs regional government area as the impact site at approximately 34 km aerial distance. The offset will be delivered entirely as a land-based offset and the conservation outcome is expected to be achieved within 20 years of commencement of the management actions detailed in this report. Offset actions and objectives are driven by the impacted matters and habitat quality at the impact site, in combination with the known threats of the Koala.

The Commonwealth Conservation Advice for Koala (DoE 2012) identifies key threats as: *The main identified threats to this species are loss and fragmentation of habitat, vehicle strike, disease, and predation by dogs. Drought and incidences of extreme heat are also known to cause very significant mortality, and post-drought recovery may be substantially impaired by the range of other threatening factors.*

This section will outline the following management actions, which are further described in **Table 13**:

1. Site Preparation:
   1.1. Initial weed eradication;
   1.2. Biofuel reduction and cool burning;
   1.3. Re-instatement of access tracks;
   1.4. Fauna friendly stock and predator exclusion fencing;
2. Revegetation and Regeneration Management:
   2.1. Reconstruction planting of RE appropriate species;
   2.2. Assisted Natural Regeneration of areas consisting of remnant vegetation;
3. Weed Management:
   3.1. Management and control of weed species;
   3.2. Management of dominant weed infestations and WONS;
4. Pest Animal Management:
   4.1. Management of targeted pest animals: cats, dogs, foxes and pigs;
   4.2. Stock exclusion management;
5. Plant Maintenance:
   5.1. Plant watering and fertilising regime;
   5.2. Water source management;
6. Fire and Vehicle Management:
   6.1. Planned low-intensity burning;
   6.2. Fauna mortality;
7. Legal and Natural Asset Protection:
   7.1. Management of Natural Assets;
   7.2. Legal Protection through Covenant;

These approaches, which target developing and implementing vegetation recovery, are identified as a priority to act against habitat loss, disturbance and modification for the Koala, as specified in the Approved Conservation Advice for *Phascolarctos cinereus* (DSEWPC 2012).

*Table 13. Offset Management Action Table*

| Management Action | Site/Management Zone | Methodology | Priority Outcomes/Objectives | Performance Indicator | Responsible Personnel | Frequency/Duration |
|---|---|---|---|---|---|---|
| **1. Site Preparation:** | | | | | | |
| 1.1. Initial weed eradication | OMZ-1<br>OMZ-3<br>OMZ-4 | Removal of Weeds of National Significance (WONS) and dominant exotic species, through a staged weed removal approach, involving:<br>• Slashing of woody species following by stem injection and mulching of remains for appropriate species;<br>• Slashing of exotic grasses, non-woody herbs, forbs and shrubs;<br>• Foliar spray on vigorous regrowth species for 6 consecutive weeks;<br>• Cool-burning as per item 1.2 below. | • Reduction of weeds to < 5% coverage site wide;<br>• Removal of all WONS from revegetation planting areas. | Decrease in weed cover and removal of all WONS to a feasible extent (regrowth is expected over time due to exotic seeds persisting in the soil. | Rehabilitation and weed management contractor. | Weed eradication is to occur during the first year, as a one-off management activity to prepare the site for revegetation and assisted natural regeneration activities. |
| 1.2 Biofuel reduction and cool burning | OMZ-1<br>OMZ-3<br>OMZ-4 | Reduction of existing biofuel load through mulching of dead wood:<br>• Mulching will take place on site where deadwood is found;<br>• Both standing and ground covering deadwood is allocated;<br>• Deadwood is not to be mulched if consisting of habitat features, such as hollows and nests.<br><br>In areas of open grassland, low-intensity burning methods is to be applied to reduce biofuel load including deadwood. | Reduction of biofuel in OMZ's to reduce the risk of bushfire and reduce the presence of exotic species in the understorey to provide revegetation and assisted natural regeneration. | Decrease in quantity of deadwood and other biofuel forms, such as exotic grasses and shrubs. | Rehabilitation and weed management contractor.<br><br>Bushfire specialist, including local indigenous groups conducting traditional fire management regimes. | Biofuel reduction and low-intensity burning is to occur during the first year, as a one-off initial site preparation activity through mulching and low-intensity burning of the biofuel load. |
| 1.3. Re-instatement of access tracks | OMZ-1<br>OMZ-3<br>OMZ-4 | Pre-existing farm tracks and water source trails have not been maintained or actively used in several areas, limiting the accessibility across the site including areas subject to inundation. Therefore, reinstatement of these tracks is required to facilitate | Allow offset contractors, machinery and vehicles to access the offset area in order to conduct management actions. | Water is not ponding on the track and creating boggy areas providing improved accessibility across the site year around. | Lite civil contractor or maintenance contractor.<br><br>Bush regeneration specialist. | Initial restoration of tracks is required and regular maintenance and annual upkeep of tracks is to occur during the entire offset period. |

| Management Action | Site/Management Zone | Methodology | Priority Outcomes/Objectives | Performance Indicator | Responsible Personnel | Frequency/Duration |
|---|---|---|---|---|---|---|
| | | the offset management actions, involving:<br>• Reshaping of tracks;<br>• Filling of track channelisation;<br>• installation of suitable track surface and foundation materials;<br>• Track signposting.<br>The reinstatement of tracks is to occur during the dry season and includes clearing of any overgrown weeds/vegetation. If the pre-existing tack layout is consisting of design flaws, redesign and installation of new track layout is to be considered.<br><br>Existing and new access tracks are to be maintained to be no wider than 5 m. | | Erosion of track is minimal during and post heavy rain events.<br><br>Management actions remain applicable during the entire offset period, if tracks become inaccessible and cause erosion or sedimentation into nearby drainage features. | | |
| 1.4. Fauna friendly stock and predator exclusion fencing | OMZ-1<br>OMZ-3<br>OMZ-4<br><br>Proposed fencing alignment is to enclose the whole property in dog proof fencing with lockable dog proof gates. | All existing fencing on perimeter to be replaced by installation of new fauna friendly stock and predator exclusion fencing in accordance with the standards and guidelines for wild dog fencing. Wild dog proof fencing would prevent entrance from all other predator animals with exemption of cats, as it stipulates the highest possible exclusion conditions to the target animals. Fencing standards include:<br>• A minimum 1.9m fence height;<br>• 15/150/15 mm wire netting fence sections at 4m spacing;<br>• Fence wire netting grid to be returned on outside of fence and buried in, to prevent pest animals digging underneath the fence;<br>• Timber or star picket posts at maximum 4m spacing; | Prevent movement of livestock and feral pest animals, such as wild dogs, pigs, foxes and cats from adjacent land into offset site, to ensure revegetation success, and a reduction in trampling, digging, browsing and compaction of plants predation on native fauna, such as the impacted MNES.<br><br>Additional benefit of exclusion fencing is preventing entrance by the general public. | No livestock observed across offset area.<br><br>No targeted predator and browsing animals observed across offset area.<br><br>Increase in native plant recruitment, species richness and revegetation success. | Fencing and/or rehabilitation contractor. | Initial construction of the exclusion fencing, followed by the annual maintenance of the fencing. |

| Management Action | Site/Management Zone | Methodology | Priority Outcomes/Objectives | Performance Indicator | Responsible Personnel | Frequency/Duration |
|---|---|---|---|---|---|---|
| | | • 2.5mm high tensed top wire;<br>• End assembly tension rails;<br><br>The entire perimeter of the offset site is to be fenced off, and to include secure predator proof access gates.<br><br>All internal fencing is to be removed from the offset site post installation of the perimeter dog proof fencing. | | | | |
| **2. Revegetation and Regeneration Management:** | | | | | | |
| 2.1. Reconstruction planting of RE appropriate species | OMZ-1<br>OMZ-3<br>OMZ-4 | Planting installation of RE appropriate **NJKHT** canopy species (match to RE) where density does not meet the minimum density. Planting densities follow the RE Technical Descriptions and Benchmark as provided by the Queensland Herbarium as a minimum.<br><br>Planting activities are to be undertaken in following three stages (where considered applicable):<br><br>Stage 1 - Year 2 post initial weed management:<br>Planting of Eucalypt species to provide a degree of canopy cover and species richness.<br><br>Stage 2 – Year 3 or 12 months post initial planting: Planting of enrichment planting species in accordance with RE benchmarks for canopy and native perennial grassland species.<br><br>Stage 3 – Year 4 – 20: Replacement planting: | Revegetate degraded open woodland and grassland vegetation communities with NKHT species to improve Koala foraging and shelter habitat quality. | Increase in RE associated NJKHT species richness.<br><br>Increase in native vegetation cover and canopy connectivity.<br><br>Increase in recruitment score.<br><br>Increase in Koala specific habitat quality, such as increase in foraging trees: *Corymbia, Eucalyptus,* and *Angophora*.<br><br>Establishment and survival of Koala habitat vegetation communities. | Bush regeneration specialist or Restoration Ecologist | Initial planting of canopy species 2 years post-initial weed treatment and/or removal of cattle, with planting of shrub and other species occurring one year following.<br><br>Yearly maintenance during first 5 years as per the offset management strategy.<br><br>After 5 years, maintenance and possible replacement planting is to occur every 2nd year (if required). |

| Management Action | Site/Management Zone | Methodology | Priority Outcomes/Objectives | Performance Indicator | Responsible Personnel | Frequency/Duration |
|---|---|---|---|---|---|---|
| | | Annual replacement of failed planting in accordance with the objectives for survival of new plantings.<br><br>.<br><br>Planting will focus on species missing from the applicable RE. New plantings are to be installed with a mix of slow-release fertiliser and water crystals. | | | | |
| 2.2. Assisted Natural Regeneration of areas consisting of remnant vegetation | OMZ-3 | Regeneration of existing remnant and regrowth vegetation is to occur in OMZ-3 in addition to the areas of revegetation (OMZ-1, OMZ-4<br><br>Assisted natural regeneration (ANR) is undertaken by removal and control of dominant and invasive plant species and by control of browsing pressures. ANR aims to support the establishment of natural recruitment in lower stratum.<br><br>ANR includes:<br>• Spraying and slashing of weeds;<br>• Mulching of deadwood and spread of mulch on same location during site preparation;<br>• Trapping of browsing pest animals;<br>• Shooting of pest animals; | Assist natural regeneration in areas where appropriate recruitment was recorded and is determined that vegetation is likely to naturally regenerate with minimal intervention. | Increase in RE associated species richness.<br><br>Increase in native vegetation cover.<br><br>Increase in recruitment score. | Bush regeneration specialist or Restoration Ecologist | |
| **3. Weed Management:** | | | | | | |
| 3.1. Management and control of weed species | OMZ-1<br>OMZ-3<br>OMZ-4 | Slashing and, where deemed appropriate, mulching of exotic woody weed species.<br><br>Application of a foliar herbicide spray to control any invasive weed species in Year 1 pre-planting, applying adequate herbicide control | Reduce overall weed cover to less than 10%, and reduce high threat weed cover to less than 5%. | Decrease in non-native plant cover to match benchmarked RE<br>Increase in:<br>- Native perennial grass cover and open woodland structure with significant establishment of trees | Bush regeneration specialist and/or pest plant control contractor with herbicide control license. | Initial weeding, and then yearly maintenance over first 5 years, as per the Specified management strategy. After 5 years, weed management actions continue every 2nd year |

| Management Action | Site/Management Zone | Methodology | Priority Outcomes/Objectives | Performance Indicator | Responsible Personnel | Frequency/Duration |
|---|---|---|---|---|---|---|
| | | substances in accordance APVMA herbicide standards.<br><br>Post planting, spot spraying is to be undertaken around new plantings and regenerating invasive weeds are to be adequately managed with either cut and stump paint or glyphosate injection herbicide application.<br><br>Weed species should be managed in accordance with the identified exotic plant list and those who identify as threats to plant establishment and ANR efforts. | | species, recruitment and eventually canopy coverage (year 20).<br>- Native plant species richness and health<br>native shrub cover<br>native perennial grasses. | | or until weed suppression is occurring through self- sustaining ecological function and practices. |
| 3.2. Management of dominant weed infestations and WONS | OMZ-1<br>OMZ-3<br>OMZ-4 | Weed infestations and WONS are initially to be managed via slashing, bulldozing and/or fire to reduce the biomass and help with access through infestations. This is to be done incrementally, starting at the edges (undertaken in accordance with a feasible follow-up planning).<br><br>Dependent on access of different areas across the offset site, management actions are to be undertaken through a foliar spray application via handgun (quick spray unit) or a splatter gun (difficult access or sensitive vegetation areas).<br><br>If mature plants have been defoliated, basal bark spraying is to be used. For the portions of site in close proximity (< 100m) to watercourses or the lake, a non-residual herbicide registered for use near waterbodies is to be used. The addition of surfactant negates the environmental rating given to some herbicides. Basal bark spraying or splatter gun (low volume) | Undertake removal of weed infestations within first year site preparation.<br><br>Control all weed infestations and WONS to reduce overall cover to less than 5%. | Eradicate weed infestations that dominate vegetation compositions and impede on ANR and revegetation activities.<br><br>Decrease in non-native plant cover to match benchmarked RE, resulting in increase of:<br>o native plant species richness and health<br>o native shrub cover<br>native perennial grasses. | Bush regeneration specialist or pest plant control operator with herbicide control license | Initial weeding, and then monthly maintenance is to occur for the first year, as per the specified management strategy.<br><br>Biannual maintenance to take place between Year 1 and Year 4.<br><br>After 4 years, Chinee apple management is to occur annually - or until weed suppression is occurring through self-sustaining ecological function and practices. |

| Management Action | Site/Management Zone | Methodology | Priority Outcomes/Objectives | Performance Indicator | Responsible Personnel | Frequency/Duration |
|---|---|---|---|---|---|---|
| | | is the preferred application to reduce off-target damage and degradation of water quality.<br><br>Follow-up regrowth via spot spraying (knapsack), until native canopy (re)established. | | | | |
| **4. Pest Animal Management** | | | | | | |
| 4.1. Management of targeted pest animals: cats, dogs, foxes and pigs. | OMZ-1<br>OMZ-3<br>OMZ-4 | Baseline assessments are to be undertaken in Year 1, to determine the most appropriate species-specific control measures, such as:<br>• Perimeter predator proof fencing to prevent access by wild digs, pigs and foxes;<br>• Shooting of pigs and cats;<br>• Trapping of foxes and cats.<br>Each species require specific control locations and timing of pest management activities during high and low activity periods.<br><br>Methodology is to include cage trapping, baiting and/or open range shooting. Consultation is to involve neighbours, to improve success rates through integration and collaboration of pest management activities with neighbouring land owners and on neighbouring properties. | Reduce abundance of non-native predators and non-native herbivores by 90% to improve revegetation success and reduce mortality of native fauna species. | Reduction of pests as per the annual monitoring and assessment.<br><br>o Increase in native fauna species presence. | Pest control contractor | As required depending on species determined to be present by feral animal assessment baseline results (likely to include Dingo/wild dog, deer, rabbit, fox, and/or pig). Pest management measures are to be implemented and reviewed annually. Pest management actions are to be ceased if no pest animals are recorded over a full year period. Review of pest animal recordings remains an annual requirement. |
| 4.2. Stock exclusion management | OMZ-1<br>OMZ-3<br>OMZ-4 | Stock exclusion is to be achieved through offset site perimeter fencing, which is proposed as per the fauna friendly exclusion fencing, as per item 1.4 of this table. Access gates installed within the perimeter fencing are to be self-closing or to include with stock grid crossings across the fencing gate. | No stock to be entering and living on the offset site. | No records of stock on the offset site during the offset period. | Fencing and/or rehabilitation contractor. | Stock proof fencing is to be maintained and monitored for faults on an annual basis. |

| Management Action | Site/Management Zone | Methodology | Priority Outcomes/Objectives | Performance Indicator | Responsible Personnel | Frequency/Duration |
|---|---|---|---|---|---|---|
| | | Stock proof fencing is to be maintained and monitored for faults on an annual basis. | | | | |
| **5. Plant Maintenance:** | | | | | | |
| 5.1. Plant watering and fertilising regime | OMZ-1<br>OMZ-4 | Apply sufficient water to each new plant within designated revegetation areas to prevent dehydration in accordance with periodic maintenance schedule, in particular in increased frequency during the establishment period.<br><br>Apply fertilising activities to ANR areas if deemed required to achieve objectives for these areas to promote native natural regeneration growth.<br><br>Prescribed watering regime may differ subject to assessment of real-time ecological conditions by the restoration/maintenance professional. Conditions, such as flooding or prolonged periods of drought can alter the amount of water given to plants. Watering frequency will also follow the plant maintenance guidelines during and post establishment period. | Prevention of reconstruction planting failure.<br><br>Encourage native growth and germination. | Increase in native plant species richness and cover.<br><br>Increase in recruitment score. | Bush regeneration specialist or maintenance contractor. | Weekly for the first 4 weeks then fortnightly for the next 12 weeks subject to weather conditions.<br><br>If dry weather persists additional waterings may be necessary. If rain occurs, fewer waterings may be necessary. |
| **6. Fire Management:** | | | | | | |
| 6.1. Planned low-intensity burning | OMZ-1<br>OMZ-3<br>OMZ-4 | Low-intensity (cool burning) of understorey is to be undertaken in ANR areas where exotic species and weed infestations persistently reoccur. Low-intensity burns are to be undertaken at early mornings, during periods of no- to limited winds, on sufficient soil moisture conditions and undertaken by either bush fire | Suppression of exotic (weed) species and encourage native growth and germination.<br><br>Retention of an intact canopy cover. | Increase in native plant species richness.<br><br>Decrease in non-native plant cover. | Bushfire specialist<br><br>Local fire brigade in collaboration with indigenous bush management groups. | Interval and strategy in accordance with fire regime frequency guidelines of applicable RE and soil moisture conditions. |

| Management Action | Site/Management Zone | Methodology | Priority Outcomes/Objectives | Performance Indicator | Responsible Personnel | Frequency/Duration |
|---|---|---|---|---|---|---|
| | | management professionals or indigenous groups.<br><br>Small patches are to be burned at each time to remain in control of the fire and prevent fires to break out and expand across the area in an uncontrollable manner. | | | | |
| 6.2. Fauna mortality | OMZ-1<br>OMZ-3<br>OMZ-4 | Fauna mortality due to collision with vehicles is to be prevented through enforcing speed limits and ensuring track design considers fauna movement and mobility across site.<br><br>A maximum speed of 30km/h throughout the site. Enforcement made apparent through speed limit signs installed at every gated entrance on the perimeter. | Prevent collision with native animals. | No koala mortality for the entire offset period. | Lite civil workers and to be adhered to by anyone visiting the site with a mode of transport. | To be installed within 6 months of the approval of the project.<br><br>Signs to be maintained visible throughout the offset period. |
| **7. Legal and Natural Asset Protection** | | | | | | |
| 7.1. Management of Natural Assets | OMZ-1<br>OMZ-3<br>OMZ-4 | OM-08.0 - Natural Assets Environmental Importance.<br><br>OM-09.0 - Natural Assets Water Resource Catchments. | Protection of Natural Assets and preventing the offset is to cause residual effects on these assets. | No pollution or depletion of the natural assets. | Rehabilitation and maintenance contractors | Periodic reporting in Strategic Asset Management Plan. |
| 6.2. Legal Protection through Covenant | OMZ-1<br>OMZ-3<br>OMZ-4 | Legal protection of the offset site for the duration of the offset period is to be enforced through Voluntary Declaration (VDec). A VDec is an option under the VM Act that provides a simplified, streamlined process for landholders to voluntarily protect areas of native vegetation not otherwise protected by the VM Act. | Protect the offset area from any activities that could impede on the rehabilitation process and or threaten the prescribed matter or existing vegetation during the offset period. | No illegal harm to fauna, flora or offset activities is to occur. | Approval holder will submit a VDec to Queensland Department of Resources (DoR), including written consent from all registered owners, a description of the purpose of the VDec and how the area meets the criteria of high nature conservation value, and a copy of the offset area management plan. | To be submitted and approved prior to the commencement of offset actions. |

## 8.2 Bushfire Management

Bushfires form a serious threat to the survival of koala habitat and koala survival in general. Koala mortality is significantly higher in comparison to other arboreal species due to the relatively slow mobility of the koala during bush fire occurrences - *Effects of fire on koalas and their habitat - The Australian National University.* Therefore, bushfires are considered one of the most prominent threats and reasons for mortality of the koala.

Infrequent bushfire regimes can alter the landscape and reduce the food source and shelter habitat availability to the koala. At adequate time intervals bushfire management action should be implemented to ensure mass landscape changes are not a high or prevalent risk. Reduction of bushfire risk can be managed in several ways. Weed control to reduce or remove the biofuel load is the most common bushfire management practice.

Where required, weed control measures can include low intensity planned burning. Litter cover and coarse woody debris will be maintained by burning only with sufficient soil moisture. **Table 14** outlines a Bushfire Management Strategy specifically designed addressing all four Regional Ecosystem classifications pertaining to the Rehabilitation Groups.

*Table 14. Bushfire Management Strategy*

| RE Description | Bushfire Regime | Interval | Intensity | Potential Issues |
|---|---|---|---|---|
| **RE 11.5.1** | Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. 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 | 6 to 10 years | low | 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. *Allocasuarina* is also an important food source for glossy-black cockatoo. |
| **RE** 11.3.18 | Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. 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. | 6 to 10 years | Primarily low to moderate | 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. *Allocasuarina* is also an important food source for glossy-black cockatoo. |
| **RE 11.5.20** | Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. 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. | 6 to 15 years | Primarily low | 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 |
| **RE 11.7.7** | 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 | 6 to 10 years | moderate | 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. |

# 9 Habitat Gain

T**able 15 – 19** provide insight into the habitat values gain achieved through the proposed offset management actions at the offset site, outlined per Offset Management Zone. These tables will be utilised to inform the adaptive management strategy if, during the offset process, certain objects are not meeting their milestone targets. Refer to **Appendix A and B** for raw data on current habitat quality scoring and offset calculations for future scoring.

*Table 15. Modified habitat quality gain – OMZ-1: Site Condition Uplift.*

| Item | AU's 1, 2 & 4 | AU 9 | Weight | Weighted Average | Values Increase with offset | Management aims | Future score |
|---|---|---|---|---|---|---|---|
| Recruitment of dominant canopy species | 5.00 | 3 | 5 | 4.95 | 100% of dominant canopy species present as regeneration) | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - trees | 3.13 | 5 | 5 | 3.03 | 100% of benchmark number of species within each life-form | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - shrubs | 4.58 | 2.5 | 5 | 4.51 | Recruitment to remain steady | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 4.51 |
| Native plant species richness - grasses | 4.79 | 5 | 5 | 4.79 | 100% of benchmark number of species within each life-form | Weed reduction, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - forbs | 4.38 | 5 | 5 | 4.53 | Recruitment to remain steady | Weed reduction, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 4.53 |
| Tree canopy height (average of emergent, canopy, sub-canopy) | 4.00 | 5 | 5 | 3.84 | mechanisms | Ecological burns to reduce the risk of wildfire. | 5 |
| Tree canopy cover (average of emergent, canopy, sub-canopy) | 3.42 | 3.5 | 5 | 3.20 | Tree canopy cover score increased to 4 | - | 4 |
| Shrub canopy cover | 3.33 | 5 | 5 | 3.39 | Shrub canopy cover score increased to 3 (50% of benchmark) | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 3.5 |
| Native Perennial grass cover | 4.67 | 5 | 5 | 4.66 | 100% of benchmark native perennial (or preferred and intermediate) grass cover | Extensive weed reduction, exclusion of cattle will result in increase of grass cover. | 5 |
| Organic litter | 3.50 | 3 | 5 | 3.35 | 100% of benchmark organic litter | Weed reduction, planting, to encourage species diversity, will result in an increase in species. | 5 |
| Large trees | 1.67 | 10 | 15 | 1.83 | Large trees to increase slightly over the 20 year time period | Ecological burns to reduce the risk of wildfire. | 5 |
| Coarse woody debris | 3.67 | 5 | 5 | 3.82 | Coarse woody debris to improve 100% of benchmark number or total length of CWD | Through natural grow of current vegetation forms | 5 |

| Item | AU's 1, 2 & 4 | AU 9 | Weight | Weighted Average | Values Increase with offset | Management aims | Future score |
|---|---|---|---|---|---|---|---|
| Non-native plant cover | 10.00 | 10 | 10 | 10 | Non-native plant cover score increased to less than 10% of vegetation cover are non-native plants). | Extensive weed reduction. | 10 |
| Quality and availability of food and foraging habitat | 5.33 | 10 | 10 | 4.40 | - | Extensive weed reduction. And habitat planting | 10 |
| Quality and availability of shelter | 5.33 | 10 | 10 | 4.40 | - | Extensive weed reduction. And habitat planting | 10 |
| **Site Condition Score** | | | | 64.71 | | | 86.54 |
| **MAX Site Condition Score** | | | | 100 | | | 100 |
| **Site Context** | | | | **1.94** | | | 2.60 |

*Table 16: Modified habitat gain – OMZ-3 Uplift*

| Item | AU's 1, 2 & 4 | Weight | Values Increase with offset | Management aims | Future score |
|---|---|---|---|---|---|
| Recruitment of dominant canopy species | 5 | 5 | 100% of dominant canopy species present as regeneration) | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - trees | 5 | 5 | 100% of benchmark number of species within each life-form | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - shrubs | 4.51 | 5 | Recruitment to remain steady | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - grasses | 5 | 5 | 100% of benchmark number of species within each life-form | Weed reduction, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - forbs | 4.53 | 5 | Recruitment to remain steady | Weed reduction, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 4 |
| Tree canopy height (average of emergent, canopy, sub-canopy) | 5 | 5 | mechanisms | Ecological burns to reduce the risk of wildfire. | 5 |
| Tree canopy cover (average of emergent, canopy, sub-canopy) | 4 | 5 | Tree canopy cover score increased to 4 | - | 4 |
| Shrub canopy cover | 3.5 | 5 | Shrub canopy cover score increased to 3 (50% of benchmark) | Weed reduction, planting, ecological burns to encourage species diversity, | 4 |

| Item | AU's 1, 2 & 4 | Weight | Values Increase with offset | Management aims | Future score |
|---|---|---|---|---|---|
| | | | | exclusion of cattle will result in an increase in species. | |
| Native Perennial grass cover | 5 | 5 | 100% of benchmark native perennial (or preferred and intermediate) grass cover | Extensive weed reduction, exclusion of cattle will result in increase of grass cover. | 5 |
| Organic litter | 5 | 5 | 100% of benchmark organic litter | Weed reduction, planting, to encourage species diversity, will result in an increase in species. | 5 |
| Large trees | 5 | 15 | Large trees to increase slightly over the 20 year time period | Ecological burns to reduce the risk of wildfire. | 5 |
| Coarse woody debris | 5 | 5 | Coarse woody debris to improve 100% of benchmark number or total length of CWD | Through natural grow of current vegetation forms | 5 |
| Non-native plant cover | 10 | 10 | Non-native plant cover score increased to less than 10% of vegetation cover are non-native plants). | Extensive weed reduction. | 10 |
| Quality and availability of food and foraging habitat | 10 | 10 | - | Extensive weed reduction. And habitat planting | 10 |
| Quality and availability of shelter | 10 | 10 | - | Extensive weed reduction. And habitat planting | 10 |
| **Site Condition Score** | 85.25 | | | | 87 |
| **MAX Site Condition Score** | 100 | | | | 100 |
| **Site Context** | 2.56 | | | | **2.61** |

*Table 17. Modified habitat gain – OMZ-4: Uplift*

| Item | AU5 | AU's 6 & 7 | Weight | Weighted Average | Values Increase with offset | Management aims | Future score |
|---|---|---|---|---|---|---|---|
| Recruitment of dominant canopy species | 5 | 5.00 | 5 | 5.00 | 100% of dominant canopy species present as regeneration) | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - trees | 2.5 | 5.00 | 5 | 3.65 | 100% of benchmark number of species within each life-form | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - shrubs | 5 | 5.00 | 5 | 5.00 | Recruitment to remain steady | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - grasses | 5 | 5.00 | 5 | 5.00 | 100% of benchmark number of species within each life-form | Weed reduction, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native plant species richness - forbs | 5 | 1.47 | 5 | 3.37 | Recruitment to remain steady | Weed reduction, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 4 |
| Tree canopy height (average of emergent, canopy, sub-canopy) | 2.25 | 3.00 | 5 | 2.60 | mechanisms | Ecological burns to reduce the risk of wildfire. | 4 |
| Tree canopy cover (average of emergent, canopy, sub-canopy) | 1 | 2.71 | 5 | 1.79 | Tree canopy cover score increased to 4 | - | 3 |
| Shrub canopy cover | 4 | 2.13 | 5 | 3.14 | Shrub canopy cover score increased to 3 (50% of benchmark) | Weed reduction, planting, ecological burns to encourage species diversity, exclusion of cattle will result in an increase in species. | 5 |
| Native Perennial grass cover | 5 | 5.00 | 5 | 5.00 | 100% of benchmark native perennial (or preferred and intermediate) grass cover | Extensive weed reduction, exclusion of cattle will result in increase of grass cover. | 5 |
| Organic litter | 5 | 3.36 | 5 | 4.24 | 100% of benchmark organic litter | Weed reduction, planting, to encourage species diversity, will result in an increase in species. | 5 |
| Large trees | 2.5 | 0.00 | 15 | 1.35 | Large trees to increase slightly over the 20 year time period | Ecological burns to reduce the risk of wildfire. | 5 |
| Coarse woody debris | 2 | 3.23 | 5 | 2.57 | Coarse woody debris to improve 100% of benchmark number or total length of CWD | Through natural grow of current vegetation forms | 5 |

| Item | AU5 | AU's 6 & 7 | Weight | Weighted Average | Values Increase with offset | Management aims | Future score |
|---|---|---|---|---|---|---|---|
| Non-native plant cover | 10 | 10.00 | 10 | 10.00 | Non-native plant cover score increased to less than 10% of vegetation cover are non-native plants). | Extensive weed reduction. | 10 |
| Quality and availability of food and foraging habitat | 1 | 1.72 | 10 | 1.33 | - | Extensive weed reduction. And habitat planting | 10 |
| Quality and availability of shelter | 1 | 2.61 | 10 | 1.74 | - | Extensive weed reduction. And habitat planting | 10 |
| Site Condition Score | | | | 55.77 | | | 86 |
| MAX Site Condition Score | | | | 100 | | | 100 |
| Site Context | | | | 1.67 | | | 2.58 |

*Table 18: Site Context whole of site*

| Item | Current Score | Values Increase with offset | Management aims | Future score |
|---|---|---|---|---|
| **Size of patch (HA) (out of 10)** | 10 | Precautionary Approach applied | Contiguous landscape is considered Koala habitat already (Maximum score is already applied) | 10 |
| **Connectedness (out of 5)** | 4.00 | Precautionary Approach applied | Adjacent areas are already considered to be KOALA habitat (Maximum score is already applied) | 4 |
| **Context (out of 5)** | 5.0 | Precautionary Approach applied | Adjacent areas are already considered to be KOALA habitat (Maximum score is already applied) | 5 |
| **Ecological Corridors (out of 6)** | 4 | Precautionary Approach applied | Adjacent areas are already in a corridor. (Maximum score is already applied) | 4 |
| **Role of site location to species overall population in the state (out of 5)** | 5 | Precautionary Approach applied | KOALA is has been located on the offset site and is already considered important in the role of the species. | 5 |
| **Threats to the species (out of 15)** | 10 | Precautionary Approach applied | Reduction of threats through fire management and pest program and fencing. | 15 |
| **Species mobility capacity (out of 10)** | 10 | Precautionary Approach applied | Capacity will improve through improved habitat rehabilitation and management but at this stage the precautionary approach will be applied as there are not definitive areas of measurement currently available. | 10 |
| **Site Context Score** | 48.00 | | | 53.00 |
| ***MAX Site Context Score*** | 56 | | | 56 |
| **Site Context Score - out of 3** | *2.41* | | | *2.63* |

*Table 19: Species Stocking Rate Whole of Site*

| **Species Stocking Rate (SSR)** | | | | | | | **Current** | **Uplift Score** |
|---|---|---|---|---|---|---|---|---|
| Presence detected on or adjacent to site (neighbouring property with connecting habitat) | Score | 0 | 5 | | 10 | 10 | | 10 |
| | | No | Yes - adjacent | | Yes - on site | | | |
| Species usage of the site (habitat type & evidenced usage) | Score | 0 | 5 | 10 | 15 | 15 | | 15 |
| | | Not habitat | Dispersal | Foraging | Breeding | | | |
| Approximate density (per ha) | Score | 0 | 10 | 20 | 30 | 10 | | 20 |
| | | 0% | | | | | | |
| Role/importance of species population on site* | Score (*Total from supplementary table below)* | 0 | 5 | 10 | | 15 | 10 | 21 |
| | | 0 | 5 - 15 | 20 - 35 | | 40 - 45 | | |
| Total SRR score (out of 70) | 55 | | | | | | **45** | **55** |
| **SRR Score (out of 4)** | | | | | | | **2.57** | **3.14** |

# 10 Offset Management Risks Analysis

The main risks identified to achieve environmental uplift on the offset site, are:

- Water security for plantings and regeneration during times of drought.
- Exotic weed dominance: Exotic weeds can suppress the regrowth and recruitment of NJKHT in the understorey and on the longer term, canopy connectivity. In particular, invasive exotic pasture and Weeds of National Significance could impede on both Koala rehabilitation planting and the availability of foraging habitat on the longer term. Therefore, control of exotic vegetation is considered essential and integral to the success of the offset.
- Risk of fire: Fire during breeding season can cause disturbance to nesting habitat and failure of breeding (DEWHA, 2009).
- Wild dog, fox and cat predation

This section accounts for, and outlines the management of the risks for failure in achieving a conservation outcome through offsetting of prescribed SRI. A majority of the land surrounding the offset site consists of Kumbarilla State Forest land. This reduces the risk of controlling land management practices and hindered access to the offset site.

Therefore, we consider the surrounding state forest and the offset being situated on one sole parcel, advantageous to undertaking and maintaining the offset site. Further, all land-based boundaries are, or will be appropriately fenced with 1.9m high dog proof fencing, and secured under lockable gates. This reduces risk further and allows for greater control over the offset land.

The risk items are assessed and rated according to the Risk matrix in **Table 20 and 21**. The results of the risk assessment are presented as per **Table 22.**

*Table 20. Likelihood of risk occurring*

| Likelihood | Qualitative description | Quantitative description |
|---|---|---|
| **Almost Certain** | The event is expected to occur in most circumstances | May occur once a month or more frequently |
| **Likely** | The event will probably occur in many circumstances | May occur once every year |
| **Possible** | Identified factors indicate the event could occur at some time | May occur once every 2 or 3 years |
| **Unlikely** | The event could occur at some time but is not expected | May occur once every 5 years |
| **Rare** | The event may occur only in exceptional circumstances | May occur once every 10 years |

*Table 21. Qualitative Risk Analysis Matrix*

| RATING | CONSEQUENCES | LIKELIHOOD | | | | |
|---|---|---|---|---|---|---|
| | | Rare - 1 | Unlikely - 2 | Possible - 3 | Likely - 4 | Almost certain - 5 |
| 5 | **Severe** - Permanent and/or very long term damage to areas of significant value, e.g., permanent loss of vegetation through pest invasion. | H | H | E | E | E |
| 4 | **Major** - Significant and/or long term damage to areas of high value, e.g., significant loss of vegetation through pest invasion. | M | M | H | H | E |
| 3 | **Moderate** - Moderate or medium term damage to areas of value, e.g., moderate loss of vegetation through pest invasion. | M | M | M | H | H |
| 2 | **Minor** - Minor and/or short term damage to areas of low value, e.g., minor loss of vegetation through pest invasion. | L | M | M | M | H |
| 1 | **Insignificant** - Insignificant or very short term damage to areas of very low or negligible value, e.g., insignificant loss of vegetation through pest invasion. | L | L | L | M | M |

| Low Risk (L) | Moderate Risk (M) | High Risk (H) | Extreme Risk (H) |
|---|---|---|---|
| Requires routine action | Requires moderate action<br>< 1 Month | Requires priority action<br>< 2 Weeks | Requires immediate action<br>< 1 Week |

*Table 22: Risk Management Strategy Fire, Flood Drought. Cyclone (Natural Events)|Pest (Fauna Flora) Human Induced Risk & Road: Noise & Koala Mortality due to Vehicle Collision*

| Risk or Hazard | Consequence | Likelihood | Risk Level | Justification | Trigger/s | Mitigation Strategy/Remedial Actions |
|---|---|---|---|---|---|---|
| A new restricted invasive plant species is detected on-site | **Moderate** | **Unlikely** | **Low** | Low level of risk applied based on the combination of existing levels of exposure to invasive plant including associated nearby seed sources, and the improved control measures under proposed management actions, such as constrained accessibility and a comprehensive pest plant management approach targeting eradication/control of weed species. Monitoring program will assist in providing input to adaptive pest plant management strategy if necessary. | Detection of new restricted invasive species, by annual inspection, through milestone BioCondition or through recordings made during maintenance activities. | • Targeted weed control and focus on containment, within 2 months of detection.<br>• Notify Government Agency and neighbours of new environmental weed outbreak.<br>• Implement new hygiene controls.<br>• Address in OMP Review.<br>• Follow all directions and guidance provided by relevant state government agency to assist in control. |
| Increased weed cover or non-response of treated areas | **Moderate** | **Possible** | **Medium** | Implementation of staged weed management and monitoring program over the duration of the offset period will ensure adaptive management is to be applied if weed control fails. | Review of monitoring data | • Increase the frequency of weed control events<br>• Investigate alternative weed management regimes or techniques for species which do not respond to treatment<br>• Suitably qualified and experienced person to review and revise management plans if it is found that changes are necessary to achieve completion requirements |
| A decrease in BioCondition or habitat value measured by monitoring efforts | **Moderate** | **Possible** | **Medium** | Adaptive management strategy allows for change in uplift approach to adjust to the factors causing decrease in BioCondition or habitat quality score, such as climate change or unprecedented browsing pressures of pest animals. | Review of monitoring data | • Review external factors (climate) and monitoring effort<br>• Revise OMP and consider new management strategies |
| Plants dehydrate prior to establishment due to dry conditions | **Moderate** | **Possible** | **Medium** | Adaptive management approach ensures risk is managed, through prolonging plant maintenance activities and increasing plant maintenance frequencies during establishing period(s), if deemed necessary. | Dry conditions prevail at time of planting.<br><br>Plants are observed to be dehydrating by maintenance crews. | • Increase watering frequency<br>• Implement corrective measures and revise OMP subject to third party review if required) |
| Inundation of offset area due to floods | **Moderate** | **Possible** | **Medium** | Records and on ground observations indicate that periodic flooding occurs on site, and existing vegetation is able to sustain temporary saturated soils conditions. Naturally shaped ephemeral waterway channels drain floodwaters off site and existing ponds remain intact. | Areas of inundation that cause the site from becoming inaccessible<br><br>New reconstruction and infill plantings are failing due to anaerobic processes – indicated by signs of root rot and dieback in wilting foliage. | • Scheduled inspection of offset revegetation areas and adjust watering regime to prevent overwatering post flood events.<br>• Management of the access tracks.<br>• Monitoring and maintenance of dams on site to ensure water security remains, providing year around water resources. |

| Risk or Hazard | Consequence | Likelihood | Risk Level | Justification | Trigger/s | Mitigation Strategy/Remedial Actions |
|---|---|---|---|---|---|---|
| | | | | | | |
| Erosion impacts within alluvial plains and waterways during period of floods | **Moderate** | **Unlikely** | **Low** | No significant signs of erosion were recorded in alluvial plains of the offset site during the survey period, which took place during and post heavy rains and severe flood events. Proposed reconstruction and infill planting is compelled RE appropriate with consideration of applicable growing conditions within each OMZ, aiming to provide soil stability functions. | Alluvium plains are recording signs of erosion on stream banks and within streambeds, including monitoring of silt accumulation downstream the offset area. Access tracks that are washed away post flood events. | • No access through alluvial plains to be provided apart from carefully designed maintenance tracks.<br>• Inspect access tracks and waterway crossings regularly for faults in drainage and signs of erosion along streambanks.<br>• Restriction of access to essential personnel.<br>• Restricting access to the public.<br>• Permanent exclusion of stock within the offset site. |
| Fire damage due to unmaintained firebreaks | **Major** | **Possible** | **High** | Level of risk is highly reliant on fire management regimes on surrounding land, such as Kumbarilla State Forest, and local effects of climate change.<br>The barren landscape can endure extreme dry conditions for extended periods of time, which increases the risks of wildfires. As surrounding land management activities fall outside the project scope span of control, the plan can only focus on fire management regimes within the offset site. Fire management will be conducted through cool burning weed management cycles and perimeter fence fire track maintenance (slashing of low growing biofuel along fence line). Fire damage caused by unmaintained firebreaks is considered a high-risk factor. | Grass height is greater than 150mm on grassed firebreaks and access/maintenance tracks.<br>Risks of fire include destroying desirable veg along access points and fire tracks, and exposing of soil which can lead to erosion. | • Scheduled slashing or grading of firebreaks<br>• Carefully managed biomass levels within offset area<br>• Prepare and implement post fire recovery plan<br>• Complete post fire survey, map fire damaged areas, and revise the OMP |
| Fauna vehicle collision | **Severe** | **Unlikely** | **High** | Vehicle related accidents are a key threat to Koala survival. Although it is highly unlikely that fatal fauna accidents would occur due to collision with a vehicle, within the offset site subject to drivers adhering to the applicable speed limits, the consequences of vehicles collisions are generally fatal. Therefore, fauna collision by vehicles is considered a high-risk threat. | Fauna mortality due to collision with vehicles. Anyone involved with a fatal fauna and vehicle collision, is obliged to report this. | • Enforce maximum speed limits for vehicles as per the OMP.<br>• Maintain access ways and intersections for good visibility.<br>• Avoid driving at dusk and dawn. |
| Koala predation | **Severe** | **possible** | **High** | The site has been found to be home to several wild pest species that either directly or indirectly affect Koala and Koala population. The need for a vertebrate pest species specific action plan is a critical step to ensuring that Koala that is on or traversing the offset site to not fall victim to predation | Fauna mortality due to predation from pest vertebrates | Enforce a dedicated pest baiting, monitoring and shooting program. |

# 11 Example Vertebrate Pest Programming

A fundamental baseline survey to determine predator presence across the calendar year for three species, Wild dogs, feral foxes and feral cats, will be undertaken, given that they will be the most direct impact on koala populations and also other native fauna. Given the landscape style and access, methodology will be focused around camera trapping and pre-feeding techniques with placebo baits initially to verify target species.

Given the ecology of the three species, there will be peaks in activity across the year, during which the control methods will be strengthened to involve strategic 1080 baiting, trapping, shooting and CPE (Canid Pest Ejectors) deployed to minimise the potential predation effect on the koala population.

A landscape approach will be used to co-ordinate the placement of 1080 baits in conjunction with neighboring landholders, predicted at twice a year (March to May) and then (August to September) depending on the allocated months by the local governments providing an injected meat bait service with the poison 1080 (Sodium fluoroacetate).

Fresh meat baits (not injected) will be supplied by Contractor to the required size, as prescribed by the Local Governments Land Protection Officer prior to injection of the Schedule 7 Dangerous poison 1080, buried and targeting Wild dog and foxes. These baits will also be supplied for pre-feeding purposes. The same meat will also be supplied to create a bait stable bait head meat matrix to the Canid Pest Ejectors (CPE's).

The supply of leg hold traps/cage traps to control all three pest species, will be provided by contractor. Crucial attention to animal welfare will be address with the IPAS team checking the traps every 24hrs whilst traps are deployed in the field. Allocated firearms, transport, storage and licensing on firearms will be undertaken by contractor. The Humane destruction and removal of target species will be overseen by IPAS, trained and qualified, carcass removal to a predetermined site. Correct caliber of firearm will be maintained and utilized according to the National Standard Operating Procedure (SOP) for that particular species. In all cases, IPAS will be undertaking strict hygiene and safety measures to minimised stress of the animal, firearm trajectory safety and potential Zoonosis disease transfer to operators.

A potential home range of suspected canid species will be overseen by remote camera trapping to ascertain capture/ recapture science methods by cameras placed at every 500m (this figure also presents preferred distance apart for 1080 meat baits and CPE's deployment – note not all control tools will have remote cameras on them), in grid like patterns GPS pointed across the site area. In return-on-investment individual characteristics could be determined by such remote cameras, and once the target animal is controlled the capture/recapture model has been successful. Remote Cameras, consumables and subsequent monitoring will be provided by contractor.

Access to site will be determined by the calendar months according to the peak in canid activity. Leg hold traps and 1080 baiting best optimised in Wild Dog mating and dispersal months of Feb-May and August- November depending on surveillance movements from cameras. Onsite cellular reception on site is adequate to deploy 3G/4G cameras, where photos can be sent to mob phone numbers for instant review and action. On ground surveillance will also be undertaken for activity in the forms of tracks and scats on predetermined canid travel ways, i.e., roads, fences, gullies, around water sources, ridges and spurs, creek lines or activity on dead carrion. As for feral fox's winter months fox activity is higher and vocalisation for mating will occur. Therefore, for both these species and feral cats, cameras will be deployed for the entire year, to ascertain triggers for control, both reactive and proactive.

Given the topography and site terrain, vehicles (4WD and Quad bike) will be equipped with an operator utilising all associate required PPE, Job Safety Analysis (JSA's) adequate training, Spot 4 tracking device deployed and required transport and storage requirements for baits, traps and firearms. Signage and SDS sheets will be on vehicles at all times, provided by contractor.

Once the contractor has left the site, no traps will be left active. Further to this 1080 baiting strategies of the baiting coordinated with council would be facilitated by (2) times a year at three day (3) allocations for bait pickup, bait

placement and return travel, then after seven days return for a further 2 (two days) for return to site to collect and dispose, record uptake and retrieval of uneaten or unused baits, to a predetermined bait burial site (preferably onsite- GPS, signage and marked to onsite users). The use of CPE's would be every day of the year, bait head stability and palatability and uptake would be checked every month on site, and if triggered replaced with the required 1080 CPE capsule. This would occur twelve (12) times a year, totally (24) days. These days through the planning phase could be coordinated in with the 1080 meat bait placement program. These CPE's have been designed to target both wild dogs and feral foxes, and when triggered both species receive a lethal dose of the toxin. At the same time (monthly) checking of camera SD cards, camera batteries etc., will also be undertaken.

# 12 Monitoring Reporting Requirements and KPI's

In order to identify whether or not an offset site is successfully managed to maintain the viability of the prescribed matter, the management plan requires a monitoring and reporting program. The programs are to be implemented and subsequently, to be submitted to the administrating agency, addressing the performance against the stated conservation outcomes and management objectives.

## 12.1 Monitoring Actions

Habitat quality monitoring will include Modified Habitat Quality Assessments as per the baseline assessment methodology, undertaken once every 2 years until the completion of the offset to assess the progress of criteria towards meeting the goal. Values for performance indicators are provided for each item or indicator within the MHQA baseline assessment, as performance is unlikely to be incremental. However, if the value for an indicator is decreasing, rather than being maintained or increasing, then this should trigger a review of monitoring effort and management actions.

Photo monitoring will be undertaken annually, ideally on the same date each year or as near as possible to the same date each year (subject to weather conditions) to ensure consistency and to account for seasonal variations in vegetation structure such as plant species (native and exotic) prevalence and grass cover.

All photos will also be taken in high resolution format and recorded on a photo monitoring record sheet that will be submitted to DCCEWW together with the associated photos in electronic format. This record sheet will include at a minimum, photo reference numbers, date, time and location details, including GPS references, as well as any relevant notes.

One monitoring point will be established at the centre point of the established assessment transect location and marked with a permanent stake or similar in addition to GPS locating to facilitate ease and reliability in re-locating the same point for consecutive monitoring events. Four photos are to be taken from this point on each monitoring occasion, one facing each of the cardinal directions. Photos should be taken in a landscape orientation to maximise the amount of site vegetation captured. To facilitate comparison between photo monitoring events permanent markers should be placed or distinctive landscape features selected to ensure consistent orientation of the camera.

At least two additional photo monitoring points are to be selected at the discretion of the monitoring personnel with the purpose of capturing a visual record of areas of particular significance to the sites rehabilitation not otherwise reflected by visual site monitoring, such as tracking areas of significant weed infestation.

Daily Works Record Sheet of herbicide application will be undertaken, and these records will be kept for the duration of the offset. Records should include herbicide use, man hours, a weed list and comments on any site damage or additional maintenance requirements. These metrics could be used as an indicator of weed persistence over time.

**Table 23** summarises the monitoring actions and timeframes and frequencies.

*Table 23: Monitoring Actions*

| Monitoring Action | Timeframe | Actions | Frequency |
|---|---|---|---|
| Modified Habitat Quality Assessment | Year 1 to 20 10 times | Habitat quality score derived from Modified Habitat Quality Assessment based on Guide to determining terrestrial habitat quality (DES, 2020) | Once every 2 years |
| Photo Monitoring | Year 1 to 20 10 times | Permanent photo points to be established (with star pickets). Analyses success or failure of relevant management actions based on photo evidence taken | Once every 2 years |
| Records of Agreed Management Actions | Year 1 to 20 10 times | Details of agreed management actions undertaken as outlined in Table 19 and 20, including:<br>• The type and location of management actions undertaken<br>• The date undertaken<br>• Outcomes<br>• Issues<br>• Any other relevant information | Once every 2 years |
| Daily Works Record Sheet | Year 1 to 20 | Recording of:<br>• Herbicide output<br>• Man hours<br>• Weed list<br>• Notes on damage or maintenance requirements | Once per maintenance run |

## 12.2 Reporting

Records will be kept in order to document the dates, methods and outcomes of the management and monitoring measures to be implemented. Records of all management actions will be maintained by the proponent to demonstrate compliance with the OMP and any conditions of approval for the offset. Reporting is to occur bi-annually or as per approval requirements by the regulator, including assessment of the offset against the Performance Indicators.

Detailed records of any unsuccessful plantings and associated replanting will also be kept and provided to DCCEWW as part of the offset monitoring and reporting requirements. In addition, records will also be kept and provided to DCCEWW in relation to weed, fire and feral animal management achievements, in particular wild dog exclusion and feral cat kill rates, and to the conservation management of Koala populations, including records of any sightings and/or evidence of occupation on the sites concerned.

## 12.3 Annual Management Plan Review

The annual review should adopt the structure of an adaptive management strategy.

The Review should examine:

- Results of monitoring activities and how they relate to the progress of the offset;
- Any changes of site conditions;
- Any performance indicators not met, and provide remedial management solutions or further investigation required to achieve success of the offset;
- Changes to cost of management activities; and
- Include management of the next year of the offset.

- If any revisions occur which relate to any information within this OMP, the OMP should also be revised.

# 13 Legal Security Mechanism

Legal security of the offset site is required to enable the protection and management of the *prescribed environmental matter* on the offset site and to ensure the proposed offset management activities will be undertaken and protected for the minimum of the duration of the offset project (20 years).

## 13.1 Voluntary Declaration

The offset area will be secured through the legally binding mechanism of a Voluntary Declaration (the VDec) under the Vegetation Management Act 1999 (VM Act). The VDec process provides a simplified and streamlined protection procedure for landholders seeking to voluntarily protect areas of generally non-remnant native vegetation on their land. The V-Dec Management Plan will be prepared in accordance with the Guide to voluntary declarations under the Vegetation Management Act 1999, published by the Department of Natural Resources, Mines and Energy, and their listed requirements (DNRME, 2019). In summary, the VDec:

- must be accompanied by a management plan that outlines the activities required to achieve the management intent and outcomes, such as achieving net environmental gain as described in this OMP.
- is declared by the Queensland Department of Resources and is registered in title. A VDec is binding on all current and future owners of the land until the intent and outcomes of the management plan have been achieved, which in the OMP concerns a proposed timeframe of 20 years or until objectives are achieved.

In general, a VDec provides protection for native vegetation for a range of purposes, including legal security for offset areas and addressing Commonwealth offset requirements un the EPBC Act.

All land parcels subject to the offset activities, one legal parcel as per this proposal, captured under the OMZ's are to be secured per VDec and agreed upon by the applicable land owners – upon acquisition of the land is the proponent. It is important to note that a protected area cannot be a legally secured offset area unless it was declared after the offset condition has been imposed.

The following information in relation to the legal security mechanism of a VDec is to be included:

- Details of land which the legal security mechanism is to be placed over;
- Evidence of the relevant agency's in-principal support for the proposed mechanism;
- The timeframe proposed for obtaining legal security after the agreed delivery arrangement has been entered into and an explanation why this timeframe is suitable;
- Explanation as to why that type of legally binding mechanism has been selected, and how the stated measures are reasonable and practical;
- If the legal security mechanism is a protected area, provide evidence that the area will be declared after the offset condition is imposed;
- Where the offset is already a legally secured offset for another purpose, please provide details of the legal security; or
- Where no legal security is proposed, provide evidence that legal security is not required or consider reasonable or practical.

# 14 Adaptive Management Principles

An adaptive implementation program will be used to ensure uncertainty is reduced over time, and that completion criteria are attained and maintained over the period of the approval. As more information becomes available following ongoing performance monitoring, the management and monitoring regime will be reviewed and revised to maximise the likelihood of attaining and maintaining the outcomes to be achieved by implementing this OMP. Any updates to the OMP which do not result in a material change to the environmental outcomes, performance and completion criteria will be made by the proponent without the requirement of informing the DCCEEW. If material amendments are likely to alter the environmental outcomes, or performance and completion criteria proposed to the OMP, the amendments and justification for the contingency measures will be provided to the DCCEEW in writing.

Adaptive management will be used to incorporate changes in any of the following areas:

- Assimilation of new data or information:
  Such as, updates to conservation advice or new threat abatement plans relevant to the Koala.
- Project coordination and scheduling:
  To manage unforeseen disruptions to schedule such as inclement weather on contractor works for management actions and environmental consultant monitoring events.
- Annual review of risks:
  To refresh the mitigation measures should new threats be identified or stochastic events such as unplanned fires or floods occur.
- Annual review of management measure effectiveness:
  to increase the frequency or change the method of management actions where monitoring performance criteria are not met.
- Contingency for unplanned incidents:
  Such as stochastic events including unplanned fires or floods.

# 15 References

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# Appendix A

SAT Results

*Table 1. SAT assessment: tree plot 1 – 3*

| **PLOT 1** | | | | **PLOT 2** | | | | **PLOT 3** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tree No. | Tree species | Scat (Y/N) | | Tree No. | Tree species | Scat (Y/N) | | Tree No. | Tree species | Scat (Y/N) | |
| 1 | Eucalyptus populnea | y | | 1 | Eucalyptus crebra | y | | 1 | Eucalyptus woollsiana | y | |
| 2 | Eucalyptus crebra | n | | 2 | Allocasuarina luehmannii | n | | 2 | Allocasuarina luehmannii | n | |
| 3 | Eucalyptus crebra | n | | 3 | Allocasuarina luehmannii | n | | 3 | Allocasuarina luehmannii | n | |
| 4 | Eucalyptus populnea | n | | 4 | Eucalyptus crebra | n | | 4 | Eucalyptus woollsiana | n | |
| 5 | Callitris glaucophylla | n | | 5 | Eucalyptus crebra | n | | 5 | Allocasuarina luehmannii | n | |
| 6 | Allocasuarina luehmannii | n | | 6 | Eucalyptus crebra | n | | 6 | Allocasuarina luehmannii | n | |
| 7 | Callitris glaucophylla | n | | 7 | Eucalyptus crebra | n | | 7 | Allocasuarina luehmannii | n | |
| 8 | Eucalyptus populnea | n | | 8 | Eucalyptus crebra | n | | 8 | Allocasuarina luehmannii | n | |
| 9 | Eucalyptus crebra | n | | 9 | Allocasuarina luehmannii | n | | 9 | Allocasuarina luehmannii | n | |
| 10 | Eucalyptus populnea | y | | 10 | Eucalyptus crebra | n | | 10 | Allocasuarina luehmannii | n | |
| 11 | Callitris glaucophylla | n | | 11 | Eucalyptus crebra | y | | 11 | Allocasuarina luehmannii | n | |
| 12 | Eucalyptus populnea | n | | 12 | Eucalyptus crebra | n | | 12 | Allocasuarina luehmannii | n | |
| 13 | Eucalyptus populnea | n | | 13 | Eucalyptus crebra | n | | 13 | Allocasuarina luehmannii | n | |
| 14 | Allocasuarina luehmannii | n | | 14 | Eucalyptus woollsiana | y | | 14 | Allocasuarina luehmannii | n | |
| 15 | Callitris glaucophylla | n | | 15 | Allocasuarina luehmannii | n | | 15 | Allocasuarina luehmannii | n | |
| 16 | Allocasuarina luehmannii | n | | 16 | Allocasuarina luehmannii | n | | 16 | Allocasuarina luehmannii | n | |
| 17 | Allocasuarina luehmannii | n | | 17 | Allocasuarina luehmannii | n | | 17 | Eucalyptus woollsiana | n | |
| 18 | Allocasuarina luehmannii | n | | 18 | Allocasuarina luehmannii | n | | 18 | Eucalyptus woollsiana | y | |
| 19 | Allocasuarina luehmannii | n | | 19 | Allocasuarina luehmannii | n | | 19 | Eucalyptus woollsiana | n | |
| 20 | Allocasuarina luehmannii | n | | 20 | Allocasuarina luehmannii | n | | 20 | Allocasuarina luehmannii | n | |
| 21 | Callitris glaucophylla | n | | 21 | Eucalyptus crebra | n | | 21 | Allocasuarina luehmannii | n | |
| 22 | Eucalyptus crebra | n | | 22 | Eucalyptus crebra | n | | 22 | Allocasuarina luehmannii | n | |
| 23 | Allocasuarina luehmannii | n | | 23 | Allocasuarina luehmannii | n | | 23 | Allocasuarina luehmannii | n | |
| 24 | Eucalyptus populnea | n | | 24 | Eucalyptus woollsiana | y | | 24 | Allocasuarina luehmannii | n | |
| 25 | Callitris glaucophylla | n | | 25 | Eucalyptus woollsiana | n | | 25 | Allocasuarina luehmannii | n | |
| 26 | Callitris glaucophylla | n | | 26 | Allocasuarina luehmannii | n | | 26 | Allocasuarina luehmannii | n | |
| 27 | Callitris glaucophylla | n | | 27 | Allocasuarina luehmannii | n | | 27 | Allocasuarina luehmannii | n | |
| 28 | Callitris glaucophylla | n | | 28 | Allocasuarina luehmannii | n | | 28 | Allocasuarina luehmannii | n | |
| 29 | Callitris glaucophylla | n | | 29 | Eucalyptus woollsiana | n | | 29 | Allocasuarina luehmannii | n | |
| 30 | Eucalyptus populnea | n | | 30 | Allocasuarina luehmannii | n | | 30 | Allocasuarina luehmannii | n | |
| | Score | 6.67 | | | | 10.00 | | | | 6.67 | |

*Table 2. SAT assessment: tree plot 4 - 6*

| **PLOT 4** | | | **PLOT 5** | | | **PLOT 6** | | |
|---|---|---|---|---|---|---|---|---|
| Tree No. | Tree species | Scat (Y/N) | Tree No. | Tree species | Scat (Y/N) | Tree No. | Tree species | Scat (Y/N) |
| 1 | Eucalyptus populnea | y | 1 | Allocasuarina luehmannii | y | 1 | Eucalyptus crebra | y |
| 2 | Callitris glaucophylla | n | 2 | Callitris glaucophylla | n | 2 | Eucalyptus crebra | n |
| 3 | Callitris glaucophylla | n | 3 | Allocasuarina luehmannii | n | 3 | Allocasuarina luehmannii | n |
| 4 | Callitris glaucophylla | n | 4 | Allocasuarina luehmannii | n | 4 | Allocasuarina luehmannii | n |
| 5 | Eucalyptus populnea | n | 5 | Allocasuarina luehmannii | n | 5 | Allocasuarina luehmannii | n |
| 6 | Callitris glaucophylla | n | 6 | Allocasuarina luehmannii | n | 6 | Allocasuarina luehmannii | n |
| 7 | Allocasuarina luehmannii | n | 7 | Allocasuarina luehmannii | n | 7 | Allocasuarina luehmannii | n |
| 8 | Eucalyptus crebra | n | 8 | Allocasuarina luehmannii | n | 8 | Allocasuarina luehmannii | n |
| 9 | Allocasuarina luehmannii | n | 9 | Allocasuarina luehmannii | n | 9 | Allocasuarina luehmannii | n |
| 10 | Allocasuarina luehmannii | n | 10 | Allocasuarina luehmannii | n | 10 | Allocasuarina luehmannii | n |
| 11 | Allocasuarina luehmannii | n | 11 | Allocasuarina luehmannii | n | 11 | Allocasuarina luehmannii | n |
| 12 | Allocasuarina luehmannii | n | 12 | Allocasuarina luehmannii | n | 12 | Allocasuarina luehmannii | n |
| 13 | Allocasuarina luehmannii | n | 13 | Allocasuarina luehmannii | n | 13 | Allocasuarina luehmannii | n |
| 14 | Allocasuarina luehmannii | n | 14 | Allocasuarina luehmannii | n | 14 | Allocasuarina luehmannii | n |
| 15 | Allocasuarina luehmannii | n | 15 | Allocasuarina luehmannii | n | 15 | Allocasuarina luehmannii | n |
| 16 | Allocasuarina luehmannii | n | 16 | Allocasuarina luehmannii | n | 16 | Allocasuarina luehmannii | n |
| 17 | Allocasuarina luehmannii | n | 17 | Eucalyptus populnea | n | 17 | Allocasuarina luehmannii | n |
| 18 | Eucalyptus crebra | n | 18 | Allocasuarina luehmannii | n | 18 | Allocasuarina luehmannii | n |
| 19 | Eucalyptus populnea | n | 19 | Allocasuarina luehmannii | n | 19 | Allocasuarina luehmannii | n |
| 20 | Allocasuarina luehmannii | n | 20 | Allocasuarina luehmannii | n | 20 | Eucalyptus crebra | y |
| 21 | Allocasuarina luehmannii | n | 21 | Allocasuarina luehmannii | n | 21 | Allocasuarina luehmannii | n |
| 22 | Allocasuarina luehmannii | n | 22 | Allocasuarina luehmannii | n | 22 | Allocasuarina luehmannii | n |
| 23 | Allocasuarina luehmannii | n | 23 | Allocasuarina luehmannii | n | 23 | Allocasuarina luehmannii | n |
| 24 | Callitris glaucophylla | n | 24 | Allocasuarina luehmannii | n | 24 | Allocasuarina luehmannii | n |
| 25 | Eucalyptus crebra | n | 25 | Allocasuarina luehmannii | n | 25 | Allocasuarina luehmannii | n |
| 26 | Eucalyptus crebra | n | 26 | Eucalyptus populnea | n | 26 | Allocasuarina luehmannii | n |
| 27 | Eucalyptus crebra | n | 27 | Allocasuarina luehmannii | n | 27 | Allocasuarina luehmannii | n |
| 28 | Callitris glaucophylla | n | 28 | Allocasuarina luehmannii | n | 28 | Allocasuarina luehmannii | n |
| 29 | Eucalyptus populnea | n | 29 | Allocasuarina luehmannii | n | 29 | Allocasuarina luehmannii | n |
| 30 | Eucalyptus populnea | n | 30 | Allocasuarina luehmannii | n | 30 | Allocasuarina luehmannii | n |
| | | 3.33 | | | 3.33 | | | 6.67 |

*Table 3. SAT assessment: tree plot 7 - 8*

| **PLOT 7** | | | | **PLOT 8** | | | |
|---|---|---|---|---|---|---|---|
| Tree No. | Tree species | Scat (Y/N) | | Tree No. | Tree species | Scat (Y/N) | |
| 1 | Eucalyptus populnea | y | | 1 | Eucalyptus populnea | y | |
| 2 | Callitris glaucophylla | n | | 2 | Eucalyptus populnea | n | |
| 3 | Eucalyptus woollsiana | n | | 3 | Callitris glaucophylla | n | |
| 4 | Eucalyptus woollsiana | n | | 4 | Eucalyptus populnea | n | |
| 5 | Eucalyptus woollsiana | n | | 5 | Callitris glaucophylla | n | |
| 6 | Eucalyptus woollsiana | n | | 6 | Eucalyptus populnea | n | |
| 7 | Eucalyptus woollsiana | n | | 7 | Eucalyptus populnea | n | |
| 8 | Eucalyptus woollsiana | n | | 8 | Eucalyptus populnea | n | |
| 9 | Eucalyptus woollsiana | n | | 9 | Eucalyptus populnea | n | |
| 10 | Eucalyptus woollsiana | n | | 10 | Eucalyptus populnea | n | |
| 11 | Eucalyptus woollsiana | n | | 11 | Eucalyptus populnea | n | |
| 12 | Eucalyptus woollsiana | n | | 12 | Eucalyptus populnea | n | |
| 13 | Eucalyptus woollsiana | n | | 13 | Eucalyptus populnea | n | |
| 14 | Eucalyptus tereticornis | n | | 14 | Eucalyptus populnea | n | |
| 15 | Callitris glaucophylla | n | | 15 | Eucalyptus populnea | n | |
| 16 | Allocasuarina luehmannii | n | | 16 | Eucalyptus populnea | n | |
| 17 | Callitris glaucophylla | n | | 17 | Eucalyptus populnea | n | |
| 18 | Callitris glaucophylla | n | | 18 | Callitris glaucophylla | n | |
| 19 | Callitris glaucophylla | n | | 19 | Callitris glaucophylla | n | |
| 20 | Eucalyptus populnea | n | | 20 | Callitris glaucophylla | n | |
| 21 | Eucalyptus populnea | n | | 21 | Callitris glaucophylla | n | |
| 22 | Eucalyptus crebra | n | | 22 | Callitris glaucophylla | n | |
| 23 | Eucalyptus crebra | n | | 23 | Callitris glaucophylla | n | |
| 24 | Eucalyptus crebra | n | | 24 | Eucalyptus crebra | n | |
| 25 | Eucalyptus crebra | n | | 25 | Eucalyptus crebra | n | |
| 26 | Eucalyptus crebra | n | | 26 | Eucalyptus crebra | n | |
| 27 | Eucalyptus crebra | n | | 27 | Eucalyptus crebra | n | |
| 28 | Eucalyptus crebra | n | | 28 | Eucalyptus crebra | n | |
| 29 | Eucalyptus populnea | n | | 29 | Eucalyptus crebra | n | |
| 30 | Eucalyptus populnea | n | | 30 | Eucalyptus crebra | n | |
| | | 3.33 | | | | 3.33 | |

*Table 4. Test results of the Phytophthora spp. lateral flow tests*

**Phytophthora spp. Lateral Flow Test Results**

| Tree No. | Tree species | Test result (p/n) |
|---|---|---|
| 1 | Eucalyptus woollsiana | n |
| 2 | Allocasuarina luehmannii | n |
| 3 | Allocasuarina luehmannii | n |
| 4 | Eucalyptus woollsiana | n |
| 5 | Allocasuarina luehmannii | n |
| 6 | Allocasuarina luehmannii | n |
| 7 | Allocasuarina luehmannii | n |
| 8 | Allocasuarina luehmannii | n |
| 9 | Allocasuarina luehmannii | n |
| 10 | Allocasuarina luehmannii | n |
| | | |
| **Key:** | *Phytophthora cinnamomi:* | 0.00 |

# Appendix B

Modified QLD Habitat Quality spreadsheet for current values of the impact & offset sites – All Assessment Units

**IMPACT - Fauna Species**

| Assessment Unit - Regional Ecosystem | AU 1 RE 11.7.5 Remnant | | | | | | | | | AU 2 RE 11.7.4 Remnant | | | | | | | | | | | | AU3 R | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Reference | Benchmark | BC8 | | | BC9 | | | Average % | Average | Benchmark | BC5 | | | BC6 | | | BC7 | | | Average % | Average | Benchmark | BC3 |
| | 11.7.5 | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | benchmar | Score | 11.7.4 | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | Raw data | % Benchma | Score | benchmar | Score | 11.5.1 | Raw Data |
| Recruitment of woody perennial species in EDL | 100 | 100 | 100 | 5 | 100 | 100 | 5 | 100 | 5 | 100 | 100 | 100 | 5 | 80 | 80 | 5 | 100 | 100 | 5 | 93.33333 | 5 | 100 | 80 |
| Native plant species richness - trees | 2 | 3 | 150 | 5 | 1 | 50 | 2.5 | 100 | 4 | 4 | 6 | 150 | 5 | 5 | 125 | 5 | 3 | 75 | 2.5 | 116.6667 | 4.166667 | 5 | 5 |
| Native plant species richness - shrubs | 12 | 6 | 50 | 2.5 | 3 | 25 | 2.5 | 37.5 | 3 | 6 | 5 | 83.33333 | 2.5 | 3 | 50 | 2.5 | 6 | 100 | 5 | 77.77778 | 3.333333 | 5 | 6 |
| Native plant species richness - grasses | 3 | 17 | 566.6667 | 5 | 8 | 266.6667 | 5 | 416 | 5 | 7 | 12 | 171.4286 | 5 | 15 | 214.2857 | 5 | 13 | 185.7143 | 5 | 190.4762 | 5 | 8 | 14 |
| Native plant species richness - forbs | 4 | 17 | 425 | 5 | 4 | 100 | 5 | 262.5 | 5 | 9 | 25 | 277.7778 | 5 | 24 | 266.6667 | 5 | 22 | 244.4444 | 5 | 262.963 | 5 | 10 | 24 |
| Tree canopy height (average of emergent, canopy, sub-canopy) | 9 | 9 | 100 | 5 | 5 | 55.55556 | 3 | 63.6 | 4 | 13.5 | 13.5 | 100 | 5 | 13 | 96.2963 | 5 | 15 | 111.1111 | 5 | 102.4691 | 5 | 14.5 | 11.5 |
| Tree canopy cover (average of emergent, canopy, sub-canopy) | 4 | 5.3 | 132.5 | 5 | 0 | 0 | 0 | 66 | 5 | 18.5 | 21.8 | 117.8378 | 4 | 24.45 | 132.1622 | 5 | 31.6 | 170.8108 | 4 | 140.2703 | 4.333333 | 22.5 | 16.2 |
| Shrub canopy cover | 46 | 16.9 | 36.73913 | 3 | 37 | 80.43478 | 5 | 58.5 | 4 | 7 | 10 | 142.8571 | 5 | 5.8 | 82.85714 | 5 | 8.8 | 125.7143 | 5 | 117.1429 | 5 | 6 | 17.7 |
| Native grass cover | 3 | 21 | 700 | 5 | 16 | 533.3333 | 5 | 616 | 5 | 12 | 13 | 108.3333 | 5 | 57 | 475 | 5 | 9.2 | 76.66667 | 3 | 220 | 4.333333 | 23 | 72 |
| Organic litter | 19 | 13 | 68.42105 | 5 | 41 | 215.7895 | 3 | 141 | 4 | 50 | 38.6 | 77.2 | 5 | 14.4 | 28.8 | 3 | 71 | 142 | 5 | 82.66667 | 4.333333 | 45 | 17 |
| Large trees (euc plus non-euc) | NA | | | | | | | | | 21 | 18 | 85.71429 | 10 | 2 | 9.52381 | 5 | 2 | 9.52381 | 5 | 34.92063 | 6.666667 | 17 | 12 |
| Coarse woody debris | NA | | | | | | | | | 320 | 680 | 212.5 | 5 | 640 | 200 | 5 | 100 | 31.25 | 2 | 147.9167 | 4 | 135 | 540 |
| Non-native plant cover | 0 | 1 | | 10 | | | 10 | | 10 | 0 | 1 | | 10 | 1 | | 10 | 1 | | 10 | | 10 | 0 | 1 |
| Quality and availability of food and foraging habitat | 10 | | | 10 | | | 10 | | 10 | 10 | | | 5 | | | 5 | | | 5 | | 5 | 10 | |
| Quality and availability of shelter | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | | 10 | | | 10 | | 10 | 10 | |
| Site Condition Score | | | | 75.5 | | | 66 | | 74 | | | | 86.5 | | | 80.5 | | | 76.5 | | 81.16667 | | |
| *MAX Site Condition Score* | | | | *80* | | | *80* | | *80* | | | | *100* | | | *100* | | | *100* | | *100* | | |
| **Site Condition Score - out of 3** | | | | | | | | | **2.78** | | | | | | | | | | | | **2.44** | | |
| **Site Context** | | | | | | | | | | | | | | | | | | | | | | | |
| Size of patch | | | | 10 | | | 10 | | 10 | | | | 10 | | | 10 | | | 10 | | 10 | | |
| Connectedness | | | | 5 | | | 5 | | 5 | | | | 5 | | | 5 | | | 5 | | 5 | | |
| Context | | | | 5 | | | 5 | | 5 | | | | 5 | | | 5 | | | 5 | | 5 | | |
| Ecological Corridors | | | | 4 | | | 4 | | 4 | | | | 4 | | | 4 | | | 4 | | 4 | | |
| Role of site location to species overall population in the state | | | | 5 | | | 5 | | 5 | | | | 5 | | | 5 | | | 5 | | 5 | | |
| Threats to the species | | | | 10 | | | 10 | | 10 | | | | 10 | | | 10 | | | 10 | | 10 | | |
| Species mobility capacity | | | | 10 | | | 10 | | 10 | | | | 10 | | | 10 | | | 10 | | 10 | | |
| Site Context Score | | | | | | | | | 49 | | | | | | | | | | | | 49 | | |
| *MAX Site Context Score* | | | | *56* | | | *56* | | *56* | | | | *56* | | | *56* | | | | | *56* | | |
| **Site Context Score - out of 3** | | | | | | | | | **2.63** | | | | | | | | | | | | **2.63** | | |

| **Species Stocking Rate (SSR)** | | | | | | | **Updated score** |
|---|---|---|---|---|---|---|---|
| Presence detected on or adjacent to site (neighbouring property with connecting habitat) | Score | 0 | | 5 | | 10 | 10 |
| | | No | | Yes - adjacent | | Yes - on site | |
| Species usage of the site (habitat type & evidenced usage) | Score | 0 | 5 | 10 | | 15 | 15 |
| | | Not habitat | Dispersal | Foraging | | Breeding | |
| Approximate density (per ha) | Score | 0 | 10 | 20 | | 30 | 10 |
| | | 0% | | | | | |
| Role/importance of species population on site* | Score (*Total from supplementary table below*) | 0 | 5 | | 10 | 15 | 10 |
| | | 0 | 5 - 15 | 20 - 35 | | 40 - 45 | |
| Total SRR score (out of 70) | | 45 | | | | | 45 |
| **SRR Score (out of 4)** | | **2.57** | | | | | 2.57 |

| ***SSR Supplementary Table** | | | | **Updated score** |
|---|---|---|---|---|
| *Key source population for breeding | Score | 0 | 10 | 0 |
| | | No | Yes/ Possibly | |
| *Key source population for dispersal | Score | 0 | 5 | 5 |
| | | No | Yes/ Possibly | |
| *Necessary for maintaining genetic diversity | Score | 0 | 15 | 15 |
| | | No | Yes/ Possibly | |
| *Near the limit of the species range | Score | 0 | 15 | 0 |
| | | No | Yes | |

From Final PD

No 'important population' has been identified within the Project Area. Where possible, clearing activities will take place outside the breeding season for Koala (October-May). A qualified fauna spotter will carry out a thorough survey for the species prior to any clearing of potential Koala habitat taking place. It is considered unlikely the Project will disrupt the breeding cycle of an important population.

**SCORING FOR KOALA REV 5 PD**

**Updated 28.06.2023**

**Evolve Changes - Updated Scoring**

**Dispersal not foraging**

| **Final habitat quality score (weighted)** | **AU1** | **AU2** | **AU3** | **AU4** | **AU5** | **verage/Final** |
|---|---|---|---|---|---|---|
| Site Condition score (out of 3) | 2.78 | 2.44 | 2.65 | 2.64 | 2.65 | 2.63 |
| Site Context Score (out of 3) | 2.63 | 2.63 | 2.63 | 2.63 | 2.63 | 2.63 |
| Species Stocking Rate Score (out of 4) | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 |
| Habitat Quality score (out of 10) | *7.98* | *7.64* | *7.85* | *7.84* | *7.85* | *7.83* |
| Assessment Unit area (ha) in disturbance foot | 23.9 | 58.4 | 58.5 | 2.7 | 47.9 | 191.4 |
| Total impact area (ha) for this MNES | 23.9 | 58.4 | 58.5 | 2.7 | 47.9 | 191.4 |
| Size Weighting | 0.12 | 0.31 | 0.31 | 0.01 | 0.25 | 100.00 |
| ***Weighted Habitat Quality Score*** | ***0.96*** | ***2.37*** | ***2.43*** | ***0.07*** | ***1.96*** | ***7.79*** |

| E 11.5.1 Advanced Regrowth | | | | | | | AU4 RE 11.7.4 Advanced Regrowth | | | | | | | | AU5 RE 11.5.1 Remnant | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BC4 | | | Average % | Average | Benchmark | BC10 | | | | | | Average % | Average | Benchmark | BC1 | | | BC2 | | | Average % | Average | Total average % benchmark | Total average score |
| % Benchma | Score | Raw Data | % Benchma | Score | benchmar | Score | 11.7.4 | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | benchmar | Score | 11.5.1 | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | benchmar | Score | | |
| 80 | 5 | 100 | 100 | 5 | 90 | 5 | 100 | 75 | 75 | 5 | | | | 5 | 100 | 100 | 100 | 5 | 60 | 60 | 3 | 80 | 4 | | |
| 100 | 5 | 4 | 80 | 2.5 | 90 | 3.75 | 4 | 4 | 100 | 5 | | | | 5 | 5 | 3 | 60 | 2.5 | 5 | 100 | 5 | 80 | 3.75 | | |
| 120 | 5 | 5 | 100 | 5 | 110 | 5 | 6 | 6 | 100 | 5 | | | | 5 | 5 | 7 | 140 | 5 | 7 | 140 | 5 | 140 | 5 | | |
| 175 | 5 | 15 | 187.5 | 5 | 181.25 | 5 | 7 | 20 | 285.7143 | 5 | | | | 5 | 8 | 18 | 225 | 5 | 14 | 175 | 5 | 200 | 5 | | |
| 240 | 5 | 28 | 280 | 5 | 260 | 5 | 9 | 24 | 266.6667 | 5 | | | | 5 | 10 | 22 | 220 | 5 | 21 | 210 | 5 | 215 | 5 | | |
| 79.31034 | 5 | 18 | 124.1379 | 5 | 101.7241 | 5 | 13.5 | 12 | 88.88889 | 5 | | | | 5 | 14.5 | 13.5 | 93.10345 | 5 | 16 | 110.3448 | 5 | 101.7241 | 5 | | |
| 72 | 5 | 17 | 75.55556 | 5 | 73.77778 | 5 | 18.5 | 13.8 | 74.59459 | 5 | | | | 5 | 22.5 | 26.35 | 117.1111 | 5 | 23.85 | 106 | 5 | 111.5556 | 5 | | |
| 295 | 3 | 25 | 416.6667 | 3 | 355.8333 | 3 | 7 | 5.8 | 82.85714 | 5 | | | | 5 | 6 | 15.6 | 260 | 3 | 8.5 | 141.6667 | 5 | 200.8333 | 4 | | |
| 313.0435 | 5 | 61 | 265.2174 | 5 | 289.1304 | 5 | 12 | 69 | 575 | 5 | | | | 5 | 23 | 33 | 143.4783 | 5 | 83 | 360.8696 | 5 | 252.1739 | 5 | | |
| 37.77778 | 3 | 26 | 57.77778 | 5 | 47.77778 | 4 | 50 | 7 | 14 | 3 | | | | 3 | 45 | 43 | 95.55556 | 5 | 10 | 22.22222 | 3 | 58.88889 | 4 | | |
| 70.58824 | 10 | 16 | 94.11765 | 10 | 82.35294 | 10 | 21 | 2 | 9.52381 | 5 | | | | 5 | 17 | 8 | 47.05882 | 5 | 10 | 58.82353 | 10 | 52.94118 | 7.5 | | |
| 400 | | 500 | 370.3704 | 5 | 385.1852 | 2.5 | 320 | 640 | 200 | 5 | | | | 5 | 135 | 690 | 511.1111 | 5 | 510 | 377.7778 | 5 | 444.4444 | 5 | | |
| | 10 | | | 10 | | 10 | 0 | 1 | | 10 | | | | 10 | 0 | 1 | | 10 | 1 | | 10 | | 10 | | |
| | 10 | | | 10 | | 10 | | | | 10 | | | | 10 | 10 | | | 10 | | | 10 | | 10 | | |
| | 10 | | | 10 | | 10 | | | | 10 | | | | 10 | 10 | | | 10 | | | 10 | | 10 | | |
| | 86 | | | 90.5 | | 88.25 | | | | 88 | | | | 88 | | | | 85.5 | | | 91 | | 88.25 | | 0 |
| | *100* | | | *100* | | *100* | | | | *100* | | | *100* | *100* | | | | *100* | | | *100* | | *100* | | *100* |
| | | | | | | **2.65** | | | | | | | | **2.64** | | | | | | | | | **2.65** | | **2.63** |
| | 10 | | | 10 | | 10 | | | | 10 | | | | 10 | | | | 10 | | | 10 | | 10 | | |
| | 5 | | | 5 | | 5 | | | | 5 | | | | 5 | | | | 5 | | | 5 | | 5 | | |
| | 5 | | | 5 | | 5 | | | | 5 | | | | 5 | | | | 5 | | | 5 | | 5 | | |
| | 4 | | | 4 | | 4 | | | | 4 | | | | 4 | | | | 4 | | | 4 | | 4 | | |
| | 4 | | | 5 | | 5 | | | | 5 | | | | 5 | | | | 5 | | | 5 | | 5 | | |
| | 10 | | | 10 | | 10 | | | | 10 | | | | 10 | | | | 10 | | | 10 | | 10 | | |
| | 10 | | | 10 | | 10 | | | | 10 | | | | 10 | | | | 10 | | | 10 | | 10 | | |
| | 56 | | | 56 | | 49<br>*56*<br>**2.63** | | | | 56 | | | *56* | 49<br>*56*<br>**2.63** | | | | *56* | | | *56* | | 49<br>*56*<br>**2.63** | | 0<br>*56*<br>**2.63** |

**OFFSET - Fauna Species**

| Assessment Unit - Regional Ecosystem | Eg. AU 1 - RE 11.5.1 remnant in good condition | | | | | | | | | AU2 - 11.5.1 - remnant in poor condition | | | | | | | | | | | | | | AU3 - 11.3.18 advanced re |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Reference | Benchmark | BC6 | | | BC9 | | | Average % benchmark | Average Score | Benchmark | BC3 | | | BC5 | | | BC13 | | | BC19 | | | Average % benchmar | Average Score | Benchmark | BC1 | | | |
| | 11.5.1 | Raw Data | % Benchmark | Score | Raw Data | % Benchmark | Score | | | 11.5.1 | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | | | 11.3.18 | Raw Data | % Benchma | Score | Raw Data |
| **Site Condition** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Recruitment of woody perennial species in EDL | 100 | 84 | 84 | 5 | 75 | 75 | 5 | 79.5 | 5 | 100 | 100 | 100 | 5 | 100 | 100 | 5 | 100 | 100 | 5 | 75 | 75 | 5 | 93.75 | 5 | 100 | 60 | 60 | 3 | 80 |
| Native plant species richness - trees | 5 | 6 | 120 | 5 | 4 | 80 | 2.5 | 100 | 3.75 | 5 | 3 | 60 | 2.5 | 3 | 60 | 2.5 | 4 | 80 | 2.5 | 4 | 80 | 2.5 | 70 | 2.5 | 4 | 5 | 125 | 5 | 5 |
| Native plant species richness - shrubs | 5 | 5 | 100 | 5 | 8 | 160 | 5 | 130 | 5 | 5 | 6 | 120 | 5 | 7 | 140 | 5 | 7 | 140 | 5 | 6 | 120 | 5 | 130 | 5 | 7 | 7 | 100 | 5 | 7 |
| Native plant species richness - grasses | 8 | 12 | 150 | 5 | 10 | 125 | 5 | 137.5 | 5 | 8 | 13 | 162.5 | 5 | 10 | 125 | 5 | 10 | 125 | 5 | 8 | 100 | 5 | 128.125 | 5 | 11 | 15 | 136.3636 | 5 | 16 |
| Native plant species richness - forbs | 10 | 7 | 70 | 2.5 | 11 | 110 | 5 | 90 | 3.75 | 10 | 14 | 140 | 5 | 23 | 230 | 5 | 14 | 140 | 5 | 10 | 100 | 5 | 152.5 | 5 | 21 | 18 | 85.71429 | 2.5 | 24 |
| Tree canopy height (average of emergent, canopy, sub-canopy) | 14.5 | 14 | 96.55172414 | 5 | 14 | 96.55172414 | 5 | 96.55172414 | 5 | 14.5 | 9 | 62.06897 | 3 | 5.75 | 39.65517 | 3 | 8.5 | 58.62069 | 3 | 13 | 89.65517 | 5 | 62.5 | 3.5 | 13.5 | 11 | 81.48148 | 5 | 11 |
| Tree canopy cover (average of emergent, canopy, sub-canopy) | 22.5 | 12.6 | 56 | 3.5 | 19.3 | 85.77777778 | 5 | 70.88888889 | 4.25 | 22.5 | 11.35 | 50.44444 | 3.5 | 0.85 | 3.777778 | 0 | 6.2 | 27.55556 | 2 | 12.35 | 54.88889 | 3.5 | 34.16667 | 2.25 | 34.5 | 17.7 | 51.30435 | 3.5 | 29.1 |
| Shrub canopy cover | 6 | 40.4 | 673.3333333 | 3 | 18.5 | 308.3333333 | 3 | 490.8333333 | 3 | 6 | 34.4 | 573.3333 | 3 | 12.9 | 215 | 3 | 33 | 550 | 3 | 50.4 | 840 | 3 | 544.5833 | 3 | 5 | 17.1 | 342 | 3 | 4.8 |
| Native grass cover | 23 | 41 | 178.2608696 | 5 | 53 | 230.4347826 | 5 | 204.3478261 | 5 | 23 | 88.6 | 385.2174 | 5 | 70 | 304.3478 | 5 | 83.6 | 363.4783 | 5 | 38 | 165.2174 | 5 | 304.5652 | 5 | 16 | 53 | 331.25 | 5 | 39 |
| Organic litter | 45 | 22.4 | 49.77777778 | 3 | 27 | 60 | 5 | 54.88888889 | 4 | 45 | 7 | 15.55556 | 3 | 7 | 15.55556 | 3 | 1 | 2.222222 | 0 | 38.4 | 85.33333 | 5 | 29.66667 | 2.75 | 35 | 36.6 | 104.5714 | 5 | 40 |
| Large trees (euc plus non-euc) | 17 | 2 | 11.76470588 | 5 | 0 | 0 | 0 | 5.882352941 | 2.5 | 17 | 2 | 11.76471 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 47.05882 | 5 | 14.70588 | 2.5 | 24 | 6 | 25 | 5 | 6 |
| Coarse woody debris | 135 | 380 | 281.4814815 | 2 | 110 | 81.48148148 | 5 | 181.4814815 | 3.5 | 135 | 215 | 159.2593 | 5 | 155 | 114.8148 | 10 | 275 | 203.7037 | 2 | 475 | 351.8519 | 2 | 207.4074 | 4.75 | 273 | 330 | 120.8791 | 5 | 400 |
| Non-native plant cover | 0 | 1 | | 10 | 1 | | 10 | | 10 | 0 | 1 | | 10 | 2 | | 10 | 1 | | 10 | 1 | | 10 | | 10 | 0 | 3 | | 10 | 3 |
| Quality and availability of food and foraging habitat | 10 | 10 | | 10 | 10 | | 10 | | 10 | 10 | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 | | 1 | 10 | 10 | | 10 | 10 |
| Quality and availability of shelter | 10 | 10 | | 10 | 10 | | 10 | | 10 | 10 | 1 | | 1 | 1 | | 1 | 1 | | 1 | 1 | | 1 | | 1 | 10 | 10 | | 10 | 10 |
| Site Condition Score | | | | 79 | | | 80.5 | | 79.75 | | | | 62 | | | 58.5 | | | 49.5 | | | 63 | | 58.25 | | | 82 | | |
| *MAX Site Condition Score* | | | | *100* | | | *100* | | *100* | | | | *100* | | | *100* | | | *100* | | | *100* | | *100* | | | *100* | | |
| **Site Condition Score - out of 3** | | | | **2.37** | | | **2.42** | | **2.39** | | | | **1.86** | | | **1.76** | | | **1.49** | | | **1.89** | | **1.75** | | | **2.46** | | |
| **Site Context** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Size of patch | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | | 10 | | | 10 | | | 10 | | 10 | 10 | | 10 | | |
| Connectedness | 5.00 | | | 4.00 | | | 4.00 | | 4.00 | 4.00 | | | 4.00 | | | 4.00 | | | 4.00 | | | 4.00 | | 4.00 | 4.00 | | 4.00 | | |
| Context | 5.0 | | | 5.0 | | | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | | | 5.0 | | | 5.0 | | 5.0 | 5.0 | | 5.0 | | |
| Ecological Corridors | 6 | | | 4 | | | 4 | | 4 | 6 | | | 4 | | | 4 | | | 4 | | | 4 | | 4 | 6 | | 4 | | |
| Role of site location to species overall population in the state | 5 | | | 5 | | | 5 | | 5 | 5 | | | 5 | | | 5 | | | 5 | | | 5 | | 5 | 5 | | 5 | | |
| Threats to the species | 15 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | | 10 | | | 10 | | | 10 | | 10 | 10 | | 10 | | |
| Species mobility capacity | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | | 10 | | | 10 | | | 10 | | 10 | 10 | | 10 | | |
| Site Context Score | 56 | | | 48 | | | 48 | | 48 | | | | 48 | | | 48 | | | 48 | | | 48 | | 48 | | | 48 | | |
| *MAX Site Context Score* | | | | *56* | | | *56* | | *56* | | | | *56* | | | *56* | | | *56* | | | *56* | | *56* | | | *56* | | |
| **Site Context Score - out of 3** | | | | **2.57** | | | **2.57** | | **2.57** | | | | **2.57** | | | **2.57** | | | **2.57** | | | **2.57** | | **2.57** | | | **2.57** | | |

| **Species Stocking Rate (SSR)** | | | | | | |
|---|---|---|---|---|---|---|
| Presence detected on or adjacent to site (neighbouring property with connecting habitat) | Score | 0 | | 5 | | 10 |
| | | No | | Yes - adjacent | | Yes - on site |
| Species usage of the site (habitat type & evidenced usage) | Score | 0 | 5 | 10 | | 15 |
| | | Not habitat | Dispersal | Foraging | | Breeding |
| Approximate density (per ha) | Score | 0 | 10 | 20 | | 30 |
| | | 0% | | | | |
| Role/importance of species population on site* | Score (*Total from supplementary table below*) | 0 | 5 | 10 | | 15 |
| | | 0 | 5 - 15 | 20 - 35 | | 40 - 45 |
| Total SRR score (out of 70) | | | | | | |
| **SRR Score (out of 4)** | | | | | | |

| **Scoring** | |
|---|---|
| | **10** |
| | **15** |
| | **10** |
| | **10** |
| | **45** |
| | **2.57** |

| ***SSR Supplementary Table** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Key source population for breeding | Score | 0 | 10 | | | | 10 | 10 |
| | | No | Yes/ Possibly | No | | | 15 | 15 |
| *Key source population for dispersal | Score | 0 | 5 | | | | 30 | 20 |
| | | No | Yes/ Possibly | No/unlikely | yes | | 15 | 10 |
| *Necessary for maintaining genetic diversity | Score | 0 | 15 | | | | | |
| | | No | Yes/ Possibly | Possibly | | | | |
| *Near the limit of the species range | Score | 0 | 15 | | | | | |
| | | No | Yes | No | | | | |

| **Change to Stocking Rate and Site Context** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **MHQA Score** | **Rehab Group 1** | | | | **Rehab Group 2** | **Rehab Group 3** | **Rehab Group 4** | | |
| **Final habitat quality score (weighted)** | **AU1** | **AU9** | **AU4** | **AU2** | **AU8** | **AU3** | **AU5** | **AU6** | **AU7** |
| Site Condition score (out of 3) | 2.39 | 2.61 | 1.87 | 1.75 | 1.09 | 2.56 | 1.69 | 2.10 | 1.56 |
| Site Context Score (out of 3) | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 |
| Species Stocking Rate Score (out of 4) | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 | 2.57 |
| Habitat Quality score (out of 10) | *7.53* | *7.75* | *7.01* | *6.89* | *6.23* | *7.70* | *6.83* | *7.24* | *6.70* |
| Assessment Unit area (ha) | 96.9 | 11.36 | 162.59 | 206.35 | 89.31 | 98.27 | 73.64 | 11.26 | 51.73 |
| Total offset area (ha) for this MNES | 477.2 | 477.2 | 477.2 | 477.2 | 89.31 | 98.27 | 136.63 | 136.63 | 136.63 |
| Size Weighting | 0.2031 | 0.0238 | 0.3407 | 0.4324 | 1.0000 | 1.0000 | 0.5390 | 0.0824 | 0.3786 |
| ***Weighted Habitat Quality Score*** | ***1.53*** | ***0.18*** | ***2.39*** | ***2.98*** | ***6.23*** | ***7.70*** | ***3.68*** | ***0.60*** | ***2.54*** |
| | *7.08* | | | | 6.23 | 7.70 | *6.81* | | |
| | ***7.00*** | | | | **6.00** | **8.00** | ***7.00*** | | |

| Area | % | Area | offset | Offset land |
|---|---|---|---|---|
| REHAB 1 | 73.10 | 477.2 | 73.1 | 477.2 |
| REHAB 2 | 9.33 | 89.31 | - | |
| REHAB 3 | 10.72 | 98.27 | 10.72 | 98.27 |
| REHAB 4 | 20.93 | 136.63 | 20.93 | 136.63 |
| Total | 114.08 | 801.41 | 104.75 | **712.1** |

| | | | |
|---|---|---|---|
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| | | | |
| | | | |

| Impact | Ratio |
|---|---|
| 167.52 | 4.250836 |

| growth | | | | AU4 - 11.5.1 advanced regrowth | | | | | | | | | | | | AU5 - 11.5.1 young regrowth | | | | | | | | | | AU6 - 11.5.20 advanced regrowth | | | | | | AU7 - 11.5.20 young regrowth | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BC2 | | Average % benchmar | Average Score | Benchmark 11.5.1 | BC10 | | | BC12 | | | BC15 | | | BC20 | | | Average % benchmar | Average Score | Benchmark 11.5.1 | BC7 | | | BC16 | | | Average % benchmar | Average Score | Benchmark 11.5.20 | BC18 | | | Average % benchmar | Average Score | Benchmark 11.5.20 | BC4 | | | BC17 | |
| % Benchma | Score | | | | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | | | | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score | | | | Raw Data | % Benchma | Score | | | | Raw Data | % Benchma | Score | Raw Data | % Benchma | Score |
| 80 | 5 | 70 | 4 | 100 | 80 | 80 | 5 | 75 | 75 | 5 | 100 | 100 | 5 | 100 | 100 | 5 | 88.75 | 5 | 100 | 100 | 100 | 5 | 100 | 100 | 5 | 100 | 5 | 100 | 100 | 100 | 5 | 100 | 5 | 100 | 100 | 100 | 5 | 100 | 100 |
| 125 | 5 | 125 | 5 | 5 | 5 | 100 | 5 | 4 | 80 | 2.5 | 4 | 80 | 2.5 | 4 | 80 | 2.5 | 85 | 3.125 | 5 | 2 | 40 | 2.5 | 3 | 60 | 2.5 | 31.5 | 2.5 | 3 | 4 | 133.3333 | 5 | 133.3333 | 5 | 3 | 3 | 100 | 5 | 3 | 100 |
| 100 | 5 | 100 | 5 | 5 | 6 | 120 | 5 | 2 | 40 | 2.5 | 7 | 140 | 5 | 2 | 40 | 2.5 | 85 | 3.75 | 5 | 6 | 120 | 5 | 7 | 140 | 5 | 73.5 | 5 | 4 | 6 | 150 | 5 | 150 | 5 | 4 | 5 | 125 | 5 | 5 | 125 |
| 145.4545 | 5 | 140.9091 | 5 | 8 | 13 | 162.5 | 5 | 12 | 150 | 5 | 14 | 175 | 5 | 6 | 75 | 2.5 | 140.625 | 4.375 | 8 | 11 | 137.5 | 5 | 11 | 137.5 | 5 | 74.25 | 5 | 7 | 15 | 214.2857 | 5 | 214.2857 | 5 | 7 | 10 | 142.8571 | 5 | 14 | 200 |
| 114.2857 | 5 | 100 | 3.75 | 10 | 19 | 190 | 5 | 6 | 60 | 2.5 | 11 | 110 | 5 | 15 | 150 | 5 | 127.5 | 4.375 | 10 | 16 | 160 | 5 | 15 | 150 | 5 | 82.5 | 5 | 13 | 6 | 46.15385 | 2.5 | 46.15385 | 2.5 | 13 | 3 | 23.07692 | 0 | 7 | 53.84615 |
| 81.48148 | 5 | 81.48148 | 5 | 14.5 | 12 | 82.75862 | 3 | 11 | 75.86207 | 4 | 8 | 55.17241 | 3 | 10 | 68.96552 | 4 | 70.68966 | 3.5 | 14.5 | 2.5 | 17.24138 | 1.5 | 5.75 | 39.65517 | 3 | 22.70259 | 2.25 | 16.5 | 8.5 | 51.51515 | 3 | 51.51515 | 3 | 16.5 | 5.25 | 31.81818 | 3 | 6 | 36.36364 |
| 84.34783 | 3.5 | 67.82609 | 3.5 | 22.5 | 12.3 | 54.66667 | 3.5 | 31.75 | 141.1111 | 4 | 31.1 | 138.2222 | 5 | 29.65 | 131.7778 | 2.5 | 116.4444 | 3.75 | 22.5 | 0 | 0 | 0 | 9.45 | 42 | 2 | 25.725 | 1 | 40.5 | 10.9 | 26.91358 | 2.5 | 26.91358 | 2.5 | 40.5 | 17.9 | 44.19753 | 3.5 | 6.25 | 15.4321 |
| 96 | 5 | 219 | 4 | 6 | 5.5 | 91.66667 | 5 | 1 | 16.66667 | 3 | 3.5 | 58.33333 | 5 | 1 | 16.66667 | 3 | 45.83333 | 4 | 6 | 29.3 | 488.3333 | 3 | 10.2 | 170 | 5 | 90.1 | 4 | 5 | 6.4 | 128 | 5 | 128 | 5 | 5 | 0.4 | 8 | 0 | 0.7 | 14 |
| 243.75 | 5 | 287.5 | 5 | 23 | 75.6 | 328.6957 | 5 | 18 | 78.26087 | 3 | 27 | 117.3913 | 5 | 12.8 | 55.65217 | 3 | 145 | 4 | 23 | 55 | 239.1304 | 5 | 58 | 252.1739 | 5 | 155.087 | 5 | 8 | 33 | 412.5 | 5 | 412.5 | 5 | 8 | 44 | 550 | 5 | 70 | 875 |
| 114.2857 | 5 | 109.4286 | 5 | 45 | 3 | 6.666667 | 0 | 53.6 | 119.1111 | 5 | 37.4 | 83.11111 | 5 | 67.2 | 149.3333 | 5 | 89.55556 | 3.75 | 45 | 39 | 86.66667 | 5 | 32 | 71.11111 | 5 | 51.55556 | 5 | 57 | 55 | 96.49123 | 5 | 96.49123 | 5 | 57 | 20.6 | 36.14035 | 3 | 25 | 43.85965 |
| 25 | 5 | 25 | 5 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 2 | 11.76471 | 5 | 0 | 0 | 0 | 0 | 2.5 | 24 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 |
| 146.5201 | 5 | 133.6996 | 5 | 135 | 155 | 114.8148 | 5 | 695 | 514.8148 | 2 | 500 | 370.3704 | 2 | 705 | 522.2222 | 2 | 380.5556 | 2.75 | 135 | 420 | 311.1111 | 2 | 410 | 303.7037 | 2 | 356.8519 | 2 | 178 | 35 | 19.66292 | 2 | 19.66292 | 2 | 178 | 280 | 157.3034 | 5 | 750 | 421.3483 |
| | 10 | | 10 | 0 | 1 | | 10 | 1 | | 10 | 1 | | 10 | 1 | | 10 | | 10 | 0 | 4 | | 10 | 3 | | 10 | | 10 | 0 | 2 | | 10 | | 10 | 0 | 1 | | 10 | 1 | |
| | 10 | | 10 | 10 | 5 | | 5 | 5 | | 5 | 5 | | 5 | 5 | | 5 | | 5 | 10 | 1 | | 1 | 1 | | 1 | | 1 | 10 | 5 | | 5 | | 5 | 10 | 1 | | 1 | 1 | |
| | 10 | | 10 | 10 | 5 | | 5 | 5 | | 5 | 5 | | 5 | 5 | | 5 | | 5 | 10 | 1 | | 1 | 1 | | 1 | | 1 | 10 | 10 | | 10 | | 10 | 10 | 1 | | 1 | 1 | |
| | 88.5 | | 85.25 | | | | 66.5 | | | 58.5 | | | 67.5 | | | 57 | | 62.375 | | | | 56 | | | 56.5 | | 56.25 | | | | 70 | | 70 | | | | 51.5 | | |
| | *100* | | *100* | | | | *100* | | | *100* | | | *100* | | | *100* | | *100* | | | | *100* | | | *100* | | *100* | | | | *100* | | *100* | | | | *100* | | |
| | **2.66** | | **2.56** | | | | **2.00** | | | **1.76** | | | **2.03** | | | **1.71** | | **1.87** | | | | **1.68** | | | **1.70** | | **1.69** | | | | **2.10** | | **2.10** | | | | **1.55** | | |
| | 10 | | 10 | 10 | | | 10 | | | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | 10 | 10 | | | 10 | | |
| | 4.00 | | 4.00 | 4.00 | | | 4.00 | | | 4.00 | | | 4.00 | | | 4.00 | | 4.00 | 4.00 | | | 4.00 | | | 4.00 | | 4.00 | 4.00 | | | 4.00 | | 4.00 | 5.00 | | | 4.00 | | |
| | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | | | 5.0 | | | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | | 5.0 | 5.0 | | | 5.0 | | 5.0 | 5.0 | | | 5.0 | | |
| | 4 | | 4 | 6 | | | 4 | | | 4 | | | 4 | | | 4 | | 4 | 6 | | | 4 | | | 4 | | 4 | 6 | | | 4 | | 4 | 6 | | | 4 | | |
| | 5 | | 5 | 5 | | | 5 | | | 5 | | | 5 | | | 5 | | 5 | 5 | | | 5.0 | | | 5.0 | | 5 | 5 | | | 5 | | 5.0 | 5 | | | 5.0 | | |
| | 10 | | 10 | 10 | | | 10 | | | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | | 10 | | 10 | 15 | | | 10 | | 10 | 10 | | | 10 | | |
| | 10 | | 10 | 10 | | | 10 | | | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | 10 | 10 | | | 10 | | |
| | 48 | | 48 | | | | 48 | | | 48 | | | 48 | | | 48 | | 48 | | | | 48 | | | 48 | | 48 | | | | 48 | | 48 | | | | 48 | | |
| | *56* | | *56* | | | | *56* | | | *56* | | | *56* | | | *56* | | *56* | | | | *56* | | | *56* | | *56* | | | | *56* | | *56* | | | | *56* | | |
| | **2.57** | | **2.57** | | | | **2.57** | | | **2.57** | | | **2.57** | | | **2.57** | | **2.57** | | | | **2.57** | | | **2.57** | | **2.57** | | | | **2.57** | | **2.57** | | | | **2.57** | | |

| | | | AU8 - old cultivation 11.3.18 | | | | | | | | | AU9 - 11.7.7 remnant | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average % | Average | Benchmark | BC8 | | | BC14 | | | Average % | Average | Benchmark | BC11 | | | Average % | Average | Total average % | Total average score |
| Score | benchmar | Score | 11.3.18 | Raw Data | % Benchm | Score | Raw Data | % Benchm | Score | benchmar | Score | 11.7.7 | Raw Data | % Benchm | Score | benchmar | Score | benchmark | |
| 5 | 100 | 5 | 100 | 100 | 100 | 5 | 100 | 100 | 5 | 100 | 5 | 100 | 60 | 60 | 3 | 60 | 3 | 88 | 4.666666667 |
| 5 | 100 | 5 | 4 | 1 | 25 | 0 | 2 | 50 | 2.5 | 37.5 | 1.25 | 5 | 5 | 100 | 5 | 100 | 5 | 86.92592593 | 3.680555556 |
| 5 | 125 | 5 | 7 | 2 | 28.57143 | 2.5 | 2 | 28.57143 | 2.5 | 28.57143 | 2.5 | 9 | 8 | 88.88889 | 2.5 | 88.88889 | 2.5 | 101.2178131 | 4.305555556 |
| 5 | 171.4286 | 5 | 11 | 14 | 127.2727 | 5 | 14 | 127.2727 | 5 | 127.2727 | 5 | 4 | 10 | 250 | 5 | 250 | 5 | 153.8217893 | 4.930555556 |
| 2.5 | 38.46154 | 1.25 | 21 | 7 | 33.33333 | 2.5 | 11 | 52.38095 | 2.5 | 42.85714 | 2.5 | 9 | 9 | 100 | 5 | 100 | 5 | 86.66361416 | 3.680555556 |
| 3 | 34.09091 | 3 | 13.5 | 9 | 66.66667 | 3 | 0 | 0 | 0 | 33.33333 | 1.5 | 14 | 13 | 92.85714 | 5 | 92.85714 | 5 | 60.63577598 | 3.527777778 |
| 2 | 29.81481 | 2.75 | 34.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 10.15 | 33.83333 | 3.5 | 33.83333 | 3.5 | 45.06809059 | 2.611111111 |
| 3 | 11 | 1.5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 16.2 | 108 | 5 | 108 | 5 | 181.9277778 | 3.277777778 |
| 5 | 712.5 | 5 | 16 | 95 | 593.75 | 5 | 31 | 193.75 | 5 | 393.75 | 5 | 4 | 48 | 1200 | 5 | 1200 | 5 | 423.9166667 | 4.888888889 |
| 3 | 40 | 3 | 35 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1.5 | 68 | 24 | 35.29412 | 3 | 35.29412 | 3 | 56.32006487 | 3.666666667 |
| 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 12 | 46.15385 | 10 | 46.15385 | 10 | 10.19356461 | 2.5 |
| 2 | 289.3258 | 3.5 | 273 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 288 | 230 | 79.86111 | 5 | 79.86111 | 5 | 183.2050895 | 3.166666667 |
| 10 | | 10 | 0 | 2 | | 10 | 2 | | 10 | | 10 | 0 | 1 | | 10 | | 10 | | 10 |
| 1 | | 1 | 10 | 1 | | 1 | 1 | | 1 | | 1 | 10 | 10 | | 10 | | 10 | | 4.888888889 |
| 1 | | 1 | 10 | 1 | | 1 | 1 | | 1 | | 1 | 10 | 10 | | 10 | | 10 | | 5.444444444 |
| 52.5 | | 52 | | | | 35 | | | 37.5 | | 36.25 | | | | 87 | | 87 | | 65.23611111 |
| *100* | | *100* | | | | *100* | | | *100* | | *100* | | | | *100* | | *100* | | *100* |
| **1.58** | | **1.56** | | | | **1.05** | | | **1.13** | | **1.09** | | | | **2.61** | | **2.61** | | **1.96** |
| 10 | | 10 | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | 10 | | 10 |
| 4.00 | | 4.00 | 4.00 | | | 4.00 | | | 4.00 | | 4.00 | 5.00 | | | 4.00 | | 4.00 | | 4.00 |
| 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | | 5.0 | 5.0 | | | 5.0 | | 5.0 | | 5.0 |
| 4 | | 4 | 6 | | | 4 | | | 4 | | 4 | 6 | | | 4 | | 4 | | 4 |
| 5.0 | | 5 | 5 | | | 5.0 | | | 5.0 | | 5 | 5 | | | 5 | | 5 | | 5 |
| 10 | | 10 | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | 10 | | 10 |
| 10 | | 10 | 10 | | | 10 | | | 10 | | 10 | 10 | | | 10 | | 10 | | 10 |
| 48 | | 48 | | | | 48 | | | 48 | | 48 | | | | 48 | | 48 | | 48 |
| *56* | | *56* | | | | *56* | | | *56* | | *56* | | | | *56* | | *56* | | *56* |
| **2.57** | | **2.57** | | | | **2.57** | | | **2.57** | | **2.57** | | | | **2.57** | | **2.57** | | **2.57** |

# Appendix C

EPBC Calculator Sheets

# Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

| *Matter of National Environmental Significance* | |
|---|---|
| **Name** | Koala |
| **EPBC Act status** | Vulnerable |
| **Annual probability of extinction**<br>Based on IUCN category definitions | 0.2% |

## Impact calculator

### *Ecological communities*

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | | Information source |
|---|---|---|---|---|---|
| **Area of community** | No | | Area *(Hectares)* | | |
| | | | Quality *(Scale 0-10)* | | |
| | | Total quantum of impact *(Adjusted Hectares)* | | | |

### *Threatened species habitat*

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | | Information source |
|---|---|---|---|---|---|
| **Area of habitat** | Yes | Koala | Area *(Hectares)* | 207 | |
| | | | Quality *(Scale 0-10)* | 8 | |
| | | Total quantum of impact *(Adjusted Hectares)* | | 165.60 | |

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Information source |
|---|---|---|---|---|
| **Number of features**<br>e.g. Nest hollows, habitat trees | No | | | |
| **Condition of habitat**<br>Change in habitat condition, but no change in extent | No | | | |

### *Threatened species*

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Information source |
|---|---|---|---|---|
| **Birth rate**<br>e.g. Change in nest success | No | | | |
| **Mortality rate**<br>e.g Change in number of road kills per year | No | | | |
| **Number of individuals**<br>e.g. Individual plants/animals | No | | | |

## Offset calculator

### *Ecological Communities*

| Protected matter attributes | Attribute relevant to case? | Total quantum of impact *(Adjusted Hectares)* | Proposed offset | Time Horizon *(Years)* | | Start area and quality | | Future area and quality **without** offset *(adjusted hectares)* | | Future area and quality **with** offset *(adjusted hectares)* | | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value *(adjusted hectares)* | Offset Result | | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Area of community** | No | | | Risk-related time horizon *(max. 20 years)* | | Start area *(hectares)* | | Risk of loss **without** offset *(%)* | | Risk of loss **with** offset *(%)* | | 0.00 | | 0.00 | 0.00 | Overall net present value | 0.00 | | |
| | | | | Time until ecological benefit | | Start quality *(scale of 0-10)* | | Future quality **without** offset *(scale of 0-10)* | | Future quality **with** offset *(scale of 0-10)* | | 0.00 | | 0.00 | 0.00 | % of impact offset | 0.00% | | |
| | | | | | | | | Future area **without** offset | 0.0 | Future area **with** offset | 0.0 | | | Minimum (90%) direct offset requirement met? | | | FALSE | | |

### *Threatened species habitat*

| Protected matter attributes | Attribute relevant to case? | Total quantum of impact *(Adjusted Hectares)* | Proposed offset | Time Horizon *(Years)* | | Start area and quality | | Future area and quality **without** offset *(adjusted hectares)* | | Future area and quality **with** offset *(adjusted hectares)* | | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value *(adjusted hectares)* | Offset Result | | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Area of habitat** | Yes | 165.60 | OMZ-1 | Risk-related time horizon *(max. 20 years)* | 20 | Start area *(hectares)* | 477.2 | Risk of loss **without** offset *(%)* | 5% | Risk of loss **with** offset *(%)* | 0% | 23.86 | 80% | 19.09 | 18.34 | Overall net present value | 121.05 | To be determined | Preliminary documentation |
| | | | | Time until ecological benefit | 20 | Start quality *(scale of 0-10)* | 7 | Future quality **without** offset *(scale of 0-10)* | 6 | Future quality **with** offset *(scale of 0-10)* | 9 | 3.00 | 80% | 2.40 | 2.31 | % of impact offset | 73.10% | | |
| | | | | | | | | Future area **without** offset | 453.3 | Future area **with** offset | 477.2 | | | Minimum (90%) direct offset requirement met? | | | FALSE | | |

| Protected matter attributes | Attribute relevant to case? | Quantum of impact | Proposed offset | Time horizon *(years)* | Start Value | Future value without offset | Future value with offset | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value | % of impact offset | Minimum (90%) direct offset requirement met? | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Number of features**<br>e.g. Nest hollows, habitat trees | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |
| **Condition of habitat**<br>Change in habitat condition, but no change in extent | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |

### *Threatened species*

| Protected matter attributes | Attribute relevant to case? | Quantum of impact | Proposed offset | Time horizon *(years)* | Start Value | Future value without offset | Future value with offset | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value | % of impact offset | Minimum (90%) direct offset requirement met? | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Birth rate**<br>e.g. Change in nest success | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |
| **Mortality rate**<br>e.g Change in number of road kills per year | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |
| **Number of individuals**<br>e.g. Individual plants/animals | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |

## Summary

| | | | | | Cost ($) | | |
|---|---|---|---|---|---|---|---|
| **Protected matter attributes** | **Quantum of impact** | **Net present value** | **% of impact offset** | **Direct offset adequate?** | **Direct offset** | **Other compensatory measures** | **Total** |
| **Birth rate** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Mortality rate** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Number of individuals** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Number of features** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Condition of habitat** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Area of habitat** | 165.60 | 121.05 | 0.73 | FALSE | To be deter | #VALUE! | #VALUE! |
| **Area of community** | | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| | | | | | **$0.00** | **#VALUE!** | **#VALUE!** |

# Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

| *Matter of National Environmental Significance* | |
|---|---|
| **Name** | Koala |
| **EPBC Act status** | Vulnerable |
| **Annual probability of extinction**<br>Based on IUCN category definitions | 0.2% |

## Impact calculator

### *Ecological communities*

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | | Information source |
|---|---|---|---|---|---|
| **Area of community** | No | | Area *(Hectares)* | | |
| | | | Quality *(Scale 0-10)* | | |
| | | Total quantum of impact *(Adjusted Hectares)* | | | |

### *Threatened species habitat*

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | | Information source |
|---|---|---|---|---|---|
| **Area of habitat** | Yes | Koala | Area *(Hectares)* | 207 | |
| | | | Quality *(Scale 0-10)* | 8 | |
| | | Total quantum of impact *(Adjusted Hectares)* | | 165.60 | |

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Information source |
|---|---|---|---|---|
| **Number of features**<br>e.g. Nest hollows, habitat trees | No | | | |
| **Condition of habitat**<br>Change in habitat condition, but no change in extent | No | | | |

### *Threatened species*

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Information source |
|---|---|---|---|---|
| **Birth rate**<br>e.g. Change in nest success | No | | | |
| **Mortality rate**<br>e.g Change in number of road kills per year | No | | | |
| **Number of individuals**<br>e.g. Individual plants/animals | No | | | |

## Offset calculator

### *Ecological Communities*

| Protected matter attributes | Attribute relevant to case? | Total quantum of impact *(Adjusted Hectares)* | Proposed offset | Time Horizon *(Years)* | | Start area and quality | | Future area and quality without offset *(adjusted hectares)* | | Future area and quality with offset *(adjusted hectares)* | | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value *(adjusted hectares)* | Offset Result | | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Area of community** | No | | | Risk-related time horizon *(max. 20 years)* | | Start area *(hectares)* | | Risk of loss without offset *(%)* | | Risk of loss with offset *(%)* | | 0.00 | | 0.00 | 0.00 | Overall net present value | 0.00 | | |
| | | | | Time until ecological benefit | | Start quality *(scale of 0-10)* | | Future quality without offset *(scale of 0-10)* | | Future quality with offset *(scale of 0-10)* | | 0.00 | | 0.00 | 0.00 | % of impact offset | 0.00% | | |
| | | | | | | | | Future area without offset | 0.0 | Future area with offset | 0.0 | | | Minimum (90%) direct offset requirement met? | | | FALSE | | |

### *Threatened species habitat*

| Protected matter attributes | Attribute relevant to case? | Total quantum of impact *(Adjusted Hectares)* | Proposed offset | Time Horizon *(Years)* | | Start area and quality | | Future area and quality without offset *(adjusted hectares)* | | Future area and quality with offset *(adjusted hectares)* | | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value *(adjusted hectares)* | Offset Result | | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Area of habitat** | Yes | 165.60 | OMZ-3 | Risk-related time horizon *(max. 20 years)* | 20 | Start area *(hectares)* | 98.27 | Risk of loss without offset *(%)* | 5% | Risk of loss with offset *(%)* | 0% | 4.91 | 80% | 3.93 | 3.78 | Overall net present value | 17.75 | To be determined | Preliminary documentation |
| | | | | Time until ecological benefit | 20 | Start quality *(scale of 0-10)* | 8 | Future quality without offset *(scale of 0-10)* | 7 | Future quality with offset *(scale of 0-10)* | 9 | 2.00 | 80% | 1.60 | 1.54 | % of impact offset | 10.72% | | |
| | | | | | | | | Future area without offset | 93.4 | Future area with offset | 98.3 | | | Minimum (90%) direct offset requirement met? | | | FALSE | | |

| Protected matter attributes | Attribute relevant to case? | Quantum of impact | Proposed offset | Time horizon *(years)* | Start Value | Future value without offset | Future value with offset | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value | % of impact offset | Minimum (90%) direct offset requirement met? | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Number of features**<br>e.g. Nest hollows, habitat trees | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |
| **Condition of habitat**<br>Change in habitat condition, but no change in extent | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |

### *Threatened species*

| Protected matter attributes | Attribute relevant to case? | Quantum of impact | Proposed offset | Time horizon *(years)* | Start Value | Future value without offset | Future value with offset | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value | % of impact offset | Minimum (90%) direct offset requirement met? | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Birth rate**<br>e.g. Change in nest success | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |
| **Mortality rate**<br>e.g Change in number of road kills per year | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |
| **Number of individuals**<br>e.g. Individual plants/animals | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |

## Summary

| | | | | | Cost ($) | | |
|---|---|---|---|---|---|---|---|
| **Protected matter attributes** | **Quantum of impact** | **Net present value** | **% of impact offset** | **Direct offset adequate?** | **Direct offset** | **Other compensatory measures** | **Total** |
| **Birth rate** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Mortality rate** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Number of individuals** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Number of features** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Condition of habitat** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Area of habitat** | 165.60 | 17.75 | 0.11 | FALSE | To be deter | #VALUE! | #VALUE! |
| **Area of community** | | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| | | | | | **$0.00** | **#VALUE!** | **#VALUE!** |

# Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

| *Matter of National Environmental Significance* | |
|---|---|
| **Name** | Koala |
| **EPBC Act status** | Vulnerable |
| **Annual probability of extinction**<br>Based on IUCN category definitions | 0.2% |

## Impact calculator

### *Ecological communities*

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | | Information source |
|---|---|---|---|---|---|
| **Area of community** | No | | Area *(Hectares)* | | |
| | | | Quality *(Scale 0-10)* | | |
| | | Total quantum of impact *(Adjusted Hectares)* | | | |

### *Threatened species habitat*

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | | Information source |
|---|---|---|---|---|---|
| **Area of habitat** | Yes | Koala | Area *(Hectares)* | 207 | |
| | | | Quality *(Scale 0-10)* | 8 | |
| | | Total quantum of impact *(Adjusted Hectares)* | | 165.60 | |

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Information source |
|---|---|---|---|---|
| **Number of features**<br>e.g. Nest hollows, habitat trees | No | | | |
| **Condition of habitat**<br>Change in habitat condition, but no change in extent | No | | | |

### *Threatened species*

| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Information source |
|---|---|---|---|---|
| **Birth rate**<br>e.g. Change in nest success | No | | | |
| **Mortality rate**<br>e.g Change in number of road kills per year | No | | | |
| **Number of individuals**<br>e.g. Individual plants/animals | No | | | |

## Offset calculator

### *Ecological Communities*

| Protected matter attributes | Attribute relevant to case? | Total quantum of impact *(Adjusted Hectares)* | Proposed offset | Time Horizon *(Years)* | | Start area and quality | | Future area and quality without offset *(adjusted hectares)* | | Future area and quality with offset *(adjusted hectares)* | | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value *(adjusted hectares)* | Offset Result | | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Area of community** | No | | | Risk-related time horizon *(max. 20 years)* | | Start area *(hectares)* | | Risk of loss without offset *(%)* | | Risk of loss with offset *(%)* | | 0.00 | | 0.00 | 0.00 | Overall net present value | 0.00 | | |
| | | | | Time until ecological benefit | | Start quality *(scale of 0-10)* | | Future quality without offset *(scale of 0-10)* | | Future quality with offset *(scale of 0-10)* | | 0.00 | | 0.00 | 0.00 | % of impact offset | 0.00% | | |
| | | | | | | | | Future area without offset | 0.0 | Future area with offset | 0.0 | | | Minimum (90%) direct offset requirement met? | | | FALSE | | |

### *Threatened species habitat*

| Protected matter attributes | Attribute relevant to case? | Total quantum of impact *(Adjusted Hectares)* | Proposed offset | Time Horizon *(Years)* | | Start area and quality | | Future area and quality without offset *(adjusted hectares)* | | Future area and quality with offset *(adjusted hectares)* | | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value *(adjusted hectares)* | Offset Result | | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Area of habitat** | Yes | 165.60 | OMZ-4 | Risk-related time horizon *(max. 20 years)* | 20 | Start area *(hectares)* | 136.63 | Risk of loss without offset *(%)* | 5% | Risk of loss with offset *(%)* | 0% | 6.83 | 80% | 5.47 | 5.25 | Overall net present value | 34.66 | To be determined | Preliminary documentation |
| | | | | Time until ecological benefit | 20 | Start quality *(scale of 0-10)* | 7 | Future quality without offset *(scale of 0-10)* | 6 | Future quality with offset *(scale of 0-10)* | 9 | 3.00 | 80% | 2.40 | 2.31 | % of impact offset | 20.93% | | |
| | | | | | | | | Future area without offset | 129.8 | Future area with offset | 136.6 | | | Minimum (90%) direct offset requirement met? | | | FALSE | | |

| Protected matter attributes | Attribute relevant to case? | Quantum of impact | Proposed offset | Time horizon *(years)* | Start Value | Future value without offset | Future value with offset | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value | % of impact offset | Minimum (90%) direct offset requirement met? | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Number of features**<br>e.g. Nest hollows, habitat trees | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |
| **Condition of habitat**<br>Change in habitat condition, but no change in extent | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |

### *Threatened species*

| Protected matter attributes | Attribute relevant to case? | Quantum of impact | Proposed offset | Time horizon *(years)* | Start Value | Future value without offset | Future value with offset | Raw gain | Confidence in result *(%)* | Adjusted gain | Net present value | % of impact offset | Minimum (90%) direct offset requirement met? | Cost *($ total)* | Information source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Birth rate**<br>e.g. Change in nest success | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |
| **Mortality rate**<br>e.g Change in number of road kills per year | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |
| **Number of individuals**<br>e.g. Individual plants/animals | No | | | | | | | 0.00 | | 0.00 | 0.00 | 0.00% | FALSE | | |

## Summary

| | | | | | Cost ($) | | |
|---|---|---|---|---|---|---|---|
| **Protected matter attributes** | **Quantum of impact** | **Net present value** | **% of impact offset** | **Direct offset adequate?** | **Direct offset** | **Other compensatory measures** | **Total** |
| **Birth rate** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Mortality rate** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Number of individuals** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Number of features** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Condition of habitat** | 0.00 | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| **Area of habitat** | 165.60 | 34.66 | 0.21 | FALSE | To be deter | #VALUE! | #VALUE! |
| **Area of community** | | 0.00 | 0.00 | FALSE | 0.00 | N/A | 0.00 |
| | | | | | **$0.00** | **#VALUE!** | **#VALUE!** |