SOUTH WALKER CREEK MRA2C
OFFSET AREA MANAGEMENT PLAN

EPBC 2017/7957 - SOUTH WALKER CREEK MRA2C IMPACTS TO KOALA, GREATER GLIDER AND SQUATTER PIGEON HABITAT

Proposed Offset Site – HAMILTON PARK

Trend Environmental Consultants

November 2024

Prepared on behalf of **STANMORE SMC**

Document Version Control

Issue	Date	Prepared By	Reviewed/Approved By
Draft A: Client Review	28 March 2024	Emily Krunes	Reviewed by Richard Oldham, Hardy Wincen
Final Draft	22 April 2024	Emily Krunes	Richard Oldham
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Approval Holder Declaration of Accuracy

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this Offset Area Management Plan that was supplied by the proponent is complete, current and correct.
2. I am duly authorised to sign this declaration on behalf of the approval holder.
3. I am aware that:
   (a) Section 490 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.
   (b) Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 where the person knows the information or document is false or misleading.
   (c) The above offences are punishable on conviction by imprisonment, a fine or both.

Signed: [redacted]

Full name: [redacted]

Organisation: Stanmore SMC Pty Ltd

Date: 14 November 2024

EXECUTIVE SUMMARY

Offset Requirements

Stanmore SMC Pty Ltd, a subsidiary of Stanmore Resources Ltd owns and operates South Walker Creek (SWC) Mine. The SWC Mulgrave Resource Access (MRA) Project (the Project) is a multi-stage progression of open cut mining of the Mulgrave Pit at SWC Mine. Stage 2 (MRA2C) involves the progression of the Mulgrave Pit in a south-westerly direction to access coal resources within the current mining lease. The MRA2C Project was referred under the *Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth) to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and determined to be a controlled action which was approved on 30 October 2019, subject to conditions which included the provision of environmental offsets under the Act for a number of matters of national environmental significance (MNES; EPBC Approval 2017/7957, dated 30 October 2019). Since the approval was granted, an additional disturbance area impacting habitat for MNES threatened species was identified, in which a variation of the conditions of the approval was sought to increase disturbance limits and deliver additional offsets to compensate for impacts. This variation of the conditions was approved on 27 November 2020. Further variations of the conditions were approved on 6 August 2021.

Three of the subject MNES that required offsetting were habitat for the Koala *(Phascolarctos cinereus),* Greater Glider *(Petauroides volans)* and Squatter Pigeon *(Geophaps scripta scripta).* Condition 1 of the EPBC Act approval (variation of conditions, dated 6 August 2021) limits the area of impact to Koala habitat to 670.9 hectares (ha), Greater Glider habitat to 151 ha and Squatter Pigeon habitat to 301.8 ha. Condition 2 requires offsets for these impacts.

For the purpose of offsets, the conditions of approval were separated into Stage 1 and Stage 2 of the Project. Condition 5, related to Stage 1 offsets requiring an Offset Area Management Plan (OAMP) for 20.94% of Koala habitat and 31.98% of Greater Glider habitat. Condition 8, related to Stage 2 offsets, requiring a revised OAMP for the residual balance of the offsets.

Two OAMPs have been developed for Stage 1 impacts to acquit Koala and Greater Glider habitat. These are to be acquitted on the Clive (Lot 6 RP860051) and Brigalow (Lot 7 RP860051) properties, which adjoin each other. These OAMPs were approved by the DCCEEW on 25 May 2021 and in combination provide offsets for 23.99% of Koala habitat and 44.99% of Greater Glider habitat (both Stage 1 impacts). The offset areas on Clive and Brigalow properties have been protected through a Voluntary Declaration (VDec) as an area of high conservation value under the *Vegetation Management Act 1999 (Qld),* with approval of the VDecs received from the Department of Resources (DoR) on 10 March 2022 for both properties.

The Stage 1 offsets on the Clive and Brigalow properties provided excess offset areas in comparison to that required by Condition 5 (i.e. 23.99% of Koala habitat compared to 20.94% required by the condition; and 44.99% of Greater Glider habitat compared to 31.98% required by the condition). Never the less, the residual environmental offsets required under Condition 8 have been calculated in this OAMP based on the residual percentages from Condition 5, which has result in a combined offset area for Stage 1 and Stage 2 that is greater than 100%. The proposed offset areas under this OAMP therefore include 79.06% of Stage 2 Koala habitat, 68.02% of Stage 2 Greater Glider habitat and 100% of Stage 1 and 2 Squatter Pigeon habitat. This OAMP has been developed to acquit these SWC MRA2C Stage 2 impacts to Koala habitat and Greater Glider habitat; and Stage 1 and 2 impacts to Squatter Pigeon habitat.

Offset Area Details

A suitable offset site for Koala, Greater Glider and Squatter Pigeon habitat, with offset areas sufficient to provide residual offsets, has been found on the Hamilton Park property (Lot 4 WHS354), located 16km south of Nebo, and approximately 41km south of the MRA2C Project site (Map 1 inset, Appendix A). This property is own by Stanmore SMC and will acquit impacts to 79.06% of Koala habitat, 68.02% of Greater Glider habitat and 100.01% of Squatter Pigeon habitat from the SWC MRA2C Project. With these offsets provided, in addition to the Clive and Brigalow offsets, impacts to Koala, Greater Glider and Squatter Pigeon habitat from the SWC MRA2C Project will be more than 100% acquitted.

To acquit the impacts for Stage 2 Koala habitat, Stage 2 Greater Glider and Stage 1 and 2 Squatter Pigeon, it was determined that 1,670ha of Koala habitat, 338ha of Greater Glider habitat and 1,296ha of Squatter Pigeon habitat was required as offset areas at Hamilton Park. These offset areas will be made up of the following:

- Koala habitat: 1,254ha of remnant vegetation and 416ha of regrowth vegetation
- Greater Glider: 338ha of regrowth vegetation
- Squatter Pigeon: 906ha of remnant vegetation and 390ha of regrowth vegetation.

OAMP Details

This OAMP demonstrates that the proposed offset site meets the principles of the *EPBC Act's Environmental Offsets Policy* and provides suitable offsets for approved impacts to Koala, Greater Glider and Squatter Pigeon habitat resulting from the SWC MRA2C Project.

The purpose of the OAMP is to identify management objectives and actions necessary to fulfil the statutory requirements for the provision of an offset area under the EPBC Approval for the MRA2C Project. This OAMP has been developed to satisfy requirements of the Commonwealth's *EPBC Act Environmental Offsets Policy 2012* and EPBC Approval Condition 11 for the SWC MRA2C Project (2017/7957; variation of conditions, dated 6 August 2021) for three MNES offset matters only, being Koala, Greater Glider and Squatter Pigeon habitat.

This OAMP has been designed to use adaptive management. The management actions proposed include placing restrictions on access, vegetation clearing, and fire and grazing activities, as well as implementing weed and pest animal control programs, deploying nest boxes, implementing strategic grazing to reduce fuel loads and ensuring active fire management to mitigate unplanned fires within the offset area. The ongoing suitability of these management actions will be informed through a rigorous monitoring and reporting schedule, allowing the actions to be adapted as needed to ensure that the completion criteria remain on track and are met during the 20-year period.

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INTRODUCTION

1.1 PROJECT BACKGROUND

Stanmore Resources Ltd (Stanmore) acquired an 80% interest in BHP Mitsui Coal Pty Ltd (BMC) on 3 May 2022. BMC is now a subsidiary of Stanmore and was renamed as Stanmore SMC Pty Ltd (Stanmore SMC) on 11 May 2022.

Trend Environmental was commissioned by Stanmore SMC to prepare this Offset Area Management Plan (OAMP) to address offset obligations for impacts to Commonwealth-listed threatened species, Koala *(Phascolarctos cinereus),* Greater Glider *(Petauroides volans)* and Squatter Pigeon *(Geophaps scripta scripta)* habitat from operations at the South Walker Creek (SWC) Mulgrave Resource Access Project, Stage 2C (MRA2C), under the EPBC Act Approval (2017/7957).

Condition 1 of the *EPBC Act* approval (variation of conditions, dated 6 August 2021) limited the area of impact to Koala habitat to 670.9 hectares (ha), Greater Glider habitat to 151ha and Squatter Pigeon habitat to 301.8ha. Condition 2 requires offsets for these impacts.

For the purpose of offsets, the conditions of approval have been separated into Stage 1 and Stage 2 of the Project. Condition 5 of the Approval requires an Offset Area Management Plan (OAMP) for Stage 1 impacts. Condition 8 requires a revised OAMP for the residual balance of the offsets (mostly Stage 2 impacts, with the exception of Squatter Pigeon which is both Stage 1 and 2 impacts).

Two OAMPs have been developed for Stage 1 impacts to acquit Koala and Greater Glider habitat. These are to be acquitted on the Clive (Lot 6 RP860051) and Brigalow (Lot 7 RP860051) properties, which adjoin each other. These OAMPs were approved by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 25 May 2021 and in combination provide offsets for 23.99% Koala habitat and 44.99% of Greater Glider habitat (Table 1). The offset areas on Clive and Brigalow properties have been protected through a Voluntary Declaration (VDec) as an area of high conservation value under the *Vegetation Management Act 1999 (Qld),* with approval of the VDecs received from the Department of Resources (DoR) on 10 March 2022 for both properties.

The stage 1 offsets on Clive and Brigalow properties provided excess offsets area in comparison to that required by Condition 5 (i.e. 23.99% of Koala habitat compared to 20.94% required by the condition; and 44.99% of Greater Glider habitat compared to 31.98% required by the condition). Never-the less, the residual environmental offsets required under Condition 8, have been calculated in this OAMP based on the residual percentages from Condition 5, resulting in a combined offset area for Stage 1 and Stage 2 that is greater than 100% (Table 1).

Another OAMP is awaiting approval from DCCEEW to acquit Stage 1 and 2 impacts to Black Ironbox habitat, on a separate portion of the Hamilton Park property (Lot 4 WHS354) to the offsets proposed in this OAMP (the proposed Black Ironbox habitat offset area can be seen in Map 1, Appendix A).

This OAMP has been developed to acquit Stage 2 impacts to Koala habitat, Stage 2 impacts to Greater Glider habitat and Stage 1 and 2 impacts to Squatter Pigeon habitat. A suitable offset site for Koala, Greater Glider and Squatter Pigeon habitat, with offset areas sufficient to provide residual offsets, has been found on the Hamilton Park property, located 16km south of Nebo, and approximately 41km south of the MRA2C Project site (Map 1 inset, Appendix A). This property will acquit the residual offsets for Koala (79.06%) and Greater Glider (68.02%) habitat, and full offsets for Squatter Pigeon habitat (100% of impacts acquitted) for the SWC MRA2C Project (Table 1).

Table 1 EPBC Act Approved Impacts from the SWC MRA2C Project and the relevant offset acquittals

Category	MNES		Total Impact (ha)	STAGE 1 offset area		Stage 1 offset Acquittal		STAGE 2 offset area		Stage 2 offset Acquittal		TOTAL Offset Acquittal (%)
				Clive	Brigalow	Percentage (%)	Area (ha)	Hamilton Park	Denham Park	Percentage (%)	Area (ha)	
TEC	Brigalow *(Acacia harpophylla* dominant and co-dominant)	Remnant	32.7	43.2	-	37.57	12.29	-	TBC – subject to a separate OAMP	TBC – subject to a separate OAMP		
Threatened Species	Black Ironbox *(Eucalytpus raveretiana)* habitat	Remnant	18.1	-	-	0 (combined with Stage 2)	0	61.2	-	100	18.1	100
	Ornamental Snake *(Denisonia maculata)* habitat	Remnant	33.7	35.5	-	44.99	15.16	-	TBC – subject to a separate OAMP	TBC – subject to a separate OAMP		
	Koala habitat	Remnant	670.9	198.9	269.6	19.01	160.90	1,254	-	49.77	333.91	103.07
		Regrowth		94.5	-	4.98		416	-	29.31	196.64	
	Greater Glider habitat	Remnant	151.0	198.9	108.1	23.72	67.90	-	-	0	0	113
		Regrowth		94.5		21.27		338	-	68.01	102.70	
	Squatter Pigeon habitat	Remnant	301.8	-	-	0	0	906	-	44.14	133.21	100.01
		Regrowth		-	-	0		390	-	55.87	168.62	

1.2 OFFSET DETAILS

1.2.1 Offset Requirements

Stanmore SMC operates the SWC MRA2C Project in central Queensland on mining lease (ML)4750 and ML70131. The SWC Mine is an open cut coal mining operation owned and managed by SMC (previously BMC). The mine is located in the northern Bowen Basin, approximately 25km northwest of Nebo in central Queensland. The MRA2C Project is a multi-stage progression of open cut mining of the SWC Mulgrave Pit (MRA2C was approved under EPBC Approval 2017/7957).

During the Preliminary Documentation stage of the EPBC Referral, MRA2C was identified as having several ecological constraints including matters of national environmental significance (MNES) as defined under the *Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth; Cth; EPBC Act)*. These included EPBC listed threatened species (Greater Glider, Koala, Ornamental Snake, Squatter Pigeon and Black Ironbox) and an EPBC threatened ecological community (TEC; Brigalow).

The proposed action was deemed likely to have a significant impact on the above MNES, so environmental offsets were required to compensate for the significant impacts under the Act. Suitable offset areas have been secured for Stage 1 impacts to Koala habitat and Greater Glider habitat required under Condition 5 of EPBC Approval 2017/7957. Offsets to acquit the remaining impacts for Koala habitat, Greater Glider habitat and Squatter Pigeon habitat are proposed on the Hamilton Park property under this OAMP.

Field surveys of the proposed offset area on Hamilton Park were completed by Trend Environmental in 2022 and 2023, to validate the habitat values for Koala, Greater Glider and Squatter Pigeon contained on the Hamilton Park property. These field surveys determined that the property is capable of satisfying the offset requirements for SWC MRA2C Stage 2 impacts to Koala habitat, Stage 2 impacts to Greater Glider habitat, and Stage 1 and 2 impacts to Squatter Pigeon habitat from the SWC MRA2C Project. It was calculated using the EPBC Act's Offsets Assessment Guide that 1670ha of Koala habitat, 338ha of Greater Glider habitat and 1296ha of Squatter Pigeon habitat was required as offset areas at Hamilton Park to acquit the SWC MRA2C impacts (results of the Offsets Assessment Guide calculator provided in Appendix D). These offset areas will be made up of the following areas of remnant and regrowth vegetation:

- Koala habitat: 1,254ha of remnant vegetation and 416ha of regrowth vegetation
- Greater Glider: 338ha of regrowth vegetation
- Squatter Pigeon: 906ha of remnant vegetation and 390ha of regrowth vegetation.

In accordance with the *EPBC Act Environmental Offsets Policy 2012 ,* management of the offset area in accordance with this OAMP is for a 20-year period. In 2022 and 2023, Trend Environmental conducted field surveys within the proposed offset site at Hamilton Park in accordance with the How to Use the Offsets Assessment Guide to collect sufficient ecological data to determine habitat quality scores for input into the Commonwealth's Offset Assessment Guide, to determine offset potential, area availability and acquittal rates.

Table 2 summarises the Project impacts and offset requirements for Koala, Greater Glider and Squatter Pigeon habitat. The objective of this OAMP is to protect and enhance the condition of the Koala, Greater Glider and Squatter Pigeon habitat within the offset area within 20-years. The management actions proposed aim to achieve this conservation objective. A monitoring program has been developed to measure the attainment of this objective by tracking the performance of habitat attributes over time, which allows for adaptive management through regular reviews to determine whether completion criteria are on track. The management approach for the nominated offset areas were designed to minimise risks associated with key threatening processes, and more specifically the recognised threats to each of the threatened species and abate them wherever possible.

1.2.2 Maintaining Consistency Between Impact and Offset Site Scoring Methodology

The *How to Use the Offsets Assessment Guide* (Department of Climate Change, Energy, the Environment and Water, 2024) defines the methdology for scoring habitat quality within the impact and offset sites, by utilising site condition, site context and species stocking rates as the attributes that contribute to the calculation of habitat quality. These attributes are then weighted depending on the ecological requirements of the impacted species or ecological community. The guide also states habitat quality needs to be scored consistently on both the impact and offset calculators of the guide.

Field surveys of both the impact site and the proposed offset site have been undertaken. The impact site was surveyed by Eco Logical Australia in 2018 (Eco Logical Australia, 2018). These surveys determined habitat quality in accordance with *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual* (Eyre, et

al., 2015) which was based solely on site condition and site context. This scoring is consistent with the methodology referred to in version 1.3 of the *Guide to Determining Terrestrial Habitat Quality* (Department of Environment and Science, 2020) and was used as the basis for the EPBC Approval Conditions for the SWC MRA2C Project. This habitat quality scoring methodology however, did not include species stocking rates or weighted scoring which is inconsistent with the methodology described within the *How to Use the Offsets Assessment Guide.*

To adhere to the methodology described in the *How to Use the Offsets Assessment Guide,* which emphasises the importance of applying the three specific attributes of habitat quality scoring (site condition, site context and species stocking rates), weighted scoring and consistency in methodology across both the impacted and offset sites, we have opted for revising the scoring system used for the impact site to align with the *How to Use the Offsets Assessment Guide* and version 1.3 of the *Guide to Determining Terrestrial Habitat Quality* (Department of Environment and Science, 2020). This revision of the impact site scoring now incorporates species stocking rates and weighted scores, is consistent with the scoring for the offset site, and moves us beyond the limited approach of relying solely on site condition and context to evaluate habitat quality for the offset site.

This update in the scoring methodology ensures three critical outcomes. First, it uses current best practice methods for determining offset obligations under the *EPBC Act,* which is defined in the *How to Use the Offsets Assessment Guide*. Second, it ensures best practice methods are used for the duration of the 20 year offset liability, with habitat quality scoring a key metric for gauging success in fulfilling offset obligations. Adhering to best practices from the outset guarantees consistent and reliable evaluations throughout the life of the offset. And third, it brings our approach in line with the habitat quality assessment methods used in other OAMPs overseen by Stanmore, specifically the Clive and Brigalow OAMPs.

The updates to the impact site scoring resulted in a reduction in habitat quality scoring for Squatter Pigeon from a 7, which was defined in the EPBC Approval 2017/7957, to a 6. Habitat quality scoring for Koala and Greater Glider remained the same, at 6 and 7 respectively (Table 2).

In 2022 and 2023, Trend Environmental conducted field surveys within the proposed offset site at Hamilton Park in accordance with the *How to Use the Offsets Assessment Guide* to collect sufficient ecological data to determine habitat quality scores for input into the *Commonwealth's Offset Assessment Guide*, to determine offset potential, area availability and acquittal rates. A detailed description of our habitat quality scoring methodology that was used for both the impact and offset sites has been provided in the Offset Ecological Assessment Report provided in Appendix C.

Table 2 Summarised impacts and offset area details for this OAMP

			IMPACT SITE		OFFSET SITE		
Project	**MNES Offset Matter**	**Status[1]**	**Impact Area**	**Score[2]**	**Offset Area**	**Current Score**	**Proposed Future Score**
SWC MRA2C	Koala habitat (Stage 2)	EN	530.4ha	6	Remnant 1254ha	7	8
					Regrowth 416ha	4	7
	Greater Glider habitat (Stage 2)	EN	102.7ha	7	Regrowth 338ha	3	6
	Squatter Pigeon habitat (Stage 1 and 2)	VU	301.8ha	6	Remnant 906ha	7	8
					Regrowth 390ha	4	7

[1] *EPBC Act Status: CE = Critically endangered; EN = Endangered; VU = Vulnerable.*
[2] *Recalculated Impact site scoring.*

1.3 REGULATORY FRAMEWORK – COMMONWEALTH LEGISLATION

The *EPBC Act* is administered by the DCCEEW. The *EPBC Act* provides a legal framework to protect and manage nationally important flora and fauna, and ecological communities, which are defined as MNES.

When a proposed action is likely to have a significant impact on an MNES, it must be referred to DCCEEW for assessment to determine if it is a controlled or not a controlled action. If DCCEEW determines the proposed action as likely to have significant impacts, the Project is considered a controlled action that requires formal assessment and approval. If approved, as a condition of the approval, environmental offsets under the Commonwealth's *Environmental Offsets Policy 2012* may be required to offset significant impacts to MNES after avoidance, mitigation and management measures have been put in place.

The SWC MRA2C Project was determined by DCCEEW to be a controlled action in 2017 and assessed via Preliminary Documentation. The Project was approved on 30 October 2019 *(EPBC Act* Approval 2017/7957). The approval contained conditions to offset a number of MNES, including Koala, Greater Glider and Squatter Pigeon habitat.

Offset areas for Stage 2 impacts to Koala and Greater Glider habitat, and Stage 1 and 2 impacts to Squatter Pigeon habitat have now been identified on the Hamilton Park property, and this OAMP has been prepared to manage these offsets separately to the other offset matters required under EPBC Approval 2017/7957.

1.4 EPBC ACT APPROVAL CONDITION REQUIREMENTS

The specific requirements of the OAMP are detailed in Condition 11 of the *EPBC Act* Approval (2017/7957, variation of conditions, dated 6 August 2021). Table 3 outlines the specific requirements of Condition 11 as they relate to Koala, Greater Glider and Squatter Pigeon habitat offsets, and provides a reference to the sections in this report that address each requirement.

Table 3 Compliance of the OAMP with the requirements of Condition 11 in EPBC Approval 2017/7957

		Reference within Report	
	OAMP Requirements	**Section**	**Page #**
	11. The approval holder must ensure the OAMP required under condition 5 and the revised OAMP required under condition 8 meet the following requirements to the written satisfaction of the Minister:	-	-
a.	relevant baseline information regarding the offset areas, including results from field validation surveys, and quantifiable ecological data on habitat quality for Listed threatened species and communities currently in the offset areas;	Appendix C contains the Offset Ecological Assessment Report which details the results of field validated surveys undertaken in 2022 and 2023 at Hamilton Park.	Appendix C, Page 267
b.	how the offset areas will provide connectivity with other habitats and biodiversity corridors and/or will contribute to a larger strategic offset for the impact identified in condition 1;	*Section 3.2 Offset Site Values* details the offset site values which includes details on how the offset site provides connectivity with other habitats and biodiversity corridors.	Section 3.2, Page 15
c.	a description and maps (including shapefiles) to clearly define the location and boundaries of the offset areas, accompanied by the offset attributes (including physical address of the offset areas, coordinates of the boundary points in decimal degrees, the Listed threatened species and communities that the environmental offset areas compensates for, and the size of the environmental offsets in hectares);	*Section 3.2 Offset Site Values* details the location and size of the offset site. Appendix A contains maps that show the proposed offset areas.	Section 3.2, Page 15, Page 15 and Maps 1-3, Appendix A
d.	commitment to measurable, defined ecological outcomes to improve upon the habitat quality (as determined in accordance with condition 11a) for the Listed threatened species and communities for which the offset areas are being provided and the timeframes in which these will be achieved;	*Section 4 Management Measures* details the management objectives and actions proposed to ensure a conservation gain. The completion criteria provided in *Section 4.3 Completion Criteria* outline the timeframes that the conservation gains are expected to be achieved.	Section 4, Page 20 Section 4.3, Page 27
e.	offset completion criteria that demonstrate: i. how the ecological outcomes will be achieved; ii. for the offset percentages required by condition 5, that the below minimum increases to the habitat quality score (based on the habitat quality as determined in accordance with condition 11.a. for each of the following Listed threatened species and communities have been achieved within 20 years of the commencement of the action and maintained over the period of effect of this approval: o Koala (Phascolarctos cinereus) (combined populations of Qld, NSW and the ACT) habitat in remnant vegetation = 1 unit increase in habitat quality score o Koala (Phascolarctos cinereus) (combined populations of Qld, NSW and the ACT) habitat in regrowth vegetation = 2 unit increase in habitat quality score o Greater Glider (Petauroides volans) habitat in remnant vegetation = 1 unit increase in habitat quality score o Greater Glider (Petauroides volans) habitat in regrowth vegetation = 3 unit increase in habitat quality score	The completion criteria are provided in *Section 4.3 Completion Criteria*. The completion criteria demonstrates: 1. The ecological outcomes for each habitat attribute proposed to be achieved. 2. The achievement of the unit increases in habitat quality score over a 20-year timeframe. 3. The future condition of the offset area will be greater than the habitat quality score for the impact site *Section 2 Environmental Offsets Policy* describes how the proposed offset area is consistent with the *Environmental Offsets Policy (2012) principles*.	Section 4.3, Page 27 Section 2, Page 12

OAMP Requirements		Reference within Report	
		Section	Page #
	iii. That condition 11e.ii. will result in future habitat quality scores which are at least the same value as the impact site habitat quality scores specified in the definitions for each of the Listed threatened species and communities; iv. for the offset percentages required by condition 5, that increases to the habitat quality scores are consistent with the requirements of the Environmental Offsets Policy (2012) over the duration of this approval;		
f.	performance criteria that set targets at 5-yearly intervals for expected progress towards the completion criteria required by condition 11.e;	The completion criteria are provided in *Section 4.3 Completion Criteria* includes set 'interim performance targets' at five-year intervals.	Section 4.3, Page 27
g.	the management measures (including timing, frequency, duration and method of outcome measurement) that will be implemented to achieve the following: i. the ecological outcomes for the protection of the Listed threatened species and communities for which the offset area(s) is(are) being provided; and ii. the increase to the habitat quality scores specified in conditions 11.e.ii. and 11.e.iv. for Listed threatened species and communities; The management measures must specify activities that will be prohibited in the offset area(s), including (but not limited to) mining/exploration, development and alternate land uses.	Table 8 details the management actions proposed, including details on methods, timing and frequency of implementation, and monitoring and report requirements Table 8 also includes actions that are prohibited from the offset area, which include, unauthorised access, cattle grazing (unless under strict circumstances), vegetation clearing, and fire.	Table 8, Page 21
h.	evidence demonstrating the management measures proposed in accordance with condition 11.g. are consistent with the Department's Environmental Management Plan Guidelines and relevant conservation advice, recovery plans and threat abatement plans;	*Section 4.1 Management Objectives and Management Actions* describe how the management actions have been developed in accordance with the Guidelines and relevant conservation advice.	Section 4.1, Page 20
i.	a risk analysis of the potential risks to the offset areas that may prevent them from achieving the performance and completion criteria required by conditions 11.e. and 11.f., including for if the offset fails to achieve and maintain the completion criteria;	*Section 4.4 Risk Analysis* and Table 14 describes the risk analysis undertaken	Section 4.4, Page 34
j.	a monitoring program designed to detect triggers for corrective actions and track progress against performance criteria in a timely manner;	*Section 5 Monitoring Program* contains the monitoring program and schedule. How this monitoring program detects triggers for corrective actions is detailed in Table 8	Section 5, Page 38
k.	an annual schedule for monitoring and evaluating the effectiveness of management measures and progress against performance criteria and completion criteria;	Table 8 describes the regular inspections planned per year to monitor and evaluated the effective of the management measures in place. *Section 5 Monitoring Program* contains the monitoring program and schedule, to track progress against completion criteria.	Table 8, Page 21 Section 5, Page 38
l.	criteria for triggering corrective actions and the proposed time-bound corrective actions or process for determining these; and	Table 8 details the triggers for remedial actions (corrective actions) and the time-bound process for implementing these.	Table 8, Page 21
m.	the proposed legal mechanism(s) for legally securing the offset area(s).	*Section 3.4 Legal Mechanism* for Offset Protection details the legal mechanism for offset are protection.	Section 3.4, Page 19

ENVIRONMENTAL OFFSETS POLICY

2.1 POLICY PRINCIPLES

The *EPBC Act Environmental Offsets Policy* has eight overarching principles that are applied to determine the suitability of offsets. These are provided in Table 4, with details describing how the proposed offset area meets each of the eight principles to be considered a suitable offset site. With respect to these principles, it was determined that the Hamilton Park property will satisfy the offset requirements of the *EPBC Act Environmental Offset Policy.*

Table 4 EPBC Act Environmental Offset Policy Principles and descriptions of suitability of the proposed offset site

Policy Principles	Offset Suitability
1. 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	The offset proposed will acquit 100% of the Project's required Stage 2 impacts Koala and Greater Glider habitat and Stage 1 and 2 impacts to Squatter Pigeon habitat. Calculations have been undertaken based on ecological surveys completed on both the impact and offset sites, informing inputs to the *Offset Assessment Guide* (provided in Appendix D). The offset areas were selected based on suitable regional ecosystems to support the species, and proximity to semi-permanent water sources. The proposed offset area will be managed to improve the condition of the habitat through the implementation of appropriate management actions which are provided in Table 8 of this OAMP. The proposed offset areas are considered to be highly valuable within the landscape due to connectivity with other habitats within a state-wide biodiversity corridor and close proximity to a National Park and State Forest (Map 2, Appendix A). Also, the offset area is adjacent to a large contiguous patch of vegetation along two large creek systems (Nebo Creek and Denison Creek) which is important for not only the Koala, Greater Glider and Squatter Pigeon, but also other threatened species, including Black Ironbox *(Eucalyptus raveretiana)* and the *Poplar Box Grassy Woodland on Alluvial Plains Threatened Ecological Community* (TEC; which has been confirmed to associate with RE11.3.2 on the property).
2. Be built around direct offsets but may include other compensatory measures	100% of the Stage 2 offsets for Koala and Greater Glider habitat and Stage 1 and 2 offsets for Squatter Pigeon habitat offset obligations will be acquitted by the proposed direct land-based offsets.
3. Be in proportion to the level of statutory protection that applies to the protected matter	The endangered and vulnerable status of the impacted threatened species is considered by the offset assessment guide on which the offset area has been calculated. The Koala and Greater Glider are listed as Endangered under the EPBC Act, while the Squatter Pigeon is listed as vulnerable under the Act.
4. Be of a size and scale proportionate to the residual impacts on the protected matter	The extent of the offset area has been calculated using ecological survey results of the habitat quality of Koala, Greater Glider and Squatter Pigeon habitat, from both the impact and offset sites. These results were input into the *Offset Assessment Guide* to calculate the area required to acquit 100% of the impacts. Results of the surveys and the outcome of the calculations are provided in the Offset Ecological Assessment Report provided in Appendix C (calculations also provided in Appendix D).
5. Effectively account for and manage the risks of the offset not succeeding	The risks associated with the offset areas have been assessed and management actions proposed to remediate or rectify as necessary. The risk analysis considered the likelihood of occurrence and consequence of the risk to determine the most appropriate management and remedial actions. This risk analysis is provided in Table 14.
6. Be additional to what is already required, determined by law or 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)	Certain vegetation clearing activities within the offset area are not currently prohibited by legislation at either the local, state or federal level, including timber harvesting, ecological thinning, and grazing on freehold land. The offset area will be protected from such clearing activities by legally securing it via a Voluntary Declaration under the *Vegetation Management Act 1999 (Qld).*

Policy Principles	Offset Suitability
7. be efficient, effective, timely, transparent, scientifically robust and reasonable	The proposed offset area will be set aside following the approval of this OAMP, which has been developed based on the results of best practice ecological surveys and designed using appropriate guidelines to ensure it is up to date, effective and scientifically robust. The offsets' scale and suitability has been determined using the Offset Assessment Guide, with the OAMP designed using adaptive management techniques to ensure continual improvement toward the completion criteria within the 20-year time frame.
8. have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	The offset site was surveyed in 2022 and 2023, providing the baseline habitat quality scores by comparing against the relevant BioCondition benchmarks. Habitat quality assessments were conducted in accordance with the *How to Use the Offsets Assessment Guide* and have been provided in the Offsets Ecological Assessment Report in Appendix C of this report. The same habitat assessment methods will be conducted at regular intervals under this OAMP and reported on throughout the life of the offset to assess the success of the offset area overtime. Other regular monitoring, inspections, audits and reporting have been proposed to measure progress over the 20-year period.

2.2 ADDRESSING KEY PRIORITY ACTIONS

The *EPBC Act Environmental Offsets Policy* states that an offset should address key priority actions for the impacted MNES in any approved recovery plans, threat abatement plans, conservation advice, ecological character description or approved Commonwealth Management Plan. Table 5 summarises how this plan addresses the relevant threatening processes impacting each MNES habitat on the offset site.

Table 5 Discussion of how the OAMP addresses key threatening processes for each MNES

MNES	Document	Key Threats	OAMP Compliance (detailed in Table 8)
KOALA	Conservation Advice for *Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory. (DAWE 2022).	Loss of climatically suitable habitat	Regeneration works to improve Koala habitat and expand habitat in regrowth woodlands within the offset area will provide long-term benefits for the species and provide a climate refuge for the Koala. This will also assist with reducing the impacts of drought and heatwaves on the species.
		Increased intensity/ frequency of drought	
		Increased intensity/ frequency of heatwaves	
		Increased intensity/frequency of bushfire	Fire management will occur throughout offset areas to reduce likelihood of an unplanned fire. This will include: • Maintaining fire management lines and vehicle access roads through weed and debris control; • Burning to reduce fuel loads in accordance with the fire management strategies per RE, provided in Appendix E.
		Declining nutritional value of foliage	Regeneration works to be undertaken to improve Koala habitat condition throughout the offset area.
		Clearing and degradation of koala habitat	• No forestry or timber harvesting activities to occur during the period of the Voluntary Declaration. Also, no unauthorised clearing activities allowed within the offset area. • Regeneration works to improve Koala habitat and expand habitat in regrowth woodlands will provide long-term benefits for the species. • Weed control and fuel load management will result in a net improvement of condition of the habitat.
		Encounter mortality with vehicles and dogs	• Restricted offset area access and movement restrictions. Only authorised personnel to access offset areas. • Educational awareness of MNES provided to site personnel • Feral animal control strategies to be implemented.
		Koala retrovirus and Chlamydia	No evidence of Koala retrovirus (KoRV) and *Chlamydia (Chlamydia percorum)* present on the site.

MNES	Document	Key Threats	OAMP Compliance (detailed in Table 8)
GREATER GLIDER	Conservation Advice for *Petauroides volans* (Greater Glider) (southern and central) (DCCEEW 2022).	Inappropriate fire regimes	Fire management to occur throughout offset areas to reduce likelihood of an unplanned fire. This will include: • Maintaining fire management lines and vehicle access roads; • Burning to reduce fuel loads in accordance with the fire management strategies per RE, provided in Appendix E.
		Habitat clearing and fragmentation	• No forestry or timber harvesting activities to occur during the period of the Voluntary Declaration. Also, no unauthorised clearing activities allowed in the offset area. • Regeneration works to improve habitat and expand habitat in regrowth woodlands will provide long-term benefits for the species. • Weed control and fuel load management • Nest box installation to provide additional denning habitat for the species in the interim until canopy trees natural produce suitable hollows for the species denning requirements.
		Timber harvesting	
		Barbed wire fencing (entanglement)	Use plain top strand wire for fencing around offset area. And only fence necessary areas to restrict cattle access.
		Increased temperatures and changes to rainfall patterns	Regeneration works to improve Greater Glider habitat and expand habitat in regrowth woodlands within the offset area will provide long-term benefits for the species and provide a climate refuge for the Greater Gliders. This will also assist with reducing the impacts of drought and heatwaves on the species.
		Hyper-predation by owls	Increase habitat quality to provide more refuges and shelter for the Greater Glider.
		Competition from Sulphur-crested Cockatoos	
		Predation by Feral Cats and European Red Foxes	Feral animal control strategies to be implemented.
SQUATTER PIGEON	Conservation Advice *Geophaps scripta scripta* (Squatter Pigeon (southern)), (TSSC) (2015).	Overgrazing of cattle and feral herbivores (Rabbits) during periods of drought	• Grazing to be strategically managed including grazing exclusion periods, to reduce fuel loads and reduce cover of exotic pasture grasses when groundcover levels are above a critical level. • Feral animal control strategies to be implemented.
		Vegetation clearance and fragmentation	• No forestry or timber harvesting activities to occur during the period of the Voluntary Declaration. Also, no unauthorised clearing activities allowed in the offset area. • Regeneration works to improve Squatter Pigeon habitat and expand habitat in regrowth woodlands within the offset area will provide long-term benefits for the species. • Weed control and fuel load control will result in a net improvement of condition of the habitat.
		Introduction of weeds	Weed control measures put in place, including a rigorous weed control program informed by regular monitoring and inspections for weeds. Weed control to occur over the 20-year period to reduce weeds in the offset area
		Inappropriate fire regimes	Grazing excluded from the offset area during the wet season. Grazing only permitted in the offset area and adjacent grassed areas during the dry season when groundcover levels are above a critical level, to assist in reducing fuel loads only.
		Thickening of understorey vegetation	• Weed control measures put in place, including a rigorous weed control program informed by regular monitoring and inspections for weeds. Weed control to occur over the 20-year period to reduce weeds in the offset area • Fire management to occur throughout offset areas which will assist in control any excessive growth of vegetation layers.
		Predation by Feral Cats and European Red Foxes	Feral animal control strategies to be implemented.
		Trampling of nests by domestic stock	Grazing to be strategically managed and excluded from the offset area during the peak breeding season(May-July).
		Illegal shooting	• Restricted offset area access and movement restrictions. • Educational awareness of MNES for site personnel

PROPOSED OFFSET SITE DESCRIPTIONS

3.1 HAMILTON PARK PROPERTY

The Hamilton Park property has a Lot on Plan of 4WHS354 and is 4,386ha in size (Table 6). The property is owned by Stanmore SMC and is located 16km south of Nebo, and approximately 41km south of the SWC MRA2C Project site (Map 1 inset, Appendix A). Hamilton Park is located within the Isaac Regional Local Government Area and the Brigalow Belt bioregion within Queensland (Table 6), the same bioregion as the SWC MRA2C Project impact site. The property is primarily used for cattle grazing, with some groundwater bores used to supply water to the SWC Mine. The property is not subject to any mining lease areas, exploration permits for coal mineral development licences, petroleum leases or petroleum exploration tenements.

Table 6 Property details

Property Name	Lot on Plan	Tenure	Local Government Area	Total Area (ha)
Hamilton Park	4WHS354	Freehold	Isaac Regional	4386

3.2 OFFSET SITE VALUES

The Hamilton Park property was selected for offsets based on identifying suitable habitats for the target threatened fauna species on the property. The habitat areas were informed by ecological field surveys and the offset areas were determined based on location of habitat, existing property boundaries and fence lines.

The Hamilton Park property is situated at the junction of two large creek systems; Nebo Creek (stream order 5) and Denison Creek (stream order 6; Map 1, Appendix A). Nebo Creek has a length of approximately 47km and starts on the western side of the Conner Range, approximately 20km north of Nebo. Denison Creek is approximately 90km long and starts approximately 40km to the northeast of Nebo, also on the western side of the Conner Range. The Hamilton Park property contains a large tract of remnant connected vegetation, and Nebo and Denison Creeks contain semi-permanent waterholes. The property is also connected at its south western end to the Dipperu National Park (Map 2, Appendix A).

The property was verified to contain the following significant biodiversity values at a Commonwealth and State level:

- Endangered and of concern remnant regional ecosystems including essential habitat for State listed threatened species.
- Black Ironbox *(Eucalyptus raveretiana)* habitat along both extents of Nebo and Denison Creeks.
- Presence of Koalas, and Koala habitat supporting locally important food trees and ancillary habitat trees.
- Presence of Greater Glider, and Greater Glider denning and foraging habitat.
- Presence of Squatter Pigeon, and Squatter Pigeon breeding, foraging and dispersal habitat.
- Presence of patches of remnant *RE11.3.2 Eucalyptus populnea woodland on alluvial plains* that likely satisfy the key diagnostic criteria and condition thresholds for the *Poplar Box Grassy Woodland on Alluvial Plains TEC.*

The MRA2C offset areas for Koala, Greater Glider and Squatter Pigeon at Hamilton Park have been placed on the eastern side of Denison Creek (Map 1, Appendix A), and contain remnant and regrowth habitat values for the Koala, Greater Glider and Squatter Pigeon. Based on the site condition, site context and species stocking rates, it was calculated that the following offset areas are required to acquit Stage 2 impacts to Koala and Greater Glider habitat, and Stage 1 and 2 impacts to Squatter Pigeon habitat from the SWC MRA2C Project:

- Koala habitat offset area: 1,254ha of remnant vegetation and 416ha of regrowth vegetation (Map 2, Appendix A).
- Greater Glider habitat offset area: 338ha of regrowth vegetation (Map 3, Appendix A).
- Squatter Pigeon habitat offset area: 906ha of remnant vegetation and 390ha regrowth vegetation (Map 4, Appendix A).

Al three proposed offset areas are shown in Maps 1 (Appendix A) with individual offset areas for each matter (Koala, Greater Glider and Squatter Pigeon) shown in Maps 3, 4 and 5 (Appendix A) respectively. Offsets Assessment Guide outputs are provided in Appendix D. In addition to the proposed offsets, 13 ha of connectivity corridor areas will be actively revegetated to connect offset areas throughout the site (onsite connectivity areas shown in Maps 1, 3, 4 and 5; Appendix A). These areas are currently non-remnant and cause some offset areas to be isolated. Stanmore SMC propose to rehabilitate these areas to provide better connectivity of habitat throughout the proposed offset areas and provide enhanced dispersal opportunities for Koalas, Greater Gliders and Squatter Pigeons.

3.2.1 Koala

The Koala is listed as endangered under the *EPBC Act.* This species has a large distribution throughout eastern Queensland, New South Wales, the Australian Capital Territory, Victoria and South Australia, inhabiting forests and woodlands of predominantly *Eucalyptus* species. Koala habitat is defined by the vegetation containing locally important food trees and ancillary habitat trees which are defined in Youngentob and colleagues (2021).

Field surveys on the Hamilton Park property were conducted to confirm the presence of the species and the species habitat. Targeted surveys conducted to confirm the presence of Koala on the property included spotlighting, scat and sign searches and incidental recordings. The species habitat was confirmed based on presence of locally important food trees and ancillary habitat trees which are defined in Youngentob and colleagues (2021). Once the species and species habitat was confirmed on the site, terrestrial habitat quality assessments were completed in accordance with the *How to Use the Offsets Assessment Guide* (Department of Climate Change, Energy, the Environment and Water, 2024).

Within the Hamilton Park property, the Koala was directly recorded on five occasions within woodland habitats, three of these were within the proposed offset area (Map 3, Appendix A). The identification of scratches on Eucalypts were also recorded throughout most of the property (Map 3, Appendix A). In close proximity to the Hamilton Park property there are also other recent records for the species, less than 5km from the property. Within the property, it was determined that Koala habitat includes remnant and regrowth woodlands within locally important food trees and ancillary habitat tree species. These included REs 11.3.2, 11.3.3, 11.3.4, 11.3.25a, 11.3.9, 11.4.2, 11.5.3, 11.5.9, 11.5.12a and 11.8.14.

The proposed offset area contains REs 11.3.3, 11.3.4, 11.3.9, 11.4.2, 11.5.3, 11.5.9, 11.5.12a and 11.8.14 (Figure 1). The proposed offset area is made up of 1,254ha of remnant REs 11.3.3, 11.3.4, 11.3.9, 11.4.2, 11.5.3, 11.5.9 and 11.5.12a; and 416ha of regrowth REs 11.5.3, 11.5.9 and 11.8.14. The starting habitat quality score for remnant vegetation is 7, and the starting habitat quality score for regrowth vegetation is 4. Offset areas for the Koala are shown on Map 3 (Appendix A), with offset calculator results provided in Appendix D. The proposed future completion scores for remnant Koala habitat is 8 (Table 9), and the proposed future completion scores for regrowth Koala habitat is 7 (Table 10).

Figure 1 a. Koala recorded on the Hamilton Park property. **b.** Riparian Koala habitat on the Hamilton Park property. **c.** Remnant Koala habitat on the Hamilton Park property**. d.** Regrowth Koala habitat on the Hamilton Park property

3.2.2 Greater Glider

The Greater Glider is listed as endangered under the *EPBC Act.* This species is an arboreal nocturnal marsupial that has a broad distribution throughout eastern Australia, from Proserpine in Queensland south through New South Wales, the Australian Capital Territory, to the Wombat State Forest in central Victoria (McGregor, et al., 2020). The Greater Glider prefers taller, montane, moist Eucalypt forests on fertile soils with relatively old trees and an abundance of hollows. During the day, the species shelters in tree hollows, with a particular preference for large hollows (>10cm diameter; (Goldingay, 2012).

Field surveys on the Hamilton Park property were conducted to confirm the presence of the species and the species habitat. Targeted surveys included spotlighting, while confirmaiton of species habitat was based on presence of suitable trees used for shelter and foraging, defined in the *Guide to Greater Glider habitat in Queensland* (Eyre, et al., 2022). Once the species and species habitat was confirmed, terrestrial habitat quality assessments were completed in accordance with the *How to Use the Offsets Assessment Guide* (Department of Climate Change, Energy, the Environment and Water, 2024).

Within the Hamilton Park property, the Greater Glider was directly recorded on four occasions within woodland habitats (Map 4, Appendix A). Two of these records occurred within the proposed offset area for Koala, which is in close proximity to the proposed regrowth offset area for Greater Glider (Map 1, Appendix A). Within the property, Greater Glider habitat includes remnant and regrowth woodlands within suitable shelter and foraging tree species. These included REs 11.3.2, 11.3.3, 11.3.4, 11.3.25a, 11.3.9, 11.4.2, 11.5.3, 11.5.9, 11.5.12a and 11.8.14.

The proposed offset area contains 338ha of regrowth *RE 11.5.9 Eucalyptus crebra and other Eucalyptus spp. and Corymbia spp. woodland on Cainozoic sand plains and/or remnant surfaces.* The tree species in RE11.5.9 include *E. crebra, Eucalytpus melanophloia, Corymbia clarksoniana, Corymbia dallachiana* and *Corymbia erythrophloia.* The following Greater Glider usage of these species have been recorded throughout Queensland in the *Guide to Greater Glider habitat in Queensland* (Eyre, et al., 2022):

- *Eucalyptus crebra* - recorded on 22 occasions as a feed tree, 8 occasions as a den tree and 90 occasions unspecified;
- *Eucalytpus melanophloia* - recorded on one occasion as a feed tree, and three occasions unspecified;
- *Corymbia clarksoniana* - recorded on 30 occasions unspecified;
- *Corymbia dallachiana* - recorded on four occasions unspecified;
- *Corymbia erythrophloia* - recorded on one occasion unspecified.

This evidence of tree use shows that RE11.5.9 is a suitable RE for offsets. The starting habitat quality score for regrowth in the proposed offset area is 3. Offset areas are shown on Map 4 (Appendix A), with offset calculator results in Appendix D. The proposed future completion score for regrowth Greater Glider habitat is 6. Note, while proposed offsets for Greater Glider habitat are provided for within the 338ha of regrowth RE11.5.9, additional remnant and regrowth habitat for Greater Glider is being offset under the proposed Koala habitat offset areas. This provides an additional 1,254ha of remnant habitat (proposed to be increased to a score of 8) and 78ha of regrowth habitat (proposed to be increased to a 7) for the Greater Glider protected on the Hamilton Park property.

Figure 2 a. Greater Glider recorded on the Hamilton Park property. **b - d.** Regrowth Greater Glider habitat on the Hamilton Park property

3.2.3 Squatter Pigeon

The Squatter Pigeon is listed as vulnerable under the *EPBC Act*. This species distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland (Cooper, et al., 2014). The species habitat is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated by Eucalyptus, Corymbia, Acacia or Callitris species; remnant, regrowth or partly modified vegetation communities; and within 3km of water bodies or watercourses.

Field surveys on the Hamilton Park property were conducted to confirm the presence of the species and the species habitat. Targeted surveys conducted to confirm the presence of Squatter Pigeon on the property included flushing surveys and incidental recordings. The species habitat was confirmed based on presence of suitable REs within land zone 3 and 5, which are known to be suitable for breeding and foraging for the species. Once the species and species habitat was confirmed on the site, terrestrial habitat quality assessments were completed in accordance with the *How to Use the Offsets Assessment Guide* (Department of Climate Change, Energy, the Environment and Water, 2024).

Within the Hamilton Park property, the Squatter Pigeon was directly recorded on one occasion in 2023 by on site personnel within woodland habitats (Map 5, Appendix A). While this observation is outside of the proposed offset area for Squatter Pigeon, we have opted to place the offset area where habitat is directly connected to Nebo and Denison Creeks and farm dams to provide water sources for the Squatter Pigeon which need to drink daily. The proposed offset area also provides connectivity via a remnant vegetation corridor to Dipperu National Park where it is anticipated that a Squatter Pigeon population occurs. Directly adjacent to Dipperu National Park, there are recent records for the species, including on two occasions in 2023 less than 5km from the Hamilton Park property (Map 5, Appendix A). It is also expected that the Squatter Pigeon is capable of flying the distance between where it has previously been recorded adjacent to Dipperu National Park and the proposed offset site. Within the property, it was determined that Squatter Pigeon habitat includes remnant and regrowth woodlands within suitable land zones (3, 5 and 7). These included REs 11.3.2, 11.3.3, 11.3.4, 11.3.25a, 11.3.9, 11.5.3, 11.5.9 and 11.5.12a.

The proposed offset area contains REs 11.3.3, 11.3.4, 11.3.9, 11.5.3 and 11.5.9 and is made up of 906ha of remnant REs 11.3.3, 11.3.4, 11.3.9, 11.5.3 and 11.5.9; and 390ha of regrowth REs 11.5.3 and 11.5.9. These areas are considered suitable as breeding, foraging and dispersal habitat for the species. The starting habitat quality score for remnant vegetation is 7, and for regrowth vegetation is 4. Offset areas are shown on Map 5 (Appendix A), with offset calculator results in Appendix D.

Figure 3 a. Squatter Pigeon recorded on the Hamilton Park property. **b and c.** Remnant Squatter Pigeon habitat on the Hamilton Park property**. d.** Regrowth Squatter Pigeon habitat on the Hamilton Park property

3.3 CONNECTIVITY VALUES

The Hamilton Park property is connected at its south eastern extent to Dipperu National Park (Map 2, Appendix A). Map 2 shows the connectivity of the property with the surrounding landscape. At a landscape scale, Hamilton Park is situated within a state significant biodiversity corridor. Directly to the west, the property connects to Dipperu National Park and extends further westward into the Carborough Range, approximately 50km from the property. To the east, the property connects to Tierawoomba and Rosedale State Forests. Both Nebo and Denison Creeks are also located within state significant biodiversity corridors that extend north and south along each creek system. Both systems support relatively intact riparian vegetation that extends from their headwaters to 50km south where Denison Creek joins into Connors River (stream order 7). Connors River also supports additional intact riparian vegetation.

The proposed offset areas at Hamilton Park have been placed on the eastern side of Denison Creek (Map 1, Appendix A). In addition to the offset areas proposed for Koala, Greater Glider and Squatter Pigeon habitat, Stanmore SMC have proposed to acquit SWC MRA2C impacts to Black Ironbox habitat (currently awaiting DCCEEW approval under EPBC Approval 2017-7957) on the Hamilton Park property (location provided in Map 1, Appendix A). Therefore, providing offsets for Koala, Greater Glider and Squatter Pigeon habitat, in addition to the Black Ironbox habitat provides opportunities for a significant conservation benefit through the extension of protected areas for threatened species.

The Hamilton Park property possess a high level of biodiversity, which retains substantial connectivity with the surrounding landscape. Due to this, it is deemed that the property possesses a high conservation value and is ideal for the provision of environmental offsets, which will ensure a conservation gain for the impacts to Koala, Greater Glider and Squatter Pigeon habitat resulting from the SWC MRA2C Project.

3.4 LEGAL MECHANISM FOR OFFSET PROTECTION

The offset areas identified in this OAMP will be protected through a Voluntary Declaration (VDec) as an area of high conservation value under the *Vegetation Management Act 1999 (Qld).* The map of the offset areas or declaration areas for purposes of lodgement of the Declaration can be found at Map 1, Appendix A. Once this has been registered on the title, the offset areas will be mapped as a category A area on the property map of assessable vegetation (PMAV). An area mapped as category A on a PMAV is described as an 'area subject to compliance notices, offsets and voluntary declarations'.

Once approved under the *EPBC Act,* the OAMP will be attached to the VDec. Management and monitoring of the offset areas will be undertaken in accordance with commitments provided in the approved OAMP. The VDec and approved OAMP will ensure the offset completion criteria are attained, and then maintained for the period of the *EPBC Act* approval. Statutory protection of the offset area is maintained under the Act.

The VDec will remain in place as the legally securing mechanism for the offset area. In accordance with Condition 4 of the Variation of Conditions (EPBC 2017/7957), Stanmore SMC commits to:

- Notify the Department within five business days of the legal mechanism being executed; and
- Notify the Department within five business days of the commencement of Stage 2.

In accordance with Condition 9 of the Variation of Conditions (EPBC 2017/7957), Stanmore SMC commits to:

- Legally securing the approved offset areas for impacts identified in Condition 1 within 12 months of the Minister's approval of the revised OAMP.

MANAGEMENT MEASURES

4.1 MANAGEMENT OBJECTIVES AND MANAGEMENT ACTIONS

Management objectives have been developed for this OAMP and are considered achievable environmental outcomes for the offset area managed under the OAMP. These management objectives will be achieved by implementing appropriate management actions, which are described in Table 8. The specific management objectives include:

- Restrict unauthorised access and prevent alternative land uses.
- Prevent unauthorised vegetation clearing.
- Control invasive weed species to reduce impacts and improve habitat quality.
- Minimise habitat degradation caused by feral animals, in particular feral pigs, wild dogs, and rabbits.
- Reduce the risk of unplanned fire causing adverse impacts to the habitat, through strategic fire management.
- Strategically graze cattle to reduce and manage understorey fuel loads.
- Provide artificial hollows (nest boxes) for Greater Gliders in regrowth vegetation to provide shelter until the vegetation matures to support suitable natural hollows
- Active revegetation in connectivity areas to connect habitat throughout the offset area

These management objectives and the corresponding management actions provided in Table 8 relate directly to the management of Koala, Greater Glider and Squatter Pigeon habitat within the offset area and were designed to improve the habitat quality, thus attaining and maintaining the completion criteria required of the offset. The management actions were developed in accordance with the requirements of the Commonwealth Department's (Cth) *Environmental Management Plan Guidelines 2014* (Department of the Environment, 2014), and with consideration of the identified threats to each species habitat, as outlined in the relevant Commonwealth's Approved Conservation Advice for each species.

The management actions are expected to be undertaken by the landholder/lessee or appointed Offset Area Manager, with ecological monitoring and reporting to be undertaken by a suitably qualified ecologist. The roles and responsibilities of personnel are defined in Table 7 in *Section 4.2*.

The proposed monitoring and reporting proposed within this OAMP provides transparency over how the management actions will be implemented, where management actions require improvement, where remedial actions are triggered, and provides for the identification of any non-compliance issues to ensure that completion criteria remain on track over the 20-year period.

4.2 ROLES AND RESPONSIBILITIES

To effectively implement this OAMP in its entirety requires active management by a number of different personnel and suitably qualified persons. The roles and responsibilities of each position is documented in Table 7.

Table 7 Roles and responsibilities

Role	Responsibility
Stanmore	Overall compliance with EPBC Approval conditions and the OAMP.
Offset Area Manager (including Stanmore SMC)	• Active management of the offset area, in consultation with the landholder (Stanmore SMC)/lessee and suitably qualified persons. • Plan monitoring surveys and management actions to be implemented in line with the requirements set out in this OAMP. • Manage reporting requirements and submission of reports to the Department.
Landholder (Stanmore SMC)/Lessee or Offset Area Manager	• Implementation of management actions on advice from the Offset Area Manager. • Day to day management, including inspections, maintenance and repair of infrastructure.
Suitably Qualified Person	• Undertake monitoring surveys – habitat quality assessments, photo point monitoring, and weed and pest monitoring. • External Audits. • Reporting associated with monitoring surveys.

Table 8 Management Actions

Management Objective	Management Actions	Frequency	Inspections	Monitoring and Reporting	Responsibility	Trigger for remedial action	Corrective Actions
Restrict unauthorised access and prevent alternative land uses (e.g., land clearing)	Access into the offset area to be restricted to authorised personnel only, using the following actions: • Fencing to exclude livestock (when not undergoing rotational grazing for fuel reduction purposes) and unauthorised access. • Fencing to be constructed 1.4m high, with the bottom wire set 350mm from ground to allow access by native wildlife, and top wire to be plain wire to reduce Greater Glider entanglement risk. • Signs installed in prominent locations (e.g., main access points) which recognise that the area is protected, and no unauthorised access allowed. • Existing access tracks to be used wherever possible. Track maintenance prioritised over alternative track alignments. • New tracks to be <5m wide with vegetation disturbance minimised wherever possible. • Grazing management tailored for fuel reduction purposes as elevated ground biomass increases the risk of uncontrolled fires; and for management of exotic pasture grass cover to a preferable cover for Squatter Pigeon (33% cover). This will also promote native groundcover species recruitment.	Life of the offset	• Annual inspections of fences and gates to ensure they're maintained in a serviceable condition to prevent unauthorised access by people/ livestock. • Additional fence inspections to take place within one month of storms or fire. • If grazing is occurring in adjacent paddocks, fence lines are to be inspected fortnightly to ensure livestock remains excluded. • During drought, fortnightly fence inspections required.	Compliance records to be kept up to date to ensure triggers for remedial action are detected. The Annual Compliance Report is to record: • Any fence maintenance activities, any incidents (e.g., unauthorised access or livestock presence) and detail results of routine inspections. • Any extreme weather events or fire causing an incident, and any fence maintenance/repair activities following an extreme weather event or fire.	Landholder/ Lessee, Offset Area Manager	• Detection of broken fence • Livestock presence outside of prescribed periods • Detection of unauthorised access • Extreme bank erosion or crossings eroded away.	• Report immediately to Landholder/Lessee or Offset Area Manager and arrange relocation of livestock. • Repair fence within one week of being notified of damage. • Undertake any remediation works as necessary and as soon as safe to do so e.g., erosion and sediment control, bank stability works and crossing repair works. • Review livestock management practices, including stocking rates in offset area within one week of being notified. • Construct additional fencing if required.
Prevent unauthorised vegetation clearing.	No unauthorised clearing to occur in the offset area. Clearing within the offset area is only permitted under the following circumstances: • As necessary to remove non-native plants and pest animals. • To ensure public safety. • To implement fire management lines to prevent unplanned fire from entering the offset area. • To maintain access tracks, fences and fire breaks. • For other lawful clearing purposes. Suitable access tracks to be provided, and where possible co-located with fence lines and fire management lines. Any new access tracks to be restricted to <5m wide.	Life of the offset	Annual inspections will monitor and document any evidence of unauthorised clearing.	Compliance records to be kept up to date to ensure triggers for remedial action are detected. The Annual Compliance Report is to record: • Vegetation clearing that has occurred for the purposes of fire management lines, access tracks or fencing. • Any illegal or unauthorised clearing that has occurred.	Landholder/ Lessee, Offset Area Manager	Detection of unauthorised clearing	• Within one week, assess how unauthorised access to the site was gained, and inspect signage and fencing and review access restrictions. • Notify Department within ten days of clearing not in accordance with OAMP. • Corrective actions to include active revegetation in areas of unauthorised clearing, as soon as practical. • Revise OAMP to include further monitoring if required.

Management Objective	Management Actions	Frequency	Inspections	Monitoring and Reporting	Responsibility	Trigger for remedial action	Corrective Actions
Improve habitat quality of threatened species habitat	Habitat quality will be improved by utilising the following methods: • Natural regeneration of regrowth and remnant habitat areas is the primary method for improving habitat quality within the offset areas once weeds and pests have been controlled. • Active revegetation (seeding/planting) is a contingency measure if natural regeneration is not readily occurring after at least three successive annual monitoring events. Three years is considered sufficient to allow natural regeneration to occur based on existing seed stock, weed control and grazing management to encourage further growth and for soil conditions to improve. Active revegetation may be required where extensive weed management has occurred to ensure other weed species do not establish. This will be determined during monitoring works. Active revegetation will involve the planting of locally endemic tree species reflective of the RE (based on the REs Technical Description) or seeding from local seed sources, as outlined below: • During bi-annual weed monitoring, mapping of weed treated areas will be undertaken to identify areas that are not naturally regenerating. Surveys will include identification of the underlying cause (e.g., soil conditions, weed presence) so these can be remediated. • Assess soil health and suitability for successful regeneration. • Undertake preparation works including soil preparation, weed and biomass control. Soil preparation procedures could include ripping and auguring where required. • Revegetation to include direct seeding and/or tube stock plantings. Overstorey species will be planted which are consistent with applicable RE that would occur in that area (based on the RE's Technical Description) and which are locally important food or shelter tree species for the Koala and/or Greater Glider. Appropriate species have been provided in Appendix F. • Trees planted at a density consistent with the applicable RE benchmarks, averaging 300 trees per hectare (to include already established trees) and will be protected with tree guards. Supplementary watering will be undertaken during and after planting. • Additional planting of groundcover species endemic to the RE at a rate of 500 plants per hectare. • All revegetation works will be undertaken by a suitably qualified bush regenerator. • Monitoring of revegetation works will be undertaken for a minimum of five years, with any mortality replaced on an annual basis to maintain tree density. • Implement increased controls for pest flora and fauna species, and increased intensity of weed management where weeds are confirmed as the key cause for lack of regeneration.	Life of the offset	• Bi-annual inspections to be undertaken (post wet season) to determine regeneration success. • Inspections ensure that any triggers for remedial action are detected in a timely manner. Compliance records to be kept up to date. • Inspections to monitor presence of recruitment and establishment of native species..	• Biannual monitoring survey to be conducted to identify natural regeneration is occurring within treated weed areas. • Annual Compliance Report to record evidence of recruitment of native species including photographs. Ecological Condition Assessment Report to compare recruitment overtime to determine the effectiveness of weed control measures in allowing natural regeneration to occur and detect triggers for remedial action.	Landholder/ Lessee, Offset Area Manager and Suitably Qualified Person	After three annual surveys, if there is low evidence of natural recruitment of native species	• Within six months, initiate active revegetation in problem areas, where limited evidence of recruitment of native species is occurring. • Continue weed control measures. • Implementation of additional corrective actions as deemed required to meet interim targets e.g., providing additional nesting boxes for Greater Gliders, seeding regrowth areas with appropriate native grass, forb or shrub species within regrowth areas to improve specie richness and cover scores, increase threat reduction management. Advice to be sought from a suitably qualified Ecologist regarding most appropriate corrective action to be implemented.
Control invasive weed species to reduce impacts and improve habitat condition.	Weeds to be managed through the following actions: • Control existing infestations of non-native plants, including prohibited and restricted pest plants under the *Biosecurity Act 2014 (Qld).* • Reduce non-native weed cover (includes non-native pasture species) to <25% (noting this is a conservative percentage proposed as weed cover on this site is currently extensive (most sites are currently recording >50% weed cover, with many sites recording >80% weed cover). • Exotic and prohibited weeds to be actively managed within the offset area. Non-invasive pasture species (e.g., Buffel Grass) can	Life of the offset	• Bi-annual weed inspections to be undertaken (post wet season and late dry season). • Inspections ensure that any triggers for remedial action are detected in a timely manner. Compliance records to be kept up to date.	• Baseline weed monitoring survey to be conducted to identify weed species, locations of major infestations and develop a plan for initial weed management. Initial • Ecological Condition Assessment Report to incorporate treatment methods, control periods and intensity information for weed species present within the offset area. • Following the baseline weed survey, weed control to be initiated. Periodic follow up as required (e.g., two – four weeks later) to	Landholder/ Lessee, Offset Area Manager and Suitably Qualified Person	• Weed cover more than 25% in the offset area, or a new species or outbreak is identified compared to baseline or previous monitoring events.	• Upon becoming aware of a new weed species or outbreak, weed control measures are to be implemented within one month. • Review weed hygiene procedures to ensure compliance, and review timing and frequency of weed control programs within one month of being notified of any new outbreaks or increase in weed populations. Implement alternative weed control if required.

Management Objective	Management Actions	Frequency	Inspections	Monitoring and Reporting	Responsibility	Trigger for remedial action	Corrective Actions
	remain but must meet the <25% threshold within offset areas. Note, list of native pasture grasses are available in Appendix F. • Prevent the introduction, establishment and spread of non-native plants in the offset area. • Weed hygiene procedures for access to be developed, and to include: o All vehicles, equipment and machinery entering the offset area to be weed free upon entry. o All vehicles/machinery to be cleaned inside and out prior to accessing the offset area. • Vehicle movement to be limited to designated access tracks and restricted to authorised personnel only. • Vehicles to travel to track conditions at a maximum speed of 20km/hr in offset area.		• Inspections to monitor presence of weeds, weed spread, or establishment of new species, and record success of previously applied control measures.	control and minimise the spread of existing weeds. • Each subsequent year, weeds should be controlled at end of the wet season when they are actively growing. • Regular maintenance of fire management lines, access tracks and fence lines to limit weed incursion. • Annual Compliance Report to record weed locations, cover estimates, control methods implemented, including dates and areas treated. • Ecological Condition Assessment Report to compare weed presence overtime to determine effectiveness of weed control measures and detect triggers for remedial action.		• Any increase in relative abundance of weed populations from those recorded in the baseline weed survey within the offset area.	
Minimise habitat degradation caused by feral animals	• Minimise presence of feral animals (rabbits. pigs, feral dogs) within the offset area in accordance with the *Biosecurity Act 2014 (Qld),* using best practice and ethical methods. This is to reduce ground disturbance and prevent further weed spread. • Pest animal management to be undertaken in consultation with landowner/lessee. • Pest control to be initiated on an as need basis. • Pest control methods are to be species-specific.	Life of the offset	• Bi-annual inspections to be undertaken (post wet season and late dry season). • Inspections to record wallows, tracks, sightings in the offset area. • Inspections ensure that triggers for remedial action are detected in a timely manner. Compliance records to be kept up to date.	• Baseline pest survey to be conducted to identify pest presence and develop a plan for the initial pest control. • Initial Ecological Condition Assessment Report to include control methods that are species-specific. • Incidental records to be taken during any site visits/inspections by landholder/lessee or site personnel. • Annual Compliance Report to record any pest species observed and control methods implemented, including dates and methods used. • Ecological Condition Assessment Report to compare pest presence across years to determine the effectiveness of control measures and detect triggers for remedial action.	Landholder/ Lessee, Offset Area Manager	When more than one individual is detected in the offset area, the control program is enacted.	• Once notified, control measures to be implemented within one month. • Review control methods as required if increase in pest animal presence is detected. • Investigate potential sources and rectify within one month of being notified of increased presence. • Increase frequency of animal control measures as necessary.
Reduce the risk of unplanned fire causing adverse impacts to the habitat, through strategic fire management.	Controlled low-intensity burning is permitted in the offset area in accordance with RE fire management defined in Appendix E: • No controlled burning to occur during May-July to avoid the peak breeding and egg laying period for the Squatter Pigeon. • Controlled burning to occur from August – September when soil moisture is still present from the wet season, at the intervals provided per RE in Appendix E. • Active fire management to be implemented, which includes maintaining fire management lines and vehicle access roads, and burning to reduce fuel loads, at intervals defined in Appendix E for the relevant RE. Low intensity burning requires no canopy scorch, with the aim to reduce fuel loads in the groundcover layer, to prevent an unplanned high intensity burn within the offset area • Grazing management tailored for fuel reduction purposes (see last table entry) as elevated ground biomass increases the risk of uncontrolled fires.	Life of the offset.	• Bi-annual inspections of fire management lines. • Maintenance to be undertaken as required, or at least every two years.	Compliance records to be kept up to date to ensure triggers for remedial action are detected. Annual Compliance Report is to record: • Any maintenance activities, or any fire management activities within the offset area, and detail results of routine inspections. • Any unplanned fires or planned fires that became out of control.	Landholder/ Lessee, Offset Area Manager	• Unplanned fire. • Planned fire becomes out of control or the expected burn regime not achieved. For fire break maintenance: • Presence of shrubs or fallen timber.	If an uncontrolled fire has occurred: • Initiate assessment by suitably qualified ecologist to determine habitat conditions and provide recommendations for remediation (e.g., active revegetation, erosion/sediment control, bank stability). • Review fire management strategy, inspect fire management lines and repair/maintain where required within one week of being notified of damage. Upon becoming aware of the need for firebreak maintenance, implement maintenance procedures within one month.
Strategically graze cattle to: • Reduce and manage understorey (groundcover) fuel loads; and	• Squatter Pigeon build their nests on the ground, under cover of tussocking grasses. These nests are at high risk of being trampled by cattle. Therefore, cattle to be excluded from the offset areas between May-July, which is the peak breeding and egg laying season for the Squatter Pigeon. • Livestock also to be excluded during wet season months to allow native groundcovers to establish during the active growth period (e.g., December to April). Wet season is when	Only during dry season, for life of offset	• In the dry season groundcover is to be monitored regularly. • During grazing periods, inspections to be conducted monthly to ensure areas are not being overgrazed. Once fuel	Fuel load monitoring to be undertaken annually prior to the dry season to determine the risk of fire to the offset area. This will inform grazing management within the offset area as a fire management tool. The Riparian Grazing Guideline (Department of Environment, Land, Water and Planning, 2016) provides useful information regarding	Landholder/ Lessee, Offset Area Manager	Trigger for fuel reduction grazing – >1500kg/ha groundcover	Upon becoming aware of groundcover exceeding 1500kg/ha, introduce livestock at rates necessary only to reduce fuel loads. Monitor groundcover during grazing period, and when groundcover is reduced to 1500kg/ha remove cattle immediately.

Management Objective	Management Actions	Frequency	Inspections	Monitoring and Reporting	Responsibility	Trigger for remedial action	Corrective Actions
• Management of exotic pasture grass cover to a preferable cover for Squatter Pigeon (33% cover) and to promote native groundcover species recruitment. • Reduce the risk of cattle trampling on Squatter Pigeon nests during the peak breeding season for the species.	native groundcovers are flowering, setting seed, sending out new growth and developing healthy root systems. Excluding grazing during the wet season allows native groundcovers to re-establish (Department of Environment and Science, 2022) and also minimises erosion and water quality risks when soils are waterlogged. • Cattle to be introduced as required outside of these periods (e.g., from August to November) to manage high fuel loads during the dry season. • Graze livestock at stocking rates and times necessary during the dry season to reduce fuel loads and exotic pasture cover. Livestock to be removed as groundcover reaches 1500kg/ha.		loads are reduced to 1500kg/ha, grazing to be excluded again.	optimum periods, grazing intensity and monitoring, with regard to using controlled grazing as a fire management tool. Fire risk is greatest during the dry season. Prior to this, groundcover biomass will be monitored, using the following approach: • Groundcover biomass to be estimated indirectly using photo standards (kg/ha of groundcover; photo standards per region and pasture type available on Future Beef website). • Should groundcover exceed 1500kg/ha during the dry season, cattle may be introduced to reduce fuels loads. • Livestock to graze at stocking rates and times necessary to reduce fuel loads only. • Livestock to be removed once groundcover reaches 1500kg/ha. Annual Compliance Report to record groundcover biomass, any cattle grazing events and detail results of routine inspections.			
Provide artificial hollows (nest boxes) for Greater Gliders in regrowth vegetation to provide shelter until the vegetation matures to support suitable natural hollows	The offset area for Greater Gliders is regrowth vegetation, and while it supports some mature trees it is recognised that this vegetation may not create trees with suitable natural forming hollows within a 20-year timeframe. Hollow formation is dependent on the tree species, the trees history and location. Generally small hollows suitable for a Krefft's Glider *(Petaurus notatus)* take about 100 years to form. Hollows of a medium size and suitable for animals such as parrots will take around 200 years to form, and the larger and deeper hollows occupied by Glossy Black Cockatoos *(Calyptorhynchus lathami)* and other larger animals such as owls can take a longer (NSW National Parkes & Wildlife Service, 1999). The offset area will be on the trajectory towards creating hollows at the 20-year time frame and will continue to mature post this OAMP. To supplement denning and breeding habitat within the offset area during the period of the OAMP, a supplementary nest box program is proposed. As some taller trees are present in the regrowth vegetation, the next box program can be initiated in Year 1 of the OAMP. Nest box density is proposed as a minimum, one nest box per 4ha which is equivalent to the Greater Glider home range (1-4ha). For an offset area the size of 338ha, this requires ~85 nest boxes. • Nest boxes to be installed under the direction of a suitably qualified person. • Nest boxes to be appropriate dimensions and design to host a Greater Glider (https://wildlife.org.au/wp-content/uploads/2016/07/WPSQ0012-2pp-Nest-Box-flyer-WPSQ_FA.pdf). • The recommended attachment method is the Habisure system (Franks & Franks, 2006), which allows for at least one metre growth in the diameter of the host tree before adjustment is required.	• Year 1 – Initial inspection • Year 2 – Nest box installation • Bi-annual monitoring until Year 6 when monitoring frequency is reviewed.	Nil	• Year 1 – Initial survey to confirm appropriate nest box locations. Nest boxes installed by Year 2. Each nest box to be assigned a number for monitoring purposes with records kept such as identification number, nest box type, GPS location, host tree species, tree diameter at breast height (DBH), nest box height and orientation. • Bi-annual monitoring and maintenance for the first five years. Following this, a review of the monitoring results to determine ongoing monitoring and maintenance requirements. • Regular inspection and maintenance of the nest boxes to be completed. • Nest box survey data will determine: o Whether the target species is utilising the box, including for breeding. o Occupancy rates, frequency of use, proportion of use by different species, pattern and timing of use. o Suitability of the design, maintenance needs and costs.	Landholder/ Lessee, Offset Area Manager and Suitably Qualified Person	• Nest boxes used by pest species (e.g., European Honeybees or Common Myna) • Low rate of success of nest box use	• Within one month of detection of pest species utilising nest boxes, addition control measures to be implemented and increased monitoring to be implemented to determine effectiveness of the controls. • Within six months of detection that nest boxes are not being successful, alter the design, height or location of the nest boxes to better promote use and increase monitoring in case Greater Gliders are only using them at certain months of the year. • Implementation of additional corrective actions as deemed required to meet interim targets e.g., providing additional nesting boxes within regrowth areas, or in adjacent remnant areas to assist in better connecting breeding habitat in remnant areas to breeding habitat in the regrowth areas. Advice to be sought from a suitably qualified Ecologist regarding most appropriate corrective action to be implemented.
Active revegetation in connectivity areas to connect habitat throughout the offset area	Active revegetation to be undertaken in connectivity areas (shown in Map 1, Appendix A) from Year 2. This will involve the planting of locally endemic tree species reflective of the RE for that area (based on the REs Technical Description) or seeding from local seed sources, as detailed above for *"Improve habitat quality of threatened species habitat".*	Year 2 with bi-annual inspections and maintenance as required.	• Bi-annual inspections to be undertaken (post wet season and late dry season). • Inspections to record revegetation success and where maintenance or	• Success of revegetation. • Annual Compliance Report to record evidence of success of plantings including photographs.	Landholder/ Lessee, Offset Area Manager and Suitably Qualified Person	• Loss of planted individuals • Patchiness in cover of plantings	• Within six months, initiate further active revegetation of problem areas. • Continue to undertake weed control measures.

Management Objective	Management Actions	Frequency	Inspections	Monitoring and Reporting	Responsibility	Trigger for remedial action	Corrective Actions
			follow up planting is required. Inspections ensure triggers for remedial action are detected in a timely manner. Compliance records to be kept up to date.				
In the event, the offset fails to achieve interim performance targets and completion criteria within the anticipated 5, 10, 15 and 20 year intervals	• All management measures outlined in this OAMP will be implemented to ensure interim performance targets and completion criteria are achieved. • A Voluntary Declaration under the *Vegetation Management Act 1999 (Qld)* will ensure the landholder and lessee remains obliged to undertake active management of the offset until all completion criteria are achieved.	3, 5, 7, 10, 12, 15, 17 and 20 years	• Habitat quality scoring assessment undertaken for each five-year monitoring period • Monitoring to be undertaken in accordance with the Monitoring methods provided in *Section 5.* • Monitoring results compared to the interim performance targets for each MNES to assess progress of the offset areas in achieving the requirements of the OAMP.	Habitat quality assessments to be conducted. Initial Ecological Condition Assessment survey and report to incorporate baseline habitat quality scores and finalised locations of transects. The OAMP will also be updated to include the finalised locations of transects. Ecological Condition Assessment Report to detail results of the Habitat quality assessments, and the finalised locations of transects for comparison overtime, to determine any non-compliance with interim performance targets.	Landholder/ Lessee, Offset Area Manager and Suitably Qualified Person	Interim performance targets not achieved by year 5, 10 or 15.	Within one month of detection of the trigger, complete an investigation into the reasons why the interim performance targets are not being achieved within the specified timeframes. This investigation should re-evaluate the suitability of the completion criteria and relevant management actions and identify appropriate corrective actions. Within six months of detection of the trigger, implement revised corrective actions, including: • Increasing the frequency and intensity of weed and pest animal control measures or revising the type of measures to be implemented. • Modify fire management measures to better enhance offset values • Implementation of additional corrective actions as deemed required to meet interim targets e.g., seeding with appropriate grass, forb or shrub species if richness or cover attributes not being met. Advice to be sought from a suitably qualified Ecologist regarding most appropriate corrective action to be implemented. If deemed required, within 1-2 years, undertake an additional habitat quality assessment to compare against interim performance targets to re-evaluate whether the offset is on track to meet the completion criteria within the 20-year timeframe. If not, and the corrective actions are not successful, additional offsets will need to be sought by the approval holder and approved by the Minister.
In the event, the offset in regrowth areas fails to achieve the interim performance targets within the first 5 years	• All management measures and corrective actions outlined in this OAMP will be implemented to ensure annual interim performance targets in regrowth areas in the first 5 years, as set out in Table 10, Table 11 and Table 13, are achieved. • Maintain the three existing watering points that are within 3km of the regrowth offset area on the Hamilton Park property (noting three additional watering points are available in close proximity on the neighbouring lease to the east) and provide an additional 2 permanent watering point(s) within the regrowth offset area to ensure water is accessible to the offset matters all year round. Map 6 shows the existing and proposed watering point(s) for the regrowth offset area. Koalas and Greater Glider access water through their food intake while Squatter Pigeons are reliant of water daily. Squatter Pigeon habitat is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated by Eucalyptus, Corymbia, Acacia or Callitris species; remnant, regrowth or partly modified vegetation communities; and within 3km of water bodies or watercourses. The existing water points near the regrowth offset area are within 3km of each other, thereby provided suitable daily drinking sources for the Squatter Pigeon. Regardless, we propose an additional 2 permanent watering point(s) within the regrowth offset area to ensure water is accessible to the species all year round.	1, 2, 3, 4, 5 years	• Habitat quality scoring assessment undertaken annually from Years 1 – 5. • Monitoring to be undertaken in accordance with the Monitoring methods provided in *Section 5.* • Monitoring results in regrowth areas compared to the annual interim performance target in the five-year monitoring period for each offset matter to assess progress of the offset areas in achieving the requirements of the OAMP.	Results of annual habitat quality surveys in regrowth areas in the first five year must be included in the annual Ecological Condition Assessment Report submitted to the Department, with reporting against the annual interim performance target in the five-year monitoring period. Compliance with the annual interim performance target in the five-year monitoring period will also be reported in the annual Compliance reports.	Landholder/ Lessee, Offset Area Manager and Suitably Qualified Person	Annual interim performance targets in regrowth areas not achieved by years 1, 2, 3, 4 and 5	If interim performance targets are not met within Years 1 -4, additional corrective actions will be implemented. This will include: • Increased installation of additional nesting boxes for Greater Gliders in regrowth areas– see row above in this table to "Provide artificial hollows (nest boxes) for Greater Gliders in regrowth vegetation to provide shelter until the vegetation matures to support suitable natural hollows", which quantifies the number of next boxes required. These additional nest boxes will be deployed at a density of two per hectare in the transition zone only (where the regrowth offset area connects with remnant habitat along Denison Creek in the south of the property) to encourage Greater Glider individuals to move into the regrowth areas from remnant areas. It is estimated that one quarter of the regrowth habitat would act as a transition zone (approx. 85ha). This results in an additional 85 nest boxes deployed, effectively doubling the number to be deployed during the relevant year. • Increased seeding regrowth areas with native grass, forb or shrub species within regrowth areas to improve species richness and cover scores. Direct seeding ratios to be deployed – 200-500g per hectare noting these areas have canopy cover and the purpose of seeding is to provide additional richness and cover then is already available (in comparison a standard seeding rate to revegetation non-remnant areas is 2-5kg per ha). At the proposed rate of 200 -500g per hectare, approximately 160kg of seed for the 338ha regrowth offset area will be utilised. Species to be used in seed mixes will include but not limited to Themeda triandra, Heteropogon contortus, Acacia salicina • Increased threat reduction management – Most threat reduction proposed cannot be increased (e.g., signage already provided, ecological burning implemented at intervals in accordance with relevant RE, and active pest control based on numbers observed within and adjacent to the offset area); however some can be increased which may provide

Management Objective	Management Actions	Frequency	Inspections	Monitoring and Reporting	Responsibility	Trigger for remedial action	Corrective Actions
							beneficial outcomes to the offset matters under certain circumstances. These will include: o Increasing to quarterly weed control and applying more targeted methods to reduce weed cover for Squatter Pigeons if the proposed weed control implemented is not as effective as expected. o Increasing to quarterly weed inspections to ensure problem areas can be targeted each quarter. o Increasing grazing to manage fuel loads when elevated ground biomass has not been effective in order to reduce the risk of uncontrolled fires. If the interim performance targets in regrowth areas are not achieved by Year 5 of the initial 5 years, the approval holder will increase the offset area as determined by relevant Offset Assessment Guide calculations. Where an increase in offset area is required, the remnant offset area already proposed for Koala and Squatter Pigeon to acquit impacts from the MRA2C project will be utilised, with additional offset areas provided as determined by the relevant Offset Assessment Guide calculations (for example, if the Greater Glider regrowth offset area fails in Year 5, the 1,254ha of Koala offset area which also provides suitable Greater Glider habitat values will be utilised with management actions implemented appropriate to Greater Glider protection, then addition offsets will be sourced if required to meet outputs provided by the Offset Assessment Guide calculation). The increase in offset area will ensure ongoing connectivity for the relevant offset matter. Five year pro rata performance calculations will be based on the projected outcomes of the habitat quality score using the most recent data available and be included in a revised OAMP as per Condition 19, with the revised OAMP to be approved by the Department.

4.3 COMPLETION CRITERIA

The *EPBC Act Environmental Offsets Policy* states that an offset must deliver an overall conservation outcome that improves or maintains the viability of the MNES. Offset completion criteria and interim performance targets have been developed as a way to measure whether the offset conservation gains are on track and ensure the final habitat quality scores are achieved. The completion criteria have been determined based on an understanding of the Koala, Greater Glider and Squatter Pigeon habitat within the offset area, the baseline habitat quality scores, landscape connectivity of the property, and what management outcomes are achievable.

Over the course of the 20-year management period, multiple interim target periods have been chosen to track the trajectory of habitat quality towards the desired final completion criteria. Completion criteria have been provided per MNES and per remnant or regrowth offset areas. The timing for these interim targets corresponds with the reporting required under condition 12 of the EPBC Approval (2017/7957, variation of conditions dated 6 August 2021), which will include:

- For remnant offset areas where an increase in habitat quality score of 1 is expected over 20 years – Baseline (2025) and 5-yearly interim targets during years 2030, 2035 and 2040. Completion expected in 2045.
- For regrowth offset areas where an increase in habitat quality score of 3 is expected over 20 years – Baseline (2025), annual interim targets for the first 5 years, then 5-yearly interim targets. These interim targets will be assessed in 2026, 2027, 2028, 2029, 2030, 2035 and 2040. Completion expected in 2045.

The interim performance targets allow for the offset to be assessed, management actions revised if required, and the OAMP amended so that the completion criteria can be attained within the 20-year time frame. If interim performance targets are not met, corrective actions can be implemented to get the completion criteria back on track. Interim targets were derived by identifying whether attributes were likely to improve in the short or long term. The annual reports will provide transparency on the implementation of the management actions and will allow for any non-compliance with the OAMP to be rectified to ensure the completion criteria remain on track.

It is anticipated that the management actions provided in Table 8 will improve the habitat quality over the 20-year period and improve the offset area compared to the impact area habitat quality. The following habitat quality improvements are expected:

- Koala habitat:
  - An increase in habitat quality score of 1 for remnant offset areas (from a 7 to an 8).
  - An increase in habitat quality score of 3 for regrowth areas (from a 4 to a 7).
- Greater Glider habitat:
  - An increase in habitat quality score of 3 for regrowth areas (from a 3 to a 6).
- Squatter Pigeon habitat:
  - An increase in habitat quality score of 1 for remnant offset areas (from a 7 to an 8).
  - An increase in habitat quality score of 3 for regrowth areas (from a 4 to a 7).

These increases in scoring are expected as a result of the following improvements (actual increase in scores for each habitat attribute expected is provided in Table 9 to Table 13 below):

- Increase in the recruitment of woody perennial species in the ecologically dominant layer, especially the recruitment of locally important food trees for the Koala, and denning habitat trees for the Greater Glider, through the reduction in competition from non-native grass and shrub species, and the removal of cattle during certain parts of the year to manage over grazing and trampling.
- Increase in tree canopy cover due to the growth of biomass of tree species over time.
- Increase in native grass and forb species richness, through the reduction of non-native plant cover as a result of the weed control program.
- Managing the threats to Koala, Greater Glider and Squatter Pigeon habitat by:
  - Actively managing fire and strategically grazing cattle to reduce fuel loads and exotic pasture grass cover. This will reduce the risk of a hot fire destroying the habitat in the offset area and will provide suitable patchiness in the groundcover that is preferred by the Squatter Pigeon;
  - Excluding cattle during the wet season to promote re-establishment of native groundcover species during their active growth period.
  - Feral animal control to mitigate degradation of the ground habitat and prevent erosion; and
  - Ensuring no unauthorised vegetation clearing.
- Providing nest boxes for Greater Gliders in regrowth habitat to provide suitable quality denning habitat until such time the ecosystem matures to produce suitable sized hollows for the species.

Where completion criteria for remnant offset areas are not achieved by the 20-year period, management actions will continue until the offset conservation gains are realised. Should the completion criteria be met prior to 20 years, management actions and monitoring will continue until the end of the approval period to ensure conservation gains are maintained or further improved.

Where interim targets are not achieved in regrowth offset areas by Year 5, the approval holder commits to increasing the offset area as determined by relevant Offset Assessment Guide calculations. Increasing the offset includes the option of replacing all or parts of the existing site to ensure site connectivity. Five year pro rata performance calculations will be based on the projected outcomes of the habitat quality scoring using the most recent data available and will be included in a revised Offset Management Plan as per Condition 19 to be approved by the Department.

4.3.1 Koala

The Hamilton Park property will acquit the balance of impacts to Koala habitat (79.01% of impacts) from the SWC MRA2C Project. Field surveys determined that the property is capable of satisfying the offset requirements and it was calculated using the EPBC Act's Offsets Assessment Guide that 1,670ha of Koala habitat was required as offsets (results provided in Appendix D). These offset areas will include 1254ha of remnant vegetation and 416ha of regrowth vegetation.

Remnant Offset Areas

Table 9 details the start, interim and completion performance criteria for Koala offsets in remnant REs.

Table 9 Completion criteria for the Koala offset areas in remnant REs

KOALA OFFSETS - REMNANT REs

		Start	Interim Performance Targets			Completion
		2025	2030	2035	2040	2045
Site Condition (Site-based Attributes)						
Number of large native trees		8.4	8.7	9.0	9.5	9.9
Tree canopy height		4.8	4.8	4.8	4.8	4.8
Tree subcanopy height		3.9	3.9	3.9	3.9	3.9
Average tree canopy height		4.3	4.3	4.3	4.3	4.3
Recruitment of woody perennial species		3.4	3.6	3.8	4.1	4.3
Tree canopy cover		4.3	4.3	4.3	4.3	4.3
Tree sub-canopy cover		3.8	3.8	3.8	3.8	3.8
Average canopy cover		3.9	3.9	3.9	3.9	3.9
Native shrub layer cover		2.9	3.0	3.2	3.4	3.5
Coarse woody debris		3.3	3.3	3.3	3.3	3.3
Native plant species richness	Trees	4.2	4.2	4.2	4.2	4.2
	Shrubs	3.1	3.1	3.1	3.1	3.1
	Grasses	3.0	3.5	3.8	4.1	4.3
	Forbs and other	1.3	1.6	2.0	2.4	2.7
Non-native plant cover		2.7	3.2	3.8	4.4	5.0
Native perennial grass cover		2.9	3.1	3.4	3.6	3.8
Organic litter cover		4.4	4.4	4.4	4.4	4.4
Quality and availability of food and foraging habitat		8.9	8.9	8.9	8.9	8.9
Quality and availability of shelter		5.5	5.5	5.5	5.5	5.5
Total (out of 100)		**62.2**	**64.3**	**66.6**	**69.1**	**71.1**
Total (out of 10)		**6.22**	**6.43**	**6.66**	**6.91**	**7.11**
Weight (30% weighted)		**1.87**	**1.93**	**2.00**	**2.07**	**2.13**
Site Context (Landscape-scale Attributes)						
Size of patch		10	10	10	10	10
Connectedness		5	5	5	5	5
Context		5	5	5	5	5
Ecological Corridors		4	4	4	4	4
Threats to the species		10	11	12	14	15
Species Mobility Capacity		7	7	7	7	7
Total (out of 51)		**41.0**	**42.0**	**43.0**	**45.0**	**46.0**
Total (out of 10)		**8.04**	**8.24**	**8.43**	**8.82**	**9.02**
Weight (30% weighted)		**2.41**	**2.47**	**2.53**	**2.65**	**2.71**
Species Stocking Rate						
Species Stocking Rate (Total out of 40)		30	30	30	30	30
Total (out of 40)		**30**	**30**	**30**	**30**	**30**
Total (out of 10)		**7.50**	**7.50**	**7.50**	**7.50**	**7.50**
Weight (40% weighted)		**3.00**	**3.00**	**3.00**	**3.00**	**3.00**
TOTAL		**7.28**	**7.40**	**7.53**	**7.72**	**7.84**
OFFSET AREA ADJUSTED WEIGHTING^		**7.15**				**7.84**
ROUNDED		**7**	**7**	**8**	**8**	**8**

Note – scores do not match Biocondition whole scores (e.g., 0, 5, 10, 15), as the values presented in the above table are averaged scores over more than one site.
^scores per RE weighted per size of polygon.

Regrowth Offset Areas

Table 10 details the start, interim and completion performance criteria for Koala offsets in remnant REs.

Table 10
Completion criteria for the Koala offset areas in regrowth REs

KOALA OFFSETS - Regrowth REs

	Start	Interim Performance Targets							Completion
	2025	2026	2027	2028	2029	2030	2035	2040	2045
Site Condition (Site-based Attributes)									
Number of large native trees	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.6	1.8
Tree canopy height	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Tree subcanopy height	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Average tree canopy height	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Recruitment of woody perennial species	3.5	3.5	3.5	3.5	3.6	3.7	3.9	4.1	4.3
Tree canopy cover	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Tree sub-canopy cover	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Average tree canopy cover	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Native shrub layer cover	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.7	2.8
Coarse woody debris	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.7	0.8
Native plant species richness – Trees	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Native plant species richness – Shrubs	0.6	0.6	0.6	0.6	0.6	0.7	0.8	1.0	1.1
Native plant species richness – Grasses	0.0	0.0	0.0	0.3	0.3	0.5	1.0	1.5	2.0
Native plant species richness – Forbs and other	0.0	0.0	0.0	0.3	0.3	0.5	1.0	1.5	2.0
Non-native plant cover	1.1	1.1	1.1	1.5	1.8	2.0	3.0	4.0	5.0
Native perennial grass cover	0.4	0.4	0.4	0.4	0.6	0.8	1.0	1.5	2.0
Organic litter cover	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Quality and availability of food and foraging habitat	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Quality and availability of shelter	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total (out of 100)	**31.4**	**3.14**	**31.4**	**31.8**	**33.0**	**34.4**	**36.6**	**40.7**	**43.7**
Total (out of 10)	**3.14**	**3.14**	**3.14**	**3.18**	**3.30**	**3.44**	**3.66**	**4.07**	**4.39**
Weight (30% weighted)	**0.94**	**0.94**	**0.94**	**0.95**	**0.99**	**1.03**	**1.10**	**1.22**	**1.31**
Site Context (Landscape-scale Attributes)									
Size of patch	4	4	4	4	4	4	4	4	4
Connectedness	2	2	2	2	2	2	2	2	2
Context	1	1	1	1	1	1	1	1	1
Ecological Corridors	3	3	3	3	3	3	3	3	3
Threats to the species	10	10	10	11	11	11	12	14	15
Species Mobility Capacity	7	7	7	7	7	7	7	7	7
Total (out of 51)	**27**	**27**	**27**	**28**	**28**	**28**	**30**	**31**	**32**
Total (out of 10)	**5.29**	**5.29**	**5.29**	**5.49**	**5.49**	**5.49**	**5.88**	**6.07**	**6.27**
Weight (30% weighted)	**1.59**	**1.59**	**1.59**	**1.65**	**1.65**	**1.65**	**1.76**	**1.82**	**1.88**
Species Stocking Rate									
Species Stocking Rate (Total out of 40)	5	5	5	5	10	15	20	25	30
Total (out of 40)	**5**	**5**	**5**	**5**	**10**	**15**	**20**	**25**	**30**
Total (out of 10)	**1.25**	**1.25**	**1.25**	**1.25**	**2.50**	**3.75**	**5.00**	**6.25**	**7.50**
Weight (40% weighted)	**0.50**	**0.50**	**0.50**	**0.50**	**1.0**	**1.50**	**2.00**	**2.50**	**3.00**
TOTAL	**3.03**	**3.03**	**3.03**	**3.10**	**3.64**	**4.18**	**4.86**	**5.54**	**6.19**
OFFSET AREA ADJUSTED WEIGHTING^	**3.59**								**6.68**
ROUNDED	**4**	**4**	**4**	**4**	**4**	**4**	**5**	**6**	**7**

Note – scores do not match Biocondition whole scores (e.g., 0, 5, 10, 15), as the values presented in the above table are averaged scores over more than one site
^scores per RE weighted per size of polygon

4.3.2 Greater Glider

The Hamilton Park property will acquit the balance of impacts to Greater Glider (68.02% of impacts acquitted). It was calculated that 338ha of Greater Glider regrowth habitat was required as offsets (Appendix D).

Table 11 Completion criteria for the Greater Glider offset areas in regrowth REs

GREATER GLIDER OFFSETS - Regrowth REs

		Start	Interim Performance Targets						Completion
		2025	2026	2027	2028	2029	2030	2035	2040	2045
Site Condition (Site-based Attributes)										
Number of large native trees		2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	3.5
Tree canopy height		2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Tree subcanopy height		2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Tree canopy height		2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Recruitment of woody perennial species		4.0	4.0	4.0	4.0	4.1	4.1	4.3	4.4	4.5
Tree canopy cover		4.3	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.3
Tree sub-canopy cover		1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Average tree canopy cover		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Native shrub layer cover		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Coarse woody debris		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Native plant species richness	Trees	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	Shrubs	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	Grasses	0.0	0.0	0.0	0.3	0.3	0.5	1.0	1.5	2.0
	Forbs and other	0.0	0.0	0.0	0.3	0.3	0.5	1.0	1.5	2.0
Non-native plant cover		2.3	2.3	2.3	2.5	2.8	3.0	3.8	4.2	5.0
Native perennial grass cover		0.8	0.8	0.8	0.8	0.9	1.1	1.4	1.7	2.0
Organic litter cover		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Quality and availability of food and foraging habitat		5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Quality and availability of shelter		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Total (out of 100)		**39.6**	**39.6**	**39.6**	**39.8**	**40.9**	**41.7**	**44.0**	**46.3**	**49.0**
Total (out of 10)		**3.96**	**3.96**	**3.96**	**3.98**	**4.09**	**4.17**	**4.40**	**4.63**	**4.90**
Weight (30% weighted)		**1.19**	**1.19**	**1.19**	**1.19**	**1.23**	**1.25**	**1.32**	**1.39**	**1.47**
Site Context (Landscape-scale Attributes)										
Size of patch		6	6	6	6	6	6	6	6	6
Connectedness		2	2	2	2	2	2	2	2	2
Context		2	2	2	2	2	2	2	2	2
Ecological Corridors		6	6	6	6	6	6	6	6	6
Threats to the species		5	5	5	5	5	7	10	12	15
Species Mobility Capacity		5	5	5	5	5	5	5	5.33	5.33
Total (out of 51)		**26.0**	**26.0**	**26.0**	**26.0**	**26.0**	**28.0**	**31.0**	**33.33**	**36.33**
Total (out of 10)		**5.10**	**5.1**	**5.1**	**5.1**	**5.1**	**5.50**	**6.08**	**6.54**	**7.12**
Weight (30% weighted)		**1.53**	**1.53**	**1.53**	**1.53**	**1.53**	**1.65**	**1.82**	**1.96**	**2.14**
Species Stocking Rate										
Species Stocking Rate (Total out of 40)		5	5	5	5	5	10	10	15	25
Total (out of 40)		**5**	**5**	**5**	**5**	**5**	**10**	**10**	**15**	**25**
Total (out of 10)		**1.25**	**1.25**	**1.25**	**1.25**	**1.25**	**2.50**	**2.50**	**3.75**	**6.25**
Weight (40% weighted)		**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**1.0**	**1.0**	**1.6**	**2.50**
TOTAL		**3.22**	**3.22**	**3.22**	**3.22**	**3.26**	**3.90**	**4.14**	**4.95**	**6.11**
OFFSET AREA ADJUSTED WEIGHTING^		**3.21**								**6.11**
ROUNDED		**3**	**3**	**3**	**3**	**3**	**4**	**4**	**5**	**6**

Note – scores do not match Biocondition whole scores (e.g., 0, 5, 10, 15), as the values presented in the above table are averaged scores over more than one site
^scores per RE weighted per size of polygon

4.3.3 Squatter Pigeon

The Hamilton Park property will acquit the balance of impacts to Squatter Pigeon habitat (100% of impacts acquitted). Field surveys determined that the property is capable of satisfying the offset requirements and it was calculated using the EPBC Act's Offsets Assessment Guide that 1,296ha of remnant Squatter Pigeon habitat and 390ha of regrowth habitat was required as offset areas (results of the Offsets Assessment Guide calculator provided in Appendix D).

Remnant Offset Areas

Table 12 details the start, interim and completion performance criteria for Squatter Pigeon offsets in remnant REs.

Table 12 Completion criteria for the Squatter Pigeon offset areas in remnant REs

SQUATTER PIGEON OFFSETS - REMNANT REs					
	Start	Interim Performance Targets			Completion
	2025	2030	2035	2040	2045
Site Condition (Site-based Attributes)					
Number of large native trees	6.8	7.1	7.4	7.8	8.1
Tree canopy height	4.2	4.2	4.2	4.2	4.2
Tree subcanopy height	3.1	3.1	3.1	3.1	3.1
Average Tree canopy height	3.9	3.9	3.9	3.9	3.9
Tree canopy cover	4.5	4.5	4.5	4.5	4.5
Tree sub-canopy cover	3.6	3.6	3.6	3.6	3.6
Average canopy cover	4.3	4.3	4.3	4.3	4.3
Coarse woody debris	4.1	4.1	4.1	4.1	4.1
Native plant species richness – Grasses	2.5	2.8	3.1	3.5	3.8
Native plant species richness – Forbs and other	1.8	2.0	2.3	2.5	2.8
Non-native plant cover	3.6	4.0	4.3	4.6	5.0
Native perennial grass cover	2.4	2.7	2.8	2.9	3.0
Quality and availability of food and foraging habitat	8.8	8.8	8.8	8.8	8.8
Quality and availability of shelter	6.1	6.1	6.1	6.1	6.1
Total (out of 70)	**44.30**	**45.80**	**47.1**	**48.5**	**49.90**
Total (out of 10)	**6.33**	**6.54**	**6.73**	**6.93**	**7.13**
Weight (30% weighted)	**1.90**	**1.96**	**2.02**	**2.08**	**2.14**
Site Context (Landscape-scale Attributes)					
Size of patch	10	10	10	10	10
Connectedness	5	5	5	5	5
Context	5	5	5	5	5
Ecological Corridors	4.5	4.5	4.5	4.5	4.5
Threats to the species	5	7	10	12	15
Species Mobility Capacity	8.33	8.33	8.33	8.33	8.33
Total (out of 51)	**37.83**	**39.83**	**42.83**	**44.83**	**47.83**
Total (out of 10)	**7.42**	**7.81**	**8.40**	**8.79**	**9.38**
Weight (30% weighted)	**2.23**	**2.34**	**2.52**	**2.64**	**2.81**
Species Stocking Rate					
Species Stocking Rate (Total out of 40)	30	30	30	30	30
Total (out of 40)	**30**	**30**	**30**	**30**	**30**
Total (out of 10)	**7.50**	**7.50**	**7.50**	**7.50**	**7.50**
Weight (40% weighted)	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**
TOTAL	**7.13**	**7.30**	**7.54**	**7.72**	**7.95**
OFFSET AREA ADJUSTED WEIGHTING^	**7.21**				**8.05**
ROUNDED	**7**	**7**	**8**	**8**	**8**

Note – scores do not match Biocondition whole scores (e.g., 0, 5, 10, 15), as the values presented in the above table are averaged scores over more than one site
^scores per RE weighted per size of polygon.

Regrowth Offset Areas

Table 13 details the start, interim and completion performance criteria for Squatter Pigeon offsets in regrowth REs.

Table 13
Completion criteria for the Squatter Pigeon offset areas in regrowth REs

SQUATTER PIGEON OFFSETS - Regrowth REs

	Start	Interim Performance Targets							Completion
	2025	2026	2027	2028	2029	2030	2035	2040	2045
Site Condition (Site-based Attributes)									
Number of large native trees	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.0	3.5
Tree canopy height	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Tree subcanopy height	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Average canopy height	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Tree canopy cover	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Tree sub-canopy cover	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Average canopy cover	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Coarse woody debris	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Native plant species richness – Grasses	0.0	0.0	0.0	0.0	0.3	0.5	1.0	1.5	2.0
Native plant species richness – Forbs and other	0.0	0.0	0.0	0.0	0.3	0.5	1.0	1.5	2.0
Non-native plant cover	2.3	2.3	2.3	2.7	3.2	3.5	4.0	4.5	5.0
Native perennial grass cover	0.8	0.8	0.8	0.8	0.9	1.1	1.4	1.7	2.0
Quality and availability of food and foraging habitat	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Quality and availability of shelter	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Total (out of 70)	**21.7**	**21.7**	**21.7**	**22.1**	**23.3**	**24.2**	**26.0**	**28.3**	**30.60**
Total (out of 10)	**3.1**	**3.1**	**3.1**	**3.2**	**3.33**	**3.46**	**3.71**	**4.04**	**4.37**
Weight (30% weighted)	**0.93**	**0.93**	**0.93**	**0.96**	**1.00**	**1.04**	**1.11**	**1.21**	**1.31**
Site Context (Landscape-scale Attributes)									
Size of patch	6	6	6	6	6	6	6	6	6
Connectedness	2	2	2	2	2	2	2	2	2
Context	2	2	2	2	2	2	2	2	2
Ecological Corridors	6	6	6	6	6	6	6	6	6
Threats to the species	5	5	5	6	6	7	10	12	15
Species Mobility Capacity	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.67	6.67
Total (out of 51)	**27.33**	**27.33**	**27.33**	**28.33**	**28.33**	**29.33**	**32.33**	**34.67**	**37.67**
Total (out of 10)	**5.36**	**5.36**	**5.36**	**5.55**	**5.55**	**5.75**	**6.34**	**6.80**	**7.39**
Weight (30% weighted)	**1.61**	**1.61**	**1.61**	**1.67**	**1.67**	**1.73**	**1.90**	**2.04**	**2.22**
Species Stocking Rate									
Species Stocking Rate (Total out of 40)	15	15	15	15	18	20	22	25	30
Total (out of 40)	**15**	**15**	**15**	**15**	**18**	**20**	**22**	**25**	**30**
Total (out of 10)	**3.75**	**3.75**	**3.75**	**3.75**	**4.50**	**5.00**	**5.50**	**6.25**	**7.50**
Weight (40% weighted)	**1.50**	**1.50**	**1.50**	**1.50**	**1.80**	**2.00**	**2.20**	**2.50**	**3.00**
TOTAL	**4.04**	**4.04**	**4.04**	**4.13**	**4.47**	**4.77**	**5.21**	**5.75**	**6.53**
OFFSET AREA ADJUSTED WEIGHTING^	**4.04**								**6.53**
ROUNDED	**4**	**4**	**4**	**4**	**4**	**5**	**5**	**6**	**7**

Note – scores do not match Biocondition whole scores (e.g., 0, 5, 10, 15), as the values presented in the above table are averaged scores over more than one site
^scores per RE weighted per size of polygon

4.4 RISK ANALYSIS

A risk analysis has been completed to assess the risks associated with failing to achieve the management objectives provided within this OAMP (Table 14). For each identified risk, the risk level has been determined using the qualitative measures of likelihood and consequence, as defined in the *Commonwealth's Environmental Management Plan Guidelines* 2014 (Department of the Environment, 2014) and also provided below.

Qualitative Measures of Likelihood	
Highly Likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the Project
Possible	Might occur during the life of the Project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

Qualitative Measures of Consequences	
Minor	Minor incident of environmental damage that can be reverse
Moderate	Isolated by substantial instances of environmental damage that could be reverse with intensive efforts
High	Substantial instances of environmental damage that could be reverse with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

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

Table 14
Rick Analysis

	Initial Risk Rating					Residual Risk Rating		
Risk	**Likelihood**	**Consequence**	**Level**	**Actions to Minimise Risk**	**Remedial Actions if Risks Occurs**	**Likelihood**	**Consequence**	**Level**
Failure to achieve offset completion criteria	Possible	Moderate	Medium	• Follow management actions in Table 7 of this OAMP. • Monitor and report on interim performance targets every five years. • Voluntary Declaration under the *Vegetation Management Act 1999 (Qld)* ensures Stanmore are liable for implementing the management actions until completion criteria are achieved.	• Investigate the suitability of management actions and identify appropriate corrective actions. • Implement corrective actions and update OAMP. • Provide additional offsets as required by the Federal Minister or delegate.	Unlikely	Moderate	Low
Failure to achieve interim targets for regrowth offset areas by Year 5	Possible	Moderate	Medium	• Follow management actions in Table 8 of this OAMP. • Monitor and report on interim performance targets every five years for the first five years.	• Implement corrective actions as per Table 8 of this OAMP, including determination of whether additional offsets are required.	Unlikely	Moderate	Low
Alternative Land uses (involving land clearing)	Unlikely	High	Medium	• VDEC used to legally secure the offset area will prevent land clearing. • Landholder/Lessee to enter into an agreement with Stanmore to ensure no land clearing within the offset area. • Access to the site will be restricted to ensure vehicles traversing the access tracks do not make additional tracks.	• Upon being notified of unauthorised clearing, Stanmore to notify the Department within ten business days of clearing. • Determine how this occurred and review access restrictions, inspect signage and fencing. • Regenerate areas if required.	Rare	Moderate	Low
Weed Presence above baseline condition	Likely	High	High	• Management actions within this OAMP developed to include the control of weeds. • Regular inspections to monitor weed presence and inform weed control. • Weed monitoring to provide transparency and compare weed presence over time. • Access to authorised personnel only. Weed hygiene procedures. • Cattle grazing managed to reduce fuel loads. • Pest animal presence controlled.	• Upon becoming aware of a new weed species or outbreak in the offset area, weed control measures are to be implemented within one month. • Review weed hygiene procedures to ensure compliance • Review timing and frequency of weed control programs • Implement alternative weed control if required.	Unlikely	Moderate	Low
Pest animal presence above baseline condition	Possible	Moderate	Medium	• Management actions within this OAMP developed to include the control of pest animals. • Regular inspections planned to monitor pest animal presence throughout each year, which will inform active management of pest animals within the offset area. • Pest animal monitoring incorporated in OAMP to provide transparency and compare pest animal presence over time.	• Upon becoming aware of the presence of feral animals, pest control measures are to be implemented. • Review animal management actions. • Investigate potential sources of pest animals and rectify as necessary. • Increase frequency of control measures as necessary.	Unlikely	Minor	Low

	Initial Risk Rating					Residual Risk Rating		
Risk	**Likelihood**	**Consequence**	**Level**	**Actions to Minimise Risk**	**Remedial Actions if Risks Occurs**	**Likelihood**	**Consequence**	**Level**
Fire	Possible	Major	High	• Maintaining fire management lines in the offset area. • Regular inspections of fire management lines, and maintenance completed as required. • Manage fuel loads through strategic grazing during the late dry season. • Active fire management in the offset area, to reduce fuel loads.	• If an uncontrolled fire has occurred an assessment by a suitably qualified ecologist is required to determine damage extent and provide recommendations for remediation. • Recommended remediation actions implemented. • Fire management strategy to be reviewed. • Inspect all fire management lines and repair. • Implement maintenance procedures as necessary.	Possible	High	Medium
Grazing, degrading habitat	Possible	Moderate	Medium	• Grazing will be selectively excluded from the offset area during the wet season. • Offset area will be fenced. • Strategic grazing only in dry season to reduce fuel loads, which will reduce the risk of unplanned fire in the offset area. • Fencing to be inspected regularly and maintained in a stock proof condition.	• Cattle to be removed, and any entry points due to fencing breaks etc., to be repaired to a stock proof condition as soon as possible. • Review livestock management practices, including stocking rates in the offset area. • Construct additional fencing if required.	Unlikely	Minor	Low
Erosion	Possible	Minor	Low	• Active weed control to reduce non-native groundcover, which will increase native groundcover and promote regeneration of native tree species. • Rotational grazing in the offset area during the dry season. When grazing implemented, this only occurs under strict circumstances when the groundcover biomass is >1500kg/ha. Stocking rates monitored and stock removed once biomass reduced to <1500kg/ha.	Inspections to identify the cause of any point source erosion and rectifying the issue.	Unlikely	Minor	Low
Cyclone	Possible	High	Medium	• No direct risk minimisation possible. • Indirect risk management to include: o Active weed control to increase native groundcover in degraded areas to reduce risk of soil loss and bank failure during extreme events. This promotes regeneration of native tree species which assists in stabilising banks subject to flooding. o Exclude grazing during wet season months, allows native plants within the offset area to establish healthy root systems to minimise risk of loss during extreme events.	• If a cyclone event has impacted the offset area, an assessment to be undertaken to determine extent of damage and provide recommendations for remediation actions to be implemented. • Implement recommended remediation actions (e.g., erosion and sediment control as needed to stabilise areas; bank stabilisation works as required; repair and maintenance of fencing.	Possible	Moderate	Medium
Heavy rain/Flood	Possible	High	Medium	As above.	As above	Possible	Moderate	Medium

	Initial Risk Rating					Residual Risk Rating		
Risk	**Likelihood**	**Consequence**	**Level**	**Actions to Minimise Risk**	**Remedial Actions if Risks Occurs**	**Likelihood**	**Consequence**	**Level**
Drought	Possible	High	Medium	• Maintain fire management lines • Manage grazing within offset areas, during the dry season according to the amount of groundcover biomass.	• Allow offset area to recover post drought/fire, particularly through the control of weeds. • Maintain higher levels of groundcover at the end of the dry season.	Possible	Moderate	Medium
Death or injury of native fauna due to entanglement in barbed wire	Possible	Moderate	Medium	• Fencing to be constructed 1.4m high, with the bottom wire set 350mm from ground to allow access by native wildlife, and top wire to be plain wire to reduce Greater Glider entanglement risk. • Existing top strain wire to be replaced with plain wire for fences around and within the offset area.	• Inspections to identify cause of entanglement. Implement appropriate corrective actions such as decommissioning fence, replacing with plain wire etc.	Unlikely	Moderate	Low

MONITORING PROGRAM

5.1 MONITORING

Ongoing monitoring is required to ensure the OAMP achieves the objectives and the completion criteria. Monitoring activities have been designed to measure how successful the OAMP is. The monitoring methods have been developed to specifically assess the interim performance targets and completion criteria and will determine whether these are being achieved or whether corrective actions need to be implemented.

The monitoring proposed uses best practice methodologies to quantitatively assess the habitat quality of the Koala, Greater Glider and Squatter Pigeon habitat within the offset area over time. This allows collected data to be comparable to track the progress towards the completion criteria. The objectives of the monitoring program are to:

- Evaluate the performance of the OAMP against the interim performance targets and completion criteria.
- Detect triggers for remedial actions and allow for the timely implementation of corrective actions.
- Inform amendments of the OAMP to ensure continued compliance toward the completion criteria.

The monitoring program includes:

- Baseline surveys for habitat quality, targeted fauna, and weed and pest identification and mapping.
- Installation of nest boxes suitable for Greater Gliders in regrowth habitat
- Habitat quality assessments and photo monitoring.
- Monitoring of usage of nest boxes.
- Weed and pest animal monitoring.

These monitoring events and associated reporting are to be undertaken by a suitably qualified ecologist. Table 16 describes the proposed monitoring actions, best practice methods to be used, site locations, monitoring frequency, responsibility and reporting requirements.

5.2 INSPECTIONS

Alongside monitoring events, regular inspections of the offset area will be undertaken by the land manager or appointed offset area manager to ensure compliance with the management actions. Such inspections will assess but may not be limited to fencing, signage, grazing, firebreaks and access tracks, weather damage and incidental weed and pest animal identification. Table 15 outlines the inspections required and the timing of these inspections. Further details regarding the inspections have been detailed in Table 16.

Table 15 Inspection Timetable

Timing	Inspection Details
Annual Inspections	Fence lines and gates to ensure they are in a serviceable condition.
Biannual (post wet season, and late dry season)	• Access track inspections to be undertaken to monitor weed spread. • Fire management line inspections to determine if maintenance required. • Weed and pest inspections to inform control programs. • Checks that natural regeneration is occurring where weed control has been undertaken. • Checks on active regeneration in connectivity areas to determine success and whether follow up planting is required.
Pre dry season (Feb-Apr)	Fuel loads to be monitored to determine grazing requirements for the offset area.
Routine determined by fuel load and planned stocking rate.	• If grazing is occurring in the offset area – fence lines to be inspected fortnightly. • If grazing in the offset area to reduce fuel loads during the dry season, regular inspections to be conducted to ensure areas are not being overgrazed.
Event based inspections	• Storm/floods/cyclones - one week after event (if safe) conduct a fence line inspection. • Drought – inspection of fence lines to be undertaken in line with stocking plan for neighbouring paddocks.

Table 16 Monitoring Method and Schedule

Frequency	Monitoring Action	Frequency	Details	Sites	Locations	Responsibility	Reporting
BASELINE SURVEY (YR 1), YRS 3, 5, 7, 10, 13, 15, 17, 20	Habitat Quality Assessments	• Late wet season (March -May) • Baseline in Year 1 • Monitoring in Years 2, 3, 4, 5, 7, 10, 12, 15, 17 and 20	Permanent habitat monitoring points to be established during the baseline survey in the offset area. Monitoring points to be located to capture an accurate representation of the condition of the REs within the offset area. Habitat monitoring points to be demarcated with a capped stake, at the start point (a second capped stake to be placed at the central point for the 100m transect for BioCondition assessments). The finalised locations will be recorded in the baseline Ecological Condition Assessment Report, and the OAMP updated to include. All subsequent monitoring events to be undertaken at the same locations. ***Methods*** The habitat quality score for an area of threatened species habitat is a measure of how well a particular site supports the species and contributes to its ongoing viability. There are three components that contribute to the calculation of habitat quality, and they are site condition, site context, and species stocking rates, as defined in the Commonwealth's *How to Use the Offsets Assessment Guide* (Department of Climate Change, Energy, the Environment and Water, 2024). The *EPBC Act Environmental Offsets Policy* and *How to Use the Offsets Assessment Guide* do not provide habitat quality survey guidelines or a methodology on how to calculate the habitat quality scores other than identifying that the impact and offset areas should determine habitat quality scores using the same methodology. Hence, habitat quality scores are to be calculated for the offset area using the methodology described in the Offset Ecological Assessment Report (Appendix C), which includes • Site condition and site context scores calculated in accordance with the *Queensland BioCondition survey methodology* (Queensland Herbarium, 2015) and a modified methodology for species habitat indices from the Queensland *Guide to Determining Terrestrial Habitat Quality version version 1.3* (Department of Environment and Science, 2020). • Species stocking rate is a measure of the presence of a species at the offset site and its role in the overall species population viability or community extent. Species stocking rates are determined using a score from 0-4, with 0 being poor presence and extent with minimal value to the greater species population viability, and 4 being high presence and extent with high value to the overall population viability. These three components (site condition, site context and species stocking rate) contribute to the final habitat quality score, with weightings given depending on the ecological requirements of the impacted species. For threatened species at Hamilton Park, the species stocking rate should be given a greater weighting, as the stocking rate is what contributes to the long-term viability of the species and ensures flow-on effects to connected habitats, with larger well-connected populations having higher value. Therefore, site condition is to be weighted 30%, site context weighted 30%, and species stocking rate weighted 40% for the final habitat quality scores. The final habitat quality scores are to be derived by adding the weighted values (out of 10) for site condition, site context and species stocking rates together.	The number and location of habitat monitoring points will be determined based on the number of sampling sites required in accordance with the *Guide to Determining Terrestrial Habitat Quality (version 1.3),* to assess any variation in condition of Assessment Units across the offset site: • 0-50ha = At least two • 50-100ha = Three • 100-500ha = Four • 500-1000ha = Five • >1000ha = Six	To be advised following the baseline survey.	Suitably qualified person e.g., ecologist, botanist.	**Ecological Condition Assessment Report** An Ecological Condition Assessment Report to be completed following each monitoring event. The Ecological Condition Assessment Report to include: • Timing of survey. • Details of personnel who completed the survey. • Location and maps of survey sites. • Results of the habitat quality assessments and relevant photographs. • Summary data from all previous years, that are presented as a trend analysis for each of the measured attributes. This will be used to assess progress towards achieving the completion criteria. • Recommendations for amendments to management actions should interim performance targets not be met.
	Photo point monitoring	• To coincide with the Habitat Quality Assessments • Late wet season (March -May) • Baseline and establishment of permanent photo monitoring points in Year 1 • Years 2, 3, 4, 5, 7, 10, 12, 15, 17 and 20	Photo monitoring is a qualitative analysis technique that provides a visual time series of the changes in vegetation composition and structure over time. Permanent photo monitoring points will be established at the start of each habitat quality assessment monitoring point within the offset area described above. Five photos at each monitoring point will be taken - at north, south, east, west and a ground photo of a representative area of cover and composition over the general area. Photos to be taken from 1.5m above the ground.	As above	As above	Suitably qualified person e.g., ecologist, botanist.	**Ecological Condition Assessment Report** The Ecological Condition Assessment to be completed following each monitoring event The Ecological Condition Assessment Report to include all photographs from each of the photo point monitoring locations, with comparison against previous years. This will be used to assess progress towards achieving the completion criteria.
	Fauna Monitoring	• To coincide with the Habitat Quality Assessments • Late wet season (March -May) to correspond with peak species activity and detectability • Baseline in Year 1 • Monitoring in Years 2, 3, 4, 5, 7, 10, 12, 15, 17 and 20	Targeted fauna surveys to determine any change in the abundance or distribution of MNES in the offset area.. Targeted fauna surveys will include: • Koala – spotlighting, scat and sign searches, call playback • Greater Glider - spotlighting • Squatter Pigeon – diurnal bird surveys early morning and late afternoon, flushing surveys, driving surveys, camera traps near waterholes. Surveys to be undertaken by suitably qualified ecologists generally during the late wet season (nominally March/April/May) which corresponds to peak species activity and detectability.	Surveys should be undertaken by two ecologists over a five-night period. Designated areas for flushing surveys and spotlighting (e.g., covering 250ha per day/night) should be defined during the baseline survey.	Whole offset area	Suitably qualified person e.g., ecologist	**Ecological Condition Assessment Report** An Ecological Condition Assessment Report to be completed following each monitoring event. The Ecological Condition Assessment Report to include: • Timing of survey. • Details of personnel who completed the survey. • Location of designated survey areas, and maps of sightings and survey effort. • Estimates of density of Koala, Greater Glider and Squatter Pigeon throughout the offset areas. • Summary data from all previous years to assess whether species usage of the offset area may be increasing

Frequency	Monitoring Action	Frequency	Details	Sites	Locations	Responsibility	Reporting
BASELINE SURVEY (YR 1), YRS 5, 10, 15, 20	Nest Box Monitoring	• Year 1 - Initial Survey • Year 2 - Installation • Biannual monitoring and maintenance (late wet season and late dry season) Years 3, 4, 5, 6, 7. Afterwards a review will determine further frequency of monitoring.	Nest boxes will be installed 1 per 4ha in the Greater Glider regrowth offset area (~85 nest boxes per 338ha offset area for Greater Gliders). Regular inspection and maintenance of the nest boxes to be completed with any too damage for repair to be replaced. ***Initial Survey*** Initial survey to be completed to confirm appropriate locations for nest boxes Nest boxes to be installed by Year 2. ***Installation*** Installation using an elevated work platform (EWP) with a suitably qualified person. Each nest box to be assigned a number for monitoring purposes. Records such as next box identification number, nest box type, GPS location, host tree species, Tree diameter at breast height (DBH), nest box height and orientation to be undertaken. ***Monitoring*** Monitoring of nest boxes to occur via pole mounted camera, direct access via ladder or EWP. Bi-annual monitoring and maintenance to take place for the first five years. Following this, and a review of the monitoring results, will determine the ongoing monitoring and maintenance requirements.	To be determined in Year 1 Initial survey	Whole 338ha Greater Glider offset area	Suitably qualified person e.g., ecologist	**Nest Box Monitoring Report** • Initial records to include nest box identification number, nest box type, GPS location, host tree species, Tree diameter at breast height (DBH), nest box height and orientation. • Biannual monitoring records to include: o Weather conditions during survey o identification number, nest box type, GPS location, host tree species, Tree diameter at breast height (DBH), nest box height and orientation. o Evidence of usage including species identification, presence of nest material, number of fauna using the box. o Whether maintenance was completed. o Presence of pest species utilising the box and whether follow up controls are required. o Any recommendations for maintenance, inspections or monitoring. • Nest box survey data will be used to determine: o Whether the target species is utilising the box, including for breeding. o Occupancy rates, frequency of use, proportion of use by different species, pattern and timing of use.
	Weed Monitoring	• Permanent weed monitoring plots to be established in Year 1 • Baseline in Year 1, • Monitoring in Years 2, 3, 4, 5, 10, 15 and 20	A baseline weed survey to be conducted within the offset area to identify weed species, map the locations of major infestations and develop a plan for the initial weed management. Following the baseline weed survey, weed control to be initiated as early as practicable. Permanent weed monitoring plots will be one hectare in size and demarcated with a capped stake, at the start point, and will be established in the following locations: • Randomly placed throughout the offset area to represent particular REs. Sites to be placed to show natural variability of the land, incorporating different aspects. • Within strategic trafficable areas – entry gates, creek crossings, fire management lines to monitor the establishment of new weed species. ***Plot transect*** 3 x 100m transects, spaced 50m apart, placed in an east/west direction. At every 10m interval, using a 1m x 1m quadrat the following data is collected: • Weed species • Cover estimates ***Photo Monitoring*** At the plot marker, five photos to be taken - north, south, east, west and a ground photo of a representative area of cover and composition over the general area. Photos to be taken from 1.5m above the ground. ***Incidental Observations*** Outside of plot-based monitoring, notable weed presence to be recorded including location, species, estimated cover and extent. This includes any new species, new weed outbreaks or areas of significant weed cover.	Minimum 1 site per 100ha	To be advised following the baseline survey	Suitably qualified person e.g., ecologist, botanist.	**Ecological Condition Assessment Report** The Ecological Condition Assessment to be completed following each monitoring event. This report to include all weed data collected including photographs from each of the weed monitoring locations, with comparison against previous years. Results to be reported include: • Total weed cover to be reported as either 0%, 0-5%, 6-25%, 26-50% or 51-100%. • Average cover for each weed species to be determined over the one-hectare plot by averaging the data from the 30 quadrats. • Mean cover scores across offset area weed monitoring plots. These data will be used to inform the weed control and management, provide recommendations for areas requiring immediate action, and results will assess progress towards achieving the completion criteria.
	Pest Animal Monitoring	Ongoing by site personnel	During the completion of the above surveys, incidental records of any pest animals, signs and tracks are to be recorded and photographed where possible. Pest animals of concern within the offset area are pigs, wild dogs and rabbits. Any evidence of pest species will inform the pest control program. Incidental records of pest species should also be taken during routine inspections by onsite personnel to ensure ongoing active management .	Incidental throughout whole offset area	Offset area	Suitably qualified person e.g., ecologist, botanist.	**Ecological Condition Assessment Report** The Ecological Condition Assessment to be completed following each monitoring event. This report to include any evidence of pest species and recommendations for control. **Annual Compliance Report** All inspections identifying infestations and treatment applied should be reported in the Annual Compliance Report

REPORTING

6.1 DATA MANAGEMENT

Stanmore SMC are responsible for overseeing the monitoring activities required under this OAMP and will maintain accurate and up to date data records to confirm compliance with the OAMP.

6.2 ECOLOGICAL CONDITION ASSESSMENT REPORT

Following the completion of each monitoring event, the consultant engaged is to provide a monitoring report that outlines the results of each monitoring survey. This Ecological Condition Assessment Report will be developed in **Years 1, 2, 3, 4, 5, 7, 10, 13, 15, 17 and 20** and include results of the following surveys:

- Habitat Quality Assessments
- Targeted Fauna Assessments
- Photo point surveys.
- Weed and pest monitoring surveys.

The baseline Ecological Condition Assessment Report is to be developed following the baseline surveys in Year 1 and is to incorporate species-specific treatment and control methods for weed and pest species observed on the site, which will inform control programs within the offset areas.

For all subsequent Ecological Condition Assessment Reports, these need to comply with condition 12 of the EPBC Approval (2017/7957, variation of conditions, dated 6 August 2021), and be submitted to the department. A reporting schedule is provided in Table 17 below.

> *Condition 12. The approval holder must submit a report prepared by a suitably qualified ecologist for each approved offset area, for the written approval of the Minister, that:*
>
> 1. *Describes the habitat quality of each approved offset area for Listed threatened species and communities and provides evidence demonstrating that the performance criteria required under condition 11.f. for each approved offset area have been achieved; and*
> 2. *To the extent that it cannot be demonstrated that the performance criteria required under condition 11.f. have been achieved, the report must:*
>   - *i. Include a review of the effectiveness of relevant management practices;*
>   - *ii. Specify commitments as to the additional actions that will be implemented to ensure the performance criteria are achieved;*
>   - *iii. Set out the timeframe within which any unmet performance criteria will be achieved; and*
>   - *iv. Specify commitments to provide further offsets if the performance criteria cannot be achieved for the approved offset area/s required under condition 5 and/or approved under condition 8.*

The report must be submitted electronically to the Department within **three months of every monitoring event**.

6.3 NEST BOX MONITORING REPORT

Following the completion of the biannual nest box monitoring, the consultant engaged is to provide a monitoring report that outlines the results of each monitoring survey. The Nest Box Monitoring Report will be development **bi-annually in Years 2, 3, 4, 5, 6** and thereon depending on a review into ongoing frequency required.

6.4 ANNUAL COMPLIANCE REPORTS

Approval conditions require compliance to be monitored, recorded and provided to the Department on request.

> *Condition 15. The approval hold must maintain accurate and complete compliance records.*
>
> *Condition 20. The approval holder must prepare a compliance report for each 12-month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must:*
>
> *(a) Publish each compliance report on the website within 20 business days following the relevant 12-month period;*
>
> *(b) Notify the Department by email that a compliance report has been published on the website and provide the weblink for the compliance report within 5 business days of the date of publication, and provide a link to the location of the published report;*
>
> *(c) Keep all compliance reports publicly available on the website until the period of effect of this approval has expired;*
>
> *(d) Exclude or redact sensitive ecological data from compliance reports published on the website; and*
>
> *(e) Where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication.*

To fulfill these conditions, an Annual Compliance Report is to be written to include a summary on performance of the OAMP on an annual basis for the period of the offset. Each Annual Compliance Report will include the following information as a minimum:

- Summary of the monitoring results for any monitoring undertaken within that year period, with monitoring reports (described above) to be included as appendices.
- Recommendations for modifications to the OAMP or weed and pest control programs.
- Assessment of progress toward completion criteria.
- Reporting of any incidents.
- Description of any new risks or potential threats to the offset area and recommended actions to be undertaken to manage these threats or risks.
- Details of any routine inspections, control programs implemented etc.

The reporting schedule is provided in Table 17. Annual Compliance Reports to be developed and provided to the Department within **20 business days from the relevant twelve-month anniversary** of the commencement of the approved OAMP.

6.5 OAMP REVIEWS

This OAMP, once approved, will remain effective for the life of the approval but will be continually updated whenever required to ensure it contains best practice information and is keeping the completion criteria on target.

Reviews of the OAMP will take place to ensure the OAMP is achieving its objectives and the requirements of the EPBC Approval conditions. The OAMP, including management actions, monitoring and reporting requirements, and remedial actions, will be reviewed under the following circumstances:

- Following the baseline or initial surveys – the OAMP will be updated to include actual survey site locations, locations of nest boxes, and refine any monitoring or management actions if required.
- Following each round of monitoring and amended as necessary to incorporate any changes identified through management activities, site visits, routine inspections and monitoring activities. Such amendments could include the revision of current management actions and programs to ensure completion criteria are on target, changes to inspection timeframes, responses to adaptive management triggers, inclusion of new threats, and inclusion of recommendations or amendments to the monitoring program or reporting schedule to meet any updates to best practice monitoring methodologies.
- Following any incident or non-compliance event to improve performance.
- On request by the Department.

6.6 INCIDENTS AND NON-COMPLIANCE

As per condition 21 and 22 of the approval, Stanmore is required to notify the Department in writing of any incident or non-compliance. The conditions state:

Condition 21: The approval holder must notify the Department in writing of any: incident, non-compliance with the conditions, or non-compliance with the commitments made in plans. The notification must be given as soon as practicable, and no later than 2 business days after becoming aware of the incident or non-compliance. The notification must specify:

1. *any condition which is or may be in breach;*
2. *a short description of the incident and/or non-compliance; and*
3. *the location (including co-ordinates), date and time of the incident and/or non-compliance.*

Condition 22: The approval holder must provide to the Department the details of any incident or non-compliance with the conditions or commitments made in plans as soon as practicable and no later than 10 business days after becoming aware of the incident or non-compliance, specifying:

(a) Any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;

(b) The potential impacts of the incident or non-compliance; and

(c) The method and timing of any remedial action that will be undertaken by the approval holder.

6.7 AUDITS

As per condition 23 – The approval holder must ensure that independent audits of compliance with the conditions are conducted when requested in writing by the Minister. On request by DCCEEW, Stanmore will organise independent external audits to be conducted by suitably qualified personnel, and an External Audit Report conforming compliance with EPBC Act Approval conditions will be developed. This External Audit Report will comply with conditions 24 – 26 stated below.

Condition 24. For each independent audit, the approval holder must:

(d) Provide the name and qualifications of the independent auditor and the draft audit criteria to the Department;

(e) Only commence the independent audit once the audit criteria have been approved in writing by the Department; and

(f) Submit an audit report to the Department within the timeframe specified in the approved audit criteria.

Condition 25. The approval holder must publish the audit report on the website within 10 business days of receiving the Department's approval of the audit report and keep the audit report published on the website until the end date of this approval.

Condition 26. Within 30 days after the completion of the action, the approval holder must notify the Department in writing and provide completion data.

Table 17 Reporting Schedule

YEARS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ecological Condition Assessment Report	✓	✓	✓	✓	✓		✓			✓			✓		✓		✓			✓
Nest Box Monitoring Report		2x	2x	2x	2x	2x	To be reviewed													
Annual Compliance Report	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External Audit Report	As requested by DCCEEW																			

GLOSSARY

Table 18 Glossary

Term	Definition
Adaptive Management	A procedure for implementing management actions while learning which actions are most effective at achieving the management objectives and which require modifying to improve outcomes.
Approved conservation advice	A conservation advice document for a EPBC listed threatened species approved by the Minister under section 266B(2) of the *EPBC Act.*
Biodiversity corridor	Vegetated corridors made up of areas with ecological values which should be maintained, and degradation or habitat loss avoided.
Completion criteria	Time-bound values, specified for measurable attributes that, if attained and maintained, ensure the OAMP's management objectives have been achieved.
Compliance records	All documentation or data required to demonstrate fulfilment of conditions of an approval.
Connectivity	Connection between habitats, fundamental for supporting biodiversity and ecosystem processes.
Department	The Australian Government agency responsible for administering the *EPBC Act.*
Environmental Management Plan Guidelines	The Environmental Management Plan Guidelines (Department of the Environment, 2014)
Environmental Offsets Policy	*EPBC Act Environmental Offsets Policy 2012,* including the Offset Assessment Guide.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Cth)*
Greater Glider *(Petauroides volans)* habitat	The EPBC listed threatened species as described in the Approved Conservation Advice for the Greater Glider, *Petauroides volans* (Department of Climate Change, Energy, the Environment and Water, 2022)
Habitat Quality	The quality of a site to support a listed threatened species or ecological community. Determined by assessing habitat attributes for examples species richness, height and cover.
Habitat quality score/s	Habitat quality score means the score out of 10 which is input into the Offsets Assessment Guide calculator based on an assessment of the habitat quality and must be consistent with the *Environmental Offsets Policy 2012 (Cth).* The score is a measure of how well a particular site supports a particular listed threatened species or ecological community and contributes to its ongoing viability. The quality consists of three components: site condition, site context, and species stocking rates, as described in the Department's Offsets Assessment Guide.
Incident	Any event which has the potential to, or does, impact on one or more protected matters.
Independent external audit	An audit conducted by an independent and suitably qualified person as detailed in the *EPBC Act Independent Audit and Audit Report Guidelines 2015.*
Interim Performance Targets	Time-bound short-term targets, used to evaluate progress toward completion criteria and to inform amendments to management actions where required to improve progress.
Koala (Phascolarctos cinereus) habitat	The EPBC listed threatened species as described in the Approved Conservation Advice for the Koala, *Phascolarctos cinereus* (Department of Agriculture, Water and the Environment, 2022)
Legally securing	Securing a legal agreement under relevant Queensland legislation, in relation to a site, to provide enduring protection for the site against development incompatible with conservation.
Management Actions	Management actions represent methods aimed at addressing management objectives, achieved by meeting interim performance targets and ultimately attaining completion criteria

Term	Definition
Management objectives	Statements identifying achievable environmental outcomes of the OAMP. Achieved by implementing appropriate management actions.
Minister	The Australian Government Minister administering the *EPBC Act* including any delegate thereof.
Monitoring	A combination of qualitative and quantitative methodologies that produce measurable attributes to confirm whether management actions are meeting interim performance targets and/or attaining completion criteria.
Monitoring data	The data recorded during monitoring events, under the conditions of an approval.
Offset Area	The extent of habitat for the relevant offset matter that will be managed and legally secured to meet offset obligation.
Offsets assessment guide	The guidance document titled How to use the Offsets Assessment Guide provided by the Department to assist implementation of the *Environmental Offsets Policy 2012 (Cth).*
Offset matters	The relevant protected MNES and MSES that requires offsetting due to impacts from development.
Remedial action	A feasible management action undertaken where an adaptive management trigger is identified, an interim performance target is not met, or completion criteria not attained or maintained.
Squatter Pigeon (Geophaps scripta scripta) habitat	The EPBC listed threatened species as described in the Approved Conservation Advice for the Squatter Pigeon, *Geophaps scripta scripta* (Threatened Species Scientific Committee, 2015)
Suitably Qualified Ecologist	A person who has professional qualifications and at least three years of work experience designing and implementing surveys for listed threatened species and communities and can give an authoritative assessment and advice on the presence of the Listed threatened species and communities using relevant protocols, standards, methods or literature. If the person does not have appropriate professional qualifications, the person must have at least five years of work experience designing and implementing surveys for Listed threatened species and communities.
Suitably Qualified Person	A person who has professional qualifications, training, skills or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.
Threat abatement plans	A threat abatement plan made or adopted by the Minister under the E*PBC Act.*

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Map 1 Threatened Species Offset Areas

Map 2 Hamilton Park Connectivity

Map 3 Offset Area for Koala habitat

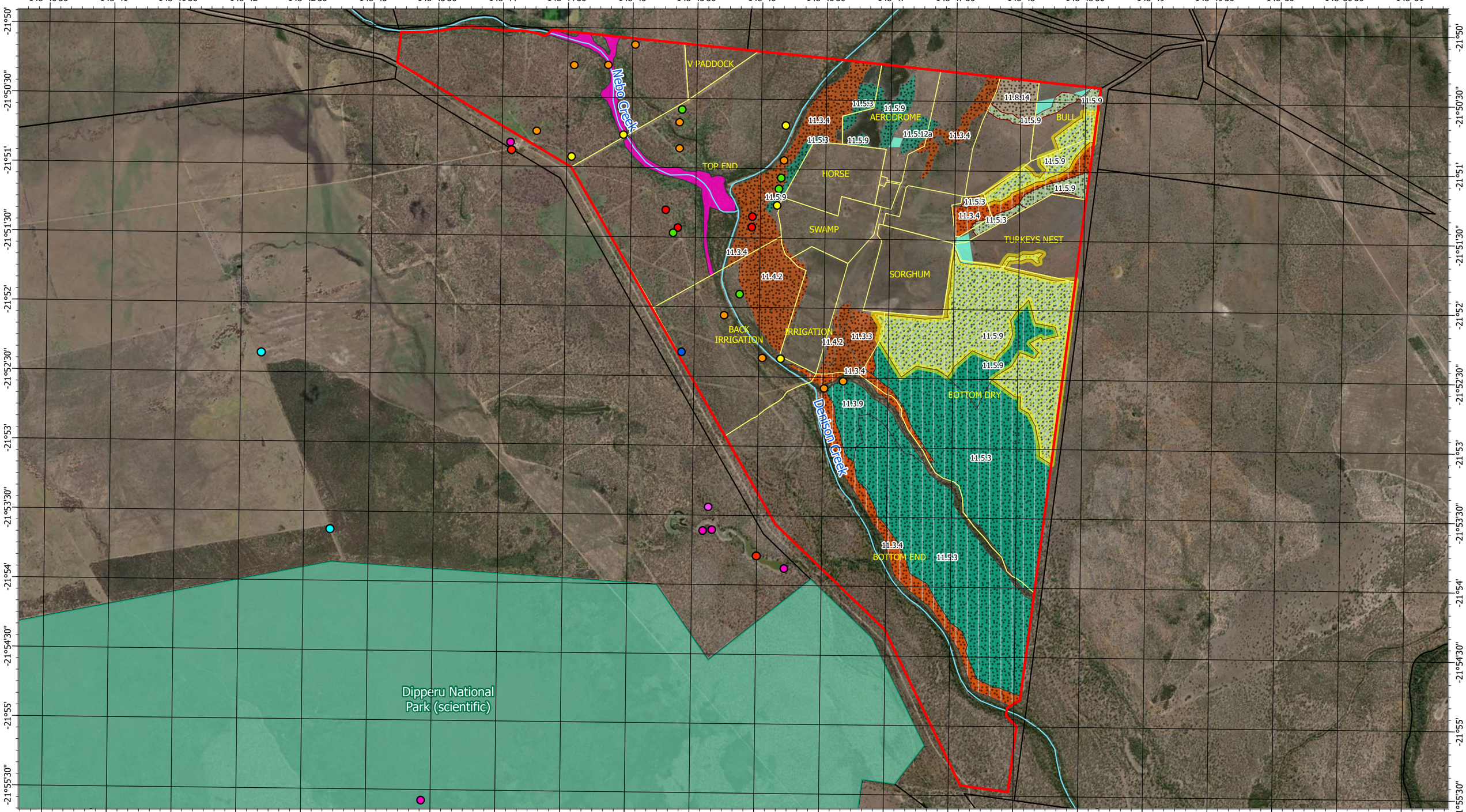
Map 4 Offset Area for Greater Glider habitat

Map 5 Offset Area for Squatter Pigeon habitat

Map 6 Existing and proposed watering points

APPENDIX A

MAPS



Legend

- Land parcel
- Stanmore Holdings
- Braeside Paddocks
- ML permit granted
- Black Ironbox Offset Extent (61.2 ha) (pending DCCEEW approval)
- Connectivity area (13 ha)
- Greater Glider habitat (338 ha HVR)
- Koala habitat (416 ha HVR, 1254 ha Remnant)

Squatter Pigeon habitat

- MRA2C (390 ha HVR 906ha Remnant)

Offset Area Records

Species

- Greater Glider
- Koala
- Koala scratches/scats
- Squatter Pigeon

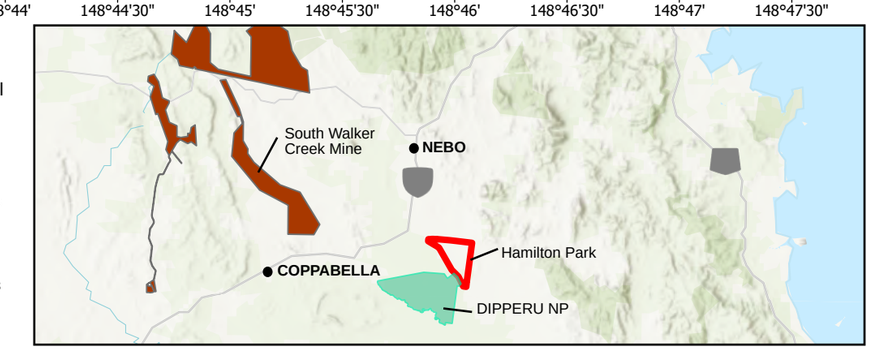
Other Species Records

- Koala - ALA
- Koala - Eco Logical 2017
- Squatter Pigeon - ALA or essential habitat database

Ground Truthed Regional Ecosystems

Vegetation Category

- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing of concern
- Category C or R that is of least concern



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS, Earthstar Geographics, Esri, USGS

MRA2C EPBC Act Offsets

Map 1 - Co-located offset areas on the Hamilton Park property for Koala, Greater Glider and Squatter Pigeon habitat

Trend Environmental Consultants

0 1 2 Kilometers

N

Scale: 1:47,000

ABN 43 622 414 046
94 Kennedy Esplanade South Mission Beach, QLD 4852

Prepared: MG
Checked: EK

Date: 26 Mar 2024

Coordinate System: GDA 1994 MGA Zone 55

Data presented is for information only, and is not to be used for navigation.
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Carborough Range
Nebo Creek
Oxford Downs - Sarina Road
Denison Creek
Rosedale State Forest
Peak Downs Highway
Dipperu National Park (scientific)
Tierawoomba State Forest
Marlborough - Sarina Road
Connors River
Fitzroy Dev Road
Peak Downs - Dysart Road

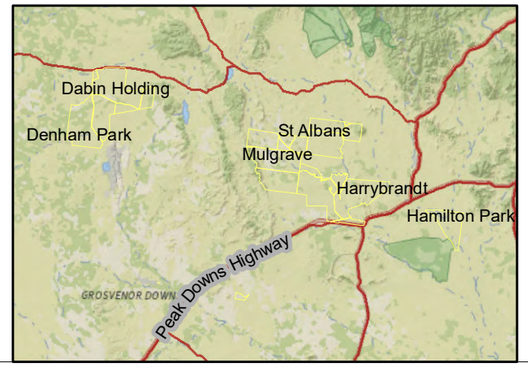
Source:
Cadastral Boundaries, National Park and State Forest tenure and BHP Holdings from QLD_CADASTRE_DCDB© State of Queensland (Department of Resources) 2022
Vegetation_management_watercourse_and_drainage_feature_map_100K© State of Queensland (Department of Resources) 2022
Mining Lease areas from Mining_lease_surface_areas.shp © State of Queensland (Department of Resources) 2022
Statewide Biodiversity Corridors from Statewide_Corridors_v1_6.gdb © State of Queensland (Department of Resources) 2023
Remnant Vegetation Extent from Regional Ecosystems (V12.2) © State of Queensland (Department of Resources) 2022
Aerial imagery from ESRI service layers

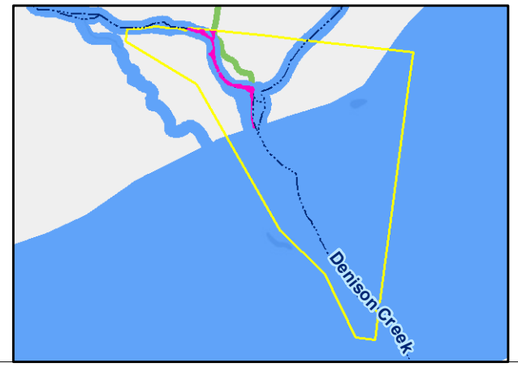
Legend

- Property Boundaries
- Stanmore Holdings
- Major Roads
- Watercourse
- Black Ironbox Offset Extent (49.8 Ha)
- Dipperu National Park
- Rosedale State Forest
- Tierawoomba State Forest
- Remnant Vegetation Extent

Statewide Biodiversity Corridors

- Regional
- State





MRA2C EPBC Act Offsets

Map 2 - Connectivity Areas

0 5 10 20
Kilometers

Scale: 1:300,000 at A3

Coordinate System: GDA2020 MGA Zone 55

N

Prepared for Trend Environmental

Trend Environmental Consultants

ecoSpatial

Produced by
Ecospatial Pty. Ltd.
www.ecospatial.com.au
info@ecospatial.com.au

Version: 1.0
Date Edited: 13/01/2023 Edited by: MG

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-21°50' -21°50'30" -21°51' -21°51'30" -21°52' -21°52'30" -21°53' -21°53'30" -21°54' -21°54'30" -21°55' -21°55'30"

V PADDOCK
Nebo Creek
TOP END
HORSE
SWAMP
SORGHUM
AERODROME
BULL
TURKEYS NEST
BACK IRRIGATION
IRRIGATION
BOTTOM DRY
BOTTOM END
Denison Creek
Dipperu National Park (scientific)

11.3.4 11.5.3 11.5.9 11.5.12a 11.8.14 11.4.2 11.3.3

Legend

- Land parcel
- Stanmore Holdings
- Braeside Paddocks
- ML permit granted
- Black Ironbox Offset Extent (61.2 ha) (pending DCCEEW approval)
- Connectivity area (13 ha)
- Koala habitat (416 ha HVR, 1254 ha Remnant)

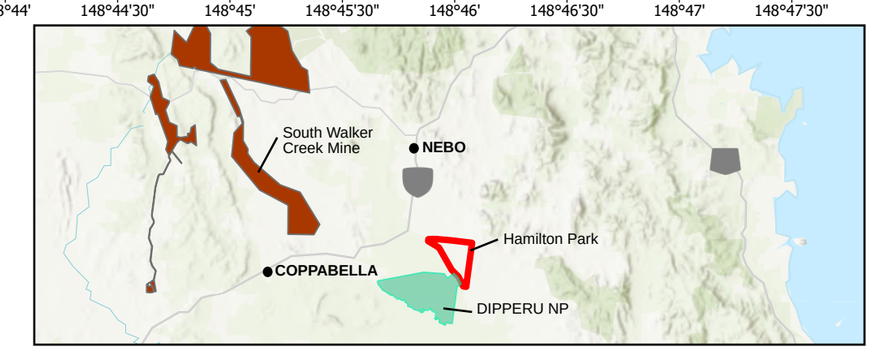
Offset Area Records

Trend Environmental
- Koala
- Koala scratches/scats

Other Species Records
- Koala - ALA or essential habitat database
- Koala - Eco Logical 2017

Ground Truthed Regional Ecosystems

Vegetation Category
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing of concern
- Category C or R that is of least concern



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, CGIAR, Maxar

MRA2C EPBC Act Offsets - Koala

Map 3 - Offset areas for Koala habitat on the Hamilton Park property

Trend Environmental Consultants

0 1 2 Kilometers

N

Scale: 1:47,000

Prepared: MG
Checked: EK

Date: 26 Mar 2024

Coordinate System: GDA 1994 MGA Zone 55

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-21°50' -21°50'30" -21°51' -21°51'30" -21°52' -21°52'30" -21°53' -21°53'30" -21°54' -21°54'30" -21°55' -21°55'30"

V PADDOCK
Nebo Creek
AERODROME
BULL
11.5.9
TOP END
HORSE
SWAMP
TURKEYS NEST
SORGHUM
BACK IRRIGATION
IRRIGATION
11.5.9
BOTTOM DRY
Denison Creek
BOTTOM END
Dipperu National Park (scientific)

148°40'30" 148°41' 148°41'30" 148°42' 148°42'30" 148°43' 148°43'30" 148°44' 148°44'30" 148°45' 148°45'30" 148°46' 148°46'30" 148°47' 148°47'30" 148°48' 148°48'30" 148°49' 148°49'30" 148°50' 148°50'30" 148°51'

Legend

- Land parcel
- Stanmore Holdings
- Braeside Paddocks
- ML permit granted
- Black Ironbox Offset Extent (61.2 ha) (pending DCCEEW approval)
- Connectivity area (13 ha)
- Greater Glider habitat (338 ha HVR)

Offset Area Records

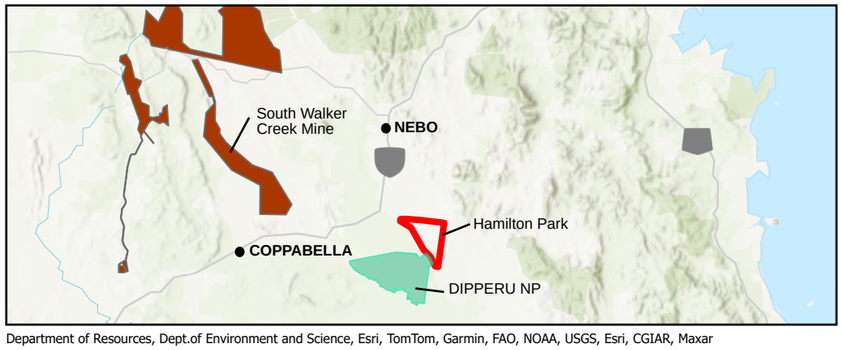
Species

- Greater Glider

Ground Truthed Regional Ecosystems

Vegetation Category

- Category C or R that is of least concern



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, CGIAR, Maxar

MRA2C EPBC Act Offsets - Greater Glider

Map 4 - Offset areas for Greater Glider habitat on the Hamilton Park property

Trend Environmental Consultants

0 1 2 Kilometers

N

Scale: 1:47,000

ABN 43 622 414 046
94 Kennedy Esplanade South Mission Beach, QLD 4852

Prepared: MG
Checked: EK

Date: 26 Mar 2024

Coordinate System: GDA 1994 MGA Zone 55

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-21°50' -21°50'30" -21°51' -21°51'30" -21°52' -21°52'30" -21°53' -21°53'30" -21°54' -21°54'30" -21°55' -21°55'30"

V PADDOCK
Nebo Creek
TOP END
HORSE
AERODROME
SWAMP
SORGHUM
BACK IRRIGATION
IRRIGATION
BULL
TURKEYS NEST
BOTTOM DRY
Denison Creek
BOTTOM END
11.5.9
11.5.3
11.3.4
11.3.3
11.3.9
Dipperu National Park (scientific)

Legend

- Land parcel
- Stanmore Holdings
- Braeside Paddocks
- ML permit granted
- Black Ironbox Offset Extent (61.2 ha) (pending DCCEEW approval)
- Connectivity area (13 ha)

Squatter Pigeon habitat
- MRA2C (390 ha HVR 906ha Remnant)

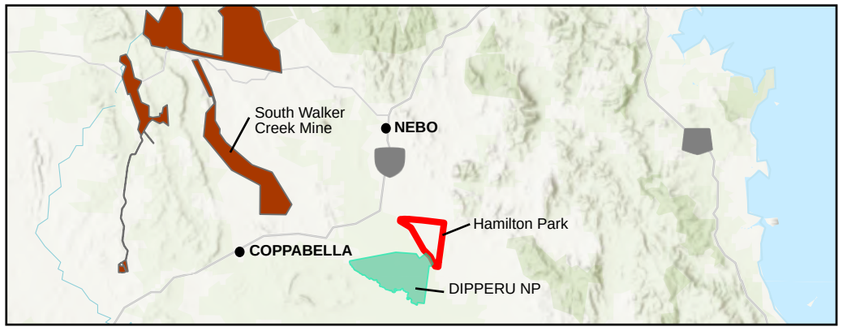
Offset Area Records

Species
- Squatter Pigeon

Other Species Records
- Squatter Pigeon - ALA or essential habitat database

Ground-truthed Regional Ecosystems

Vegetation Category
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R that is of least concern



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, CGIAR, Maxar

MRA2C EPBC Act Offsets - Squatter Pigeon

Map 5 - Offset areas for Squatter Pigeon habitat on the Hamilton Park property

Trend Environmental Consultants

0 1 2 Kilometers

N

Scale: 1:47,000

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Prepared: MG
Checked: EK

Date: 26 Mar 2024

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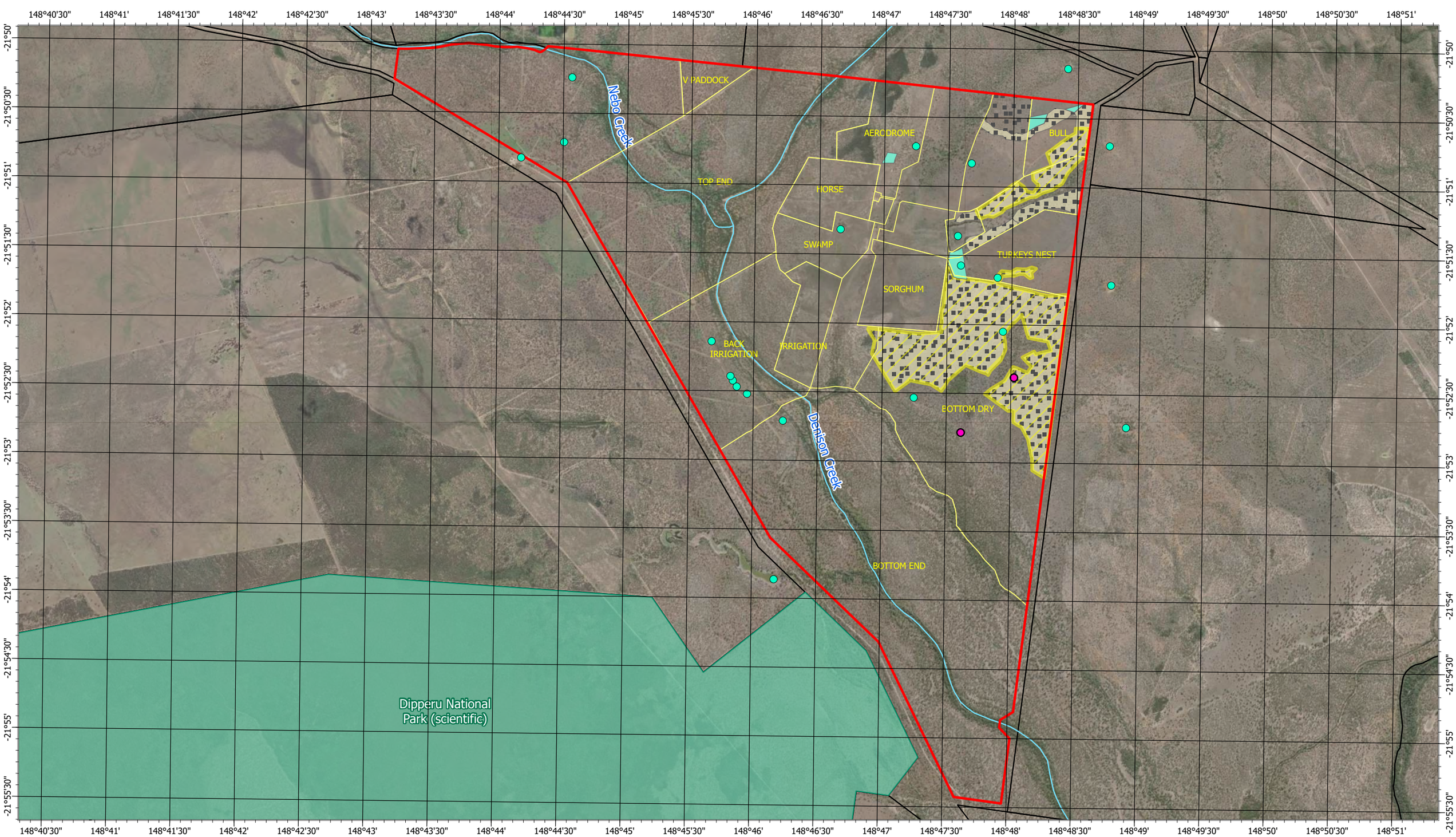


Legend

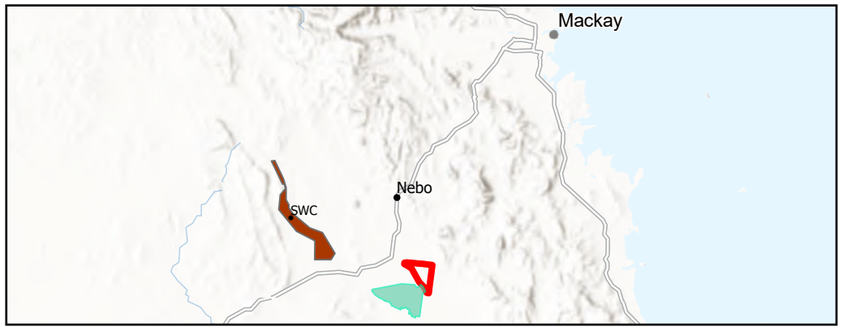
- Stanmore Holdings
- Land parcel
- Protected areas of Queensland
- Braeside Paddocks
- ML permit granted

Watering points

Type

- Existing
- Proposed
- Connectivity areas (13 ha)

- Greater Glider habitat (338 ha HVR)
- Koala habitat (416 ha HVR)
- Squatter Pigeon habitat (390 ha HVR)



Earthstar Geographics, Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

MRA2C EPBC Act Offsets

Map 6 - Proposed Regrowth and watering hole offset areas on the Hamilton Park property

0 1 2
Kilometers

Scale: 1:47,000

N

Trend Environmental Consultants

ABN 43 622 414 046
94 Kennedy Esplanade South Mission Beach, QLD 4852

Prepared: MG
Checked: EK

Date: 13 Nov 2024

Coordinate System: GDA 1994 MGA Zone 55

APPENDIX

B

SWC MRA2C IMPACT ECOLOGICAL ASSESSMENT REPORT – ECO LOGICAL 2018

BHP

South Walker Creek Mulgrave Resource Access: Stage 2C (MRA2C)

EPBC 2017-7957

Appendix E:
Ecological Impact Study

Mulgrave Stage 2C Ecological Impact Study

Assessment of Matters of National Environmental Significance

Prepared for
BHP

19 July 2018

DOCUMENT TRACKING

Item	Detail
Project Name	Mulgrave Stage 2C Ecological Impact Study / MRA2C Preliminary Documentation
Project Number	2251 / 8852
Project Manager	Liz Fisher (07) 3503 7194 471 Adelaide St, Brisbane QLD 4000
Prepared by	Loren Appleby, Renee Whitchurch, Jessie McCudden & Liz Fisher
Reviewed by	Ailsa Kerswell & Tom Kaveney
Approved by	Ailsa Kerswell
Status	FINAL
Last saved on	19 July 2018
Cover photo	Carborough Creek, ELA 2016

This report should be cited as 'Eco Logical Australia 2018. *Mulgrave Stage 2C Ecological Impact Study*. Prepared for BHP.'

Template 29/9/2015

Contents

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Abbreviations

Abbreviation	Description
BMC	BHP Billiton Mitsui Coal
DoEE	Commonwealth Department of the Environment and Energy
EA	Environmental Authority
ELA	Eco Logical Australia Pty Ltd
EPBC	*Environment Protection and Biodiversity Conservation Act 1999 (Clth)*
ERE	Endangered Regional Ecosystems

Abbreviation	Description
ESA	Environmentally Sensitive Area
GIS	Geographic Information System
GPS	Geographical positioning system
ML	Mining Lease
MNES	Matters of National Environmental Significance
MRA	Mulgrave Resource Access
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
SWC	South Walker Creek
TEC	Threatened Ecological Community
VM Act	*Vegetation Management Act 1999*

Executive summary

South Walker Creek (SWC) Mine is a BHP Billiton Mitsui Coal (BMC) owned and operated open cut coal mine located in the Northern Bowen Basin subregion of Central Queensland. To allow for continued development of the coal resource, the Mulgrave Pit located in the north-central portion of the mine's operational land has been identified as requiring further progression. Referred to as MRA Stage 2C (Project), the project will encompass approximately 1,279 ha of land disturbance, which includes disturbance associated with diversion of about 8km of Walker Creek, progressive mining of the Mulgrave coal resource, and associated works.

Matters of National Environmental Significance (MNES) protected under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) have been previously identified in ecological studies across the project disturbance footprint. This included:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) Threatened Ecological Community (TEC)
- One threatened flora species – Black Ironbox (*Eucalyptus raveretiana*)
- Four threatened fauna species – South-eastern Long-eared Bat (*Nyctophilus corbeni*); Koala (*Phascolarctos cinereus*), Ornamental Snake (*Denisonia maculata*) and Squatter Pigeon (*Geophaps scripta scripta*)

Current database searches confirmed the potential presence of these MNES values as well as an additional three threatened species and ten migratory species. Recently de-listed MNES values previously identified were also confirmed in the current database results.

Based on additional field validation surveys, the following MNES values or associated habitat were confirmed within the project disturbance footprint of MRA Stage 2C:

- Brigalow TEC
- Black Ironbox
- Habitat for Koala, Ornamental Snake, Greater Glider (*Petauroides volans*) and Squatter Pigeon

Further analysis identified critical habitat for the Brigalow TEC, as well as critical habitat and an important population of Ornamental Snake within the MRA Stage 2C disturbance footprint. The determination of critical habitat for the Brigalow TEC is attributed to the extent of area that the study area provides for the endangered ecological community. For the Ornamental Snake, the presence of high value habitat within the disturbance footprint and nearby confirmed records determined both critical habitat and an important population of the species.

Koala and Greater Glider were both confirmed to be present within the study area during field assessments in 2018. The presence of these species and the types of habitat present (including high density tree hollows), suggests the study area supports important populations and habitat critical to the survival of both species.

The occurrence of Black Ironbox and Squatter Pigeon were not determined to be part of an important population as larger habitat areas with the ability of supporting a source population occur outside of the disturbance footprint and within the surrounding region. Habitat for these species within the project disturbance footprint was also not determined to be critical due to the availability of higher quality habitat in the surrounding area and therefore the ability of the species to still persist in the surrounding region. No species were considered to be near the limit of their range.

The level of dependency that Black Ironbox has on groundwater sources at SWC Mine is also not considered to be high. The interaction with groundwater is likely to be intermittent, seasonally and situationally dependent at best. Due to the lower level of reliance on groundwater, the severity of threat of potential groundwater drawdown is considered to be low.

Based on these determinations and/or potential disturbance limits associated with the project, significant impacts were assessed to be likely for Brigalow TEC, Ornamental Snake, Koala and Greater Glider. The implementation of mitigation measures will limit the severity and magnitude of significant impacts; however residual impacts will remain significant. Significant residual impacts associated with MRA Stage 2C are:

- Clearing of Brigalow TEC – 32.7 ha
- Ornamental Snake habitat clearing– 33.7 ha
- Koala habitat clearing – 212.2 ha
- Greater Glider habitat clearing – 149.3 ha

In accordance with the EPBC Act, the residual significant impacts for these MNES values will be offset as per the EPBC Act Environmental Offset Policy.

1 Introduction

1.1 Project Background

South Walker Creek (SWC) Mine is a BMC operated open cut coal mine located in the Northern Bowen Basin subregion of Central Queensland, approximately 125 km south-west of Mackay within the Isaac Regional Council Local Government Area (herein referred to as the Project Area) (**Figure 1**).

The mining activities at SWC operate under Environmental Authority (EA) MIN100552107, and are conducted on Mining Lease (ML) 4750 across five active pits. The Mulgrave Pit is located in the north-central portion of the mine's operational land and has been identified in the mid-long term mine planning process as requiring further progression to allow for continued development of the coal resource.

An earlier progression project extending 778 ha from the western boundary of the Mulgrave Pit (MRA Stage 2A) has previously been referred to the Department of the Environment and Energy (DoEE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral process (EPBC 2014/7272). The proposed action was decided to be a "controlled action" in 2014, with relevant controlling provisions relating to listed threatened species and communities (sections 18 & 18A). The proposed action was assessed and approved with conditions under the EPBC Act on 16 January 2015.

The current progression project, referred to as MRA Stage 2C, will encompass 1,279 ha of land disturbance within the total study area of 1,775.8 ha. The MRA2C Project Area overlaps the approved MRA2A (2014/7272) Project Area by approximately 98 ha.

Much of the MRA2C area has been previously disturbed by grazing activities; however the proposed activity will require clearing of some previously undisturbed vegetation and the diversion of Walker Creek, which currently traverses through the Project Area.

This ecological impact assessment has been prepared to identify and quantify likely impacts to ecologically related MNES within the MRA Stage 2C 'study area' **(Figure 1**).

1.1.1 EPBC Act process to date

The project was referred to the Department of the Environment and Energy (DoEE) in June 2017 and was determined to be a controlled action (EPBC2017/7957). The controlling provisions were listed as threatened species (section 18 and 18A) and protection of water resources (i.e. 'the water trigger' section 24D and 24E).

Further assessment via Preliminary Documentation (PD) is required and DoEE has provided a list of additional information requirements that should be addressed in the PD. Relevant to this report, are a number of threatened species, as well as potential groundwater dependent ecosystems (GDEs).

1.2 Objectives and Scope of Works

The objective of this assessment is to identify and quantify potential impacts associated with the project on ecological values, specifically MNES protected under the EPBC Act. The assessment includes both desktop and existing information previously reported for the area as well as additional field verified data.

Scope of works specific to this objective include:

- Reviewing and confirming the suitability of previous ecological studies in determining the presence of MNES values within the study area

- Confirming the type and extent of vegetation communities and habitats within the study area
- Validating the habitat values, particularly in relation to supporting previously identified threatened species as well as species recently listed under the EPBC Act
- Assessing the condition and extent of Threatened Ecological Communities (TECs) that have been reported as occurring within the study area
- Collecting population data on previously identified threatened flora species
- Undertaking targeted threatened species assessments for a number of species highlighted by DoEE as being potentially impacted by the project
- Evaluating potential presence of Groundwater Dependent Ecosystems (GDEs) and associated ecological values
- Determining the likelihood of significant impacts to MNES
- Providing avoidance, mitigation and management strategies to reduce the severity and magnitude of potential impacts
- Evaluating significant residual impacts and developing an environmental offsets strategy that will sufficiently compensate for the impacts

1.3 Study Area

The study area includes both the project and surrounding adjacent areas and is located within the southern portion of ML 4750 (granted in 1978) and a small area in the northern portion of ML70131 (granted in 1996) (**Figure 1**). The study area encompasses approximately 1,775.8 ha of land and is divided into three areas – a northern, central and southern area. The central area is the largest component of the study area and is bounded by the existing Mulgrave pit and haul road to the north and east, Central Pit to the south-east, Carborough Creek to the north-west and the mine lease boundary to the west. The northern area is surrounded by a current grazing lease and the southern area is bounded by the north by Walker Creek, to the east by rail and to the south and west by operational mining land. The study area falls within Surface Areas 1,2,4 and 5 formally described as Lot 7 on SP155252, Lot 2 on SP162563 and Lot 2 on WHS16.

The study area is predominantly vegetated and consists of remnant and regrowth vegetation as well as cleared areas. Walker Creek and associated drainage lines traverse through the central portion the study area. Existing mine site infrastructure within the study area includes powerline easements, easement and exploration access tracks, fugitive emission drainage facility and dragline road.

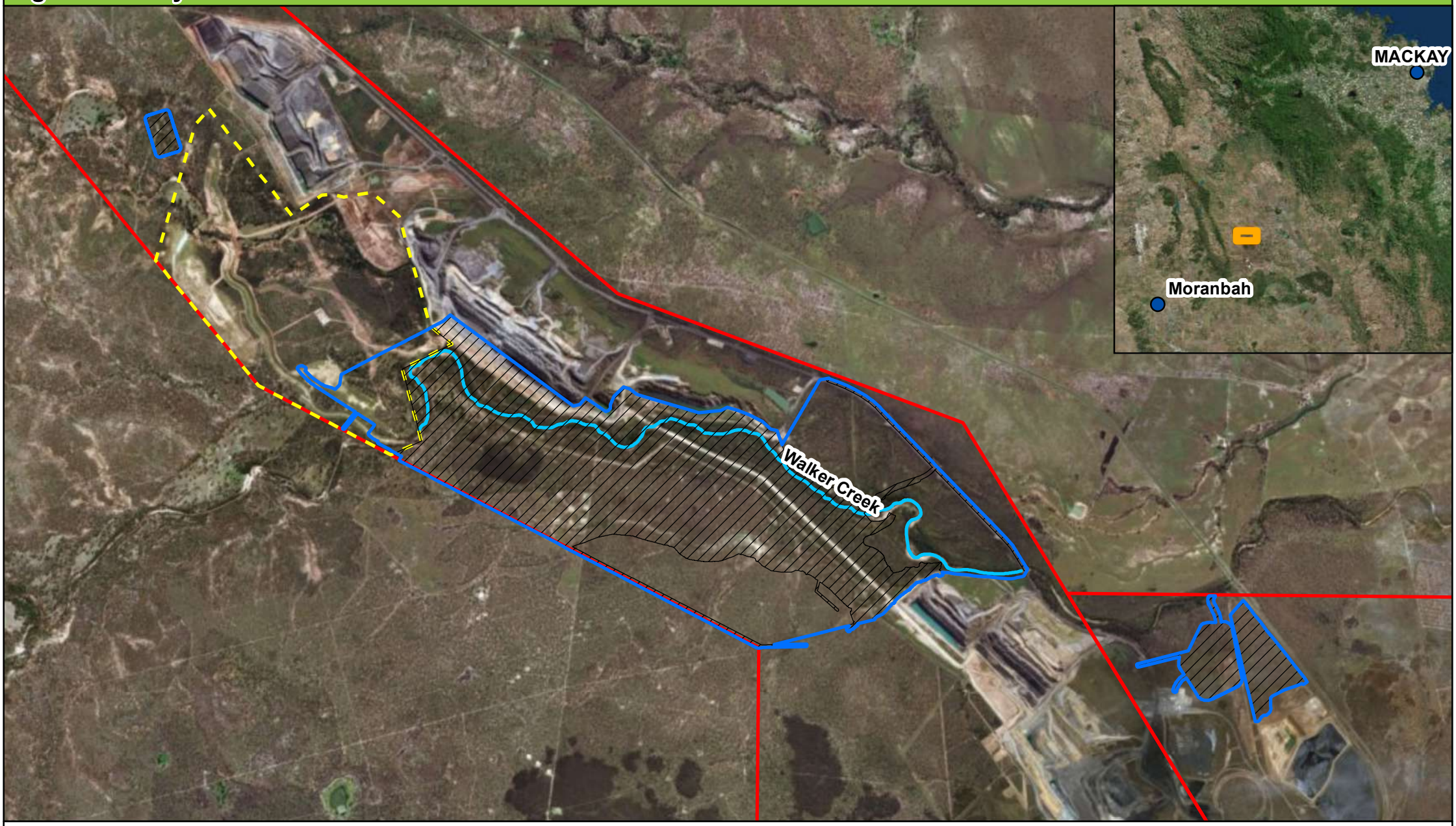
1.3.1 Project Disturbance Footprint

The Project will require the disturbance of approximately 1,279 ha of land for mine pit extension, diversion of approximately 8 km of Walker Creek, levee, northern and southern water storage dam development, and associated works (**Figure 1**).

Previously studies have been conducted on the watercourse diversion for Walker Creek, which has resulted in the preferred option of utilising an existing tributary of Walker Creek to divert water flows. The diversion is about 8 km long and has been designed to be a functioning and sustainable diversion that meets regulatory requirements. The creek diversion will connect to Carborough Creek, directly adjacent to the approved and developed MRA Stage 2A diversion and make the new confluence with Walker Creek about 6.4 km downstream from its current confluence. An overland flow bund will be constructed along the south-western length of the diversion channel with associated batter drains to receive overland flow runoff. Levees will be required at sections along the north-eastern length of the diversion channel to retain functionality of the diversion.

The expansion of the Mulgrave pit will involve clearing of vegetation and the continuation of mining activities in the Mulgrave Pit via south-west migration of the existing highwall. Associated mine related infrastructure will disturb vegetation, including for an approximate 2GL water storage dam in the south of the Project Area, and an approximately 0.5GL water storage in the northern.

Figure 1: Study area and location



Legend

- Mining Lease
- Study area
- Impact area
- EPBC approved area (MRA Stage 2A)
- Walker Creek

0 550 1,100 2,200

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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Prepared by: RW Date: 03/05/2018

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2 Method

This report has been developed over several iterations between 2016 and 2018 to accommodate the requirement of the EPBC Act assessment and approvals process. It has included a desktop assessment to evaluate available literature and data (e.g. database searches) as well as the review of a number of previous field assessments undertaken within and around the study area. Three field surveys have also been undertaken in 2016, 2017 and 2018 to specifically investigate particular aspects of the ecology of the study area. The methods for both the desktop and field assessments are detailed below.

2.1 Desktop Assessment

A desktop assessment and review of previous ecological studies, as well as associated literature, was undertaken to evaluate existing data and identify the presence of information gaps relating to MNES within the study area.

2.1.1 Databases

The following databases were reviewed to determine potential MNES values occurring within the study area:

- Protected Matters Search Tool (PMST) Report from a central coordinate of -21.77785, 148.47047 (10 km buffer)[1]
- Wildlife Online Search from a central coordinate of -21.77785, 148.47047 (10 km buffer)
- Protected Plants Flora Survey Trigger Map
- Regional Ecosystem (RE) mapping version 9.0
- Queensland geological digital data, Clermont mapping tile (DNRM, 2012)
- Isaac-Comet land-systems mapping (CSIRO, 1967)
- Essential Habitat mapping
- Referrable Wetland mapping
- Environmentally Sensitive Area (ESA) Map
- *Vegetation Management Act 1999* (VM Act) watercourse data
- Matters of State Environmental Significance mapping
- VM Act wetland data
- GDE Atlas
- Queensland GDE mapping
- Atlas of Living Australia species search

2.1.2 Previous Studies

Five previous ecological studies have been conducted within or within close proximity to the study area. These previous ecological studies, including associated mapping and data, were reviewed in order to confirm their suitability in determining the presence of MNES values within the study area. This also included cross-checking results with database results (**Section 2.1.1**). Each previous study and survey effort has been summarised in **Table 2-1**.

[1] A number of PMST searches have been undertaken over the course of the project. The latest was undertaken on 8 May 2018 and provides the most up to date list of threatened and migratory species relevant to the project

Table 2-1: Summary of Previous Studies

Previous Study	Aim	Method & Survey Effort
Threatened Terrestrial Fauna Species Assessment Report for Mulgrave Pit Expansion Project (Footprints Environmental Consultants, 2013)	The survey focused on determining the presence of EPBC Act or NC Act listed species identified as potential occurrences.	Targeted threatened fauna species surveys were undertaken within the study area during 5th – 14th April and 22nd – 26th April 2013. The survey methods and effort were reported to be in accordance with the Commonwealth threatened species survey guidelines. Survey techniques utilised in the survey included: • Brigalow Scaly-foot – pits & areas searches five pits / three nights • Yakka Skink – area searches, Elliott trapping, three days / three nights • Ornamental Snake – nocturnal area searches (throughout survey period) • Red Goshawk – 80 hrs over 10 days • Squatter Pigeon – 15 hrs of area searches, 10 hours of flushing • Cotton Pygmy-goose – waterbody survey (throughout survey period) • Little Pied Bat – active and passive searches, harp trapping (20 traps), Anabat (six nights, nine locations) • Greater Long-eared Bat – harp trapping (20 traps), Anabat (six nights, nine locations) • Koala – Area searches, spotlighting (throughout survey period)
Walker Creek Diversion Biodiversity Assessment Report – Stage 1 (Cardno, 2012a)	Assess biodiversity values within the study area and associated environmental constraints (Commonwealth and State).	The study area incorporated a 100 m wide buffer area either side of the high bank of Walker and Carborough Creeks (totalling 17 km). The assessment included both desktop and a field survey conducted from 14th – 16th March 2012.
Walker Creek Diversion Biodiversity Assessment Report – Stage 3 (Cardno, 2012b)	Assess ecological values of terrestrial habitats within mining lease of South Walker Creek Mine (ML 4750)	The assessment included desktop searches and a field survey conducted from 23rd – 28th April 2012, to review terrestrial vegetation communities and the distribution of significant species within the study area. Vegetation communities were recorded in accordance with Neldner *et al* 2012, whilst significant flora recognised as being of conservation significance at the Commonwealth and / or State level were recorded.
South Walker Mine Biodiversity Assessment – Bee Creek Section (Cardno, 2012c)	Quantify the presence of Black Ironbox (*Eucalyptus raveretiana*) along a 4.3 km section of Bee Creek	A two day survey (5th – 6th June 2012) along Bee Creek. The survey area extended 100 m either side of the centre line of the creek. The survey was undertaken in order to gain an understanding of potential biodiversity offset

Previous Study	Aim	Method & Survey Effort
		options should disturbance to Black Ironbox be proposed along Walker Creek (upstream of Bee Creek).
Koala Kemmis II (Vital Signs Environmental Services, 2014)	Assess Koala presence and utilisation across the Kemmis II project area (approximately 7.5km north-west of MRA2C) and in surrounding area, including east of Walker Creek within MRA2C study area.	A four day (July 2014), two person field survey adopting the 'Koala Rapid Assessment Methodology' where direct sightings, and indirect evidence e.g. faecal evidence, scratches, were recorded across 30 x 2,000m^2 quadrats that represented all vegetation community types within the project area.

2.1.3 Literature Review

Database searches and previous studies informed an assessment of the MNES values likely to occur within the study area. From this list, further information was obtained on each MNES. The literature reviewed included:

- Relevant previous ecological studies listed in **Table 2-1**
- Species Profile and Threats Database (SPRAT), to determine the distribution, habitat requirements, population statistics and ecology of each species identified
- Survey guidelines for Australian's threatened reptiles (for the Ornamental Snake)
- National Koala Conservation Management Strategy 2009-2014
- EPBC Act Referral Guidelines for Vulnerable Koala (2014)
- Commonwealth Conservation Advice and / or Commonwealth Listing Advice, for each threat-listed species identified in the desktop assessment
- Priority Threat Management for Imperilled Species of the Queensland Brigalow Belt (Ornamental Snake, Koala and Squatter Pigeon)
- Species Management Program – Koala. (Transport and Main Roads, Queensland Government, 2015)
- Australian Koala Foundation (AKF) National Koala Tree Planting List (2015)
- Draft Assessing Groundwater-Dependent Ecosystems: IESC Information Guideline Explanatory Note (2018)
- Commonwealth Significant Impact Guidelines (Version 1.1).

2.2 Field Survey

Three field surveys were undertaken to develop this report. Each survey was undertaken by two qualified ecologists and included a number of survey techniques. The details of each survey are provided in **Table 2-2**, with details of specific survey elements provided in the sections below. Survey sites are illustrated in **Figure 2 and Figure 3.**

Table 2-2: Field survey program

Field survey & dates	Purpose	Survey techniques
2016 – 4 to 8 May	Address information gaps identified in the desktop analysis (incl. updates to threatened species listings)	Flora, TEC and targeted habitat assessments

2017 – 20 to 21 April	Assess additional impact areas	Flora, TEC and targeted habitat assessments
2018 – 9 to 13 February	Undertaken targeted threatened fauna surveys, particularly for species of interest to DoEE	Targeted threatened fauna species surveys

2.2.1 Flora Assessment

Information gaps identified in the previous studies included no population data on previously recorded threatened flora species and the lack of detailed vegetation mapping with associated condition rating, including TEC status. These gaps were addressed in the flora assessment during the field surveys.

Targeted Flora Survey

A targeted flora survey to record individuals of Black Ironbox was undertaken along a 7 km section of Walker Creek in order to determine the extent and density of the species. The search was restricted to the riparian zone of Walker Creek as well as instream bars.

Direct counts of identified Black Ironbox individuals were taken using hand-held GPS units. Fertile material (fruit) was present to confirm the species identification. Accuracy of the GPS units at the time of the survey was noted to be ±5 m.

Site Condition Assessments

In accordance with the BioCondition Assessment Manual '*A Condition Assessment Framework for Terrestrial Biodiversity in Queensland'* (Eyre, T.J. *et al* 2015), 25 site condition assessments were conducted across 16 assessment units identified on site. Assessment units were based on ground-truthed vegetation communities within the study area that had associated MNES values.

Site condition assessments involved the collection of the following eight site based attributes within a 100 m x 50 m nested sampling plot:

- Large trees
- Tree canopy height
- Recruitment of dominant canopy species
- Native species richness
- Tree canopy cover
- Native shrub cover
- Course woody debris
- Ground cover (native shrub, grass, forbs, non-native cover and organic litter cover)

Quaternary surveys

Quaternary surveys were conducted to validate the extent, classification and condition of ground-truthed vegetation communities and habitat types within the study area, as well as increase spatial coverage of the survey. Quaternary surveys were undertaken in accordance with the '*Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland'* (Nelder *et. al.* 2012). At each survey point, the following information was recorded:

- RE classification
- Vegetation status (remnant, high-value regrowth or non-remnant).

A total of 191 quaternary surveys were conducted across the study area.

TEC Assessments

Specific condition assessments were conducted for Brigalow patches to determine whether patches met the thresholds for classification as the TEC, which had not been previously recorded. Assessments were conducted in accordance with condition thresholds outlined within the *Approved Conservation Advice for the Brigalow (dominant or co-dominant) Ecological Community* (DoE, 2013). Thresholds included, species composition of patches (dominance or co-dominance of *Acacia harpophylla*) and species condition including patch size and percentage exotic perennial grass cover.

A total of nine TEC assessments were conducted across the study area.

2.2.2 Targeted Habitat Assessments

To further confirm and validate threatened fauna species values within the study area, targeted habitat assessments were conducted for the Squatter Pigeon (*Geophaps scripta scripta*), Koala (*Phascolarctos cinereus*) and Ornamental Snake (*Denisonia maculata*) to quantify the extent of habitat within the study area. Targeted habitat assessments were not conducted for the Greater Glider during the May 2016 survey, as the survey occurred prior to the species listing under the EPBC Act. Targeted Greater Glider habitat assessments were conducted during the April 2017 survey. Habitat assessments were species specific and included identifying the presence of key values such as:

- Habitat condition (i.e. remnant or regrowth)
- Presence of foraging resources (e.g. Koala food trees)
- Presence and proximity to water
- Soil type
- Occurrence of species specific habitat features (deep cracking clays, gilgai, percentage of bare ground and native vegetation cover)
- Species specific threats

For Greater Glider habitat assessments, tree hollow density quadrats (50 x 100 m) were conducted in areas of suitable habitat. Within the quadrat, total number of small (<8 cm), medium (8 to 15 cm) and large (>15 cm) hollows were counted and recorded. Density data was used to map areas of suitable denning habitat.

A total of 24 Squatter Pigeon, 27 Koala, six Ornamental Snake and 32 Greater Glider targeted habitat assessments were conducted. **Appendix A** describes the targeted habitat assessment criteria considered for each species. Species specific habitat attributes targeted during the field survey was from relevant literature for each species (**Section 2.1.3**).

2.2.3 Targeted fauna survey

Further field surveys were undertaken in February 2018 to provide additional information for key threatened species that were highlighted by DoEE as having the potential to be impacted by the project. Review of the list of species provided by DoEE in the information request (provided by DoEE to BHP on 25 October 2017) was undertaken and it was deemed necessary to undertake targeted threatened species surveys for Greater Glider and Star Finch (*Neochmia ruficauda*).

Greater Glider

Survey Guidelines for Threatened Mammals recommend the following for Greater Glider:

- Spotlighting
    - At least two 200 m transects per 5 ha site within suitable habitat (at least 100 m apart)

    - Repeated over two separate nights
- Stag watch
    - Observe a potential shelter site (hollow) 30 minutes before dusk and 60 minutes after sunset.

For this survey, spotlighting was conducted over four consecutive nights, for a minimum of two hours by two qualified ecologists, equating to a total survey effort of 16 spotlighting hours. Spotlighting transects included a combination of driving and walking. Where suitable habitat was present alongside driving tracks, these areas were driven at slow speed and eye-shine searched for by two ecologists. Walking transects were also conducted within and alongside of Walker Creek. Any eye-shine that was detected was investigated to confirm species. Stag watches were conducted at the beginning of each spotlighting evening (30 minutes before sunset).

Star Finch

EPBC Act Survey Guidelines for Threatened Birds (DEWHA 2010) recommends the following survey effort for Star Finch:

- Area searches or transect-point surveys (15 hours over five days)
- Broadcast surveys (15 hours over three days)
- Targeted waterhole surveys (10 hours over four days)

A combination of all survey types was conducted over six days by two qualified ecologists. The site was initially searched for dam sites or any areas of Walker Creek that may be holding water where targeted surveys were conducted either early morning or late evening. Transect surveys were conducted throughout the day within riparian and open woodland habitats. Broadcast surveys were conducted using calls available on the eGuide to The Birds of Australia (Morecombe & Stewart 2014) phone application. Total survey effort for each survey technique equated to the following:

- Transect bird survey – 30.5 hours over six days
- Broadcast surveys – 15.5 hours over five days
- Targeted surveys – 16.5 hours over five days

2.3 Data Analysis

2.3.1 GIS Analysis

Spatial data collected during the field survey was imported into ArcMap GIS (Version 10.2) and analysed. Where necessary, vegetation community and habitat boundaries were refined using the collected spatial data to produce a final ground-truthed map.

This mapping was then used to undertake a landscape-scale attribute assessment to provide a quantitative assessment of the landscape values of the study area as well as an overall condition score for each assessment unit as per Eyre *et.al.* (2015).

Landscape-scale Attributes Assessment

In accordance with the BioCondition Assessment Manual, landscape-scale attributes were assessed within a 'Fragmented Landscape'. Attributes calculated included:

- Patch Size
- Connectedness
- Context

The spatial layers used to assess the site context attributes were:

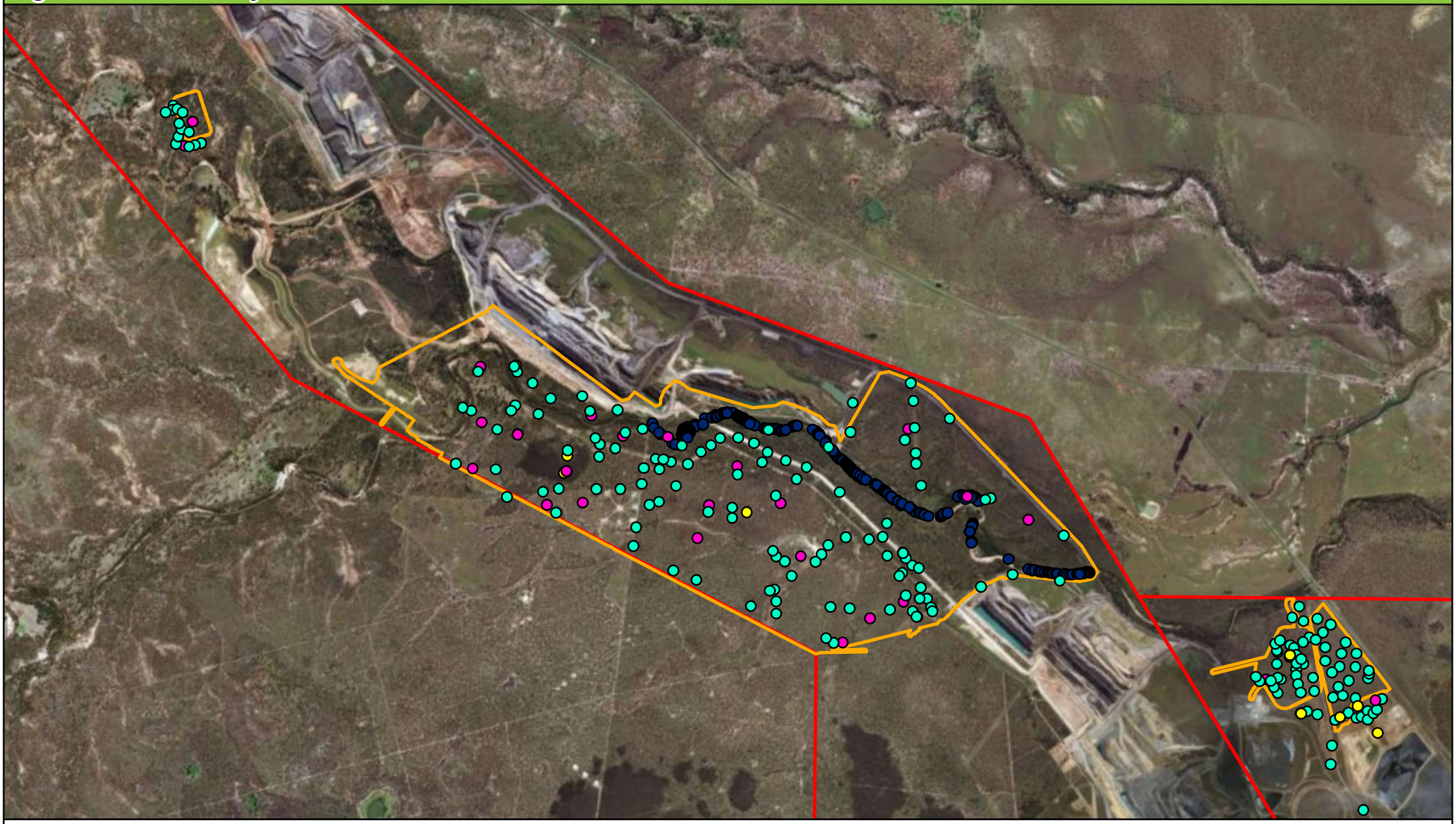
- Ground-truthed vegetation mapping of the study area (ELA, 2016 and ELA, 2017)
- Regulated Vegetation Mapping (Version 9.0)

2.3.2 BioCondition Scoring

BioCondition scoring was conducted in accordance with Eyre *et. al.* 2015. This involved accumulating the site condition and landscape attributes score and dividing the total against the maximum score for the ecosystem type (i.e. woodland = maximum score of 100) to provide a total BioCondition score.

Benchmark data to complete the comparison value assessment for the site condition assessment was sourced from Queensland Herbarium prepared benchmarks for each assessment unit's ground-truthed RE (or closest RE benchmark within the same Broad Vegetation Group). Where multiple field survey sites were assessed for one assessment unit, site condition scores were averaged.

Figure 2: Flora survey sites



Legend

- Mining Lease
- Study area

Flora survey sites

- Quarternary sites
- BioCondition sites
- TEC assessment sites
- Threatened flora sites

0 500 1,000 2,000

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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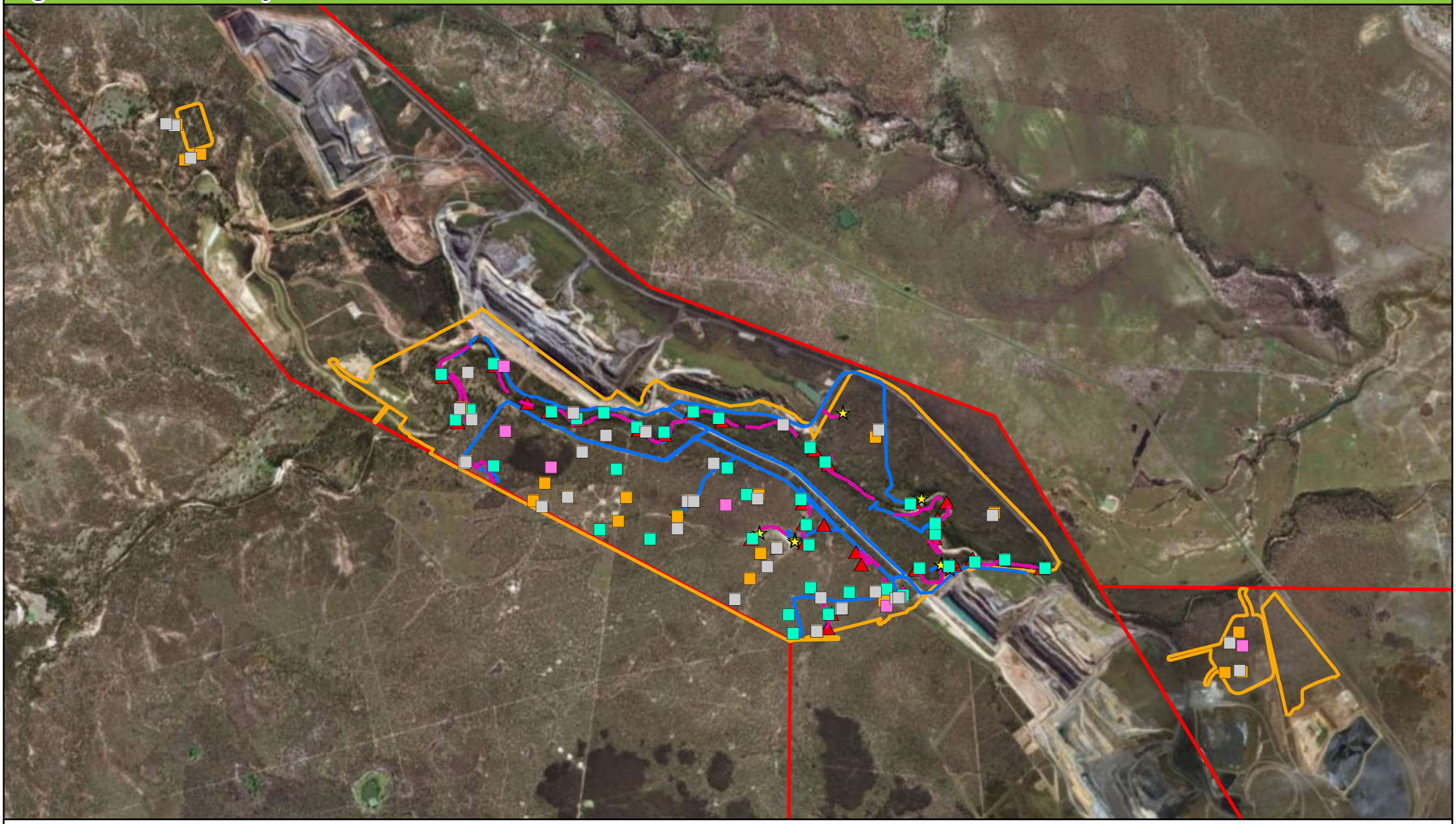
Figure 3: Fauna survey sites



Legend

- Mining Lease
- Study area

Fauna survey sites

- Koala habitat assessment sites
- Ornamental Snake habitat assessment sites
- Squatter Pigeon habitat assessment sites
- Greater Glider habitat assessment sites
- Bird survey - targeted waterhole watch
- Bird survey - area searches
- Hollow bearing tree density quadrats
- Spotlighting survey transects

0 550 1,100 2,200

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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Prepared by: RW Date: 03/05/2018

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3 Desktop Assessment Results

3.1 Previous Ecological Assessments

Previous ecological studies across the study area identified a number of MNES values either as occurring or likely to occur. These included:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC
- One threatened flora species – Black Ironbox
- Four threatened fauna species – South-eastern Long-eared Bat (*Nyctophilus corbeni*); Koala, Ornamental Snake and Squatter Pigeon

MNES values considered unlikely to occur were so determined due to a lack of detection during field surveys or the absence of ground-truthed suitable habitat.

3.2 Database Results

Results from the desktop assessment confirmed the potential occurrence of MNES values identified in previous ecological assessments with the exception of two threatened species and five migratory species that have since been reclassified and are no longer listed under the EPBC Act. This includes the following species:

- Brigalow Scaly-foot (*Paradelma orientalis*)
- Finger Panic Grass (*Digitaria porrecta*)
- Australian Cotton Pygmy-goose (*Nettapus coromandelianus albipennis*)
- Cattle Egret (*Ardea ibis*)
- Great Egret (*Ardea modesta*)
- Rainbow Bee-eater (*Merops ornatus*)
- White-bellied Sea-eagle (*Haliaeetus leucogaster*)

In addition to this, four new threatened fauna species have been recently listed under the EPBC Act and identified as potentially occurring within the study area. These species are the Curlew Sandpiper (*Calidris ferruginea*; also listed as migratory), Greater Glider (*Petauroides volans*), Ghost Bat (*Macroderma gigas*) and the Southern Snapping Turtle (*Elseya albagula*). Furthermore, potential habitat for seven migratory species has recently extended to include the range of the study area. These species are the Common Sandpiper (*Actitis hypoleucos*), Sharp-tailed Sandpiper (*Calidris acuminata*), Pectoral Sandpiper (*Calidris melanotos*), Oriental Cuckoo (*Cuculus optatus*), Osprey (*Pandion haliaetus*) and Yellow Wagtail (*Motacilla flava*).

The full extent of desktop government database results are provided in **Appendix B.** The likelihood of occurrence for all threatened and migratory species identified on the current databases has been assessed, with the results provided in **Section 4.3** and **Section 4.5**.

4 Field Results

4.1 Vegetation Communities

The majority of the study area was found to comprise remnant vegetation (approximately 1,392.2 ha), in which 15 vegetation communities were ground-truthed (**Figure 4**). All ecosystem types present are wooded ecosystems, dominated by either *Eucalyptus*, *Corymbia* or *Acacia* species. This includes a Brigalow dominated community described as the listed Brigalow TEC RE 11.4.9. Vegetation communities ground-truthed within the study area are described in **Table 4-1** as per the Regional Ecosystem Description Database (REDD).

Vegetation communities were found to range in functional biodiversity condition, with some areas scoring within the highest BioCondition Class through to areas scoring within the medium Class of 3. However, the majority of vegetation communities (60%) within the study area were found to be in functional condition and a BioCondition Class of 2.

The higher BioCondition scoring for vegetation communities is predominantly attributed to the landscape context of the study area. Over 85% of the vegetation communities are part of a larger tract of vegetation (>200 ha of remnant vegetation) which continues outside of the study area. Connectivity and context of vegetation communities to other adjacent vegetation also ranged from medium to very high connectivity. However, at a site level the condition of the vegetation communities is reflective of the historical and on-going long-term grazing disturbances that are present within the study area. Extensive weed incursion occurs within the understorey of riparian communities along Walker Creek and portions of the Eucalypt woodland communities are in a state of regrowth and regeneration from previous thinning and clearing activities.

BioCondition Score and BioCondition Class for each vegetation community is provided in **Table 4.1**. Detailed BioCondition data is provided in **Appendix C**.

Table 4-1: Ground-truthed vegetation communities within the study area

RE	Short Description	Area (ha)	TEC RE*	BioCondition Score / Class**
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	82.75	-	0.81 / 1
11.3.25a	Riverine wetland or fringing riverine wetland. *Eucalyptus raveretiana, Melaleuca fluviatilis* woodland	66.66	-	0.69 / 2
11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	29.2	-	0.53 / 3
11.3.27	Freshwater wetlands	6.14	-	0.77 / 2
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus spp*. woodland on alluvial plains	15.73	-	0.54 / 3
11.3.4a	Floodplain (other than floodplain wetlands). *Corymbia tessellaris* woodland.	244.49		
Analogous to 11.3.4a	*Corymbia tessellaris* open woodland.	8.32		-

RE	Short Description	Area (ha)	TEC RE*	BioCondition Score / Class**
11.3.9	*Eucalyptus platyphylla, Corymbia spp*. woodland on alluvial plains	33.65	-	0.73 / 2
11.4.9	*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	37.17	Brigalow	0.74 / 2
11.4.13	*Eucalyptus orgadophila* open woodland on Cainozoic clay plains	5.5	-	-
11.5.2a	*Allocasuarina luehmannii* low tree layer with or without emergent woodland.	11.33	-	0.87 / 1
11.5.3	*Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	358.94	-	0.82 / 1
Analogous to 11.5.3	*Eucalyptus populnea* regrowth.	2.97	-	-
Analogous to 11.5.3 and 11.5.8b	Mix polygon (50/50%) comprising of *Eucalyptus populnea* and *E. platyphylla* regrowth.	119.75	-	0.62 / 2
11.5.8b	*Corymbia clarksoniana*, *Eucalyptus exserta, E. crebra, E. tereticornis, E. platyphylla* woodland with low tree layer dominated by *Melaleuca viridiflora, M. nervosa, Allocasuarina littoralis, Grevillea banksii, Acacia flavescens +/- Acacia leiocalyx.*	78.17	-	0.82 / 1
11.5.8c	*Eucalyptus platyphylla* woodland on white-yellow weathered sands, with grassy ground layer. Occurs on Quaternary sediments.	336.23	-	0.71 / 2
11.5.9	*Eucalyptus crebra* and other *Eucalyptus spp*. and *Corymbia spp*. woodland on Cainozoic sand plains and/or remnant surfaces	85.55	-	0.80 / 2
11.9.2	*Eucalyptus orgadophila* woodland on fine-grained sedimentary rocks	0.68	-	-
-	Eucalypt spp. Regrowth	1.96	-	-
Total		1,525.19		

* TEC listed REs as per EPBC Act Conservation Advice

**Rating of 1 (for 'functional' biodiversity condition) to 4 (for 'dysfunctional' biodiversity condition)

4.2 Threatened Ecological Communities

Two TECs were identified in the desktop assessment as potentially occurring within the study area, including:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) endangered community
- Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin

Field surveys only identified the listed Brigalow TEC RE11.4.9 within the study area. This RE was ground-truthed to be in remnant condition and comprising patches >0.5 ha in size.

Further assessment of the other key diagnostic and condition thresholds during the survey determined four patches of RE11.4.9 to be dominated by *A. harpophylla* and with an exotic perennial groundcover of <50%. These patches were validated to meet TEC status (**Figure 4**). Additional patches of RE11.4.9 were found to be dominated by *Casuarina cristata* (Belah) and therefore did not meet the key diagnostic criteria for the Brigalow TEC.

The findings of the Brigalow TEC assessments across the study area are provided in **Appendix D**.

4.3 Threatened Flora Species Presence

The current database results identified five threatened flora species as potentially occurring within the study area. Of these five species, one was identified as occurring within the study area, whilst the remaining four were considered unlikely due to the lack of associated vegetation communities and soil substrates (**Table 4.2**).

The identified threatened species, Black Ironbox, was located along portions of Walker Creek's riparian zone. Targeted surveys along Walker Creek identified 525 individuals (both mature and immature) within a 6.8 km section within the study area. The species was recorded throughout the majority of the length of Walker Creek downstream of the confluence with Carborough Creek, however, the species was found to be absent along a 2 km reach of the creek. A particularly dense patch within the far westerly section of the creek was identified that contained over 100 individuals over ~370 m. The location of the species is illustrated in **Figure 4**.

The riparian vegetation in which the species was recorded was ground-truthed as RE 11.3.25a, described in short as *Eucalyptus raveretiana, Melaleuca fluviatilis* woodland. In some locations, the species was co-dominant with *Melaleuca* species, Queensland Blue Gum (*E. tereticornis*) and River Red Gum (*E. camaldulensis*). The ecosystem was noted to be heavily invaded by an introduced grass, Guinea Grass (*Megathyrsus maximum*). This exotic species has the potential to impact on germination and growth success for Black Ironbox seeds and saplings along Walker Creek through shading and outcompeting of resources.

It should be noted that field validation of vegetation communities and habitat values did not detect any significant inconsistencies with previous likelihood assessments conducted as part of the preceding studies (**Table 4.2**).

Table 4-2: Likelihood of occurrence results for threatened flora species

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
Flora					
Black Ironbox *Eucalyptus raveretiana*	V	Black Ironbox occurs on the banks of rivers, creeks and other watercourses, on clayey or loamy soil (TSSC 2008).	Known	Known	Species recorded along Walker Creek within the study area.
Bluegrass *Dichanthium setosum*	V	*Dichanthium setosum* is associated with heavy basaltic black soils and stony red-brown hardsetting loam with clay subsoil and is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The extent to which this species tolerates disturbance is unknown (TSSC 2008).	Unlikely	Unlikely	The study area does not contain soils derived from either basalt or fine-grained sedimentary rock.
Cycas ophiolitica	E	*Cycas ophiolitica* grows on hills and slopes in sparse, grassy open forest at altitude ranges from 80–400 m above sea level. Although this species reaches its best development on red clay soils near Marlborough, it is more frequently found on shallow, stony, infertile soils, which are developed on sandstone and serpentinite (DoE 2015).	Unlikely	Unlikely	The study area does not contain soils derived from sandstone and serpentinite.
King Blue-grass *Dichanthium queenslandicum*	E	King Blue-grass is poorly studied but is known to occur as a component of Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin (Natural Grasslands TEC) and is associated with other species of blue grasses (Dichanthium spp. and Bothriochloa spp.). The grassland community occurs on fine textured soils, typically cracking clays on derived from either basalt or fine-grained sedimentary rocks, on flat of gently undulating rise. These grasslands occur in areas with relatively high summer rainfall and where a tree canopy is usually absent (TSSC 2013).	Unlikely	Unlikely	The study area does not contain natural grassland habitat or soils derived from either basalt or fine-grained sedimentary rock

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
Quassia *Samadera bidwillii*	V	Quassia is endemic to Queensland and is known to occur in several coastal locations between Mackay and Goomboorian, north of Gympie. The species commonly occurs in lowland rainforest or rainforest margins, but can also be found in open forest and woodland. The species is commonly found near both permanent and ephemeral watercourses.	-	Unlikely	Species generally occurs in coastal areas with nearest records in Mackay, approximately 125km to the north-east.

[1] Current status under the EPBC Act: E = Endangered; V = Vulnerable

[2] Known: Records from the study area.

Likely: Preferred habitat observed or mapped in the study area and known to occur in the region surrounding the study area and distribution overlaps with the study area.

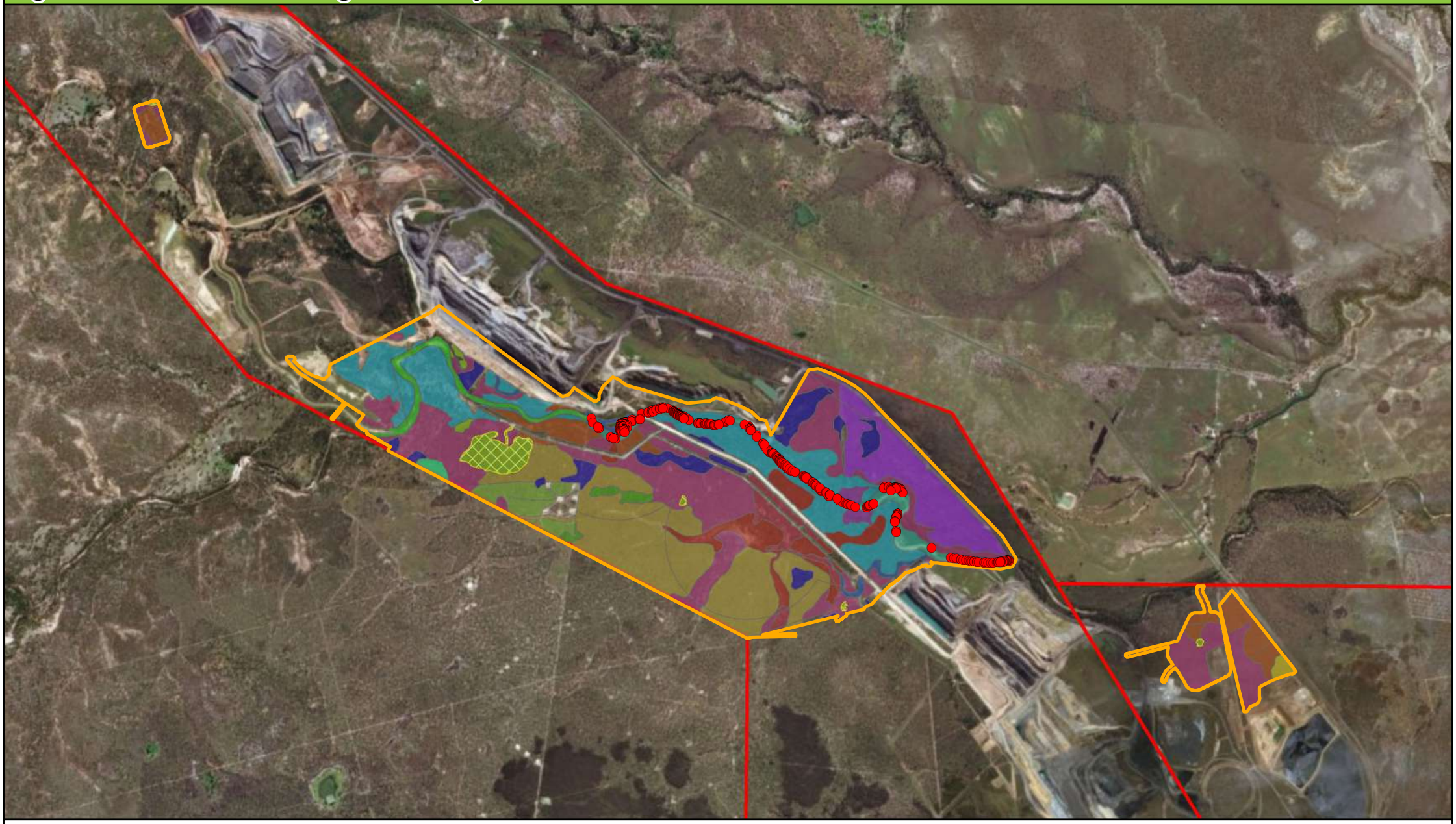
Potential: Marginal habitat observed or mapped in the study area and known to occur in the region surrounding the alignment corridor and distribution overlaps with the study area.

Unlikely occurring: Not known from surrounding region or distribution does not overlap with the study area but at least marginal habitat present.

Does not occur. Not known from the surrounding region and distribution does not overlap with the study area (usually associated with errors in databases searched) or no habitat present on the study area.

* Derived from Species Profile and Threats Database (http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl) or A-Z of animals (https://www.ehp.qld.gov.au/wildlife/animals-az/index.html)

Figure 4: Ground-truthed Regional Ecosystems & threatened flora records



Legend

Mining Lease

Threatened flora records

- Black Ironbox
- Brigalow

GTRE

- Mature Regrowth, 11.5.3/8b
- Mature regrowth, 11.5.3
- Non-rem, 11.3.4a
- Regrowth, 11.5.3/8b
- Regrowth, 11.5.8c
- Remnant, 11.3.2
- Remnant, 11.3.25
- Remnant, 11.3.25a
- Remnant, 11.3.27
- Remnant, 11.3.4
- Remnant, 11.3.4a
- Remnant, 11.3.9
- Remnant, 11.4.13
- Remnant, 11.4.9
- Remnant, 11.5.2a
- Remnant, 11.5.3
- Remnant, 11.5.8b
- Remnant, 11.5.8c
- Remnant, 11.5.9
- Remnant, 11.9.2

0 500 1,000 2,000

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

N

ecological AUSTRALIA

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Prepared by: RW Date: 03/05/2018

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4.4 Habitat Values

Habitat occurring within the study area can be classified into five distinct habitat types:

- Fringing riparian forest
- Floodplain Eucalypt forest
- Dry Eucalypt forest
- Brigalow woodland
- Wetland

Fringing Riparian Forest

Fringing riparian forest habitat occurs on the stream banks of Walker Creek and Carborough Creek (**Figure 5**). This habitat was found to have well developed canopy (77% cover) and sub-canopy layers (13% cover) but a more open understorey structure with the shrub layer predominantly absent. The ground layer was also found to lack complexity with woody debris coverage (185 m per ha) and leaf litter cover (22% cover) recorded as low. The groundcover within this habitat is dominated by the exotic Guinea Grass.

Whist the more open understorey layer and low ground layer complexity limits the use of the habitat for some fauna species, the well-developed canopy layer was found to contain numerous hollow bearing trees providing sheltering, nesting and breeding habitat for hollow dependent birds, arboreal mammals and microbats.

This habitat is highly connected to adjacent vegetation, contributing to a landscape in which fauna species can readily move between areas of suitable habitat.

Floodplain Eucalypt Forest

Floodplain Eucalypt forest habitat occurs on the Quaternary alluvial plains of the Walker Creek and Carborough Creek (**Figure 5**), adjacent to the riparian forest. This habitat was found to have a well-developed canopy (62.5% cover) and sub-canopy layers (14.5% cover) but a more open understorey structure with the shrub layer predominantly absent. The ground layer was found to be moderately complex with moderate woody debris coverage (128 m – 384 m per ha), high leaf litter cover (51% cover) and presence of native grass tussocks (26% cover).

The complex ground layer provides suitable foraging and nesting habitat for numerous mammals and reptiles. However, the more open understorey layer limits the use of the habitat for some fauna species. In addition, the well-developed canopy layer was found to lack the density of hollow bearing trees found within the adjacent riparian forest habitat.

This habitat is highly connected to adjacent vegetation, contributing to a landscape in which fauna species can readily move between areas of suitable habitat.

Dry Eucalypt Forest

Dry Eucalypt forest encompasses the majority of the study area and is associated with the Tertiary loamy and sandy plains of the older alluvial terraces of Walker Creek and Carborough Creek (**Figure 5**). This habitat occurs both in remnant and regrowth states.

Within the remnant areas, structural complexity varied with some areas providing a diverse shrub layer whilst in other areas it was absent. A more open canopy layer was recorded compared to other habitat types within the study area and large hollow-bearing trees were limited. Across all areas the ground layer was found to be moderately complex and would provide suitable foraging and nesting habitat for

numerous mammals and reptiles. Similar habitat resources were recorded within the regrowth areas; however due to the regenerating stage of the area, a mature canopy layer was absent.

Brigalow / Belah Woodland

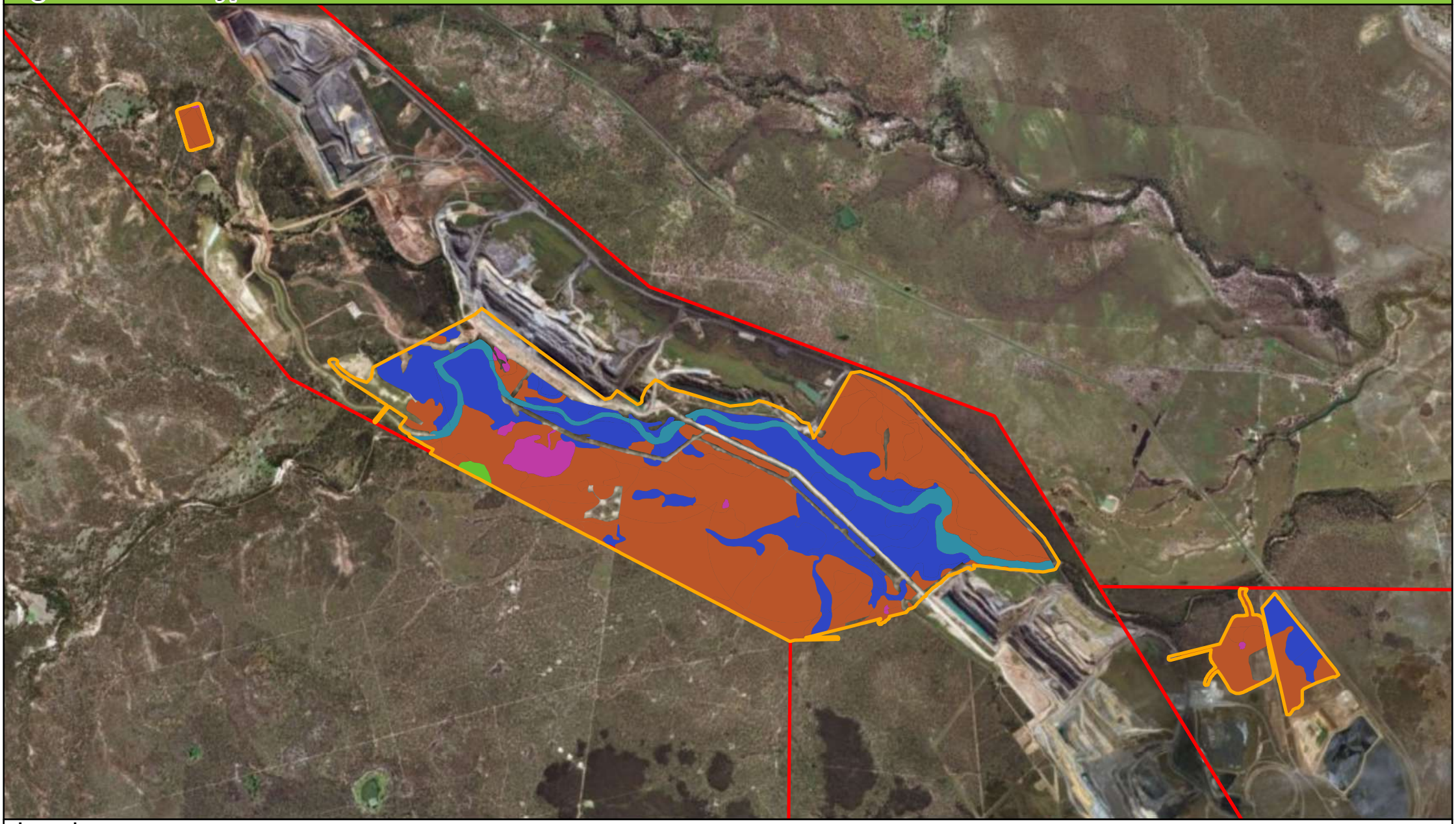
Brigalow / Belah woodland habitat occurs in discrete patches across the study area and is associated with the Cainozoic clay plains situated on the older alluvial terraces of Walker Creek (**Figure 5**). This habitat was found to have a high structural complexity consisting of a moderately dense canopy layer (61.3% cover) and a moderate shrub layer (17.6% cover). This habitat also contains a relatively complex ground layer, with extensive woody debris (1,685 m per ha) and moderate organic litter cover (66.1% cover) present, although grass cover was low / absent. A gilgai landform was present within some areas of the habitat, which during rainfall events would become an ephemeral wetland providing habitat for frog species.

This high level of structural complexity provides suitable foraging and nesting habitat for numerous woodland birds, mammals and reptiles. However, the low number of hollow bearing trees within this habitat means there is limited sheltering, nesting and breeding habitat for hollow dependent birds, arboreal mammals and microbats.

Wetlands

Wetland habitat within the study area is limited to a palustrine wetland located within the western outer limits (**Figure 5**), comprising of approximately 4 ha. The wetland is ephemeral, experiencing varying degrees of inundation throughout the year. The habitat predominantly consists of a disturbed Buffel Grass (*Cenchrus ciliaris*) depression with fringing large River Red Gum and *E. platyphylla* (Poplar Gum). Canopy die back was noted to be severe within this habitat.

Figure 5: Habitat types



Legend

- Mining Lease
- Study area

Habitat types

- Brigalow Woodland
- Dry Eucalypt Forest
- Floodplain Eucalypt Forest
- Fringing Riparian Forest
- Wetland

0 550 1,100 2,200

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

N

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Prepared by: RW Date: 03/05/2018

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4.5 Threatened Fauna Species Presence

The current database results identified 15 threatened fauna species and 10 migratory species as potentially occurring within the study area. Of the 15 threatened species, three were identified as occurring within the study area, the Greater Glider, Koala and Squatter Pigeon. Ornamental Snake was not identified within the study area; however due to the presence of suitable habitat and species records in adjacent areas, this species is considered likely to occur within the study area.

Of the 10 migratory species, none were identified as occurring with the study area. All migratory species were considered unlikely to occur due to the lack of detection of the species during field surveys and lack of suitable species habitat or key habitat features.

The complete assessment of the likelihood of occurrence is provided in **Table 4-3**. It should be noted that field validation of vegetation communities and habitat values did not detect any significant inconsistencies with previous likelihood assessments, with two exceptions. The South-eastern Long-eared Bat was previously assessed as a potential occurrence. The validated marginal habitat coupled with the study area occurring outside of the likely distribution of the species makes it an unlikely occurrence. The re-assessment of the South-eastern Long-eared Bat likelihood of occurrence is provided in **Table 4-3**. The Koala was listed in previous assessments as being a 'transient species', however it was recorded within the study area during the 2018 survey.

Surveys conducted in February 2018 were undertaken to target the presence of the Star Finch in the study area, to address the DoEE information request for the Preliminary Documentation. The eastern sub-population of the Star Finch is poorly known due to small number of records in scattered areas. However it is believed to extend north to Bowen, west to Winton and south to near Wowan. The population is likely severely fragmented with an estimate of 50 or less breeding birds and the species is believed to be locally extinct in many areas of its range (DoE 2018, DEWHA 2008). The Star Finch occurs mostly in grassy woodlands close to bodies of fresh water (DoE 2018). Seeds of native grasses are the main food source for the Star Finch (DoE 2018). Major threats to the species are degradation of habitat and reduction of native grass seeds through weed incursion and overgrazing by cattle (DEWHA 2008).

The species was not confirmed within the study area during the 2018 survey and is considered unlikely to occur. There are no recent records within the surrounding area (ALA 2018) and the species' distribution is now highly fragmented and potentially locally extinct. Ground-truthed potential habitat within the study area was considered to be of poor quality, with a high abundance of non-native grasses (Buffel and Guinea Grass) and a lack of permanent watering holes. Bird surveys also found a distinct lack of other common finch species, such as Double-barred Finch (*Taeniopygia bichenovii*) or Zebra Finch (*Taeniopygia guttata*), suggesting the study area does not contain suitable habitat for finches more generally. Abundance of bird species observed during the survey is shown in **Appendix E**.

As the Star Finch is considered unlikely to occur within the study area, impact of the project on the species is not assessed further.

A description of the habitat extent based on targeted field assessments for each known or likely occurring species is provided below. Detailed results of the targeted habitat assessments are provided in **Appendix A**.

Greater Glider

Greater Glider has been observed in various habitat types along Walker Creek within the study area on several occasions (**Figure 6**). Greater Glider has been previously recorded within the study area during detailed fauna surveys (Footprints, 2013) and pre-clearance surveys across the mine have also recorded five individuals north of the study area along Walker Creek. During the February 2018 survey 22 Greater Gliders were recorded within the study area.

Records of Greater Glider during the 2018 survey indicate a preference for habitat along a small section of the riparian corridor of Walker Creek (**Figure 6**). Adjacent Eucalypt floodplain areas were found not to be utilised by Greater Glider, despite containing a high abundance of hollows. Other arboreal species such as Sugar Gliders, Squirrel Gliders and Brush-tail Possums, which utilise similar habitats (i.e. hollow bearing Eucalypts), were found not to overlap with Greater Glider records, and tended to occur in the floodplain or lower reaches of Walker Creek, indicating potential competition for areas containing hollows suitable for Greater Glider.

Hollow bearing tree transects found a high abundance of tree hollows suitable for Greater Glider (i.e. medium 8 to 15 cm or large >15 cm diameter). These were found to occur both within riparian corridors (average of 24 medium and nine large per hectare), as well as adjacent floodplain eucalypt woodlands (average of 23 medium and 11 large per hectare). Whilst these numbers are greater than the hollow densities that are considered suitable for Greater Glider use (2 to 4 for every two hectares of suitable habitat (TSSC 2016)), assessing the number of suitable hollows during on-ground surveys may be overestimated, as the extent to which the hollow has established and its suitability for the species is difficult to determine.

Overall, the fringing riparian habitat within the study area provides both the foraging and breeding habitat required to support the Greater Glider (**Figure 6**).

Squatter Pigeon

Squatter Pigeon was recorded within the Dry Eucalypt Forest habitat in study area during the field survey in 2016 (**Figure 6**). Targeted Squatter Pigeon habitat assessments identified suitable water points for the species along Walker Creek, Carborough Creek and an artificial farm dam located in the central portion of the study area. Carborough Creek and Walker Creek are both ephemeral in nature but are major watercourses for the area with a stream order of four and five, respectively. Small pools of water were observed at various points along the dry sandy creek bed of Walker Creek, and the artificial dam was found to be at a moderate level of water capacity. These field observations occurred at the commencement of the dry season and whilst the water sources cannot be identified as permanent (i.e. spring-fed source), they may provide a reliable source of water for much of the year.

Habitats on the appropriate sandy substrates for foraging and breeding (DoE 2016d) that were ground-truthed within a 1 km range of these water sources, included the fringing riparian forest, floodplain Eucalypt forest and the dry Eucalypt forest. For the floodplain Eucalypt forest and dry Eucalypt forest habitat, only the southern portions of the primary impact area and a small portion of the southern dam footprint were found to comprise the bare ground conditions that are preferential for the species (i.e. in the order of 30%) (**Figure 6**). During the field survey, two Squatter Pigeon individuals were observed within the central area of the dry Eucalypt forest habitat (**Figure 6**). The extensive weed incursion within the fringing riparian forest has significantly degraded the habitat resources for the Squatter Pigeon, with the dense groundcover inhibiting foraging opportunities and providing poor conditions for breeding.

Overall, portions of the floodplain Eucalypt forest and dry Eucalypt forest habitat within 1 km of identified water sources are considered areas of Squatter Pigeon habitat within the study area (**Figure 6**).

Koala

Koala has been observed numerous times in areas in the vicinity of the study area and three Koalas were recorded within the floodplain and fringing riparian forest habitats in the study area during the February 2018 survey (**Figure 6**).

Koala has been previously recorded within the operational mine lease (EcoServe & LAMR, 2005). In 2016, two individuals were recorded in floodplain Eucalypt habitat adjacent to the study area along Walker and Carborough Creek. Species presence has also been recorded in 2015 along Humbug Creek, 10 km south-east of the study area. Two un-confirmed sightings of the species occurred in 2008 and 2013 by mine staff along the mine access road and haul road.

Targeted Koala habitat assessments identified the total extent of fringing riparian forest habitat as containing two known Koala food tree species, Queensland Blue Gum and River Red Gum (Australian Koala Foundation 2015). Only portions of the floodplain Eucalypt forest habitat and dry Eucalypt habitat were found to contain Koala food tree species. This ranged from containing two known species (Poplar Box (*Eucalypts populnea*) and Narrow-leaved Ironbark (*Eucalyptus crebra*)) to only one known food tree species dominating the canopy layer (i.e. >50% coverage).

Within these areas containing Koala food tree species, only the riparian forest habitat and floodplain Eucalypt forest habitat occurred on alluvial substrates where canopy trees could access the saturation zone along Walker Creek and Carborough Creek. In these areas, soil moisture is likely to be retained for extended periods in between creek flow events. In contrast, the dry Eucalypt forest habitat was found to contain deep sandy soils with limited water holding capacity.

Overall, the riparian forest habitat and portions of the floodplain Eucalypt forest habitat containing Koala food trees are considered areas of Koala habitat within the study area (**Figure 6**).

Ornamental Snake

Ornamental Snake has been previously recorded in Brigalow habitat within the mine site (EcoServe & LAMR Pty Ltd, 2007). Queensland Essential Habitat Mapping also identifies three records within a 2 – 5 km radius of the study area. Targeted Ornamental Snake habitat assessments across the Brigalow / Belah woodland habitat revealed varying values for the species. Only three of the seven patches of Brigalow / Belah habitat were found to contain the essential microhabitat features necessary to support the species. This includes a structurally complex ground layer comprising extensive amounts of woody debris, wide soil cracks, as well as deep ephemeral gilgai (**Figure 6**).

Table 4-3: Likelihood of occurrence results for threatened and migratory fauna species

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
Fauna					
Allan's Lerista *Lerista allanae*	E	Found in association with *Eucalyptus orgadophila* (Mountain Coolabah), *E. erythrophloia* (Red Bloodwood) open woodlands and *Melaleuca bracteata* (Black Tea-tree). It is currently associated with altered landscapes that have areas with leaf litter and friable surface soils beneath trees and shrubs. These sites were characterised by dark chocolate non-cracking clay-based soils which are mapped as Regional Ecosystem 11.8.5 and 11.8.11.	Unlikely	Unlikely	The study area does not contain suitable habitat for the species and is not within its current range. Species is only known to occur within a small area south of Clermont.
Australia Painted Snipe *Rostratula australis*	E	Species dependent on wetlands and can inhabit a variety of types including shallow terrestrial freshwater (occasionally brackish) wetlands, temporary and permanent lakes, swamps and claypans. Preferred wetland habitats are characterised by emergent vegetation (including tussocks, grasses, sedges, rushes, reeds, canegrass and/or paperbarks) where nesting will occur. Artificial habitats that are occasionally used include reservoirs, farm dams, sewage	Unlikely	Unlikely	The study area does not contain suitable habitat for the species due to the lack of wetland habitats containing fringing aquatic vegetation.

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
		ponds, inundated grasslands, and leaking irrigation channels.			
Curlew Sandpiper *Calidris ferruginea*	CE, M	Species usually forages and roosts in intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms.	Not assessed	Unlikely	Suitable coastal habitat is not present within the study area.
Fitzroy River Turtle *Rheodytes leukops*	V	Generally associated with instream habitats providing deep pool and riffle sequences, this species also prefers *Vallisneria* spp. (Ribbonweed) beds. Common riparian trees associated with the Fitzroy River Turtle habitat include E*ucalyptus tereticornis* (Queensland Blue Gum), *Casuarina cunninghamiana (*River She-oak), *Callistemon viminalis (*Weeping Bottlebrushes) and *Melaleuca linariifolia* (Paperbarks).	Unlikely	Unlikely	Walker Creek within the study area does not support the instream habitat requirements for the species.

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
Ghost Bat *Macroderma gigas*	V	Ghost bats occur in a wide range of habitats from rainforest, monsoon and vine scrub, to open woodlands in arid areas. These habitats are used for foraging, while roost habitat is more specific. Favoured roosting sites of the ghost bat are undisturbed caves or mineshafts which have several openings.	Not assessed	Unlikely	The species occurs in two disjunction distributions and 4 known disjunct subpopulations throughout Queensland. The study area overlaps one of the two disjunct distributions which occurs from coastal northeast Queensland from near the tip of Cape York Peninsula to approximately Gladstone. Microbat surveys were conducted during previous ecological surveys, however, the species (or its genus) was not detected. The study area also does not support potential rooting or foraging habitat.
Greater Glider *Petauroides volans*	V	Largely restricted to eucalypt forest and woodlands, with a preference of old growth with abundant large tree hollows (den habitat).	Known	Known	Identified within the study area by Footprints Environmental (2013) prior to species' listing. Vegetation within the study area is contiguous with a large forested tract that extends further west of the study area. Riparian vegetation along Walker Creek within the study area, likely to contain hollow-bearing trees.

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
Koala *Phascolarctos cinereus*	V	Koala habitat can be broadly defined as any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. Within inland environments (<800mm rainfall), this is limited to open forests and woodland where Koala food trees have a reliable access to soil moisture. Habitat in particular includes Box Gum or Red Gum woodlands on heavier soils in remnant or regrowth vegetation patches particularly riparian zones (DoE, 2014a)	Transient species	Known	Use of Walker Creek by the species determined to be infrequent based on scratch marks (Ecoserve & LAMR, 2006)) and the lack of direct and indirect sighting during targeted searches (Footprints, 2013). Two individuals have been recorded in 2016 directly adjacent to the study area along Walker and Carborough Creek. Suitable habitat for the species has been identified on the alluvial plains of Walker Creek within the study area. Three individuals were sighted in 2018 field surveys.
Ornamental Snake *Denisonia maculata*	V	The Ornamental Snake inhabits remnant and non-remnant low-lying areas with cracking clay soils, where it can be locally abundant. Prefers moist areas and adjoining elevated ground, particularly areas associated with gilgai development. Areas dominated by *Acacia harpophylla* (Brigalow), *Acacia cambagei* (gidgee), *Acacia argyrodendron* (blackwood) and *Eucalyptus coolabah* (coolabah) are the habitats where the Ornamental Snake is most likely to be	Likely	Likely	Ornamental Snake has been previously recorded 2-5 km south-east of the study area in remnant vegetation. Three areas within the Brigalow habitat provide suitable microhabitat features for the species.

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
		found, which includes riparian woodlands and open forest on levees.			
Northern Quoll *Dasyurus hallucatus*	V	The species occupies a diversity of habitats across its range including Eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern Quoll are also known to occupy non rocky lowland habitats such as beach scrub communities in central Queensland. Northern Quolls appear to be most abundant in habitats within 150 km of the coast.	Unlikely	Unlikely	The study area does not contain suitable rocky habitats for the species.

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
Red Goshawk *Erythrotriorchis radiatus*	V	Occurs over wooded and forested lands, associated with different vegetation mosaics between south-east Queensland, northern Queensland and Cape York Peninsula. Prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds), and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest, and rainforest margins. Nesting habitat has been defined as a stand of tall trees within 1km of permanent water. The species is mainly associated with regional ecosystems at risk with rugged terrain in southern and northern Queensland.	Unlikely	Unlikely	The study area does not contain suitable habitat for the species, specifically extensive vegetated tracts of mosaic communities, and the presence of permanent water i.e. large river systems.
South-eastern Long-eared Bat *Nyctophilus corbeni*	V	This species can occur in a range of inland woodland vegetation types, including box, ironbark, and cypress pine woodlands. Brigalow woodland and River Red Gum forests lining watercourses and lakes also provide habitat for the species Throughout inland Queensland, the species habitat is dominated by various eucalypt and bloodwood species and is most abundant in	Possible / Likely	Unlikely	Previous ecological studies determined the species to be 'likely' due to the presence of suitable refuge, foraging and breeding habitat within the study area. Suitable habitat present consists of poplar box woodlands on alluvial plains, Brigalow woodlands and riparian zones (Cardno, 2013 & Footprints, 2013). Targeted surveys were conducted for the species using harps and Anabat devices. *Nyctophilus* spp. was recorded during a

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
		vegetation with a distinct canopy and a dense cluttered shrub. Captures have been made in open dry woodland and forest, which may include *Corymbia citriodora, C. bloxsomei, Eucalyptus crebra, E. melanophloia, E. populnea, E. major, E. pilligaensis, E. Chloroclada, E. fibrosa, Angophora leiocarpa, Allocasuarina luehmannii, Dodonaea viscosa, Callitris glaucophylla, Acacia harpophylla, Ac. leiocalyx, Ac. conferta, Casuarina cristata and Geijera parviflora*.			2013 survey however, classification to species was not determined (Footprints, 2013). Further field validation was required to assess suitable habitat and quality within the study area. Eucalypt woodland and River Red Gum riparian forest (RE 11.3.25) is present within the study area which is stated habitat for the species. Also occurring are habitats dominated by several species associated with the South-eastern Long-eared Bat. Although this habitat is present, it is considered marginal due to the lack of a dense cluttered shrub layer, which the preferential habitat structure for the species. Whilst marginal habitat is present, the study area occurs outside of the likely distribution for the species, which is predominantly restricted to the Brigalow Belt South Bioregion and the Mulga Lands Bioregion. The most northern record for the species is within the Expedition National Park located approximately 390 km south of the study area. Collectively, these results have led to the reassessment of the species' occurrence from likely (previous) to unlikely (current).

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
Squatter Pigeon (southern) *Geophaps scripta scripta*	V	Open-forests to sparse, open-woodlands and scrub that are mostly dominated in the overstorey by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species; remnant, regrowth or partly modified vegetation communities; within 3 km of water bodies or courses.	Likely	Known	Previous ecological studies have recorded the presence of the species within the surrounding area. Current field surveys recorded the species within the study area. Suitable habitat identified within portions of the fringing Eucalypt and dry Eucalypt forest.
Star Finch *Neochmia ruficauda ruficauda*	E	Occurs in grasslands and grassy woodlands, near permanent water, and often in or near cleared suburban areas. Also reported along river banks dominated by native grasses and sedges.	Unlikely	Unlikely	The study area does not contain suitable habitat for the species due to the lack of grassy habitats adjacent to permanent water. No evidence of the species or its habitats were found during targeted survey in 2018.
Yakka Skink *Egernia rugosa*	V	Known woodland habitats include *Eucalyptus populnea (*Poplar Box), *Acacia aneura* (Mulga), *Callitris glaucophylla* (White Cypress Pine), and disturbed, treated and cleared areas where suitable microhabitat features remain. Also been recorded, though less frequently, in *Acacia harpophylla* (Brigalow), *Acacia catenulata (*Bendee), *Casuarina cristata (*Belah), *Acacia cambagei (*Gidgee), *Acacia shirleyi (*Lancewood), and *Allocasuarina luehmannii* (Buloke) woodlands.	Possible	Unlikely	Previous ecological studies determined the species to be 'possible' due to the presence of suitable refuge, foraging and breeding habitat within the study area. Extensive ground searches and nocturnal surveys failed to detect the species or any signs of potential occurrence (Footprints, 2013). Current closest records of the species are located approximately 187 km south of the study area.

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
White-throated / Southern Snapping Turtle *Elseya albagula*	CE	Found only in Queensland in the Fitzroy, Mary and Burnett Rivers and associated smaller drainages in south eastern Queensland. The white-throated snapping turtle is recognised as a habitat specialist. Within the river system the white-throated snapping turtle prefers clear, flowing, well-oxygenated waters.	Not assessed	Unlikely	The study area is outside of the known distribution for the species and contains no suitable habitat.
Migratory Species					
Black-faced Monarch *Monarcha melanopsis*	M	The species mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest.	Not assessed	Unlikely	The required habitat (rainforest ecosystems) for the species does not occur within the study area.
Common Sandpiper *Actitis hypoleucos*	M	The species utilises saltwater and freshwater ecosystems for foraging and roosting. These include coastal and inland wetlands, and mangroves.	Not assessed	Unlikely	Sufficient wetland habitat not present within the study area

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
Fork-tailed Swift *Apus pacificus*	M	The Fork-tailed Swift is predominantly aerial and occurs over inland areas and occasionally above the foothills in coastal areas with dry and open habitat. They can also occur over low scrub, heathland, saltmarsh and riparian woodlands and are associated with low pressure systems that favour the occurrence of insect prey.	Not assessed	Unlikely	The study area lacks suitable habitat for the species. The closest known recorded for the species was captured in 2012 over 50km to the west (ALA 2016).
Latham's Snipe *Gallinago hardwickii*	M	Occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies).	Not assessed	Unlikely	A small ephemeral wetland was identified within the west of the Project Area and described as RE 11.3.27. Although this habitat feature is present, the species is unlikely to occur due to the lack of foraging habitat (mud) coupled with some form of cover (low, dense vegetation) being present within the wetland.
Oriental Cuckoo *Cuculus optatus*	M	Monsoon forest, rainforest edges, leafy trees in paddocks, river flats, roadsides, mangroves, islands.	Not assessed	Unlikely	The study area is dominated by dry Eucalypt woodlands and forests with some riparian habitat. The habitat occurring with the study area is not suitable for this species.

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
Osprey *Pandion cristatus*	M	Littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. Require extensive areas of open fresh, brackish or saline water for foraging. Frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes.	Not assessed	Unlikely	The study area does not possess extensive areas of open fresh, brackish or saline water for foraging in which the species requires.
Pectoral Sandpiper *Calidris melanotos*	M	The species inhabits shallow fresh to saline wetlands and is usually found in coastal or near coastal habitat but occasionally found further inland.	Not assessed	Unlikely	Sufficient wetland habitat not present within the study area.
Satin Flycatcher *Myiagra cyanoleuca*	M	Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moister, taller forests than *Myiagra rebecula* (Leaden Flycatcher), often occurring in gullies. They also occur in eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest. Mainly recorded in eucalypt forests, especially wet sclerophyll forest, often dominated by eucalypts such as *Eucalyptus fastigata (*Brown	Not assessed	Unlikely	No wet sclerophyll forest dominated by preferred species were recorded within the study area.

Species	EPBC Act Status[1]	Habitat*	Likelihood of Occurrence Assessment[2]		Justification
			Previous assessment	Current assessment	
		Barrel), *E. dalrympleana* (Mountain Gum), *Eucalyptus cypellocarpa* (Mountain Grey Gum), *Eucalyptus radiata* (Narrow-leaved Peppermint), *Eucalyptus viminalis* (Manna Gum), or occasionally *E. regnans* (Mountain Ash). They sometimes also occur in dry sclerophyll forests and woodlands, usually dominated by eucalypts such as *E. blakelyi* (Blakely's Red Gum), *E. sideroxylon* (Mugga Ironbark), *Eucalyptus melliodora* (Yellow Box), *Eucalyptus albens* (White Box), Manna Gum or stringybarks, including *E. macrorhyncha* (Red Stringybark), and *Eucalyptus caliginosa*, (Broad-leaved Stringybark), usually with open understorey.			
Sharp-tailed Sandpiper *Calidris acuminata*	M	The species prefers muddy edges of shallow fresh or brackish wetlands, with suitable vegetation cover (sedges, grass or saltmarsh).	Not assessed	Unlikely	Sufficient wetland habitat not present within the study area.
Yellow Wagtail *Motacilla flava*	M	Short grass and bare ground, swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, town lawns.	Not assessed	Unlikely	No suitable habitat for the species was recorded within the study area.

[1] Current status under the EPBC Act: CE = Critically; V = Vulnerable; M = Migratory

[2] Known: Records from the study area.

Likely: Preferred habitat observed or mapped in the study area and known to occur in the region surrounding the study area and distribution overlaps with the study area.

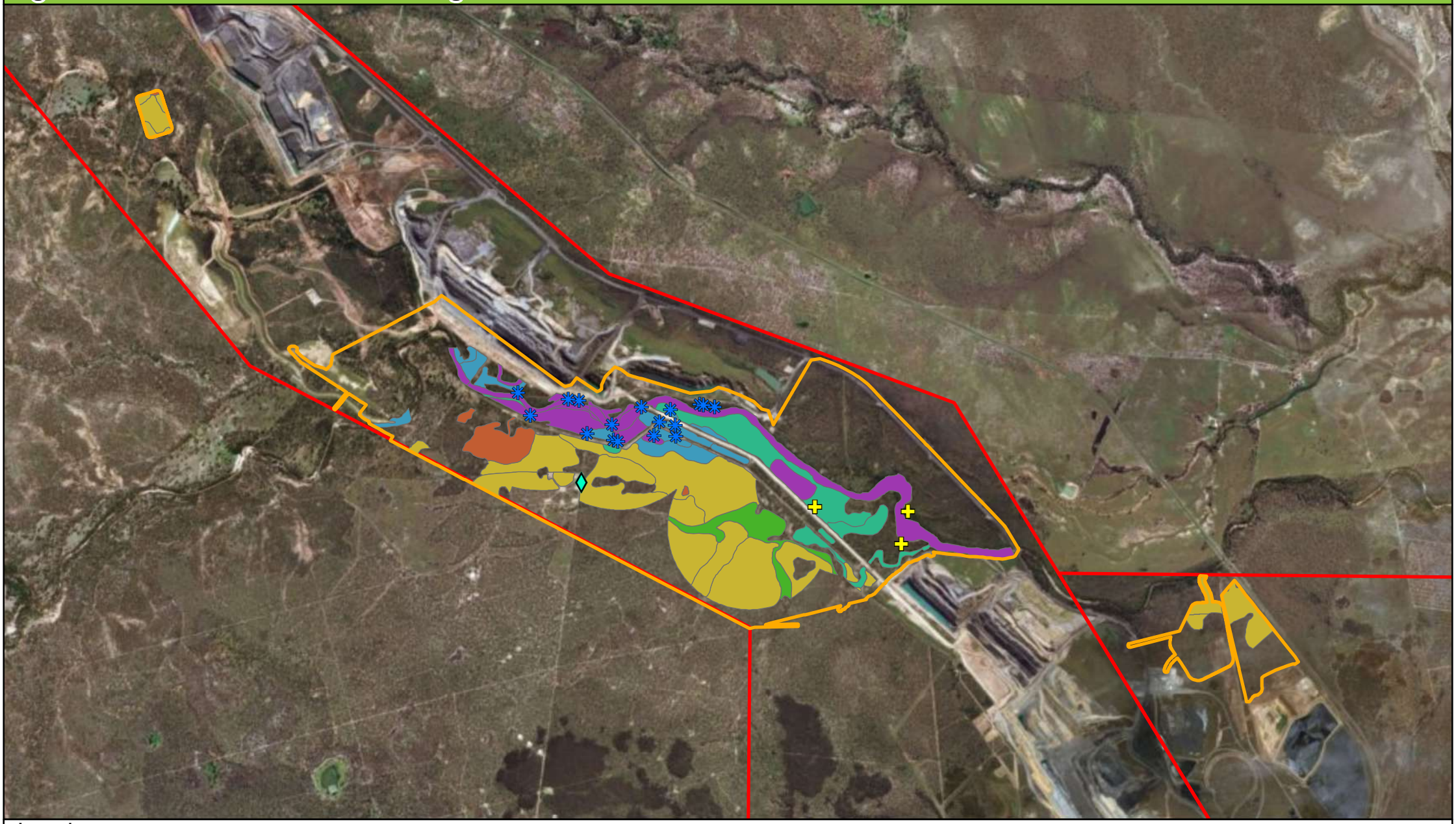
Potential: Marginal habitat observed or mapped in the study area and known to occur in the region surrounding the alignment corridor and distribution overlaps with the study area.

Unlikely occurring: Not known from surrounding region or distribution does not overlap with the study area but at least marginal habitat present.

Does not occur. Not known from the surrounding region and distribution does not overlap with the study area (usually associated with errors in databases searched) or no habitat present on the study area.

* Derived from Species Profile and Threats Database (http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl) or A-Z of animals (https://www.ehp.qld.gov.au/wildlife/animals-az/index.html)

Figure 6: Threatened fauna records & ground-truthed habitat



Legend

- Mining Lease
- Study area

Threatened species records

- Greater Glider
- Koala
- Squatter Pigeon

Ground-truthed Threatened Fauna Habitat

- Greater Glider
- Koala
- Koala, Greater Glider
- Ornamental Snake
- Squatter Pigeon
- Squatter Pigeon, Koala

0 500 1,000 2,000

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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4.6 Groundwater Dependent Ecosystems

The groundwater system across the SWC Mine has been described as comprising of two distinct aquifers – the unconfined or 'water table' aquifer and the confined coal seam aquifer (Golders, 2018). The water table aquifer consists of an alluvial and regolith hydrostratigraphic units that are in hydraulic connection. The regolith unit covers the majority of the study area whilst the alluvial unit is limited to the creek channels associated with Walker and Carborough Creeks. The alluvium can be locally saturated where the water table is shallow enough to intersect the unit. The water table aquifer is recharged via direct precipitation (surface runoff percolating through the ground surface) and by ephemeral stream recharge during flow events (Golders, 2018). The confined coal seam aquifer occurs deep below the water table aquifer and is separated by unweathered bedrock, which acts as an aquitard (Golders, 2018).

Desktop GDE mapping indicates the potential presence of two types of GDEs that may be utilising the groundwater resources at SWC Mine. These area:

- Aquatic (Type 2 GDEs) - ecosystems dependent on the surface expression of groundwater such as wetlands, lakes, seeps, springs, and river baseflow systems. In these cases, groundwater discharge provides water to support aquatic biodiversity
- Terrestrial (Type 3 GDEs) - ecosystems dependent on subsurface presence of groundwater such as terrestrial vegetation which depends on groundwater on a seasonal, episodic or permanent basis. These types of ecosystems can exist wherever the water table capillary fringe is within the root zone of the plants, either permanently or episodically.

The current described hydrogeologic model for the SWC Mine does not identify any areas within or surrounding the study area where there is a surface expression of groundwater (Golders, 2013). As such aquatic GDEs (Type 2) are not considered to occur within or surrounding the study area.

However, based on available monitoring bore data across the SWC Mine (Golders, 2018), there are habitats where vegetation could potentially access groundwater (i.e. < 10 m depth to water) (Canadell *et al*., 1996) and be considered a terrestrial GDE (Type 3). This is limited to the identified fringing riparian forest and portions of the floodplain Eucalypt forest habitat within the western portion of the study area along Walker Creek (**Figure 7**). In the broader area across the SWC Mine where shallow groundwater has also been identified, the habitats present are also limited to these two types. This includes areas within the upper branches of Walker Creek and along Carborough Creek.

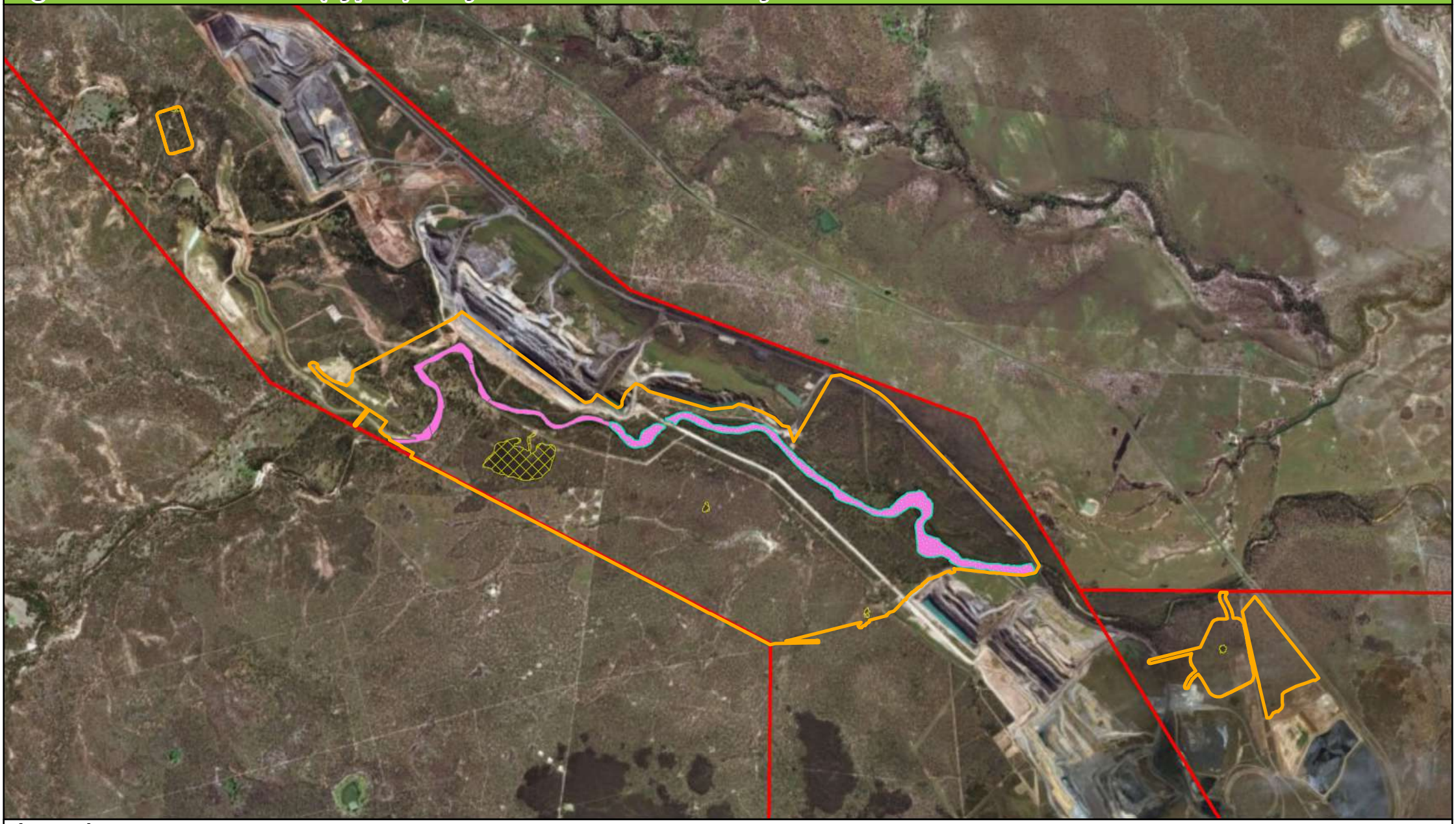
For these habitat types, the groundwater that may potentially be accessed would be contained within the water table aquifer. This aquifer system does have limitations as a reliable and consistent groundwater source for vegetation as it is seasonally influenced. During dry periods when vegetation would be more reliant on this source of water, recharge rates and the influx of fresh water decreases, which impacts on water quality and water levels within the aquifer (Golders, 2018).

Nonetheless, these limitations would not necessarily discount the potential use of groundwater by these habitat types. Particularly for the habitat types that occur within the upper reaches of Walker Creek and along Carborough Creek where depth to water has been recorded at less than 5 m (Golders, 2018). Species composition within these habitat types also consist of native canopy species that have been recorded to access groundwater between depths of 6 to 10 m (i.e. *Eucalyptus calmedulensis* and *Corymbia clarksoniana*) (Orellana et al., 2011).

However, not all areas of these two habitat types occur in areas of shallow groundwater. The fringing riparian forest and floodplain Eucalypt forest habitat also extends along and adjacent to Walker Creek within the study area and further along Bee Creek, where depth to water within the water table aquifer are > 10m.

Therefore the likelihood of the study area supporting Type 3 GDEs is considered to be high in areas where shallow groundwater is present. This includes areas of fringing riparian forest and floodplain Eucalypt forest along the upper reaches of Walker Creek and Carborough Creek. The likelihood that these habitat types are Type 3 GDEs is lower along the downstream portions of Walker Creek, as well as outside of the study area along Bee Creek. This is due to the increase in depth to water within the water table aquifer.

Figure 7: Terrestrial GDEs (Type 3) likely to occur within the study area



Legend

- Mining Lease
- Study area

Flora values

- Brigalow TEC
- Black Ironbox

GDE values

- Potential Terrestrial GDE (Type 3)

0 500 1,000 2,000

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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5 Matter of National Environmental Significance

The MNES identified as occurring or likely to occur within the MRA Stage 2C study area are:

- One listed TEC (Brigalow dominant or co-dominant)
- Black Ironbox – threatened flora species and a GDE component of a water resource
- Habitat for four threatened fauna species (Greater Glider, Ornamental Snake, Koala and Squatter Pigeon)

Table 5-1 provides MNES values and extent (including species habitat), identified within the MRA Stage 2C study area. **Figure 8** illustrates the location of each MNES value.

Table 5-1: Summary of Field Verified MNES values

MNES Value	Study area (ha)	Disturbance footprint (ha)[1]
Threatened Ecological Communities		
Brigalow (dominant or co-dominant) TEC	32.7	32.7
Threatened Species' Habitat		
Black Ironbox	27.2	16.8
Koala	259.4	212.2
Ornamental Snake	33.7	33.7
Squatter Pigeon	401.6	295.3
Greater Glider	186.2	149.3

[1] = Excluding approved Stage 2A area (EPBC 2014/7272)

The following sections provide a description of each field verified MNES value including the determination of key characteristics such as important populations, ecologically significant proportions and habitat critical to the survival of the species. Interpretation of these key characteristics has been done in accordance with the definitions provided in Commonwealth Significant Impact Guidelines (EPBC Act Policy Statement 1.1).

Figure 8: MNES values

Legend

- Mining Lease
- Study area

Flora values

- Brigalow TEC
- Black Ironbox

Fauna values

- Greater Glider
- Koala
- Koala, Greater Glider
- Ornamental Snake
- Squatter Pigeon
- Squatter Pigeon, Koala

0 500 1,000 2,000

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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5.1 Threatened Ecological Communities

5.1.1 Brigalow (dominant or co-dominant)

Four patches of Brigalow (dominant or co-dominant) TEC were identified within the study area, comprising of a total area of approximately 32.7 ha (**Figure 8**). These patches met all key diagnostic criteria and condition thresholds for the TEC (**Appendix D**).

Three of the Brigalow TEC patches within the study area are only small occurrences encompassing a total area of less than 1.5 ha. The majority of Brigalow TEC occurs in one large patch located in the western portion of the study area.

5.2 Black Ironbox

Approximately 27.2 ha containing 525 individuals of Black Ironbox was ground-truthed within the study area (**Figure 8**). An assessment of the population and value of habitat within the project disturbance footprint to the survival of the species is provided in the following sections.

As well as being a listed threated flora species, Black Ironbox may also be considered a groundwater dependent ecosystem (GDE). This is relevant to this assessment, as GDEs are considered MNES if they form an environmental water resource user that may be impacted by coal seam gas or a large coal mine development (i.e. the water trigger applies). The extent to which Black Ironbox within the study area should be considered a GDE is also discussed below.

Important population

Black Ironbox occurs in two disjunct distributions, Townsville to Nebo and around Rockhampton, which provide an extent of occurrence (EOO) in the order of 124,000 km^2 (DoE 2016e). Currently, there are no defined important populations for this species within its current range.

The Central Queensland population of Black Ironbox occurs within the Townsville to Nebo distribution and is separated into two catchments, the Bowen / Broken and Boogie River catchment and the Isaac / Fitzroy catchment. The study area occurs within the Isaac / Fitzroy catchment where the core and largest populations of Black Ironbox have been identified along Bee Creek, Funnel Creek and Dennison Creek (Queensland Herbarium, 2012). The density of mature Black Ironbox individuals along Bee Creek has been recorded at 165 individuals / km (Cardno, 2012), which falls within the upper quartile range of average measured density for the species (Queensland Herbarium, 2012). Walker Creek is a tributary of Bee Creek.

In consideration of the important population attributes defined in the Commonwealth Significant Impact Guidelines (EPBC Act Policy Statement 1.1), the study area is not considered to support an important population of Black Ironbox (**Table 5-2**). The density of mature Black Ironbox individuals along Walker Creek is approximately 76 individuals / km, which is similar to the average measured density for the species (Queensland Herbarium, 2012) and significantly lower than Bee Creek at 165 individuals / km. The large and denser population along Bee Creek provides a greater source a reproductive output (pollen) and plays a critical role in maintaining genetic diversity. At a catchment level scale, the Walker Creek Black Ironbox population is a localised occurrence of the species on a more minor tributary system, with the Bee Creek population being the main source population for the drainage system.

A summary of the assessment against the Commonwealth Significant Impact Guidelines (EPBC Act Policy Statement 1.1) important population criteria is provided in **Table 5-2.** The assessment is based on data, expert opinion and precedence.

Table 5-2: Important population assessment for Black Ironbox

Important Population Criteria	Assessment	Justification
Key source population either for breeding or dispersal	No	• Density within the study area is 7.6 individuals / 100m. • As a precedence the Sonoma Mine project recorded an important population at a density of 14.2 individuals / 100m along Coral Creek, double that of the Walker Creek occurrence. • Bee Creek (downstream from impact site) density equates to 16.5 individuals / 100m. • Lower density along Walker Creek indicates that habitat conditions are of a lower quality for the species when compared to Bee Creek and Coral Creek. Areas of higher quality habitat supporting a greater density of individuals are considered to be of greater source value for the wider population. • For Eucalypt species the reproductive output (pollen pool) of a population is frequently dominated by a small percentage of mature trees flowering synchronously. Given that Bee Creek has a high density of individuals compared to Walker Creek, reproductive output is likely to be greater due to a higher chance of more mature trees flowering.
Populations that are necessary for maintaining genetic diversity	No	• Gene flow between populations for Eucalypt species is limited. This is most likely attributed to differences in flowering phenology between population, pollination mechanism (localised dispersal of pollen by insects and birds) and localised distribution of seed. • Dispersal of seed and thus genetic material to other populations can be enhanced for riparian species; however this is still limited in Central Queensland due to the ephemeral nature of creek systems. • For Eucalypt species, most of the genetic diversity occurs within populations. This is more pronounced in disjunct populations like the Black Ironbox. • Whilst Eucalypts are commonly self-compatible (hermaphroditic flowers), the breeding system is one of mixed mating with preferential outcrossing. As such genetic diversity within populations can be impacted by inbreeding. • Given that Bee Creek has a high density of individuals compared to Walker Creek, the chances of inbreeding are reduced. As such Walker Creek is less likely to be a population necessary for maintaining genetic diversity for the species in the local area.
Populations that are near the limit of the species range	No	• Expert distribution estimates for the species (Atlas of Living Australia) locate the study area within the species range, rather than on the limit. • Study area is not the most western record for the Central Queensland population. The most western record for the

Important Population Criteria	Assessment	Justification
		population occurs approximately 77km north-west from the study area and is 16km further west along Exe Creek. • The species distribution extends much further south (Rockhampton region) and north (Ayr). The extent of occurrence is about 90,000 km^2 (Queensland Herbarium, 2008).

Habitat critical to the survival of the species

Black Ironbox is a riparian dependent species, mainly distributed along the banks of wide (>10 m) drainage lines, usually of middle-order streams, with river sand, rock cobble or gravel substrates. Stream environment is ephemeral but subject to periodic high-energy flood flows. Sun-exposed sandy channels with deep river sands, or narrow drainage line tended to be free of this species and is considered unsuitable habitat (Queensland Herbarium, 2012). Habitat for Black Ironbox within the study area is restricted to the stream banks of Walker Creek.

Riparian condition surveys within the Isaac / Fitzroy catchment determined Walker Creek and Bee Creek to be good condition (Queensland Herbarium, 2012). Habitat for the species is not limited to the area within the study area and opportunities exist for the species to disperse and inhabit areas elsewhere in the catchment. As such, whilst habitat is suitable and supports the species within the project disturbance footprint, it is not critical in maintaining the survival of the species in the area.

Black Ironbox as a GDE

Desktop GDE mapping indicates the potential presence of two types of GDEs that may be utilising the groundwater resources at SWC Mine along Walker Creek where Black Ironbox was identified. These area:

- Aquatic (Type 2 GDEs) - ecosystems dependent on the surface expression of groundwater such as wetlands, lakes, seeps, springs, and river baseflow systems. In these cases, groundwater discharge provides water to support aquatic biodiversity
- Terrestrial (Type 3 GDEs) - ecosystems dependent on subsurface presence of groundwater such as terrestrial vegetation which depends on groundwater on a seasonal, episodic or permanent basis. These types of ecosystems can exist wherever the water table capillary fringe is within the root zone of the plants, either permanently or episodically.

As discussed in **Section 4.6,** the fringing riparian forest habitat and the floodplain Eucalypt forest habitat within areas of shallow groundwater (<10m), are likely to be terrestrial (Type 3) GDEs. However, groundwater depth is not consistent across the study area. Shallow groundwater is limited to the areas of this habitat along the upper reaches of Carborough Creek and Walker Creek within the study area. However, further downstream depth to groundwater increases. The likelihood of these habitats being a terrestrial (Type 3) GDE further downstream in areas where groundwater is deeper (>10m), is considered to be low.

The occurrence of Black Ironbox across the SWC Mine occurs within the fringing riparian forest habitat where depth to water within the water table aquifer has been recorded to range from 10 – 15 m from adjacent monitoring bores (Golders, 2018). It does not occur along Carborough Creek or upper portions of Walker Creek west of the study area where groundwater is very shallow (<5m). The density of Black

Ironbox along Walker within the study area and then further downstream along Bee Creek also varies, but generally increases as the creeks progress downstream. Within the project footprint of MRA2C, the density of Black Ironbox along Walker Creek was found to be approximately 7.6 individuals / 100m^2. This progresses to 8.27 individual / 100m^2 further downstream along Walker Creek within the mining lease. Along Bee Creek the density of Black Ironbox is substantially greater at 16.5 individuals / 100m^2.

While the species is within areas of habitat that may have access to shallow groundwater (i.e. 10 m), it also occurs outside of these areas and increases in density as groundwater becomes deeper and is therefore less accessible. It also does not occur in areas where groundwater is highly accessible. The species is very much restricted to the riparian zone of watercourses, so there is a level of water dependency. However, the variation in occurrence of the species suggests that this water dependency may be from other sources such as surface flow rather than groundwater. The variation of occurrence also suggest that other factors may contribute to the persistence of the species in the area other than water dependency such as stream characteristics and recruitment strategy (Queensland Herbarium, personal communication, 8 August 2017).

Studies have found that Black Ironbox seldom occurs on very narrow (5-10 m wide) drainage systems and is mainly distributed along the banks of middle-order streams, usually with a meander pattern (Pollock, 2012). Most of the streams in which Black Ironbox has been recorded are ephemeral. Occurrences are generally on alluvial soil substrates of river sand, rock cobble or gravel, which are typically well-drained and remain moist for much of the year. Other factors noted to influence the occurrence of Black Ironbox is water flow velocity, with most watercourses systems where Black Ironbox is situated found to be subject to periodic high energy flood flows (Pollock, 2012). The reason attributed to this is that that the regeneration of the species appears to be dependent on bare seed-beds prepared by previously flood-scoured cobble and river sand banks (Pollock, 2012). The high-water flows preceding the seeding of the species reduces understorey competition from other herbs, grasses and forbs and allows seeds to successfully germinate. All such factors are present along Walker Creek within the study area.

The rooting depth or depth to water table range has not been studied for Black Ironbox so the ability of the species to tap into the groundwater within the study area and further downstream cannot be negated. However, the level of dependency that the species has on groundwater sources at SWC Mine is not considered to be high. The interaction with groundwater is likely to be intermittent, seasonally and situationally dependent at best. This concept is supported by other examples of the species persistence without groundwater sources, including along watercourse in Collinsville, Queensland where the underlying metamorphic geology prevents access to groundwater and in plantings in non-riparian environments in Biloela, Queensland (Queensland Herbarium, personal communication, 8 August 2017).

5.3 Threatened fauna species

5.3.1 Ornamental Snake (*Denisonia maculata*)

Approximately 33.7 ha of Ornamental Snake habitat has been identified in the study area (**Figure 8**). This is based on habitat assessments identifying known ecological requirements for the species (refer to **Section 4.5**). Whilst previous ecological studies did not record the presence of the species within the study area, the species has been previously recorded across the mine site. This includes three records 2 – 5 km south-east of the study area in remnant Brigalow habitat.

Habitat within the study area considered to support Ornamental Snake includes gilgai relief areas on cracking clays. Targeted habitat assessments identified three areas of this habitat within the study area. The habitat was found to contain a structurally complex ground layer comprising extensive amounts of

woody debris, wide soil cracks, as well as deep ephemeral gilgai. Given the abundance and high variety of essential microhabitat features, coupled with the predominantly low presence of threats, it is likely that the species would be utilising the study area for breeding, feeding and sheltering. As such the study area is considered to contain important habitat for the species.

As per the Draft Referral Guidelines for the Nationally listed Brigalow Belt Reptiles (DoE, 2011), important habitat is utilised as a surrogate for important populations due to the cryptic nature of reptile species such as Ornamental Snake. Subsequently, the study area would be considered as an area supporting an important population of Ornamental Snake.

Additional Brigalow / Belah habitat was ground-truthed within the study area; however these areas were not determined to be Ornamental Snake habitat due to the lack of essential microhabitat features including gilgai and soil cracks.

5.3.2 Koala (*Phascolarctos cinereus*)

Habitat critical to the survival of the species

As per the EPBC Act referral guidelines for the vulnerable Koala, Koala habitat value is categorised by five primary habitat attributes – vegetation composition, occurrence, recovery value, key existing threats and connectivity. By applying these five attributes as per the referral guideline's Koala habitat assessment tool, the study area is deemed to contain habitat critical to the survival of the Koala (habitat score of 9). Approximately 259.4 ha of Koala habitat occurs within the study area (**Figure 8**).

A determination on the critical role of this habitat is provided below covering the five primary Koala habitat attributes and includes the latest regional data, previous ecological assessment results for the study area and the recent results of the targeted habitat assessments and fauna survey.

Vegetation composition, structure and condition

As per the EPBC Act referral guidelines for the vulnerable Koala (DoE 2014a), vegetation with a reliable access to soil moisture is a key habitat requirement for inland environments. Long periods of drought are a natural climatic condition of inland environments, which can cause moisture stress for large canopy trees resulting in the release of chemicals (terpenes and phenols) that can deter Koala consumption. An alternate access to a reliable source of soil moisture other than surface rainfall runoff is critical during these dry conditions.

Within the study area, the fringing riparian forest habitat and floodplain Eucalypt forest habitat is likely to have access to some degree to the saturation zone associated with Walker and Carborough Creek. Whilst this is not considered a continual alternate source to surface runoff, seasonal replenishment would provide for an extended period of soil moisture.

Based on targeted habitat assessments across the study area, Koala food trees listed for the Isaac Regional Council Area (AKF, 2015) were confirmed within the floodplain of Walker and Carborough Creek. The entirety of the fringing riparian forest habitat was found to contain two known Koala food trees; however only portions (approximately 45%) of the floodplain Eucalypt forest habitat was found to contain Koala food trees dominating the canopy layer (>50% coverage) (refer to **Section 4.4**). Koala food trees identified within these habitat types include:

- Poplar Box
- Narrow-leaved Ironbox
- Queensland Blue Gum
- River Red Gum

Suitable vegetation composition, structure and condition to support Koalas was therefore only identified within two habitat areas within the study area – the fringing riparian forest and portions of the floodplain Eucalypt forest habitat.

Occurrence

Surveys conducted in 2018 identified three Koalas within the study area, all restricted to the riparian and fringing floodplain Eucalypt forests. Additionally, survey data for the SWC Mine spanning over 11 years from 2005 – 2016, has also two confirmed sightings within proximity to the study area.

Recovery value

As per the EPBC Act referral guidelines for the vulnerable Koala, the interim recovery objectives for inland environments is protecting and conserving refuge habitat. Given the Koala was recorded within riparian habitats during the 2018 field assessment, it is considered that the study area and in particular the riparian and fringing floodplain Eucalypt forests, would contribute to the recovery of the Koala.

Key existing threats

The study area has historically been utilised for grazing purposes. Key threats to the species such as dog attacks and vehicle strikes would have been low. Operational mining activities do not currently extend into the study area. Vehicle traffic associated with mining activities are infrequent and occur as part of routine maintenance and inspection checks across the lease. Clearing or construction of infrastructure within the study area has not occurred to the extent that it would create a barrier to Koala movement.

Overall, key existing threats to Koala within the study area are considered to be low.

Connectivity

The study area forms the eastern edge of a large vegetation tract that extends west of the South Walker mining lease. Connectivity to the west and south of the study area is therefore high. The large vegetation tract provides a landscape linkage between the Carborough Ranges and Dipperu National Park.

The operational mining area fragments the study area from areas to the north and east, creating a significant barrier to fauna movement. However, Walker Creek does provide a corridor that links to other eastern areas of habitat along Bee Creek.

Determination of habitat critical to the survival of the species

All habitats within the study area form the eastern extent of a larger vegetation tract, contributing to a landscape in which fauna species can readily disperse. Due to the study area's dominant grazing land use key existing threats to Koalas such as dog attacks and vehicle strikes are uniformly low. However, the 2018 survey confirmed the occurrence of three Koalas only in riparian and fringing floodplain Eucalypt forests in the study area. These areas are also the only habitat types within the study area that provide suitable vegetation composition, structure and condition for the species. These habitats contain the foraging resources capable of supporting species utilisation of the area.

Based on the Koala referral guidelines, the riparian and fringing floodplain Eucalypt forest habitat within the study area is considered to be habitat critical to the survival of the species due to three confirmed sightings in 2018, good connectivity to the west, high vegetation structure and composition value, high recovery value of the habitat and low existing threats.

Important population

At present, there are no species-specific policy guidelines on what constitutes an important population for the Koala. As such, an assessment of an 'important population' was made based on guidance within the *Matters of National Environmental Significance Significant impact guidelines 1.1* (DoE 2013).

The species is known to occur within the study area and surrounds and has been identified as using both riparian and floodplain eucalypt woodland habitat areas. Based on available evidence and regional species records to date, concentration of sightings occur around specific habitat nodes within the Conor Ranges, Dipperu National Park and the Funnel Creek riparian habitat, as well as Blair Athol State Forest Park (ALA, 2016). The Carborough Ranges to the west of the study area are also likely to provide a large habitat area for Koalas. Given the high connectivity value that Walker Creek provides to these areas, as well as numerous recent records, the study area is likely to:

- Contain a key source population for breeding or dispersal; and
- Contain a population large enough that is necessary for maintaining genetic diversity.

The study area does not contain a population that is near the limit of its range, as Koala are found throughout eastern Queensland and southern states.

5.3.3 Squatter Pigeon (*Geophaps scripta scripta*)

Approximately 401.6 ha of Squatter Pigeon habitat was identified within the study area (**Figure 8**). This is based on positive identification of the species within the study area and targeted habitat assessments identifying known ecological requirements for the species (refer to **Section 4.5**). In addition to the recent survey record, previous ecological studies recorded the presence of the species adjacent to the study area. Habitat considered to support Squatter Pigeon within the study area includes Eucalypt dominated forest habitat with the following characteristics:

- Within 1km of a permanent water source (artificial and non-artificial)
- Consists of a diverse groundcover with bare ground (approximately 30%) available for foraging
- Occurs on a well-draining sandy substrate (Land zone 5)

An assessment of the population status of individuals utilising the study area, as well as the value of habitat to the survival of the species is provided in the following sections.

Important population

Squatter Pigeon is a far ranging species with the extent of occurrence (EOO) in the order of 1,684,230 km^2 across north Queensland to central New South Wales (ELA, 2015). The southern EOO for the species has been determined as contracting northwards and as a result all relatively small, isolated and sparsely distributed sub-populations occurring south of the Carnarvon Ranges are considered important (DoE 2016d). The study area occurs in the northern EOO for the species and is well north of the Carnarvon Ranges.

In addition to this, the study area is not considered to support an important population of Squatter Pigeon as it does not comprise the attributes defined in the Commonwealth Significant Impact Guidelines (EPBC Act Policy Statement 1.1) (**Table 5-3**). The key component of this determination is that suitable habitat within the study area is small in extent and would not be considered source habitat supporting a source population. At a regional scale (1:500,000), the study area forms a potential sink area where individuals disperse to from larger areas of higher quality habitat. Source areas surrounding the study area include the lateritic jump ups and old alluvial plains of the Isaac River and Funnel Creek as well as the ridge lines of Crediton State Forest and Carborough Ranges adjacent to Eungella Dam. This is supported by the numerous species records within these areas. As a sink habitat, the study area would not play a critical role in maintaining genetic diversity of the species. This would be a primary role of a source population.

A summary of the assessment against the Commonwealth Significant Impact Guidelines (EPBC Act Policy Statement 1.1) important population criteria is provided in **Table 5-3.** The assessment is based on data and expert opinion.

Table 5-3: Important population assessment for Squatter Pigeon

Important Population Criteria	Assessment	Justification
Key source population either for breeding or dispersal	No	• Large areas of higher quality habitat can support a greater number of individuals, which would be considered source populations. • Areas of high quality habitat within the region include the lateritic jump ups and old alluvial plains of the Isaac River and Funnel Creek, and the ridges within Carborough ranges and Crediton State Forest located to the west, east and north of the study area, respectively • The study area contains areas of suitable habitat; however in a regional and overall species distribution context this habitat is of a smaller extent and would be considered a sink area - habitat where individuals disperse to from a source area
Populations that are necessary for maintaining genetic diversity	No	• Squatter Pigeon is a mobile species with a widespread EOO (1,684,230 km^2) and a substantial AOO (2,888 km^2). It's not a sedentary species that occurs in isolated and disjunct populations. • Due to the nature of the species, genetic flow is not constrained for the greater population and the risk of inbreeding is low. • There are no distinct populations that are necessary for maintaining genetic diversity; however source populations are considered important for maintaining EOO and AOO, which in turn effects the genetic flow characteristics of the species. The study area is not considered to contain a source population.
Populations that are near the limit of the species range	No	• Study area located within the central portion of the species known range • Other records further west of the study area

Habitat critical to the survival of the species

The Squatter Pigeon occupies a wide array of habitat types, however, requires specific habitat values to support breeding and foraging opportunities. This includes open forest and woodland communities on sandy or gravelly substrates with low vegetated ground cover and within 1 km of permanent water sources to fulfil the species daily requirements (DoE 2016d). The habitat identified within the study area consists of the Tertiary loamy and sandy plains of the older alluvial terraces of Walker Creek and Carborough Creek that were found to consist of a sparse groundcover and sufficient areas of bare ground. This also includes similar habitat ground-truthed within 1 km of a large farm dam.

Whilst suitable habitat does occur within the study area, it is not considered to play a critical role in maintaining the survival of the species in the area. In addition to the source habitat areas located in the surrounding landscape, there is a large extent that could provide similar sink habitat for the species. Numerous water sources are also provided by mine site dams where the species has been previously recorded. Thus other areas of habitat are available in the region and the persistence of the species is not reliant on habitat within the study area.

5.3.4 Greater Glider (*Petauroides volans*)

Approximately 186.2 ha of Greater Glider habitat was identified within the study area (refer to **Section 4.5**) (**Figure 8**). Nocturnal surveys carried out along Walker Creek in 2018 confirmed the presence of 22 individuals. Previous ecological studies have also recorded the presence of the species within the study area and five species records occur directly upstream of the study area along Walker Creek. Habitat considered to support Greater Glider within the study area includes Eucalypt dominated forest habitat with an abundance of hollow-bearing trees. This was associated with the fringing riparian habitat along Walker Creek.

An assessment of the population status of individuals utilising the study area, as well as the value of habitat to the survival of the species is provided in the following sections.

Important population

Currently, there are no defined important populations for this species within its current range. Greater Glider is a far ranging species with the extent of occurrence (EOO) in the order of 1,586 870 km^2 across north Queensland to Victoria (ELA, 2015). Current population density estimates across its distribution range between 0.01 to 5 individuals per hectare (TSSC 2016).

In consideration of the important population attributes defined in the Commonwealth Significant Impact Guidelines (EPBC Act Policy Statement 1.1), the study area is considered to support an important population of Greater Glider (**Table 5-4**). The key component of this determination is the identification of 22 individuals across five nights of survey within 153.2 ha of suitable habitat (equating to a density of 0.14 per ha). Additionally, the study area contains a high abundance of important habitat resources such as hollow-bearing trees both within and adjacent to Walker Creek. Additionally, pre-clearance surveys across approximately 70 ha of suitable Greater Glider habitat directly north of the study area along Walker Creek also identified five individuals.

Greater Glider have low dispersal ability and are sensitive to fragmentation. Large vegetation tracts containing old growth vegetation with a high density of hollow-bearing trees would be required to support a population large enough to be considered a source population. The study area contains a high density of hollow bearing trees and is highly connected to large tracts of vegetation such as the Carborough Ranges in the west and Dipperu National Park in the south. Records of Greater Glider exists within the Carborough Ranges and due to the high connectivity, the Greater Glider population within the study area would be contiguous with the western population. This population is likely to be a source population, where individuals would most likely be dispersing from to sink populations in the south, which contains fewer records (ALA 2018). As a source population, the study area would play a role in maintaining genetic diversity of the species.

A summary of the assessment against the Commonwealth Significant Impact Guidelines (EPBC Act Policy Statement 1.1) important population criteria is provided in **Table 5-4**.

Table 5-4: Important population assessment for Greater Glider

Important Population Criteria	Assessment	Justification
Key source population either for breeding or dispersal	Yes	Modelling indicates that native forest patches of at least 160 km^2 are required to maintain a viable population of Greater Glider. Whilst home ranges are small the species requires up to four den sites / 2 ha of suitable habitat (DoE, 2015). Large forest patches within the region that have the potential to contain suitable habitat and a high density of den sites include the Carborough ranges and Connor Ranges. The study area is considered to form part of a large tract of suitable habitat (> 160 km^2) that contains a high density of hollow bearing trees (> 4 sites per 2 ha). Habitat areas connect west to the Carborough Ranges and south to Dipperu National Park. Records in the wider area are considered to form part of the same population that exists within the study area, and is likely a source population for habitat areas in the south and south-east.
Populations that are necessary for maintaining genetic diversity	Yes	Large habitat tracts supporting a source populations are considered important for maintaining genetic diversity. The study area is considered to contain a source population.
Populations that are near the limit of the species range	No	The population within the study area is not near the limit of its range as the study area is located within the central portion of the species known range, with exiting records to the west.

Habitat critical to the survival of the species

The survival of Greater Glider within an area is heavily dependent on the presence of contiguous vegetation containing hollow bearing trees. Areas that have been cleared of such habitat resources have shown rapid and significant population declines (DoE, 2015). Even areas where vegetation has regrown such as forestry reserves, Greater Glider populations have not been able to recover due to the lack of nesting hollows (DoE, 2015).

A similar strong correlation exists between tree hollows and species abundance. With the species small home ranges, areas containing a high density of hollow bearing trees have the capacity to support a high abundance of the species (DoE 2015). The species preference is for 2 – 4 den sites / 2 ha of suitable habitat (DoE, 2015). To support a viable population of Greater Glider, an extensive area containing hollow bearing trees is required. Habitat modelling has indicated areas in the order of 160 km^2 (DoE, 2015).

Based on these habitat requirements, habitat critical to the survival of the species is considered to consist of large vegetation patches containing a high density of hollow bearing trees. The study area is highly connected to vegetation the west and south creating large tracts of suitable habitat. Riparian and eucalypt floodplain vegetation also contain a high density of hollow bearing trees. As such, the study area is considered to contain habitat critical to the survival of the Greater Glider.

6 Impact Assessment

In determining the significance of impact associated with the MRA Stage 2C, the relevant criteria listed in the Matters of National Environmental Significance – Significant Impact Guidelines 1.1 (DoE) dated 2013 were applied.

6.1 Threatened Ecological Communities

6.1.1 Brigalow (dominant or co-dominant)

Table 6-1 outlines the significant impact assessment for the Brigalow TEC, listed as endangered under the EPBC Act. A maximum of approximately 32.7 ha of Brigalow TEC will be impacted by the Project, which will adversely affect habitat critical to the survival of the ecological community (**Figure 9**). Project impacts are likely to be significant on this MNES value.

Table 6-1: Significant Impact Criteria – Brigalow TEC

Significant Impact Criteria	Assessment	Response to Criteria
Reduce the extent of an ecological community	No	The extent of occurrence for Brigalow TEC across the region will remain unchanged following the development of the project.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	No	Clearing for the project will not fragment any patches of Brigalow TEC. Connectivity between remaining Brigalow TEC patches will remain following the development of the project.
Adversely affect habitat critical to the survival of an ecological community	Yes	Approximately 32.7 ha of Brigalow TEC habitat will be lost as a result of the project.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.	Yes	The progression of the Mulgrave pit and construction of associated infrastructure will ultimately remove 32.7 ha of Brigalow TEC and associated habitat.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	No	The progression of the Mulgrave pit and construction of associated infrastructure will ultimately remove 32.7 ha of Brigalow TEC rather than cause a substantial change in species composition.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:	No	The progression of the Mulgrave pit and construction of associated infrastructure will ultimately remove 32.7 ha of Brigalow TEC rather than cause a substantial reduction in the quality or integrity.

Significant Impact Criteria	Assessment	Response to Criteria
– assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community		
Interfere with the recovery of an ecological community	No	The project will result in 32.7 ha of Brigalow TEC being impacted. This equates to only 0.2% of the mapped Brigalow TEC extent (based on RE associations) occurring within the Northern Bowen Basin (subregion).

Figure 9: MNES values - impact area

Legend

- Mining Lease
- Study area
- Impact area

Flora values

- Brigalow TEC
- Black Ironbox

Fauna values

- Greater Glider
- Koala
- Koala, Greater Glider
- Ornamental Snake
- Squatter Pigeon
- Squatter Pigeon, Koala

0 500 1,000 2,000

Metres

Datum/Projection:
GDA 1994 MGA Zone 55

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Prepared by: RW Date: 03/05/2018

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6.2 Black Ironbox

Threatened species impact assessment

Table 6-2 outlines the significant impact assessment for Black Ironbox, as per its listing as a vulnerable flora species under the EPBC Act. Approximately 405 individuals across 16.8 ha of suitable riparian habitat will be impacted by the project (**Figure 9**). This habitat has been assessed as not critical for the survival of the species and the occurrence of Black Ironbox within the study area is not considered to be part of an important population (refer to **Section 5.2**). Project impacts are not considered to be significant on Black Ironbox.

In addition to the remaining undisturbed habitat within the study area, it is proposed to use Black Ironbox in the revegetation of the constructed diversion channel to assist in mitigating impacts associated with the removal of mature individuals within the project disturbance footprint. This is discussed further in **Section 7.0**.

Table 6-2: Significant Impact Criteria (vulnerable species) – Black Ironbox

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	No	The occurrence of Black Ironbox is not considered to be part of an important population. Larger more densely populated occurrences occur in the region and immediate surrounding areas (e.g. Bee Creek). Revegetation of the creek diversion utilising the species would mitigate the long-term decrease of Black Ironbox within the impact area.
Reduce the area of occupancy of an important population	No	The occurrence of Black Ironbox is not considered to be part of an important population. Larger more densely populated occurrences occur in the region and immediate surrounding areas (e.g. Bee Creek). Impacts are expected on approximately 405 individuals across 16.8 ha. Nearby important populations downstream on Bee Creek will not be impacted by this Project. Revegetation of the creek diversion utilising the species would mitigate the reduction of area of occupancy of Black Ironbox within the impact area.
Fragment an existing important population into two or more populations	No	Project clearing will not fragment habitat supporting an important population.
Adversely affect habitat critical to the survival of the species	No	Habitat within the study area is not considered critical to the survival of the species due good quality habitat still occurring downstream of the study area. Loss equates to only 0.04 % of potential Black Ironbox habitat modelled within the region.
Disrupt the breeding cycle of an important population	No	The occurrence of Black Ironbox is not considered to be part of an important population. Larger more densely populated occurrences occur in the region and immediate surrounding areas (e.g. Bee Creek).

Significant Impact Criteria	Assessment	Response to Criteria
		This population would have a greater reproductive output (pollen) in comparison to population within the study area.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	Habitat within the study area is not considered critical to the survival of the species due good quality habitat occurring downstream of the study area and in numerous other large watercourse systems in the nearby region. The loss equates to only 0.04% of potential Black Ironbox habitat modelled within the region. It is unlikely that this will result in a decline of the species. Rubber Vine is a threat to the species and has the potential to cause extensive degradation. No Rubber Vine infestations were located along Walker Creek. Current mining operations have not introduced this species and it is unlikely that this will occur as a result of the expansion project. Exotic grasses were prevalent along Walker Creek and likely a result of previous grazing land use rather than current mining activities. Management of diversion rehabilitation will include weed and exotic grass control which are identified as threatening processes.
Introduce disease that may cause the species to decline	No	No diseases listed as a threat to the species
Interfere substantially with the recovery of the species	No	Based on the percentage of potential modelled habitat impacted, the project is not considered to substantially interfere with the recovery of the species. Rehabilitation of creek diversion will include Black Ironbox to mitigate impacts.

GDE impact assessment

Groundwater impacts have been assessed based on the level of risk that predicted drawdown will affect Black Ironbox within SWC Mine. The level of risk has been determined on:

- Likelihood of drawdown impacts;
- Likelihood of Black Ironbox utilising groundwater (i.e. inferred degree of dependency);
- Consequences of drawdown on Black Ironbox (considering associated ecological value and severity of threat);

Drawdown within the water table aquifer has been predicted within a 0.2 – 2 km radius around the life of mine extent at SWC Mine. Approximately 2 km of fringing riparian forest containing Black Ironbox occurs within the effected drawdown area. Black Ironbox outside of the predicted draw down area along the lower reaches of Walker Creek and Bee Creek are unlikely to be impacted by changes in groundwater levels.

The level of dependency that the species has on groundwater sources at SWC Mine is not considered to be high. The interaction with groundwater is likely to be intermittent, seasonally and situationally dependent at best. Due to the lower level of reliance on groundwater, the severity of threat is considered to be low.

In addition to drawdown, other groundwater impacts can occur as a result of mining operations such as aquifer fragmentation. Water table aquifer within the alluvium at SWC Mine is already fragmented so impacts associated with interrupted connectivity is not anticipated. Overall, indirect impacts to Black Ironbox as a result of groundwater drawdown are not anticipated to be significant. Based on the low risk of indirect impacts, approximately 120 individuals across approximately 10.4 ha of riparian habitat will remain undisturbed within the study area.

As it is highly likely that Black Ironbox requires water from the riparian saturation zone, the maintenance of the current hydrological flows along Walker Creek is of importance. The constructed diversion channel will divert the current catchment area associated with Walker Creek. Connectivity of subsurface flows (hyporheic) will remain through deliberate design and over excavation of the diversion channel to provide a hyporheic zone. As such, water flow and volume to downstream areas will be equivalent to current conditions, which will further reduce the likelihood of indirect impacts to downstream populations.

6.3 Threatened Fauna Species

6.3.1 Ornamental Snake (*Denisonia maculata*)

Table 6-3 outlines the significant impact assessment for Ornamental Snake, listed as vulnerable under the EPBC Act. A maximum of approximately 33.7 ha of Ornamental Snake habitat supporting an important population will be impacted by the project (**Figure 9**). Project impacts are therefore likely to be significant for this MNES value.

Table 6-3: Significant Impact Criteria – Ornamental Snake

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	Yes	Habitat within the study area is considered to support an important population due to the presence of important habitat (gilgai habitat in good condition). The determination of important habitat is supported by species records 2 – 5 km south-east of the study area. The project will impact on 33.7 ha of Ornamental Snake habitat. No undisturbed Ornamental Snake habitat will remain within the study area following the development of the project, resulting in the reduction of the local important population.
Reduce the area of occupancy of an important population	Yes	Habitat within the study area is considered to support an important population due to the presence of high quality habitat. The project will impact on 33.7 ha of Ornamental Snake habitat. No undisturbed Ornamental Snake habitat will remain within the study area following the development of the project,

Significant Impact Criteria	Assessment	Response to Criteria
		resulting in the reduction of area of occupancy for the local important population.
Fragment an existing important population into two or more populations	No	Project clearing will not fragment Ornamental Snake habitat supporting an important population.
Adversely affect habitat critical to the survival of the species	Yes	The project will impact on 33.7 ha of Ornamental Snake habitat. No undisturbed Ornamental Snake habitat will remain within the study area following the development of the project.
Disrupt the breeding cycle of an important population	No	The project will not specifically disrupt the breeding cycle of an important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	The species is also known to persist in disturbed environments as long as key microhabitat features are present (gilgai, soil cracks)
Introduce disease that may cause the species to decline	No	There are no known diseases that threatened the species
Interfere substantially with the recovery of the species	No	The project does not interfere with the recovery actions outlined in the Draft Recovery Plan for Queensland Brigalow Belt Reptiles.

6.3.2 Koala (*Phascolarctos cinereus*)

Table 6-4 describes the significant impact criteria for the Koala, listed as vulnerable under the EPBC Act. A maximum of 212.2 ha of Koala habitat will be impacted by the project (**Figure 9**). This habitat has been assessed as critical for the survival of the species and is considered to support an important population (refer to **Section 5.3.2**).

The diversion channel has been designed to maintain the hydrology of Walker Creek and indirect impacts on habitat further downstream along Walker Creek are unlikely. The inclusion of Koala food trees in the revegetation of the constructed diversion channel is proposed to assist in mitigating impacts on habitat within study area. This is discussed further in **Section 7.0**.

Project impacts are likely to adversely affect habitat critical to the survival of the species.

Table 6-4: Significant Impact Criteria – Koala

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	No	The study area is considered to support an important population of Koalas. Three individuals were confirmed within the study area during the 2018 survey. Based on current information and concentrations of species records, important populations are likely to occur in the Conor Ranges, Carborough Ranges, Dipperu National Park and the Funnel Creek riparian habitat, as well as Blair Athol State Forest Park. The study area is highly

Significant Impact Criteria	Assessment	Response to Criteria
		connected to these areas enabling a contiguous population The project is unlikely to lead to a long-term decrease in the size of the population. The connectivity with surrounding habitat will remain following the creek diversion project, allowing for breeding males to still disperse across the area. Whilst some connectivity along the riparian corridor will be lost until rehabilitation of the creek diversion is established, the species will be able to utilise adjacent eucalypt woodland habitats to disperse. The existing hydrology of Walker Creek will also be maintained within the diversion channel, which will retain habitat values within the study area. Rehabilitation of the creek diversion will include Koala food trees to mitigate impacts.
Reduce the area of occupancy of an important population	No	The study area is considered to support an important population of Koalas. Three individuals were confirmed within the study area during the 2018 survey. Based on current information and concentrations of species records, important populations are likely to occur in the Conor Ranges, Carborough Ranges, Dipperu National Park and the Funnel Creek riparian habitat, as well as Blair Athol State Forest Park. The study area is highly connected to these areas enabling a contiguous population. The project is unlikely to lead to a reduction in area occupancy of the population. The connectivity with surrounding habitat will remain following the creek diversion project, allowing for breeding males to still disperse across the area. Whilst some connectivity along the riparian corridor will be lost until rehabilitation of the creek diversion is established, the species will be able to utilise adjacent eucalypt woodland habitats to disperse. The existing hydrology of Walker Creek will also be maintained within the diversion channel, which will retain habitat values within the study area. Rehabilitation of the creek diversion will include Koala food trees to mitigate impacts.
Fragment an existing important population into two or more populations	No	The project is unlikely to fragment an existing population into two or more populations. The study area is well connected to large tracts of surrounding habitat within the Conor Ranges, Carborough Ranges, Dipperu National Park and the Funnel

Significant Impact Criteria	Assessment	Response to Criteria
		Creek riparian habitat, as well as Blair Athol State Forest Park. The connectivity with surrounding habitat will remain following the construction of the project. Whilst some connectivity along the riparian corridor will be lost until rehabilitation of the creek diversion is established, the species will be able to utilise adjacent eucalypt woodland habitats to disperse.
Adversely affect habitat critical to the survival of the species	Yes	Habitat within the study area is considered critical to the survival of the species. This is in accordance with the Koala referral guidelines (habitat score of 9). Two key considerations are outlined in referral guidelines as to whether a proposed action will have or is likely to have a significant impact on the koala. These include: • Adversely affecting habitat critical to the survival of the species (specifically, > 20 ha with a habitat score of >8), and/or • Interfering substantially with the recovery of the species through the introduction or exacerbation of key threats in areas of habitat critical to the survival of the species A total of 212.2 ha of habitat (habitat score of 9) will be impacted by the project, as such the project is likely to have a significant impact on the Koala.
Disrupt the breeding cycle of an important population	No	Based on current information and concentrations of species records, important populations are likely to occur in the Conor Ranges, Carborough Ranges, Dipperu National Park and the Funnel Creek riparian habitat, as well as Blair Athol State Forest Park. The study area is highly connected to these areas enabling a contiguous population. The project is unlikely to disrupt the breeding cycle of the population. The connectivity with surrounding habitat will remain following the creek diversion project, allowing for breeding males to still disperse across the area. Whilst some connectivity along the riparian corridor will be lost until rehabilitation of the creek diversion is established, the species will be able to utilise adjacent eucalypt woodland habitats to disperse.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	The project is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of the habitat. A total of 212.2 ha of Koala habitat will be impacted by the project. The area provides suitable

Significant Impact Criteria	Assessment	Response to Criteria
		foraging resources for the species. However, the connectivity with surrounding habitat will remain following the creek diversion project, allowing for breeding males to still disperse across the area. Whilst some connectivity along the riparian corridor will be lost until rehabilitation of the creek diversion is established, the species will be able to utilise adjacent eucalypt woodland habitats to disperse.
Introduce disease that may cause the species to decline	No	It is unlikely that the project will facilitate the introduction or spread of diseases specific to the species such as Chlamydia, or diseases that can significantly degrade critical habitat such as root rot (*Phytophthora cinnamomi*). Whilst dieback was noted to occur in the study area, this was highly localised and not to the extent that occurs as a result of root rot. No other signs of root rot such as yellow and wilting of the leaves was observed across the vegetation communities within the study area.
Interfere substantially with the recovery of the species	No	The project will not increase Koala fatalities due to dog attacks, vehicle strike or introduced pathogens. Mining activities are limited to operational land and will not encroach into remaining habitat areas. The retention of vegetation within undisturbed portions of the study area will retain connectivity across the landscape, allowing Koalas to continue to disperse to surrounding areas of suitable habitat. Maintaining existing hydrology of Walker Creek within the diversion channel will also retain refuge habitat values within the study area. Rehabilitation of the creek diversion will include Koala food trees to mitigate impacts.

6.3.3 Squatter Pigeon (*Geophaps scripta scripta*)

Table 6-5 outlines the significant impact assessment for Squatter Pigeon, listed as vulnerable under the EPBC Act. A maximum of approximately 295.3 ha of Squatter Pigeon habitat will be potentially impacted by the project (**Figure 9**). This habitat has been assessed as not critical for the survival of the species and is not considered to support an important population (refer to **Section 5.3.3**). Project impacts are not considered to be significant on Squatter Pigeon.

Table 6-5: Significant Impact Criteria – Squatter Pigeon

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	No	Not considered an important population as current occurrence not considered to be part of a source population and playing a critical role in maintaining genetic diversity.
Reduce the area of occupancy of an important population	No	Not considered an important population as current occurrence not considered to be part of a source population and playing a critical role in maintaining genetic diversity.
Fragment an existing important population into two or more populations	No	Project clearing will not fragment Squatter Pigeon habitat supporting an important population.
Adversely affect habitat critical to the survival of the species	No	Habitat within the study area is not considered critical to the survival of the species due to the abundance of habitat (including breeding) that occurs in the region. Potential breeding habitat for the species will be cleared as a result of the project. The diversion will result in the relocation of a suitable water source for the species further south. Current extent of breeding habitat ground-truthed within the study area is 401.6 ha, of which 295.3 ha will be impacted. Following the construction of the project, including the diversion, critical water resources may be available to the surrounding suitable foraging habitat for the species.
Disrupt the breeding cycle of an important population	No	Not considered an important population as current occurrence not considered to be part of a source population and playing a critical role in maintaining genetic diversity.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	The project will result in the potential loss of 295.3 ha of Squatter Pigeon habitat. This equates to only 0.3% of potential Squatter Pigeon habitat modelled within the region (1:500,000). It is unlikely that this will result in a decline of the species. Other threats to the species including overgrazing, weed incursion of Buffel Grass and predation by pest species are already noted and are likely the result of the current grazing land use.
Introduce disease that may cause the species to decline	No	No diseases are listed as a threat to the species.
Interfere substantially with the recovery of the species	No	Based on the percentage of potential modelled habitat impacted, the project is not considered to substantially interfere with the recovery of the species.

Significant Impact Criteria	Assessment	Response to Criteria
		Rehabilitation of creek diversion to ensure the catchment size and volume of water flow through the diversion is similar to that of Walker Creek will assist in mitigating impacts on breeding habitat.

6.3.1 Greater Glider (*Petauroides volans*)

Table 6-6 outlines the significant impact assessment for Greater Glider, listed as vulnerable under the EPBC Act. Approximately 149.3 ha of Greater Glider habitat will be potentially impacted by the project (**Figure 9**). This habitat is considered to support an important population and to be habitat critical to the survival of the species.

The persistence of the species in a fragmented and disturbed landscape like that of the Northern Brigalow Belt is heavily dependent on forest connectivity, sizeable habitat tracts and the presence of hollow-bearing trees. Hollow-bearing trees are a particularly critical component as they are a limited resource due to the association with old growth forest.

The project will result in the removal of habitat containing a high density of breeding resources. Riparian corridors along Walker Creek provide high quality connectivity for the Greater Glider to Carborough Range in the west, Conor Range and Dipperu National Park in the east. Diversion of the creek will reduce the riparian connectivity and the ability of the species to disperse between sink and source populations. The project is therefore likely to have a significant impact on the Greater Glider.

Table 6-6: Significant Impact Criteria – Greater Glider

Significant Impact Criteria	Assessment	Response to Criteria
Lead to a long-term decrease in the size of an important population of a species	Yes –within the study area	The study area is considered to contain an important population of Greater Glider. 22 individuals were identified across five nights of survey within 153.2 ha of suitable habitat. 149.3 ha of habitat will be removed for the project, including trees with high densities of hollows, which are a key resource for the species. It is considered likely that this impact will reduce the size of the population with in the study area.
Reduce the area of occupancy of an important population	Yes	The study area is considered to contain an important population of Greater Glider and 149.3 ha of habitat will be removed for the project. This will reduce the area of occupancy of the species.
Fragment an existing important population into two or more populations	Yes	The study area is considered to contain an important population of Greater Glider. 22 individuals were identified across five nights of survey within 153.2 ha of suitable habitat. This population is likely to form part of a larger source population to the west in the Carborough Ranges. Riparian habitat with old growth forest provide connectivity corridors between suitable habitat areas and Walker Creek is likely to provide

Significant Impact Criteria	Assessment	Response to Criteria
		connection to larger habitat areas in the east, such as Dipperu National Park. Removal of old growth forest within the riparian corridor of Walker Creek may reduce Greater Glider movement between habitat areas and fragment populations east and west of the study area. Greater Glider is known to be sensitive to even small levels of fragmentation and this is therefore considered to be significant.
Adversely affect habitat critical to the survival of the species	Yes	The study are is considered to contain habitat critical to the survival of the Greater Glider. 149.3 ha of habitat will be removed for the project and this is considered to be significant.
Disrupt the breeding cycle of an important population	Yes	The study area contains a high density of tree hollows which is a key breeding resource for Greater Gliders. It is likely the removal of this resource would have some disruptive effected on the important population of Greater Glider in the study area.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Yes – within the local area	The study are is considered to contain habitat critical to the survival of the Greater Glider. High density suitable hollows were identified within Walker Creek that are known to be utilised by the species. Riparian habitat with old growth forest provide connectivity corridors between suitable habitat areas and Walker Creek is likely to provide connection to larger habitat areas east and west of the study area. Greater Glider are considered particularly sensitive to removal of old growth forests containing hollows and have little dispersal ability between cleared areas. The project will result in the potential impact on 149.3 ha of riparian habitat containing the essential breeding resource of hollow-bearing trees. As hollow-bearing trees are a limited resource with density concentrated along Walker Creek, the removal of this riparian habitat will reduce the carrying capacity of the area. This is likely to result in localised population decline.
Introduce disease that may cause the species to decline	No	There are no known diseases that threaten the species.
Interfere substantially with the recovery of the species	Yes	The project is likely to interfere with the primary conservation action listed in the species conservation advice (TSSC 2016), specifically; • Protect and retain hollow-bearing trees, suitable habitat and habitat connectivity

Significant Impact Criteria	Assessment	Response to Criteria
		Greater Glider are considered particularly sensitive to removal of old growth forests containing hollows and have little dispersal ability between cleared areas. Removal of old growth forest within the riparian corridor of Walker Creek may reduce movement between east and west habitat areas and diminish the availability of suitable hollow-bearing trees. These actions may interfere with the recovery of the species in the area.

7 Mitigation and Management

7.1 Avoidance and minimisation

The diversion channel alignment has been chosen to predominantly traverse an existing drainage line, which will reduce the extent of excavation and clearing required. In doing so the pit will be limited to the available area north of the diversion. Whilst clearing impacts will occur to develop the pit and establish the diversion and associated water management infrastructure, further disturbance to surrounding MNES values within the study area will be minimised.

7.2 Mitigation and management

The proposed diversion channel presents an opportunity to rehabilitate in consideration of MNES values impacted by the MRA Stage 2C project. The diversion channel has been specifically designed to provide features that are characteristic of incised alluvial streams within the Bowen Basin with the purpose of creating a riparian environment close to natural conditions. The design includes a lower bench that is inundated by flows around the 2 year ARI events, and a higher bench that is inundated by flows around the 50 year ARI events in the downstream sections of the diversion (**Figure 10**). The benches will act as an inset floodplain, providing a suitable environment to facilitate ongoing riparian zone regeneration and long term vegetation cover and stability of the channel.

A hyporheic zone will develop over time as the sand bed level accumulates, which will provide a similar saturation zone present along the existing Walker Creek. The saturation zone will provide a source of soil moisture for surrounding vegetation (including planted Koala food trees and Black Ironbox) as well as retaining sub-surface flow connectivity to downstream environments.

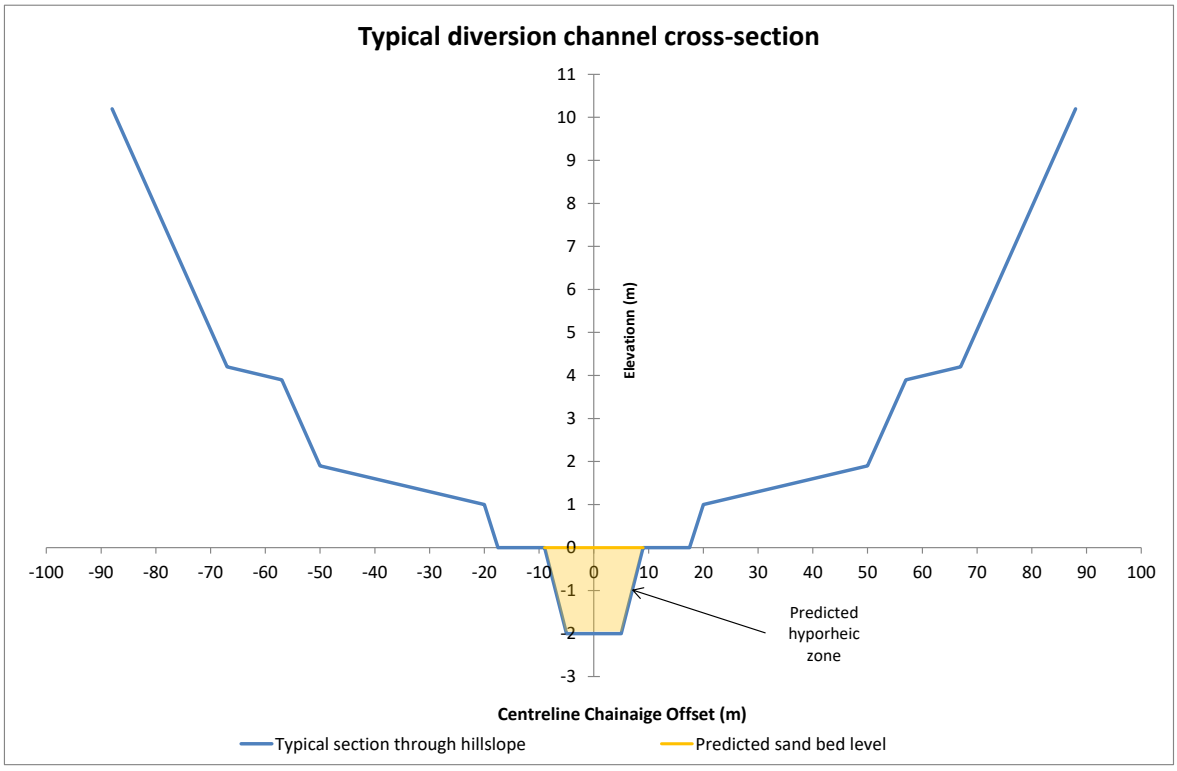

Figure 10: Generalised cross section of proposed diversion channel

A revegetation plan has been prepared for the constructed channel that specifies the use of Koala food tree species as well as the threatened Black Ironbox in the planting mix along the channel (Alluvium, 2016). The area available for revegetation along the diversion channel in consideration of lost Koala habitat is estimated to be 157.5 ha and 46.3 ha for Black Ironbox.

The preparation of a revegetation plan specific for the diversion channel ensures appropriate planning, site preparation and maintenance, which in turn increases the rate of rehabilitation success. A number of risks to revegetation failure have been specifically identified for the diversion channel, which have been addressed through the proposed implementation of the following key strategies:

- Permian bedrock to be deeply ripped and left with a surface layer of rock rubble to provide armouring for topsoil, and allow for suitable rooting depth and water retention in sub-soils
- Addition of topsoil to provide an appropriate growth medium for seeding and compensate for deficiencies associated with current weathered soils
- Further testing to determine geo-chemical properties of Permian bedrock as well as nutrient content and structure of weathered soils
- Addition of soil ameliorants to supplement tested deficiencies
- On-site seed sourcing to ensure local provenance and adaptability to local conditions
- Follow up monitoring and maintenance, including additional planting of Black Ironbox if initial seeding fails

The establishment of the diversion channel for MRA Stage 2A has provided insight into the conditions of the area, which has been considered in the design and planning of the diversion channel for Stage 2C. Black Ironbox was not utilised in Stage 2A plantings due to expected hydrological differences between MRA2A and MRA2C (i.e. inclusion of Carborough Creek); however consultation with the former Biloela district group of Landcare Australia has revealed that the species has been successfully utilised in revegetation projects and plantings across the Central Queensland Township. Whilst the distribution of Black Ironbox does not extend as far south as Biloela, seed was sourced from a certified merchant, successfully propagated into tube stock, planted and has since matured to large fertile trees across the Township area (Donna Davis, personal communication, 30 June 2016). The establishment of Black Ironbox along the diversion channel for MRA Stage 2C is therefore considered a viable mitigation strategy.

The construction of the diversion channel will commence in the first stage of project construction and will be completed and revegetated as far as practicable before substantial progression of the mining put occurs. As such mitigation efforts will have occurred prior to the disturbance of MNES values.

Further, the construction and progression of the Mulgrave pit removing the Koala habitat will occur over a period of 30+ years allowing a considerable amount of time for habitat to be regenerated in the diversion, its riparian zone and any land based offset location.

Other management measures to be incorporated pre- and post-construction to assist in mitigating impacts on MNES include:

- Weed management including controlling infestations of Restricted Matters (as classified under the *Biosecurity Act 2014*) or Weed of National Significance (WoNS), (i.e. *Parthenium hysterophorus* or *Harrisia* spp.) as well as regular wash downs for vehicle and equipment, particularly for those that have been operating in an area of known weed infestation
- Fauna management during construction such as key habitat identification (nesting trees) and spotter-catchers to remove fauna and relocate to surrounding areas prior to clearing
- Sensitive vegetation clearing techniques i.e. targeted, staged and sequential clearing as well as demarcated ‘no go’ zones for areas of conservation value

- Standard fire, waste water management, pest, sediment, dust and noise control implemented as part of the mine's Environmental Management Plan
- Topsoil salvage, stockpiling and rehabilitation of disturbed mine areas to be undertaken in accordance with the mine's Plan of Operation, topsoil management and rehabilitation plans.

8 Offsets Strategy

The MRA Stage 2C project is likely to have a significant impacts on the following MNES values:

- 32.7 ha of Brigalow TEC
- 33.7 ha of Ornamental Snake habitat
- 212.2 ha of Koala habitat
- 149.3 ha of Greater Glider habitat

Proposed mitigation and management measures will limit the severity and magnitude of significant impacts to the listed above for all MNES values. However, significant residual impacts are unavoidable.

In accordance with the EPBC Act, significant residual impacts to MNES values are required to be offset as per the requirements of the EPBC Act Offset Policy. This requires the delivery of a land based offset that is suitable to offset a minimum of 90% of the significant residual impact (in combination with other offset delivery options).

BMC is currently undergoing land brokerage activities with third party owned properties to secure suitable land for Mulgrave Stage 2C offset requirements. The properties will legally secure the potential offset areas. Further assessment will be undertaken on the suitability of the potential properties in offsetting project specific impacts utilising the Commonwealth Offset Assessment Guidelines (OAG).

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Appendix A Targeted Habitat Assessment Data

Koala

Site	Habitat aspect							
	Vegetation	Abundance of food trees	Soil type	Presence / absence of water source	Water source type	Slope / aspect	Connectivity	Severity of disturbance
K1	Remnant	>2 food trees	Sandy	N/A	Ephemeral	5% south	High	Low
K2	Remnant	1 food tree >50%	Silt	N/A	Ephemeral	None	High	None
K3	Remnant	1 food tree <50%	Silt	Yes	N/A	None	Low canopy connectivity	Previously cleared
K4	Remnant	1 food tree <50%	Sandy	N/A	Ephemeral	None	High	None
K5	Remnant	1 food tree >50%	N/A	N/A	Permanent	None	Moderate canopy connectivity	Some dieback
K6	Remnant	1 food tree >50%	Silt	N/A	Ephemeral	None	High	None
K7	Remnant	N/A	Silt	N/A	Ephemeral	5% east	Moderate canopy connectivity	Previously cleared
K8	Remnant	1 food tree <50%	Sandy loam	Yes	N/A	7% west	High	Dieback
K9	Remnant	1 food tree >50%	Sandy	Yes	N/A	7% west	High	None
K10	Remnant	1 food tree <50%	Sandy	Yes	N/A	None	High	None
K11	Remnant	1 food tree >50%	Sandy loam	N/A	Ephemeral	None	High	None
K12	Remnant	1 food tree >50%	Sandy loam	Yes	Ephemeral	None	High	Some dieback
K13	Remnant	>2 food trees	N/A	N/A	Ephemeral	10% north	High	None

Site	Habitat aspect							
	Vegetation	Abundance of food trees	Soil type	Presence / absence of water source	Water source type	Slope / aspect	Connectivity	Severity of disturbance
K14	HVR	N/A	Sandy	Yes	N/A	2% west	Low canopy connectivity	None
K15	Remnant	1 food tree >50%	N/A	Yes	N/A	None	Low	None
K16	Remnant	>2 food trees	Silt	N/A	Ephemeral	None	Low	Severe dieback
K17	Remnant	1 food tree >50%	Sandy loam	N/A	Ephemeral	None	High	None
K18	Remnant	>2 food trees	Sandy	N/A	Ephemeral	None	High	None
K19	Remnant	N/A	Sandy	N/A	Ephemeral	None	Low	None
K20	Remnant	1 food tree >50%	Sandy loam	N/A	Ephemeral	None	High	None
K21	Remnant	>2 food trees	Sandy	N/A	Ephemeral	15% south	High	None
K22	Remnant	N/A	Sandy	N/A	Ephemeral	None	High	None
K23	HVR	1 food tree >50%	Sandy	Yes	N/A	None	Low	None
K24	Remnant	N/A	Sandy loam	Yes	N/A	None	High	None
K25	Remnant	>2 food trees	Sandy loam	N/A	Ephemeral	None	High	None
K26	Remnant	1 food tree >50%	Sandy	N/A	Ephemeral	None	High	None
K27	Remnant	1 food tree >50%	Sandy	N/A	Ephemeral	None	Moderate	None
K28	Remnant	1 food tree >50%	Sandy	N/A	Ephemeral	None	High	None
K29	Remnant	1 food tree >50%	Sandy loam	N/A	Ephemeral	None	High	None
K30	Remnant	1 food tree >50%	Sandy loam	N/A	Ephemeral	None	High	None

Ornamental Snake

Ornamental SnakeSite	Habitat aspect									Threats						
	Gilgais			Soil crack			Water	Aquatic vegetation	FWD							
	Presence	Abundance	Type	Presence	Abundance	Type				Habitat clearing	Cattle	Fire	Weeds	Weed Species	Pest	Pest Species
os1	×	Nil	-	×	Nil	-	×	No	Occasional to Common	No	Moderate	No	No	-	No	-
os2	✓	Common to Abundant	Diverse	✓	Common to Abundant	Deep	×	No	Abundant	No	Moderate	No	No	-	No	-
os3	✓	Abundant	Deep	✓	Abundant	Deep	×	Yes	Abundant	No	No	No	Low	Harissa cactus	low	Pigs
os4	✓	Abundant	Deep	✓	Common	Deep	×	No	Abundant	No	No	No	Low	Harissa cactus	low	Pigs
os5	×	Nil	-	✓	Occasional	Diverse	×	No	Occasional	No	No	No	Low	-	No	-
os6	×	Nil	-	×	Nil	-	×	No	Occasional	No	No	No	Low	Buffel Grass, Harrisia cactus	No	-

Squatter Pigeon

Site	Habitat aspect																	
												Threats						
	Landform	Pattern	Soil type	Canopy cover %	Native ground cover %	Litter cover %	Weed cover %	Distance to water (km)	Water	Water type	Bank slope	Habitat clearing	Cattle	Fire	Pests	Pest Species	Other
SP1	Plain	Gently Undulating Plain	sandy silt	50	20	70	5	0.2	No but ephemeral	Stream/ River	gentle	No	No	No	No	-	-
SP10	Hillslope	Gently Undulating Plain	sandy loam	60	10	80	1	0.5	Yes	Stream/ River	gentle	No	No	No	No	-	-
SP11	Hillcrest	Gently Undulating Plain	sandy loam	75	20	35	1	2	Yes	Dam	gentle	No	low	No	No	-	-
SP12	Plain	Gently Undulating Plain	sandy	40	40	10	0	0	No but ephemeral	Stream/ River	gentle	No	No	No	No	-	-
SP13	Plain	Gently Undulating Plain	sandy	35	40	50	20	0.1	No but ephemeral	Gilgai	gentle	No	No	No	No	-	-

Site	Habitat aspect																	
												Threats						
	Landform	Pattern	Soil type	Canopy cover %	Native ground cover %	Litter cover %	Weed cover %	Distance to water (km)	Water	Water type	Bank slope	Habitat clearing	Cattle	Fire	Pests	Pest Species	Other
SP14	Plain	Gently Undulating Plain	sandy	10	25	2	0	0.5	No but ephemeral	Wetland	gentle	Moderate	No	No	No	-	-
SP15	Swamp	Gently Undulating Plain	silt	10	15	25	30	0	No but ephemeral	Wetland	gentle	No	Moderate	No	No	-	-
SP16	Hillslope	Gently Undulating Plain	sandy	20	25	20	7	0.5	No but ephemeral	Wetland	gentle	Moderate	No	No	No	-	-
SP17	Stream Bank	Gently Undulating Plain	sandy	60	20	10	5	0	No but ephemeral	Stream/ River	gentle	No	Moderate	No	No	-	-
SP18	Plain	Gently Undulating Plain	sandy loam	25	45	55	30	0	No but ephemeral	Stream/ River	gentle	No	No	No	No	-	-
SP19	Plain	Gently Undulating Plain	sandy loam	30	20	70	20	1	No but ephemeral	Stream/ River	steep	No	No	No	Moderate	-	-

Site	Habitat aspect																	
												Threats						
	Landform	Pattern	Soil type	Canopy cover %	Native ground cover %	Litter cover %	Weed cover %	Distance to water (km)	Water	Water type	Bank slope	Habitat clearing	Cattle	Fire	Pests	Pest Species	Other
SP2	Plain	Gently Undulating Plain	sandy silt	25	40	55	5	2	No but ephemeral	Stream/ River	gentle	low	No	No	No	-	-
SP20	Plain	Gently Undulating Plain	sandy	5	40	60	60	0.1	No but ephemeral	Stream/ River	steep	No	No	No	No	-	weeds
SP21	Plain	Gently Undulating Plain	sandy	0	40	60	70	2	No but ephemeral	Stream/ River	gentle	Moderate	No	No	No	-	weeds
SP3	Drainage Depression	Gently Undulating Plain	sandy	65	25	70	7	0	No but ephemeral	Stream/ River	gentle	No	low	No	No	-	-
SP4	Hillslope	Gently Undulating Plain	sandy silt	20	10	30	2	0.1	No but ephemeral	Stream/ River	gentle	No	Moderate	No	No	-	-
SP5	Plain	Gently Undulating Plain	sandy loam	30	20	25	2	0.1	Yes	Dam	gentle	No	High	No	No	-	-

Site	Habitat aspect																	
												Threats						
	Landform	Pattern	Soil type	Canopy cover %	Native ground cover %	Litter cover %	Weed cover %	Distance to water (km)	Water	Water type	Bank slope	Habitat clearing	Cattle	Fire	Pests	Pest Species	Other
SP6	Plain	Gently Undulating Rises	sandy	20	10	25	0	0	No			No	No	No	No	-	-
SP7	Plain	Gently Undulating Plain	sandy loam	20	15	10	2	1.5	Yes	Dam	gentle	No	Moderate	No	No	-	-
SP8	Plain	Badlands	sandy	20	30	15	0	0	Yes	Stream/ River	gentle	No	No	No	No	-	-
SP9	Plain	Gently Undulating Plain	sandy loam	40	30	60	1	0.1	No but ephemeral	Stream/ River	steep	No	No	No	No	-	-
SP22	Plain	Gently Undulating Plain	Sandy loam	35	40	15	5	0.5	No but ephemeral	Stream/ River	steep	No	No	No	No	-	-
SP23	Plain	Gently Undulating Plain	Sandy loam	25	60	10	30	0.8	No but ephemeral	Stream/ River	steep	No	No	No	No	-	-

Site	Habitat aspect																	
												Threats						
	Landform	Pattern	Soil type	Canopy cover %	Native ground cover %	Litter cover %	Weed cover %	Distance to water (km)	Water	Water type	Bank slope	Habitat clearing	Cattle	Fire	Pests	Pest Species	Other
SP24	Plain	Gently Undulating Plain	Sandy loam	25	60	10	10	1	No but ephemeral	Stream/ River	steep	No	No	No	No	-	-
SP25	Plain	Gently Undulating Plain	sandy	35	30	20	2	0.2	No but ephemeral	Stream/ River	gentle	No	No	No	No	-	-
SP26	Plain	Gently Undulating Plain	sandy	40	40	30	2	0.3	No but ephemeral	Stream/ River	gentle	No	No	No	No	-	-
SP27	Plain	Gently Undulating Plain	sandy	35	45	20	0	0.2	No but ephemeral	Stream/ River	gentle	No	No	No	No	-	-

Greater Glider

Site	Habitat aspect					
	Well-developed canopy layer	Tree hollows			Threats	
		Presence	Abundance	Size	Habitat clearing	Cattle
GG1	Yes	✓	sparse	small / med	Not present	Not present
GG2	Yes	×	-	-	Not present	Not present
GG3	Yes	✓	sparse	small / med	Not present	Not present
GG4	Yes	×	-	-	Not present	Not present
GG5	Yes	✓	sparse	small / med	Not present	Not present

Appendix B Desktop Results

Australian Government
Department of the Environment and Energy

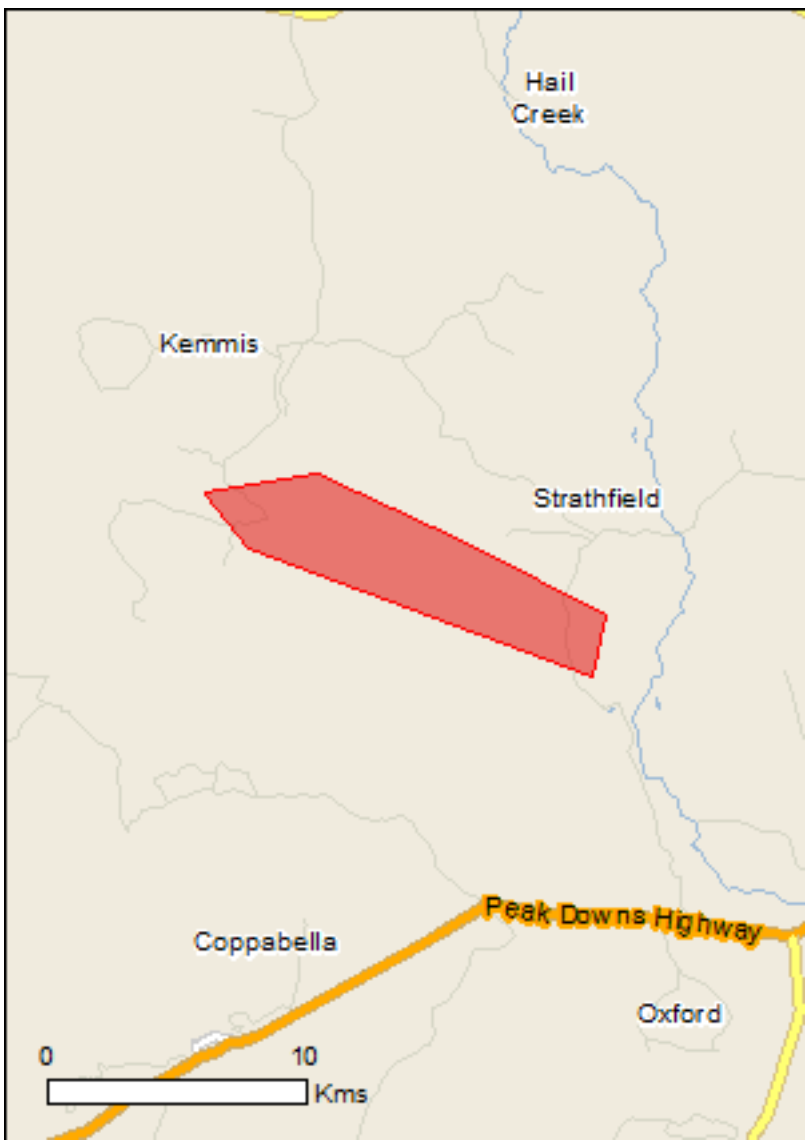
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

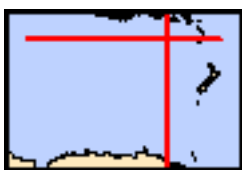
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 06/02/18 16:26:09



Coordinates
Buffer: 20.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	24
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	19
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-	Vulnerable	Species or species

Name	Status	Type of Presence
eared Bat [83395]		habitat may occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Plants		
Cycas ophiolitica		
[55797]	Endangered	Species or species habitat likely to occur within area
Dichanthium queenslandicum		
King Blue-grass [5481]	Endangered	Species or species habitat known to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus raveretiana		
Black Ironbox [16344]	Vulnerable	Species or species habitat known to occur within area
Omphalea celata		
[64586]	Vulnerable	Species or species habitat likely to occur within area
Samadera bidwillii		
Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Denisonia maculata		
Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area
Egernia rugosa		
Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Elseya albagula		
Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area
Furina dunmalli		
Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lerista allanae		
Allan's Lerista, Retro Slider [1378]	Endangered	Species or species habitat may occur within area
Rheodytes leukops		
Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]		
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area
[Ardea ibis](#) Cattle Egret [59542]		Species or species habitat may occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area
[Cuculus saturatus](#) Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat likely to occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat likely to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat may occur within area
[Rostratula benghalensis (sensu lato)](#) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Dipperu	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-21.728652 148.361995,-21.722911 148.400791,-21.745554 148.454349,-21.768194 148.500697,-21.787323 148.496234,-21.74683 148.376415,-21.728971 148.361995,-21.728652 148.361995

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Defined Area
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: 21.5765 to 21.9166
Longitude: 148.2402 to 148.6271
Email: kateb@ecoaus.com.au
Date submitted: Tuesday 06 Feb 2018 15:18:17
Date extracted: Tuesday 06 Feb 2018 15:20:11

The number of records retrieved = 509

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	*Litoria inermis*	bumpy rocketfrog		C		1
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		2
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		4
animals	amphibians	Hylidae	*Cyclorana alboguttata*	greenstripe frog		C		1
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		4
animals	amphibians	Limnodynastidae	*Limnodynastes salmini*	salmon striped frog		C		1
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		1
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		4
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		2
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		2
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		7
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		1
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		3
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		4
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		1
animals	birds	Anatidae	*Aythya australis*	hardhead		C		1
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		4
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		3
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		C		1
animals	birds	Anatidae	*Malacorhynchus membranaceus*	pink-eared duck		C		1
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		1
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		1
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		1
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		1
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		1
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		1
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		3
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		1
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		5
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		6
animals	birds	Artamidae	*Cracticus tibicen*	Australian magpie		C		10
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		5
animals	birds	Cacatuidae	*Calyptorhynchus funereus*	yellow-tailed black-cockatoo		C		1
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		4
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		1
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		4
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		1
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		1
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		1
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		1
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	5
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		1
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		1
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		1
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		1
animals	birds	Corcoracidae	*Struthidea cinerea*	apostlebird		C		7

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		11
animals	birds	Cuculidae	*Cuculus optatus*	oriental cuckoo		SL		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		1
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		1
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		1
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		2
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		1
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		1
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		2
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		1
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		1
animals	birds	Gruidae	*Grus rubicunda*	brolga		C		1
animals	birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra		C		2
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		2
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		5
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		1
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		1
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		1
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		2
animals	birds	Meliphagidae	*Manorina flavigula*	yellow-throated miner		C		2
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		4
animals	birds	Meliphagidae	*Melithreptus gularis*	black-chinned honeyeater		C		1
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		4
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		4
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		2
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		8
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		2
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		8
animals	birds	Meliphagidae	*Stomiopera flava*	yellow honeyeater		C		1
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		1
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		2
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		1
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		9
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		SL		1
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		2
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		3
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		2
animals	birds	Otididae	*Ardeotis australis*	Australian bustard		C		1
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		5
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		5
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		12
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		2
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		7
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		1
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		7
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		12

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animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		10
animals	birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot		C		3
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus nuchalis*	great bowerbird		C		1
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		1
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		2
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		8
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		4
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		1
animals	mammals	Cervidae	*Axis axis*	chital	Y			1
animals	mammals	Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail bat		C		7
animals	mammals	Felidae	*Felis catus*	cat	Y			1
animals	mammals	Leporidae	*Oryctolagus cuniculus*	rabbit	Y			1
animals	mammals	Macropodidae	*Lagorchestes conspicillatus*	spectacled hare-wallaby		C		2
animals	mammals	Macropodidae	*Macropus dorsalis*	black-striped wallaby		C		1
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		1
animals	mammals	Macropodidae	*Macropus parryi*	whiptail wallaby		C		1
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		3
animals	mammals	Molossidae	*Mormopterus norfolkensis*	east coast freetail bat		C		1
animals	mammals	Petauridae	*Petaurus norfolcensis*	squirrel glider		C		2
animals	mammals	Petauridae	*Petaurus breviceps*	sugar glider		C		3
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	3
animals	mammals	Potoroidae	*Aepyprymnus rufescens*	rufous bettong		C		2
animals	mammals	Pseudocheiridae	*Petauroides volans minor*	northern greater glider		V	V	8
animals	mammals	Suidae	*Sus scrofa*	pig	Y			2
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		1
animals	mammals	Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat		C		21
animals	mammals	Vespertilionidae	*Chalinolobus morio*	chocolate wattled bat		C		2
animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		2
animals	reptiles	Boidae	*Antaresia maculosa*	spotted python		C		1
animals	reptiles	Chelidae	*Chelodina longicollis*	eastern snake-necked turtle		C		1
animals	reptiles	Colubridae	*Boiga irregularis*	brown tree snake		C		2
animals	reptiles	Colubridae	*Tropidonophis mairii*	freshwater snake		C		2
animals	reptiles	Diplodactylidae	*Oedura monilis*	ocellated velvet gecko		C		11
animals	reptiles	Diplodactylidae	*Diplodactylus vittatus*	wood gecko		C		2
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		6
animals	reptiles	Elapidae	*Demansia psammophis*	yellow-faced whipsnake		C		1
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		57
animals	reptiles	Gekkonidae	*Gehyra sp.*					1
animals	reptiles	Gekkonidae	*Heteronotia binoei*	Bynoe's gecko		C		7
animals	reptiles	Gekkonidae	*Gehyra versicolor*			C		16
animals	reptiles	Pygopodidae	*Lialis burtonis*	Burton's legless lizard		C		3
animals	reptiles	Pygopodidae	*Delma tincta*	excitable delma		C		1
animals	reptiles	Scincidae	*Carlia rubigo*	orange-flanked rainbow skink		C		4
animals	reptiles	Scincidae	*Ctenotus ingrami*	unspotted yellow-sided ctenotus		C		1
animals	reptiles	Scincidae	*Egernia striolata*	tree skink		C		1
animals	reptiles	Scincidae	*Ctenotus spaldingi*	straight-browed ctenotus		C		3

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animals	reptiles	Scincidae	*Lygisaurus foliorum*	tree-base litter-skink		C		2
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		3
animals	reptiles	Scincidae	*Carlia pectoralis sensu lato*			C		4
animals	reptiles	Scincidae	*Ctenotus taeniolatus*	copper-tailed skink		C		1
animals	reptiles	Scincidae	*Cryptoblepharus pannosus*	ragged snake-eyed skink		C		2
animals	reptiles	Scincidae	*Glaphyromorphus punctulatus*	fine-spotted mulch-skink		C		1
animals	reptiles	Scincidae	*Pygmaeascincus timlowi*	dwarf litter-skink		C		1
animals	reptiles	Varanidae	*Varanus tristis*	black-tailed monitor		C		4
animals	uncertain	Indeterminate	*Indeterminate*	Unknown or Code Pending		C		1
plants	ferns	Adiantaceae	*Cheilanthes sieberi subsp. sieberi*			C		6
plants	ferns	Adiantaceae	*Cheilanthes distans*	bristly cloak fern		C		1/1
plants	higher dicots	Acanthaceae	*Rostellularia adscendens*			C		9
plants	higher dicots	Acanthaceae	*Brunoniella australis*	blue trumpet		C		20/1
plants	higher dicots	Acanthaceae	*Pseuderanthemum tenellum*			C		13
plants	higher dicots	Aizoaceae	*Trianthema triquetra*	red spinach		C		2/1
plants	higher dicots	Aizoaceae	*Zaleya galericulata*			C		1/1
plants	higher dicots	Amaranthaceae	*Amaranthus cochleitepalus*			C		1/1
plants	higher dicots	Amaranthaceae	*Alternanthera nana*	hairy joyweed		C		16
plants	higher dicots	Amaranthaceae	*Achyranthes aspera*			C		4
plants	higher dicots	Amaranthaceae	*Alternanthera denticulata*	lesser joyweed		C		2
plants	higher dicots	Amaranthaceae	*Gomphrena celosioides*	gomphrena weed	Y			2
plants	higher dicots	Amaranthaceae	*Amaranthus mitchellii*	Boggabri weed		C		1/1
plants	higher dicots	Anacardiaceae	*Pleiogynium timorense*	Burdekin plum		C		1
plants	higher dicots	Apocynaceae	*Secamone elliptica*			C		1
plants	higher dicots	Apocynaceae	*Marsdenia microlepis*			C		2
plants	higher dicots	Apocynaceae	*Parsonsia lanceolata*	northern silkpod		C		13/1
plants	higher dicots	Apocynaceae	*Gomphocarpus physocarpus*	balloon cottonbush	Y			1
plants	higher dicots	Apocynaceae	*Cynanchum viminale subsp. brunonianum*			C		7
plants	higher dicots	Apocynaceae	*Marsdenia viridiflora subsp. viridiflora*			C		5
plants	higher dicots	Apocynaceae	*Carissa ovata*	currantbush		C		13
plants	higher dicots	Araliaceae	*Astrotricha biddulphiana*			C		1/1
plants	higher dicots	Asteraceae	*Calotis cuneata*			C		1/1
plants	higher dicots	Asteraceae	*Cirsium vulgare*	spear thistle	Y			1/1
plants	higher dicots	Asteraceae	*Sonchus oleraceus*	common sowthistle	Y			6
plants	higher dicots	Asteraceae	*Xanthium spinosum*	Bathurst burr	Y			1/1
plants	higher dicots	Asteraceae	*Calotis cuneifolia*	burr daisy		C		4/1
plants	higher dicots	Asteraceae	*Emilia sonchifolia*		Y			5
plants	higher dicots	Asteraceae	*Vittadinia sulcata*	native daisy		C		1/1
plants	higher dicots	Asteraceae	*Lagenophora gracilis*			C		2
plants	higher dicots	Asteraceae	*Cyanthillium cinereum*			C		10
plants	higher dicots	Asteraceae	*Acanthospermum hispidum*	star burr	Y			1
plants	higher dicots	Asteraceae	*Parthenium hysterophorus*	parthenium weed	Y			4/1
plants	higher dicots	Asteraceae	*Chrysocephalum apiculatum*	yellow buttons		C		4
plants	higher dicots	Asteraceae	*Sphaeromorphaea australis*			C		4
plants	higher dicots	Asteraceae	*Apowollastonia spilanthoides*			C		9
plants	higher dicots	Asteraceae	*Peripleura hispidula var. hispidula*			C		1

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plants	higher dicots	Asteraceae	*Pterocaulon serrulatum var. serrulatum*			C		1/1
plants	higher dicots	Asteraceae	*Pluchea dentex*	bowl daisy		C		1/1
plants	higher dicots	Boraginaceae	*Heliotropium*			C		1
plants	higher dicots	Boraginaceae	*Ehretia membranifolia*	weeping koda		C		12
plants	higher dicots	Boraginaceae	*Trichodesma zeylanicum*			C		3
plants	higher dicots	Brassicaceae	*Lepidium virginicum*	Virginian peppercress	Y			1/1
plants	higher dicots	Byttneriaceae	*Waltheria indica*			C		7
plants	higher dicots	Cactaceae	*Opuntia tomentosa*	velvety tree pear	Y			12
plants	higher dicots	Cactaceae	*Harrisia martinii*		Y			10
plants	higher dicots	Caesalpiniaceae	*Cassia tomentella*			C		10
plants	higher dicots	Caesalpiniaceae	*Senna coronilloides*			C		1
plants	higher dicots	Caesalpiniaceae	*Chamaecrista concinna*			C		2
plants	higher dicots	Caesalpiniaceae	*Cassia brewsteri*			C		1/1
plants	higher dicots	Caesalpiniaceae	*Lysiphyllum carronii*	ebony tree		C		1
plants	higher dicots	Caesalpiniaceae	*Chamaecrista absus*			C		5
plants	higher dicots	Campanulaceae	*Wahlenbergia gracilis*	sprawling bluebell		C		1
plants	higher dicots	Campanulaceae	*Lobelia concolor*			C		1
plants	higher dicots	Capparaceae	*Capparis canescens*			C		1
plants	higher dicots	Capparaceae	*Capparis lasiantha*	nipan		C		6
plants	higher dicots	Casuarinaceae	*Allocasuarina luehmannii*	bull oak		C		3
plants	higher dicots	Casuarinaceae	*Casuarina cristata*	belah		C		13/1
plants	higher dicots	Celastraceae	*Elaeodendron australe*			C		1
plants	higher dicots	Celastraceae	*Denhamia cunninghamii*			C		10
plants	higher dicots	Celastraceae	*Denhamia oleaster*			C		2
plants	higher dicots	Chenopodiaceae	*Dysphania melanocarpa forma melanocarpa*			C		2
plants	higher dicots	Chenopodiaceae	*Enchylaena tomentosa var. tomentosa*			C		1/1
plants	higher dicots	Chenopodiaceae	*Chenopodium auricomiforme*			C		1/1
plants	higher dicots	Chenopodiaceae	*Einadia polygonoides*	knotweed goosefoot		C		1
plants	higher dicots	Chenopodiaceae	*Enchylaena tomentosa*			C		6
plants	higher dicots	Chenopodiaceae	*Maireana microphylla*			C		2
plants	higher dicots	Combretaceae	*Terminalia oblongata*			C		10
plants	higher dicots	Convolvulaceae	*Convolvulus erubescens*	Australian bindweed		C		1
plants	higher dicots	Convolvulaceae	*Polymeria longifolia*	polymeria		C		5
plants	higher dicots	Convolvulaceae	*Evolvulus alsinoides*			C		11
plants	higher dicots	Convolvulaceae	*Ipomoea plebeia*	bellvine		C		7
plants	higher dicots	Convolvulaceae	*Ipomoea brownii*			C		1
plants	higher dicots	Convolvulaceae	*Jacquemontia paniculata*			C		14
plants	higher dicots	Cucurbitaceae	*Cucumis anguria var. anguria*	West Indian gherkin	Y			4
plants	higher dicots	Droseraceae	*Drosera*			C		4
plants	higher dicots	Ebenaceae	*Diospyros humilis*	small-leaved ebony		C		8/1
plants	higher dicots	Erythroxylaceae	*Erythroxylum australe*	cocaine tree		C		15
plants	higher dicots	Euphorbiaceae	*Euphorbia coghlanii*			C		1/1
plants	higher dicots	Euphorbiaceae	*Euphorbia drummondii*			C		10
plants	higher dicots	Euphorbiaceae	*Adriana tomentosa var. tomentosa*			C		2/2
plants	higher dicots	Euphorbiaceae	*Euphorbia tannensis subsp. eremophila*			C		3
plants	higher dicots	Euphorbiaceae	*Croton phebalioides*	narrow-leaved croton		C		2/2

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plants	higher dicots	Euphorbiaceae	*Bertya pedicellata*			NT		1/1
plants	higher dicots	Euphorbiaceae	*Euphorbia hyssopifolia*		Y			8
plants	higher dicots	Fabaceae	*Glycine falcata*			C		1/1
plants	higher dicots	Fabaceae	*Crotalaria mitchellii subsp. mitchellii*			C		1
plants	higher dicots	Fabaceae	*Tephrosia juncea*			C		5
plants	higher dicots	Fabaceae	*Vigna lanceolata*			C		6
plants	higher dicots	Fabaceae	*Desmodium varians*	slender tick trefoil		C		3
plants	higher dicots	Fabaceae	*Zornia muriculata*			C		8
plants	higher dicots	Fabaceae	*Crotalaria montana*			C		3
plants	higher dicots	Fabaceae	*Desmodium muelleri*			C		1/1
plants	higher dicots	Fabaceae	*Glycine tomentella*	woolly glycine		C		10/1
plants	higher dicots	Fabaceae	*Indigofera colutea*	sticky indigo		C		6
plants	higher dicots	Fabaceae	*Indigofera linnaei*	Birdsville indigo		C		6
plants	higher dicots	Fabaceae	*Zornia muelleriana*			C		1
plants	higher dicots	Fabaceae	*Galactia tenuiflora*			C		2
plants	higher dicots	Fabaceae	*Stylosanthes scabra*		Y			15
plants	higher dicots	Fabaceae	*Alysicarpus muelleri*			C		2/2
plants	higher dicots	Fabaceae	*Indigofera linifolia*			C		1
plants	higher dicots	Fabaceae	*Tephrosia leptoclada*			C		3
plants	higher dicots	Fabaceae	*Desmodium brachypodum*	large ticktrefoil		C		8
plants	higher dicots	Fabaceae	*Tephrosia dietrichiae*			C		2
plants	higher dicots	Fabaceae	*Crotalaria medicaginea*	trefoil rattlepod		C		4
plants	higher dicots	Fabaceae	*Crotalaria sessiliflora*					8
plants	higher dicots	Fabaceae	*Indigofera sericovexilla*			C		2
plants	higher dicots	Fabaceae	*Vigna radiata var. sublobata*			C		1/1
plants	higher dicots	Fabaceae	*Rhynchosia minima var. australis*			C		13/1
plants	higher dicots	Fabaceae	*Zornia dyctiocarpa var. filifolia*			C		1/1
plants	higher dicots	Fabaceae	*Tephrosia brachyodon var. longifolia*			C		2
plants	higher dicots	Fabaceae	*Glycine tabacina*	glycine pea		C		14
plants	higher dicots	Goodeniaceae	*Goodenia glabra*			C		2
plants	higher dicots	Goodeniaceae	*Velleia*			C		5
plants	higher dicots	Haloragaceae	*Haloragis aspera*	raspweed		C		1/1
plants	higher dicots	Lamiaceae	*Teucrium integrifolium*			C		1/1
plants	higher dicots	Lamiaceae	*Plectranthus parviflorus*			C		4
plants	higher dicots	Lamiaceae	*Clerodendrum floribundum*			C		3
plants	higher dicots	Lamiaceae	*Leucas lavandulifolia*		Y			1/1
plants	higher dicots	Lamiaceae	*Plectranthus*			C		1/1
plants	higher dicots	Lamiaceae	*Basilicum polystachyon*			C		1/1
plants	higher dicots	Loganiaceae	*Mitrasacme alsinoides*			C		5
plants	higher dicots	Loganiaceae	*Mitrasacme pygmaea*			C		8
plants	higher dicots	Lythraceae	*Lythrum paradoxum*			C		1
plants	higher dicots	Lythraceae	*Ammannia multiflora*	jerry-jerry		C		2
plants	higher dicots	Malvaceae	*Sida*			C		7
plants	higher dicots	Malvaceae	*Sida rohlenae*			C		7
plants	higher dicots	Malvaceae	*Sida cordifolia*		Y			13/1
plants	higher dicots	Malvaceae	*Sida hackettiana*			C		5

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plants	higher dicots	Malvaceae	*Sida rhombifolia*		Y			11
plants	higher dicots	Malvaceae	*Sida cunninghamii*			C		3
plants	higher dicots	Malvaceae	*Abutilon guineense*		Y			3/3
plants	higher dicots	Malvaceae	*Abutilon malvifolium*	bastard marshmallow		C		1
plants	higher dicots	Malvaceae	*Abutilon subviscosum*			C		1/1
plants	higher dicots	Malvaceae	*Hibiscus verdcourtii*			C		1/1
plants	higher dicots	Malvaceae	*Malvastrum americanum*		Y			2
plants	higher dicots	Malvaceae	*Hibiscus sturtii var. sturtii*			C		8
plants	higher dicots	Malvaceae	*Abutilon oxycarpum var. incanum*			C		1/1
plants	higher dicots	Malvaceae	*Abutilon oxycarpum var. subsagittatum*			C		16
plants	higher dicots	Meliaceae	*Owenia acidula*	emu apple		C		1
plants	higher dicots	Mimosaceae	*Vachellia farnesiana*		Y			1/1
plants	higher dicots	Mimosaceae	*Acacia bancroftiorum*			C		1/1
plants	higher dicots	Mimosaceae	*Vachellia bidwillii*			C		3
plants	higher dicots	Mimosaceae	*Acacia holosericea*			C		2
plants	higher dicots	Mimosaceae	*Acacia harpophylla*	brigalow		C		2
plants	higher dicots	Mimosaceae	*Acacia flavescens*	toothed wattle		C		2
plants	higher dicots	Mimosaceae	*Acacia salicina*	doolan		C		4
plants	higher dicots	Mimosaceae	*Acacia oswaldii*	miljee		C		1/1
plants	higher dicots	Mimosaceae	*Acacia julifera*			C		2
plants	higher dicots	Mimosaceae	*Acacia conferta*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia excelsa*			C		4
plants	higher dicots	Mimosaceae	*Neptunia gracilis forma gracilis*			C		3/1
plants	higher dicots	Mimosaceae	*Acacia blakei subsp. blakei*			C		1/1
plants	higher dicots	Mimosaceae	*Archidendropsis basaltica*	red lancewood		C		8
plants	higher dicots	Myrtaceae	*Eucalyptus crebra x E.orgadophila*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus camaldulensis*			C		1
plants	higher dicots	Myrtaceae	*Eucalyptus tereticornis*			C		3
plants	higher dicots	Myrtaceae	*Eucalyptus tholiformis*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus raveretiana*	black ironbox		C	V	2/2
plants	higher dicots	Myrtaceae	*Eucalyptus platyphylla*	poplar gum		C		3
plants	higher dicots	Myrtaceae	*Melaleuca fluviatilis*			C		1/1
plants	higher dicots	Myrtaceae	*Corymbia clarksoniana*			C		7/1
plants	higher dicots	Myrtaceae	*Corymbia tessellaris*	Moreton Bay ash		C		4/1
plants	higher dicots	Myrtaceae	*Corymbia dallachiana*			C		6
plants	higher dicots	Myrtaceae	*Eucalyptus tenuipes*	narrow-leaved white mahogany		C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus populnea*	poplar box		C		13
plants	higher dicots	Myrtaceae	*Melaleuca nervosa*			C		5
plants	higher dicots	Myrtaceae	*Eucalyptus crebra*	narrow-leaved red ironbark		C		1/1
plants	higher dicots	Nyctaginaceae	*Boerhavia dominii*			C		9
plants	higher dicots	Oleaceae	*Jasminum didymum subsp. lineare*			C		6
plants	higher dicots	Oleaceae	*Notelaea microcarpa*			C		1
plants	higher dicots	Onagraceae	*Ludwigia*			C		1/1
plants	higher dicots	Phyllanthaceae	*Phyllanthus mitchellii*			C		1
plants	higher dicots	Phyllanthaceae	*Phyllanthus virgatus*			C		16
plants	higher dicots	Phyllanthaceae	*Phyllanthus lacunarius*			C		1/1

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plants	higher dicots	Phyllanthaceae	*Phyllanthus maderaspatensis*			C		6
plants	higher dicots	Phyllanthaceae	*Phyllanthus*			C		1
plants	higher dicots	Phyllanthaceae	*Breynia oblongifolia*			C		11
plants	higher dicots	Phyllanthaceae	*Phyllanthus fuernrohrii*			C		1
plants	higher dicots	Picrodendraceae	*Petalostigma pubescens*	quinine tree		C		10
plants	higher dicots	Pittosporaceae	*Bursaria incana*			C		10/1
plants	higher dicots	Pittosporaceae	*Pittosporum angustifolium*			C		3
plants	higher dicots	Plantaginaceae	*Stemodia pubescens*			C		1/1
plants	higher dicots	Plantaginaceae	*Scoparia dulcis*	scoparia	Y			3
plants	higher dicots	Polygonaceae	*Emex australis*		Y			7
plants	higher dicots	Portulacaceae	*Portulaca pilosa*		Y			1
plants	higher dicots	Portulacaceae	*Portulaca oleracea*	pigweed	Y			1
plants	higher dicots	Portulacaceae	*Portulaca filifolia*			C		8
plants	higher dicots	Portulacaceae	*Calandrinia pickeringii*			C		3/1
plants	higher dicots	Proteaceae	*Grevillea striata*	beefwood		C		1
plants	higher dicots	Proteaceae	*Hakea lorea*			C		5
plants	higher dicots	Proteaceae	*Persoonia amaliae*			C		1/1
plants	higher dicots	Proteaceae	*Grevillea parallela*			C		1
plants	higher dicots	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		11
plants	higher dicots	Rhamnaceae	*Ventilago viminalis*	supplejack		C		11/1
plants	higher dicots	Rubiaceae	*Psydrax saligna forma saligna*			C		1/1
plants	higher dicots	Rubiaceae	*Psydrax odorata forma buxifolia*			C		7
plants	higher dicots	Rubiaceae	*Psydrax odorata subsp. australiana*			C		1/1
plants	higher dicots	Rubiaceae	*Psydrax oleifolia*			C		2
plants	higher dicots	Rubiaceae	*Psydrax attenuata*			C		4
plants	higher dicots	Rubiaceae	*Spermacoce multicaulis*			C		13
plants	higher dicots	Rubiaceae	*Spermacoce brachystema*			C		1/1
plants	higher dicots	Rutaceae	*Flindersia dissosperma*			C		12
plants	higher dicots	Rutaceae	*Geijera salicifolia*	brush wilga		C		13/1
plants	higher dicots	Rutaceae	*Citrus glauca*			C		1/1
plants	higher dicots	Rutaceae	*Flindersia australis*	crow's ash		C		1
plants	higher dicots	Santalaceae	*Santalum lanceolatum*			C		2
plants	higher dicots	Sapindaceae	*Alectryon pubescens*			C		1/1
plants	higher dicots	Sapindaceae	*Alectryon oleifolius subsp. elongatus*			C		2
plants	higher dicots	Sapindaceae	*Alectryon diversifolius*	scrub boonaree		C		4
plants	higher dicots	Sapindaceae	*Atalaya hemiglauca*			C		11
plants	higher dicots	Sapotaceae	*Planchonella pohlmaniana*			C		1/1
plants	higher dicots	Sapotaceae	*Planchonella pohlmaniana var. (Gilbert River C.T.White 1409)*			C		1/1
plants	higher dicots	Scrophulariaceae	*Eremophila debilis*	winter apple		C		5
plants	higher dicots	Scrophulariaceae	*Eremophila deserti*			C		1
plants	higher dicots	Scrophulariaceae	*Eremophila mitchellii*			C		10
plants	higher dicots	Scrophulariaceae	*Myoporum acuminatum*	coastal boobialla		C		6/2
plants	higher dicots	Solanaceae	*Solanum parvifolium subsp. parvifolium*			C		3
plants	higher dicots	Solanaceae	*Solanum ellipticum*	potato bush		C		3
plants	higher dicots	Solanaceae	*Solanum esuriale*	quena		C		2/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Sparrmanniaceae	*Grewia latifolia*	dysentery plant		C		19
plants	higher dicots	Sparrmanniaceae	*Corchorus trilocularis*			C		1/1
plants	higher dicots	Sterculiaceae	*Brachychiton australis*	broad-leaved bottle tree		C		1/1
plants	higher dicots	Sterculiaceae	*Brachychiton populneus subsp. trilobus*			C		1/1
plants	higher dicots	Thymelaeaceae	*Pimelea linifolia subsp. linifolia*			C		3
plants	higher dicots	Violaceae	*Afrohybanthus stellarioides*			C		2
plants	higher dicots	Violaceae	*Afrohybanthus enneaspermus*			C		9
plants	higher dicots	Vitaceae	*Clematicissus opaca*			C		1
plants	lower dicots	Lauraceae	*Cassytha filiformis*	dodder laurel		C		1
plants	lower dicots	Menispermaceae	*Tinospora smilacina*	snakevine		C		1
plants	monocots	Amaryllidaceae	*Crinum flaccidum*	Murray lily		C		1
plants	monocots	Centrolepidaceae	*Centrolepis exserta*			C		1/1
plants	monocots	Commelinaceae	*Cyanotis axillaris*			C		5
plants	monocots	Commelinaceae	*Murdannia graminea*	murdannia		C		5
plants	monocots	Commelinaceae	*Commelina diffusa*	wandering jew		C		8
plants	monocots	Cyperaceae	*Cyperus difformis*	rice sedge		C		2
plants	monocots	Cyperaceae	*Cyperus scariosus*			C		1
plants	monocots	Cyperaceae	*Fimbristylis nuda*			C		1
plants	monocots	Cyperaceae	*Abildgaardia ovata*			C		5/1
plants	monocots	Cyperaceae	*Cyperus cyperoides*			C		3
plants	monocots	Cyperaceae	*Cyperus esculentus*	yellow nutgrass	Y			1/1
plants	monocots	Cyperaceae	*Cyperus leiocaulon*			C		1/1
plants	monocots	Cyperaceae	*Cyperus squarrosus*	bearded flatsedge		C		7
plants	monocots	Cyperaceae	*Cyperus cristulatus*			C		3
plants	monocots	Cyperaceae	*Cyperus perangustus*			C		1
plants	monocots	Cyperaceae	*Fimbristylis nutans*			C		1
plants	monocots	Cyperaceae	*Cyperus sesquiflorus*		Y			1/1
plants	monocots	Cyperaceae	*Scleria mackaviensis*			C		13
plants	monocots	Cyperaceae	*Fimbristylis dichotoma*	common fringe-rush		C		12
plants	monocots	Cyperaceae	*Fimbristylis microcarya*			C		1/1
plants	monocots	Cyperaceae	*Lipocarpha microcephala*			C		2
plants	monocots	Cyperaceae	*Cyperus concinnus*			C		3/1
plants	monocots	Cyperaceae	*Cyperus gracilis*			C		9
plants	monocots	Cyperaceae	*Cyperus fulvus*			C		1/1
plants	monocots	Cyperaceae	*Cyperus bifax*	western nutgrass		C		1/1
plants	monocots	Cyperaceae	*Cyperus iria*			C		2
plants	monocots	Cyperaceae	*Cyperus rigidellus*			C		9
plants	monocots	Hemerocallidaceae	*Dianella*			C		2
plants	monocots	Hypoxidaceae	*Hypoxis pratensis var. pratensis*			C		4
plants	monocots	Johnsoniaceae	*Tricoryne elatior*	yellow autumn lily		C		4
plants	monocots	Laxmanniaceae	*Lomandra multiflora*			C		2
plants	monocots	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		6
plants	monocots	Laxmanniaceae	*Lomandra longifolia*			C		2
plants	monocots	Orchidaceae	*Cymbidium canaliculatum*			C		3
plants	monocots	Poaceae	*Dichanthium fecundum*	curly bluegrass		C		6/3
plants	monocots	Poaceae	*Dichanthium sericeum*			C		4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Poaceae	*Enneapogon nigricans*	niggerheads		C		1
plants	monocots	Poaceae	*Enneapogon truncatus*			C		14
plants	monocots	Poaceae	*Eragrostis lacunaria*	purple lovegrass		C		14/2
plants	monocots	Poaceae	*Iseilema macratherum*			C		1/1
plants	monocots	Poaceae	*Sporobolus elongatus*			C		1/1
plants	monocots	Poaceae	*Tripogon loliiformis*	five minute grass		C		2
plants	monocots	Poaceae	*Urochloa praetervisa*			C		2
plants	monocots	Poaceae	*Whiteochloa airoides*			C		3/1
plants	monocots	Poaceae	*Alloteropsis cimicina*			C		3
plants	monocots	Poaceae	*Cenchrus polystachios*		Y			1/1
plants	monocots	Poaceae	*Cymbopogon bombycinus*	silky oilgrass		C		2
plants	monocots	Poaceae	*Dichanthium aristatum*	angleton grass	Y			2/2
plants	monocots	Poaceae	*Elytrophorus spicatus*			C		2/1
plants	monocots	Poaceae	*Eragrostis leptocarpa*	drooping lovegrass		C		5
plants	monocots	Poaceae	*Eragrostis tenuifolia*	elastic grass	Y			1/1
plants	monocots	Poaceae	*Heteropogon contortus*	black speargrass		C		15
plants	monocots	Poaceae	*Heteropogon triticeus*	giant speargrass		C		4
plants	monocots	Poaceae	*Alloteropsis semialata*	cockatoo grass		C		4
plants	monocots	Poaceae	*Bothriochloa ewartiana*	desert bluegrass		C		1
plants	monocots	Poaceae	*Dinebra decipiens var. decipiens*			C		6
plants	monocots	Poaceae	*Aristida benthamii var. benthamii*			C		2
plants	monocots	Poaceae	*Aristida holathera var. holathera*			C		4
plants	monocots	Poaceae	*Panicum decompositum var. tenuius*			C		10
plants	monocots	Poaceae	*Setaria pumila subsp. subtesselata*		Y			1/1
plants	monocots	Poaceae	*Bothriochloa bladhii subsp. bladhii*			C		6
plants	monocots	Poaceae	*Megathyrsus maximus var. pubiglumis*		Y			3
plants	monocots	Poaceae	*Urochloa panicoides var. panicoides*		Y			1/1
plants	monocots	Poaceae	*Dichanthium sericeum subsp. sericeum*			C		2/2
plants	monocots	Poaceae	*Bothriochloa decipiens var. decipiens*			C		7
plants	monocots	Poaceae	*Urochloa holosericea subsp. holosericea*			C		3
plants	monocots	Poaceae	*Aristida jerichoensis var. subspinulifera*			C		8
plants	monocots	Poaceae	*Calyptochloa gracillima subsp. gracillima*			C		4
plants	monocots	Poaceae	*Enneapogon intermedius*			C		1/1
plants	monocots	Poaceae	*Enteropogon acicularis*	curly windmill grass		C		4
plants	monocots	Poaceae	*Enteropogon unispiceus*			C		13
plants	monocots	Poaceae	*Moorochloa eruciformis*		Y			1/1
plants	monocots	Poaceae	*Paspalidium criniforme*			C		1/1
plants	monocots	Poaceae	*Urochloa mosambicensis*	sabi grass	Y			5
plants	monocots	Poaceae	*Ancistrachne uncinulata*	hooky grass		C		10
plants	monocots	Poaceae	*Dactyloctenium radulans*	button grass		C		4
plants	monocots	Poaceae	*Eragrostis leptostachya*			C		11
plants	monocots	Poaceae	*Eragrostis megalosperma*			C		1/1
plants	monocots	Poaceae	*Eragrostis spartinoides*			C		2/2
plants	monocots	Poaceae	*Paspalidium caespitosum*	brigalow grass		C		11/1
plants	monocots	Poaceae	*Paspalidium constrictum*			C		14
plants	monocots	Poaceae	*Sporobolus actinocladus*	katoora grass		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Poaceae	*Sporobolus jacquemontii*		Y			1/1
plants	monocots	Poaceae	*Capillipedium spicigerum*	spicytop		C		3
plants	monocots	Poaceae	*Walwhalleya subxerophila*			C		1/1
plants	monocots	Poaceae	*Bothriochloa erianthoides*	satintop grass		C		1/1
plants	monocots	Poaceae	*Digitaria divaricatissima*	spreading umbrella grass		C		5
plants	monocots	Poaceae	*Dichanthium queenslandicum*			V	E	1/1
plants	monocots	Poaceae	*Eriochloa pseudoacrotricha*			C		11/1
plants	monocots	Poaceae	*Aristida calycina var. calycina*			C		10
plants	monocots	Poaceae	*Dinebra decipiens var. asthenes*			C		1
plants	monocots	Poaceae	*Perotis rara*	comet grass		C		1
plants	monocots	Poaceae	*Eriachne rara*			C		4
plants	monocots	Poaceae	*Eulalia aurea*	silky browntop		C		12/1
plants	monocots	Poaceae	*Lolium perenne*	perennial ryegrass	Y			1/1
plants	monocots	Poaceae	*Melinis repens*	red natal grass	Y			12
plants	monocots	Poaceae	*Aristida ramosa*	purple wiregrass		C		11
plants	monocots	Poaceae	*Chloris inflata*	purpletop chloris	Y			4
plants	monocots	Poaceae	*Eleusine indica*	crowsfoot grass	Y			1/1
plants	monocots	Poaceae	*Panicum effusum*			C		14
plants	monocots	Poaceae	*Setaria surgens*			C		4
plants	monocots	Poaceae	*Cynodon dactylon*		Y			2
plants	monocots	Poaceae	*Eriochloa crebra*	spring grass		C		2
plants	monocots	Poaceae	*Themeda avenacea*			C		1
plants	monocots	Poaceae	*Themeda triandra*	kangaroo grass		C		11
plants	monocots	Poaceae	*Urochloa foliosa*			C		1/1
plants	monocots	Poaceae	*Cenchrus ciliaris*		Y			18
plants	monocots	Poaceae	*Dichanthium tenue*	small bluegrass		C		2
plants	monocots	Poaceae	*Digitaria brownii*			C		13
plants	monocots	Poaceae	*Panicum paludosum*	swamp panic		C		1/1
plants	monocots	Poaceae	*Sporobolus caroli*	fairy grass		C		7
plants	monocots	Poaceae	*Urochloa pubigera*			C		8
plants	monocots	Poaceae	*Aristida holathera*			C		3
plants	monocots	Poaceae	*Aristida personata*			C		1/1
plants	monocots	Poaceae	*Chloris ventricosa*	tall chloris		C		12
plants	monocots	Poaceae	*Chrysopogon fallax*			C		19
plants	monocots	Poaceae	*Digitaria bicornis*			C		5/1
plants	monocots	Poaceae	*Echinochloa colona*	awnless barnyard grass	Y			6/3
plants	monocots	Poaceae	*Eragrostis brownii*	Brown's lovegrass		C		1/1
plants	monocots	Poaceae	*Eragrostis sororia*			C		4
plants	monocots	Poaceae	*Eriachne mucronata*			C		1
plants	monocots	Poaceae	*Digitaria ammophila*	silky umbrella grass		C		4
plants	monocots	Poaceae	*Enneapogon pallidus*	conetop nineawn		C		7
plants	monocots	Poaceae	*Eragrostis elongata*			C		13/1
plants	monocots	Poaceae	*Imperata cylindrica*	blady grass		C		1
plants	monocots	Poaceae	*Leptochloa digitata*			C		1/1
plants	monocots	Poaceae	*Panicum larcomianum*			C		1
plants	monocots	Poaceae	*Paspalidium distans*	shotgrass		C		4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Poaceae	*Sporobolus fertilis*	giant Parramatta grass	Y			1/1
plants	monocots	Poaceae	*Tragus australianus*	small burr grass		C		4
plants	monocots	Poaceae	*Bothriochloa pertusa*		Y			20
plants	monocots	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		7

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix C BioCondition Assessment Data

BioCondition Scoring Sheet	RE 11.3.2	RE 11.3.25	RE 11.3.25	RE 11.3.27	RE 11.3.4a		RE 11.3.9	RE 11.4.9			RE 11.5.2a
	Mrb1	Mrb17	Mrb21	Mrb13	Mrb15	Mrb18	Mrb3	Mrb9	Mrb10	SWC3	Mrb6
Site Condition											
Recruitment of woody perennials	5	5	5	3	5	5	5	5	5	5	5
Native plant species richness											
Trees	5	5	5	5	2.5	5	5	2.5	5	5	5
Shrubs	5	2.5	2.5	5	5	5	5	2.5	5	0	5
Grass	5	0	0	5	2.5	2.5	2.5	2.5	5	5	5
Forbs	2.5	0	2.5	2.5	0	0	2.5	2.5	5	5	5
Tree canopy height	5	5	5	5	5	5	5	5	5	5	5
Tree canopy cover	5	3	3	5	3	3	3	3	3	5	5
Shrub canopy cover	3	0	5	5	0	5	0	3	3	3	5
Native perennial grass cover	3	0	0	5	0	1	3	1	1	5	5
Organic litter cover	5	3	5	5	3	5	5	5	5	5	5
Large trees	10	15	15	5	5	5	10	5	5	5	5
Coarse woody debris	2	0	2	5	2	0	2	5	5	5	2
Weed cover	5	0	0	3	0	0	5	5	5	5	10
Total field based attributes	60.5	38.5	50.0	58.5	33.0	41.5	53.0	47.0	57.0	58.0	67.0

BioCondition Scoring Sheet	RE 11.3.2	RE 11.3.25	RE 11.3.25	RE 11.3.27	RE 11.3.4a		RE 11.3.9	RE 11.4.9			RE 11.5.2a
	Mrb1	Mrb17	Mrb21	Mrb13	Mrb15	Mrb18	Mrb3	Mrb9	Mrb10	SWC3	Mrb6
Site Context											
Patch size	10	5	10	10	10	5	10	10	10	10	10
Connectivity	5	5	5	4	5	5	5	5	5	5	5
Context	5	4	4	4	4	4	5	5	5	4	5
Distance from Water	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total GIS attributes	20.1	14.1	19.1	18.1	19.1	14.1	20.1	20.1	20.1	19.1	20.1
BioCondition Score	0.81	0.53	0.69	0.77	0.52	0.56	0.73	0.67	0.77	0.77	0.87
Average BioCondition Score	0.81	0.53	0.69	0.77	0.54		0.73	0.74			0.87

BioCondition Scoring Sheet	RE 11.5.3					Regrowth	RE 11.5.8b		RE 11.5.8c		Regrowth		RE 11.5.9	
	Mrb4	Mrb7	Mbr14	SWC1	SWC4	Mrb19	Mrb8	Mrb20	Mrb2	Mrb5	Mrb11	Mrb12	Mrb16	SWC2
Site Condition														
Recruitment of woody perennials	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Native plant species richness														
Trees	5	5	5	2.5	5	5	5	5	5	5	2.5	5	5	5
Shrubs	2.5	5	5	5	2.5	5	5	5	5	5	5	5	2.5	5

BioCondition Scoring Sheet	RE 11.5.3					Regrowth	RE 11.5.8b		RE 11.5.8c		Regrowth		RE 11.5.9	
	Mrb4	Mrb7	Mbr14	SWC1	SWC4	Mrb19	Mrb8	Mrb20	Mrb2	Mrb5	Mrb11	Mrb12	Mrb16	SWC2
Grass	2.5	5	5	5	5	5	5	2.5	5	5	2.5	5	2.5	2.5
Forbs	2.5	2.5	2.5	5	5	2.5	2.5	2.5	2.5	2.5	0	2.5	5	2.5
Tree canopy height	5	5	5	5	5	3	5	5	5	5	5	5	5	5
Tree canopy cover	5	3	5	5	5	5	5	5	5	5	2	5	5	5
Shrub canopy cover	3	5	3	3	3	5	0	0	0	3	0	0	3	3
Native perennial grass cover	3	5	3	5	1	5	3	1	3	3	3	3	5	5
Organic litter cover	5	3	3	5	5	3	5	3	5	5	5	5	5	5
Large trees	15	10	0	15	15	0	15	15	0	0	0	0	10	15
Coarse woody debris	2	5	5	5	2	2	5	5	5	2	5	5	2	2
Weed cover	5	10	5	5	0	0	10	3	5	5	10	5	10	5
Total field based attributes	60.5	68.5	51.5	70.5	58.5	45.5	68.5	57.0	50.5	50.5	45.0	50.5	65.0	65.0
Site Context														
Patch size	10	10	10	10	10	10	10	10	10	10	10	10	5	10
Connectivity	5	5	5	5	2	4	5	4	5	5	2	2	2	5
Context	5	5	5	5	4	2	5	4	5	5	4	4	4	5
Distance from Water	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total GIS attributes	20.1	20.1	20.1	20.1	16.1	16.1	20.1	18.1	20.1	20.1	16.1	16.1	11.1	20.1
BioCondition Score	0.81	0.89	0.72	0.91	0.75	0.62	0.89	0.75	0.71	0.71	0.61	0.67	0.76	0.85

BioCondition Scoring Sheet	RE 11.5.3					Regrowth	RE 11.5.8b		RE 11.5.8c		Regrowth		RE 11.5.9	
	Mrb4	Mrb7	Mbr14	SWC1	SWC4	Mrb19	Mrb8	Mrb20	Mrb2	Mrb5	Mrb11	Mrb12	Mrb16	SWC2
Average BioCondition Score	0.82					0.62	0.82		0.71		0.64		0.80	

Appendix D TEC Assessments Results

Brigalow Patch ID	TEC Threshold Criteria	Field Evidence
BTEC1	Tree layer	*A. harpophylla* dominant
	Age	>15 years
	Patch size	>0.5 ha
	Weed cover	0 %
BTEC2	Tree layer	*A. harpophylla* dominant
	Age	>15 years
	Patch size	>0.5 ha
	Weed cover	5 %
BTEC3	Tree layer	*A. harpophylla* dominant
	Age	>15 years
	Patch size	>0.5 ha
	Weed cover	10 %
BTEC4	Tree layer	*A. harpophylla* dominant
	Age	>15 years
	Patch size	>0.5 ha
	Weed cover	5 %

Appendix E Bird Survey Abundance Data

Common Name	Species Name	Total Count	Average occurrence across 40 bird surveys
Apostle Bird	*Struthidea cinerea*	6	0.15
Australasian Pipit	*Anthus novaeseelandiae*	1	0.03
Australian Magpie	*Cracticus tibicen*	6	0.15
Black-faced Cuckoo-Shrike	*Coracina novaehollandiae*	25	0.63
Bar-shouldered Dove	*Geopelia humeralis*	4	0.10
Blue-faced Honeyeater	*Entomyzon cyanotis*	83	2.08
Blue-winged Kookaburra	*Dacelo leachii*	1	0.03
Brolga	*Grus rubicunda*	3	0.08
Brown Honeyeater	*Lichmera indistincta*	2	0.05
Brown Quail	*Coturnix ypsilophora*	5	0.13
Budgerigar	*Melopsittacus undulatus*	8	0.20
Channel-billed Cuckoo	*Scythrops novaehollandiae*	4	0.10
Cicadabird	*Coracina tenuirostris*	10	0.25
Dollarbird	*Eurystomus orientalis*	20	0.50
Double-barred Finch	*Taeniopygia bichenovii*	32	0.80
Spangled Drongo	*Dicrurus bracteatus*	25	0.63
Eastern Koel	*Eudynamys orientalis*	3	0.08
Emu	*Dromaius novaehollandiae*	2	0.05
Figbird	*Sphecotheres vieilloti*	33	0.83
Forest Kingfisher	*Todiramphus macleayii*	18	0.45
Eastern Great Egret	*Ardea modesta*	1	0.03
Grey Butcherbird	*Cracticus torquatus*	15	0.38
Grey-crowned Babbler	*Pomatostomus temporalis*	11	0.28
Grey Shrike-thrush	*Colluricincla harmonica*	1	0.03
Grey Teal	*Anas gracilis*	1	0.03
Hardhead	*Aythya australis*	4	0.10
Horsefield's Bronze Cuckoo	*Chrysococcyx basalis*	1	0.03
Intermediate Egret	*Ardea intermedia*	1	0.03
Laughing Kookaburra	*Dacelo novaeguineae*	45	1.13
Leaden Flycatcher	*Myiagra rubecula*	9	0.23
Little Bronze Cuckoo	*Chrysococcyx minutillus*	3	0.08
Little Friarbird	*Philemon citreogularis*	8	0.20
Magpie-lark	*Grallina cyanoleuca*	7	0.18
Masked Lapwing	*Vanellus miles*	4	0.10
Masked Woodswallow	*Artamus personatus*	50	1.25
Mistletoebird	*Dicaeum hirundinaceum*	2	0.05
Noisy Friarbird	*Philemon corniculatus*	47	1.18
Noisy Minor	*Manorina melanocephala*	32	0.80

Common Name	Species Name	Total Count	Average occurrence across 40 bird surveys
Olive-backed Oriole	*Oriolus sagittatus*	2	0.05
Pacific Baza	*Aviceda subcristata*	1	0.03
Pacific Black Duck	*Anas superciliosa*	2	0.05
Pale-headed Rosella	*Platycercus adscitus*	81	2.03
Peaceful Dove	*Geopelia striata*	30	0.75
Pheasant Coucal	*Centropus phasianinus*	7	0.18
Pied Butcherbird	*Cracticus nigrogularis*	41	1.05
Pied Currawong	*Strepera graculina*	8	0.20
Plumed Whistling-duck	*Dendrocygna eytoni*	2	0.05
Rainbow Bee-eater	*Merops ornatus*	15	0.38
Rainbow Lorikeet	*Trichoglossus haematodus*	68	1.70
Red-Backed Fairy-Wren	*Malurus melanocephalus*	71	1.78
Red-Winged Parrot	*Aprosmictus erythropterus*	15	0.38
Restless Flycatcher	*Myiagra inquieta*	1	0.03
Singing Honeyeater	*Gavicalis virescens*	7	0.18
Spotted Bowerbird	*Ptilonorhynchus maculatus*	4	0.10
Squatter Pigeon	*Geophaps scripta*	11	0.28
Striated Pardalote	*Pardalotus striatus*	90	2.25
Straw-Necked Ibis	*Threskiornis spinicollis*	2	0.05
Striped Honeyeater	*Plectorhyncha lanceolata*	1	0.03
Sulphur-crested Cockatoo	*Cacatua galerita*	15	0.38
Tawny Frogmouth	*Podargus strigoides*	1	0.03
Torresian Crow	*Corvus orru*	54	1.35
Varied Sittella	*Daphoenositta chrysoptera*	28	0.70
Wedge-tailed Eagle	*Aquila audax*	9	0.23
Weebill	*Smicrornis brevirostris*	89	2.23
Whistling Kite	*Haliastur sphenurus*	5	0.13
White-breasted Woodswallow	*Artamus leucorynchus*	2	0.05
White-Browed Woodswallow	*Artamus superciliosus*	85	2.13
White-faced Heron	*Egretta novaehollandiae*	5	0.13
White-necked Heron	*Ardea pacifica*	3	0.08
White-throated Gerygone	*Gerygone olivacea*	2	0.05
White-throated Honeyeater	*Melithreptus albogularis*	170	4.25
Willie Wagtail	*Rhipidura leucophrys*	1	0.03
White-bellied Cuckoo Shrike	*Coracina papuensis*	19	0.48
Australian Wood Duck	*Chenonetta jubata*	44	1.10
Yellow Honeyeater	*Stomiopera flavus*	1	0.03
Yellow-Throated Miner	*Manorina flavigula*	7	0.18

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APPENDIX

C

OFFSET ECOLOGICAL ASSESSMENT REPORT – TREND ENVIRONMENTAL 2024

OFFSET ECOLOGICAL ASSESSMENT REPORT

EPBC 2017/7957 SOUTH WALKER CREEK MRA2C IMPACTS TO KOALA, GREATER GLIDER AND SQUATTER PIGEON HABITAT

Proposed Offset Site – HAMILTON PARK

Trend | Environmental Consultants

April 2024

Prepared on behalf of **STANMORE SMC**

EXECUTIVE SUMMARY

Stanmore SMC Pty Ltd, a subsidiary of Stanmore Resources Ltd owns and operates South Walker Creek (SWC) Mine. The SWC Mulgrave Resource Access (MRA) Project (the Project) is a multi-stage progression of open cut mining of the Mulgrave Pit at SWC Mine. Stage 2 (MRA2C) involves the progression of the Mulgrave Pit in a south-westerly direction to access coal resources within the current mining lease. The MRA2C Project was referred under the *Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth) to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and determined to be a controlled action which was approved on 30 October 2019, subject to conditions which included the provision of environmental offsets under the Act for a number of matters of national environmental significance (MNES; EPBC Approval 2017/7957, dated 30 October 2019). Since the approval was granted, an additional disturbance area impacting habitat for MNES threatened species was identified, in which a variation of the conditions of the approval was sought to increase disturbance limits and deliver additional offsets to compensate for impacts. This variation of the conditions was approved on 27 November 2020. Further variations of the conditions were approved on 6 August 2021.

Three of the subject MNES that required offsetting were habitat for the Koala *(Phascolarctos cinereus),* Greater Glider *(Petauroides volans)* and Squatter Pigeon *(Geophaps scripta scripta).* Condition 1 of the EPBC Act approval (variation of conditions, dated 6 August 2021) limits the area of impact to Koala habitat to 670.9 hectares (ha), Greater Glider habitat to 151 ha and Squatter Pigeon habitat to 301.8 ha. Condition 2 requires offsets for these impacts.

For the purpose of offsets, the conditions of approval were separated into Stage 1 and Stage 2 of the Project. Condition 5, related to Stage 1 offsets requiring an Offset Area Management Plan (OAMP) for 20.94% of Koala habitat and 31.98% of Greater Glider habitat. Condition 8, related to Stage 2 offsets, requiring a revised OAMP for the residual balance of the offsets.

Offsets for Stage 1 impacts to acquit Koala and Greater Glider habitat have been acquitted on the Clive (Lot 6 RP860051) and Brigalow (Lot 7 RP860051) properties, which adjoin each other. The Offset Area Management Plans (OAMPs) for these offsets were approved by the DCCEEW on 25 May 2021 and in combination provide offsets for 23.99% of Koala habitat and 44.99% of Greater Glider habitat (both Stage 1 impacts). The offset areas on Clive and Brigalow properties have been protected through a Voluntary Declaration (VDec) as an area of high conservation value under the *Vegetation Management Act 1999 (Qld),* with approval of the VDecs received from the Department of Resources (DoR) on 10 March 2022 for both properties.

The remaining **offsets** therefore include **79.06% of Koala habitat, 68.02% of Greater Glider habitat** and **100% of Squatter Pigeon habitat.** These offsets have been proposed on the **Hamilton Park** property. Offset surveys of the Hamilton Park property were undertaken in 2022 and 2023 to determine the suitability of the habitat available to support offset sites for Koala, Greater Glider and Squatter Pigeon habitat.

The surveys identified each of the species utilising the property and the prevalence of Koala, Greater Glider and Squatter Pigeon habitat. A total of 3,564ha of Koala habitat, 3,525ha of Greater Glider habitat and 3,345ha of Squatter Pigeon habitat was identified within the property made up of both remnant and regrowth vegetation. All the habitat present was connected to further tracks of remnant vegetation adjacent to the property, particularly to habitat within the Dipperu National Park which contains additional records for the Koala and Squatter Pigeon. As such, the Hamilton Park property was considered suitable to provide offsets for the balance of the SWC MRA2C impacts to these offset matters.

A calculation of offset requirements was undertaken using the Offsets Assessment Guide, which calculated the following offset areas were required to acquit the remaining impacts from the SWC MRA2C Project:

- 1,254ha of remnant REs and 416ha of regrowth REs forming Koala habitat. These offsets in combination with Stage 1 offsets already secured acquit 104.03% of SWC MRA2C impacts to Koala habitat.
- 338ha of regrowth REs forming Greater Glider habitat. These offsets in combination with Stage 1 offsets already secured acquit 113% of SWC MRA2C impacts to Greater Glider habitat.
- 906ha of remnant REs and 390ha of regrowth REs forming Squatter Pigeon habitat (acquits 100.01% of SWC MRA2C impacts to Squatter Pigeon habitat.

These offset areas have been co-located where possible and have been placed on the eastern side of Denison Creek, away from most operational areas of the property (i.e., operational bores for the Braeside Borefield).

Within the chosen offset area, Stanmore plan to manage historical and current threatening processes, which include cattle grazing and non-native plant presence, which will improve the condition of the habitat and enhance recruitment of native groundcover and canopy cover species. Nest boxes will also be placed within regrowth offset areas for the Greater Glider, to provide arteficial denning habitat until such time that large trees can form natural hollows for the species. These management measures have been provided in detail in the OAMP for these matters.

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INTRODUCTION

1.1 PROJECT BACKGROUND

Stanmore Resources Ltd (Stanmore) acquired an 80% interest in BHP Mitsui Coal Pty Ltd (BMC) on 3 May 2022. BMC is now a subsidiary of Stanmore and was renamed as Stanmore SMC Pty Ltd (Stanmore SMC) on 11 May 2022. The South Walker Creek Mulgrave Resource Access (MRA) Project (the Project) is a multi-stage progression of open cut mining of the Mulgrave Pit at SWC Mine. Stage 2 (MRA2C) involves the progression of the Mulgrave Pit in a south-westerly direction to access coal resources within the current mining lease. The MRA2C Project was referred under the *Environmental Protection and Biodiversity Conservation Act 1999* (Commonwealth; Cth; EPBC Act) to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and determined to be a controlled action which was approved on 30 October 2019 subject to conditions which included the provision of environmental offsets under the Act for a number of matters of national environmental significance (MNES; EPBC Approval 2017/7957, dated 30 October 2019).

The South Walker Creek Mine is an open cut coal mining operation located in the northern Bowen Basin, approximately 25 kilometres (km) north west of Nebo in central Queensland. During the Preliminary Documentation stage of the EPBC Referral, MRA2C was identified as having several ecological constraints including MNES as defined under the *EPBC Act.* These included EPBC threatened species (Greater Glider, Koala, Ornamental Snake, Squatter Pigeon and Black Ironbox) and an EPBC threatened ecological community (TEC; Brigalow).

The proposed action was deemed likely to have a significant impact on the above MNES, so environmental offsets were required to compensate for the significant impacts under the *EPBC Act.* Suitable offset areas have been secured for some Stage 1 impacts to MNES including Brigalow TEC, Koala, Ornamental Snake and Greater Glider habitat. These offsets have been secured within the Clive (Lot 6 RP860051) and Brigalow (Lot 7 RP860051) properties, which adjoin each other. Stage 1 and 2 Black Ironbox offsets are awaiting DCCEEW approval on the Hamilton Park property. This Offsets Ecological Assessment Report relates to offsets for Stage 2 impacts to Koala habitat, Stage 2 impacts to Greater Glider and Stage 1 and 2 impacts to Squatter Pigeon from the SWC MRA2C Project.

Trend was engaged to conduct offset surveys on the Hamilton Park property throughout 2022 and 2023 to determine its suitability as an environmental offset site to acquit the remaining SWC MRA2C impacts to Koala, Greater Glider and Squatter Pigeon habitat. During these surveys, the Hamilton Park property was identified as containing suitable Koala, Greater Glider and Squatter Pigeon habitat, with all three species recorded within the property by Trend Environmental or site personnel on multiple occasions in 2022 and 2023.

It is proposed the Hamilton Park property will acquit 79.06% impacts to Koala habitat, 68.01% of impacts to Greater Glider habitat and 100% of impacts to Squatter Pigeon habitat for the SWC MRA2C Project.

1.2 HAMILTON PARK PROPERTY

The Hamilton Park property has a Lot on Plan of 4WHS354 and is 4,386 hectares (ha) in size (Table 1). The property is owned by Stanmore SMC and is located 16km south of Nebo (Map 1, Appendix A), and approximately 41km south of the SWC MRA2C Project site. Hamilton Park is located within the Isaac Regional Local Government Area and the Brigalow Belt bioregion within Queensland (Table 1), the same bioregion as the SWC MRA2C Project impact site. The property is primarily used for cattle grazing, with some groundwater bores used to supply water to the SWC Mine. The property is not subject to any mining lease areas, exploration permits for coal mineral development licences, petroleum leases or petroleum exploration tenements.

Table 1 Property details

Property Name	Lot on Plan	Tenure	Local Government Area	Total Area (ha)
Hamilton Park	4WHS354	Freehold	Isaac Regional	4386

1.3 PURPOSE

The purpose of the Offset Ecological Assessment and Report was to:

- Complete a targeted survey for the Koala, Greater Glider and Squatter Pigeon to determine presence on the property and habitat utilisation throughout the property.

- Identify habitat values on the Hamilton Park property that are suitable to provide offsets for Koala, Greater Glider and Squatter Pigeon habitat to deliver Stanmore SMC's remaining offset requirements for these matters from the SWC MRA2C Project; and
- Provide quantitative baseline data on the proposed offset areas and determine the area of offset required to acquit 100% of Stanmore SMC's offset requirements relating to Stage 2 impacts to Koala habitat, Stage 2 impacts to Greater Glider and Stage 1 and 2 impacts to Squatter Pigeon habitat.

The data collected as part of the offset survey provides the baseline habitat quality scoring to inform the Offset Area Management Plan (OAMP) for the Koala, Greater Glider and Squatter Pigeon habitat offset matters on the Hamilton Park property.

1.4 REGULATORY FRAMEWORK – COMMONWEALTH LEGISLATION

The *EPBC Act* is administered by the Commonwealth's DCCEEW. The Act provides a legal framework to protect and manage nationally important flora and fauna, and ecological communities, which are defined as MNES. When a proposed action is likely to have a significant impact on a MNES, it must be referred to DCCEEW for assessment as a controlled or not a controlled action. If DCCEEW determines the proposed action as likely to have significant impacts, the project is considered a controlled action that requires formal assessment and approval. If approved, as a condition of the approval, environmental offsets under the Commonwealth's *Environmental Offsets Policy 2012* may be required to offset significant residual impacts to MNES.

1.5 OFFSET MATTERS

1.5.1 MNES Matters to be Impacted

Stanmore SMC's Commonwealth approval for the SWC MRA2C Project requires offsets for 670.9ha of impacts to Koala habitat, 151ha of impacts to Greater Glider habitat, and 301.8ha of impacts to Squatter Pigeon habitat from the SWC MRA2C Project (EPBC Approval 2017/7957, dated 30 October 2019). The offset requirements within the approval are separated by Stage 1 and Stage 2 impacts. Stage 1 impacts to Koala and Greater Glider habitat have been approved on the Clive and Brigalow properties. The remaining offset requirements for Stage 2 Koala, Stage 2 Greater Glider and Stage 1 and 2 Squatter Pigeon include 79.06% for Koala, 68.01% Greater Glider and 100% Squatter Pigeon habitat.

The Koala and Greater Glider are both listed as endangered under the *EPBC Act,* while the Squatter pigeon is listed as vulnerable under the Act. The definitions of habitat for each of these species includes the following:

- Koala habitat is typically defined as eucalypt woodland containing locally important food trees and ancillary habitat trees, as listed in *A Review of koala habitat assessment criteria and methods* (Youngentob, et al., 2021)
- Greater Glider habitat is typically split into suitable denning and foraging habitat, as defined in the *Guide to Greater Glider habitat in Queensland* (Eyre, et al., 2022):
  - Denning habitat includes woodland habitat dominated by Eucalypts that have records for Greater Gliders, with a high density of trees with a diameter at breast height (DBH) >50cm; and
  - Foraging habitat includes woodland habitat dominated by Eucalypts that have records for Greater Gliders, with trees with a diameter at breast height (DBH) >30cm.
- Squatter Pigeon habitat is typically defined as either breeding, foraging or dispersal habitat:
  - Breeding habitat occurs on sandy and gravelly soil land zones within 1km of a suitable permanent waterbody, typically on land zone 3, 5 and 7 (Squatter Pigeon Workshop, 2011).
  - Foraging habitat for this species is any remnant or regrowth open forest to sparse, open woodland or scrub dominated *Eucalyptus, Corymbia, Acacia* or *Callitris* species, on sandy or gravelly soils within 3km of suitable permanent or seasonal waterbody (Squatter Pigeon Workshop 2011).
  - Dispersal habitat for this species is any forest or woodland occurring between patches of foraging or breeding habitat and suitable waterbodies. These areas facilitate the local movement of the species.

1.5.2 Maintaining Consistency Between Impact and Offset Site Scoring Methodology

The *How to Use the Offsets Assessment Guide* (Department of Climate Change, Energy, the Environment and Water, 2024) defines the methdology for scoring habitat quality within the impact and offset sites, by utilising site condition, site context and species stocking rates as the attributes that contribute to the calculation of habitat quality. These attributes are then weighted depending on the ecologuical requirements of the impacted species or ecological community. The guide also states habitat quality needs to be scored consistently on the both the impact and offset calculators of the guide.

Field surveys of both the impact site and the proposed offset site have been undertaken. The impact site was surveyed by Eco Logical Australia in 2018 (Eco Logical Australia, 2018). These surveys determined habitat quality in accordance with *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual* (Eyre, *et al.,* 2015) which was based solely on site condition and site context. This scoring is consistent with the methodology referred to in version 1.3 of the *Guide to Determining Terrestrial Habitat Quality* but was based solely on site condition and site context. This scoring was used as the basis for the EPBC Approval Conditions for the SWC MRA2C Project, however, did not include species stocking rates or weighted scoring in the calculation of habitat quality. This is inconsistent with the methodology described within the *How to Use the Offsets Assessment Guide.*

To adhere to the methodology described in the *How to Use the Offsets Assessment Guide,* which emphasizes the importance of applying the three specific attributes of habitat quality scoring (site condition, site context and species stocking rates), weighted scoring and consistency in methodology across both the impacted and offset sites, we decided to revise the scoring system used for the impact site to align with both the *How to Use the Offsets Assessment Guide* and the updated version of *Guide to Determining Terrestrial Habitat Quality Version 1.3* (Department of Environment and Science, 2020). This revision of the impact site scoring now incorporates species stocking rates and weighted scores, and moves us beyond the limited approach of relying solely on site condition and context to evaluate habitat quality for the offset site.

This update in the scoring methodology ensures three critical outcomes. First, it uses current best practice methods for determinining offset obligations under the *EPBC Act,* which is defined in the How to Use the Offsets Assessment Guide. Second, it ensures best practice methods are used for the duration of the 20 year offset liability, with habitat quality scoring a key metric for gauging success in fulfilling offset obligations. Adhering to best practices from the outset guarantees consistent and reliable evaluations throughout the life of the offset. And third, it brings our approach in line with the habitat quality assessment methods used in other OAMPs overseen by Stanmore, specifically the Clive and Brigalow OAMPs.

To recalculate habitat quality scores the following data was used:

- Condition data from the impact site as provided in Appendix C of the Mulgrave Stage 2C Ecological Impact Study (Eco Logical Australia, 2018).
- Aerial imagery to determine site context (patch size, connectedness, context and ecological corridors).
- Aerial imagery, species usage of the site provided in (Eco Logical Australia, 2018), and other known records for the site and adjacent areas (e.g., from Atlas of Living Australia).

These new calculations for the impact site have resulted in the same habitat quality score for Koala and Greater Glider habitat, however a reduction in score of 1 for Squatter Pigeon habitat. Table 2 below provides details of these differences in habitat quality scoring at the impact site.

In 2022 and 2023, Trend Environmental conducted field surveys within the proposed offset site at Hamilton Park in accordance with the *Guide to Determining Terrestrial Habitat Quality Version 1.3* and *How to Use the Offsets Assessment Guide* to collect sufficient ecological data to determine habitat quality scores for input into the Commonwealth's Offset Assessment Guide, to determine offset potential, area availability and acquittal rates.

Table 2 Offset details for Koala, Greater Glider habitat at the SWC MRA2C impact site

Offset Matter	Attribute	Approved Liability	Revised Scoring	Rationale
Stage 2 Koala habitat	Area (ha)	670.9ha	-	Area of Koala habitat that resulted in a significant impact
	Habitat Quality Score	6	6	Original habitat quality scores and updated habitat quality scoring.
	Total quantum of impact to be offset	402.54	-	As per the Offset Assessment Guide
Stage 2 Greater Glider habitat	Area (ha)	151ha	-	Area of Greater Glider habitat that resulted in a significant impact
	Habitat Quality Score	7	7	Original habitat quality scores and updated habitat quality scoring.
	Total quantum of impact to be offset	105.70	-	As per the Offset Assessment Guide
Stage 1 and 2 Squatter Pigeon habitat	Area (ha)	301.8ha	-	Area of Squatter Pigeon habitat that resulted in a significant impact
	Habitat Quality Score	7	6	Original habitat quality scores and updated habitat quality scoring.
	Total quantum of impact to be offset	211.26	181.08	As per the Offset Assessment Guide

METHODOLOGY

A desktop and field assessment was undertaken to determine presence of suitable habitat for the offset matters on the property and determine habitat quality scores for the proposed offset sites.

2.1 DESKTOP ASSESSMENT

The desktop assessment involved a literature and database review to determine the potential suitability of the property as an offset area for all three matters. The literature review included:

- *Eco Logical Australia's Ecological Impact Study, South Walker Creek Mulgrave Resource Access: Stage 2C (MRA2C;* Eco Logical , 2018)
- *How to Use the Offsets Assessment Guide* (Department of Climate Change, Energy, the Environment and Water, 2024)
- *Guide to Determining Terrestrial Habitat Quality: Methods for assessing habitat quality under the Queensland Environmental Offsets Policy, Version 1.3* (February 2020; Department of Environment and Science, 2020).
- *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual.* (Eyre, *et al.,* 2015)
- *A review of koala habitat assessment criteria and methods* (Youngentob, et al., 2021)
- *Guide to Greater Glider habitat in Queensland* (Eyre, et al., 2022)
- *Survey Guidelines for Australia's threatened birds - Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, Water, Heritage and the Arts, 2010)
- DCCEEW SPRAT profiles for threatened species, relevant referral guidelines, and available Threatened Species Scientific Committee Conservation and Listing Advice.

The database review was undertaken to assist in determining target areas for the offset matters during the field surveys and to provide additional evidence of species presence on the site and in the near vicinity. This review included:

- WildNet Species List (20km buffer)
- Vegetation Management Report (provided in Appendix B of this report)
- Queensland Herbarium (2019) Regional Ecosystem Description Database (REDD), Version 13 (May 2023; Department of Environment and Science, Brisbane)
- Queensland Herbarium BioCondition Benchmarks for Regional Ecosystem Condition Assessment (Department of Environment and Science, Brisbane)
- Protected Matters Search Tool Report (20km buffer)
- Atlas of Living Australia wildlife records.

2.2 FIELD ASSESSMENT

Three field assessments on the Hamilton Park property were completed by Trend Environment throughout 2022 and 2023:

- 2 November 2022
- 3-7 April 2023
- 12-23 June 2023

These field surveys were used to determine the suitability of the property to provide offsets for Koala, Greater Glider and Squatter Pigeon habitat, to verify the current Department of Natural Resources, Mines and Energy (DNRME) regulated vegetation mapping, undertake targeted and opportunistic surveys for the three species to determine presence on the site and determine habitat quality of all relevant vegetation communities that could provide offsets for these offset matters. These field surveys focussed on all vegetated areas of the Hamilton Park property.

2.2.1 Survey Timing

Koala, Greater Glider and Squatter Pigeon can be observed year-round and therefore offset surveys were not restricted to a specified period of peak activity. Both Koala and Greater Gliders were recording during the April and June 2023 survey events, while Squatter Pigeon was recorded by onsite personnel in October 2023.

2.2.2 Survey Effort

Field surveys were targeted within vegetated areas of the property to confirm:

- The regional ecosystems mapping and vegetation communities using quaternary survey methods, as described in the *Methodology for surveying and mapping regional ecosystems* (Neldner, et al., 2023).
- Presence of Koala, Greater Glider and Squatter Pigeon on the property.
- Presence of locally important food trees and ancillary habitat trees for Koala as defined within the *A review of koala habitat assessment criteria and methods* (Youngentob, et al., 2021) to determine suitability as koala habitat.
- Presence of suitable Eucalypt tree species and suitable denning and foraging habitat for the Greater Glider, as defined in the *Guide to Greater Glider habitat in Queensland* (Eyre, et al., 2022).
- Habitat quality scoring of each assessment unit in accordance with the *Queensland Guide for Determining Terrestrial Habitat Quality* (Department of Environment and Science, 2020) and the *BioCondition Assessment Manual* (Eyre, et al., 2015).

A total of 89 quaternary surveys and 33 BioCondition plots were completed during the November 2022, April and June 2023 field surveys. Map series 2, Appendix A shows the location of these survey sites.

2.2.3 Survey Methodology

2.2.3.1 Quaternary Surveys

Regional ecosystem classification was determined based on the vegetation, soil and landform characteristics identified in the field, geological mapping for the region and the Regional Ecosystem Description Database (REDD). Polygons were assigned to remnant, regrowth or non-remnant status, and designated as a homogenous RE where relevant, as defined by the *Vegetation Management Act 1999 (Qld).* Quaternary surveys, as described in the *Methodology for surveying and mapping regional ecosystems* (Neldner, *et al.,* 2023) were used as a record of field traverses and to verify RE and vegetation mapping on the property. As part of the quaternary surveys we:

- Identified land zone characteristics.
- Identified dominant tree, shrub and ground cover species, and identified the ecological dominant layer to determine the RE present; and
- Recorded tree heights, diameter at breast height (DBH) and canopy cover to gain to an understanding of the remnant status of the vegetation community present.

These quaternary surveys assisted in determining species habitat requirements, including:

- Koala - determining whether habitat on the site was suitable for Koalas based on the availability of locally important food trees and ancillary habitat trees defined within the *A review of koala habitat assessment criteria and methods,*
- Greater Glider - determining availability of suitable Eucalypt tree species and adequately sized trees for denning and foraging for the Greater Glider, as defined in the *Guide to Greater Glider habitat in Queensland.*
- Squatter Pigeon – determining presence of appropriate land zones (e.g., 3, 5 and 7) and native understorey species suitable for foraging.

The DNRME vegetation management regional ecosystem mapping was used to initially identify assessment units for the property, which determined the likely number and location of habitat quality assessment plots. Assessment units are relatively homogenous units defined by a unique RE and broad condition state (i.e. 'remnant' versus 'regrowth' versus 'non-remnant'. The assessment units were refined following field verification of the mapped vegetation which was undertaken in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems (RE) and Vegetation Communities in Queensland* (Neldner, *et al.*, 2023). Overall, eleven assessment units were defined for the property following field verification of the on-ground vegetation. Within each assessment unit, the number of habitat quality plots was determined in accordance with the guide provided in the *Guide to Determining Terrestrial Habitat Quality, version 1.3* (Department of Environment and Science, 2020).

2.2.3.2 Targeted Surveys

A number of targeted surveys for Koala, Greater Glider and Squatter Pigeon were completed to verify the presence of these species on the property, including:

- Flushing surveys for the Squatter Pigeon using methods described in the *Survey Guidelines for Australia's threatened birds.* Flushing surveys were completed throughout the property on foot and by vehicle during each survey event.
- Diurnal searches, nocturnal spotlighting surveys, and scat and sign searches for the Koala. Diurnal searches were completed throughout the property on foot and by vehicle during each survey event, scat and signs were recorded incidentally, while spotlighting surveys were undertaken on the nights of 3 and 5 April 2023, and 13, 14 and 15 June 2023. To maximise the likelihood of detecting the Koala the search effort was targeted within remnant vegetation supporting koala food trees.
- Nocturnal spotlighting surveys for the Greater Glider were completed in target areas of the property. Spotlighting surveys were undertaken on the nights of 3 and 5 April 2023, and 13, 14 and 15 June 2023. To maximise the likelihood of detecting the Greater Glider the search effort was targeted within remnant vegetation supporting trees bearing hollow's large enough for the Greater Glider.

2.2.3.3 Habitat Quality Assessments

The habitat quality score for an area is a measure of how well a particular site supports a species and contributes to its ongoing viability. The *EPBC Environmental Offsets Policy* and *How to Use the Offsets Assessment Guide* do not provide habitat quality survey guidelines or a methodology on how to calculate the habitat quality scores other than identifying that the impact and offset areas should determine habitat quality scores using the same methodology, and the habitat quality score should be calculated from three weighted attributes: site condition, site context and species stocking rates.

Habitat Quality Scoring Methodology at the Impact Site

The impact site was surveyed by Eco Logical Australia in 2018 (Eco Logical Australia, 2018). These surveys determined habitat quality in accordance with *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual* (Eyre, et al., 2015) which was based solely on site condition and site context. This scoring is consistent with the site condition and context methodology referred to in *version 1.3* of the *Guide to Determining Terrestrial Habitat Quality* (Department of Environment and Science, 2020) and was used as the basis for the EPBC Approval Conditions for the SWC MRA2C Project. This habitat quality scoring methodology, however, did not include species stocking rates or weighted scoring which is inconsistent with the methodology described within the *How to Use the Offsets Assessment Guide.*

Maintaining Consistency between Impact and Offset site Scoring Methodology

To adhere to the methodology described in the *How to Use the Offsets Assessment Guide,* which emphasises the importance of applying the three specific attributes for habitat quality scoring (site condition, site context and species stocking rates), weighted scoring and consistency in methodology across both the impacted and offset sites, we have opted for revising the scoring system used for the impact site to align with the *How to Use the Offsets Assessment Guide* and *version 1.3* of the *Guide to Determining Terrestrial Habitat Quality* (Department of Environment and Science, 2020). This revision of the impact site scoring now incorporates species stocking rates and weighted scores, is consistent with the scoring for the offset site, and moves us beyond the limited approach of relying solely on site condition and context to evaluate habitat quality for the offset site.

This update in the scoring methodology ensures three critical outcomes. First, it uses current best practice methods for determining offset obligations under the EPBC Act, which is defined in the How to Use the Offsets Assessment Guide. Second, it ensures best practice methods are used for the duration of the 20 year offset liability, with habitat quality scoring a key metric for gauging success in fulfilling offset obligations. Adhering to best practices from the outset guarantees consistent and reliable evaluations throughout the life of the offset. And third, it brings our approach in line with the habitat quality assessment methods used in other OAMPs overseen by Stanmore, specifically the Clive and Brigalow OAMPs.

Revised Habitat Quality Scoring Methodology for both the Impact and Offset sites

The habitat quality scoring methodology utilised by Trend for both the revised impact site scores and the offset site scores at Hamilton Park used combination of attributes for site condition, site context and species stocking rate in accordance with the *How to Use the Offsets Assessment Guide.* The attributes for site condition and site context were derived from *Version 1.3* of the *Guide to Determining Terrestrial Habitat Quality* and utilised species habitat indices where appropriate, while species stocking rates and weighted scoring was derived from the *How to Use the Offsets Assessment Guide.*

These three components (site condition, site context and species stocking rate) contribute to the final habitat quality score, with weightings given depending on the ecological requirements of the impacted species. For all three species (Koala, Greater Glider and Squatter Pigeon), the species stocking rate was given a greater weighting, as the stocking rate is what contributes to the long-term viability of the species and ensures flow-on effects to adjacent habitats, with larger well-connected populations having a higher value. Therefore, site condition was weighted 30%, site context was weighted 30%, and species stocking rate was weighted 40% for the final habitat quality scores. The final habitat quality scores were derived by adding the weighted values (out of 10) for site condition, site context and species stocking rates together.

The scoring methodology implemented has been summarised in Table 3.

Table 3 Field Methodology

Attribute	Methods
Site Condition	Condition was recorded using the Queensland BioCondition survey methodology , as described in Version 1.3 (Department of Environment and Science, 2020) of the Guide to Determining Terrestrial Habitat Quality. BioCondition uses benchmark values to determine a condition score. Benchmarks are quantitative values for each vegetation condition attribute and are used as a reference to compare the condition of regional ecosystems and vegetation communities. Benchmarks are subject to regular review and updates based on additional data. BioCondition benchmarks are compiled for quantitative site data from reference sites, data from the Queensland Herbarium's CORVEG database as well as other relevant information and expert opinions and are specific to each regional ecosystem or vegetation community (Queensland Herbarium, 2024). Reference benchmarks for REs on the property were obtained from the published benchmark dataset (Queensland Herbarium, 2024) and where unavailable for a particular RE, the closest RE benchmark within the same broad vegetation group (BVG) was used. For each habitat quality assessment plot, a 100 x 50m plot was established. Within each plot, a 50m transect was laid parallel to the slope of the land, which was parallel to the creek bank. The following details were recorded: • Basic site details, including date and time, observers, site number, location, RE and GPS coordinates were recorded. Four landscape photographs (two parallel and two perpendicular to the transect) and a ground photograph were taken at the midpoint of the 50m transect. The orientation of the site was recorded using a compass. • All parameters were collected in the field, with parameters displayed in bold below being relevant to the development of habitat condition scores: • Along the 50m transect line the following data were recorded: o **Tree canopy cover.** This is the proportion of the 50m transect intersected by the foliage of a tree within the emergent, canopy and sub-canopy layer. In order to calculate cover, an observer walked along the transect line, looking up and noting at which point on the transect an overlap with the tree canopy occurred. The observer then walked along the transect until it no longer overlapped with the canopy and noted this point on the transect line. The difference in length between the two points is the length of canopy cover. This was repeated for the length of the transect, and the canopy cover lengths were added and multiplied by two to give a percentage tree canopy cover over a 100m transect line. o **Shrub canopy cover.** This is the proportion of the 50m transect intersected by the foliage of shrubs. Calculation of cover was as per 'tree canopy cover' above. • A 50m x 25m plot was marked out. Within this area, the following data were recorded: o **Large trees of eucalypt and non-eucalypts.** Large trees are defined as the number of living trees per hectare with a DBH greater than the DBH threshold provided in the benchmark document. Native trees larger than the DBH threshold were counted within the 50 x 25m plot (i.e., 0.125 hectare, which was multiplied by eight to compare with the DBH threshold). o **Tree canopy height.** The median height in metres of the emergent, canopy and sub-canopy heights were recorded.

Attribute	Methods
	○ **Recruitment of dominant canopy species.** The presence of regeneration of the dominant canopy species. That is the proportion of tree species represented by at least one recruit, provided as a percentage. ○ **Native tree and shrub species richness.** The number of native tree and shrub species present, determined by walking through the plot and identifying each species present. ○ **Coarse woody debris**. This is the cumulative length of all logs within the plot that are >10cm in diameter and >50cm in total length. • A 50m x 10m plot was marked out. Within this area, the following data were recorded: ○ **Native plant species richness**. The number of native non-woody species (i.e., grass and forbs) present within the ground layer, determined by walking through the plot and identifying each species. ○ Five 1m x 1m quadrats were placed along the transect at the 5, 15, 25, 35, and 45m marks. These quadrats were assessed for **percentage cover of native perennial grass, organic litter and non-native plants.** The cover percentages for each were averaged across the five quadrats to provide a final value contributing to ground cover. These data were then compared to the Benchmark data to give a score using the formulas provided within the *BioCondition Assessment Manual* for each attribute. In addition to the above attributes for site condition, the following species habitat indices were included in site condition scoring: • Quality and availability of food and foraging habitat: • Quality and availability of shelter These attributes were species specific, as detailed below: **Koala and Greater Glider-** The quality and availability of food and foraging habitat for the Koala was assigned a score out of 10, based on the average score from the following criteria: • Relative abundance of food trees present – calculated by dividing the number of mature Eucalypt trees in the BioCondition plot by the number of mature Eucalypt trees detailed in the benchmark for that RE community, converted to a score out of 10. • Relative diversity of food tree species present – estimated based on the number of food tree species in the BioCondition plot, assigning scores from 0-10 where 0 = no food trees, 5 = 1 food tree species and 10 = 2+ food tree species present. • Ease of movement – estimated based on the connectivity of vegetation and the physical and behavioural barriers to movement, assigning scores from 0 – 10 where 0 – 2 = (movement totally restricted), 2 – 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (along a koala movement corridor). The quality and availability of shelter was derived by assigning scores for both tree canopy cover and subcanopy cover from 0-5 each where 1 = <10%, 3 = 10-30% and 5 = >30%, then adding these scores together out of 10. **Squatter Pigeon -** The quality of food and foraging habitat for the Greater Glider was assigned a score out of 10, based on the average score from the following criteria: • Relative abundance of native grasses (food) present – calculated by dividing the native perennial grass cover in the BioCondition plot by the native perennial grass cove detailed in the benchmark for that RE community, converted to a score out of 10. • Relative diversity of native grass species present – estimated based on the number of native grass species in the BioCondition plot, assigning scores from 0-10 where 0 = no food trees, 5 = 1 food tree species and 10 = 2+ food tree species present. • Ease of movement – estimated based on the connectivity of vegetation and the physical and behavioural barriers to movement, assigning scores from 0 – 10 where 0 – 2 = (movement totally restricted), 2 – 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (along a koala movement corridor). The quality and availability of shelter was derived by assigning scores for both tree canopy cover and subcanopy cover from 0-5 each where 1 = <10%, 3 = 10-30% and 5 = >30% then adding these scores together out of 10. Habitat quality scoring for each matter is provided in Appendix C.

Attribute	Methods
Site Context (Landscape-scale Attribute Scoring)	Site context scoring involved assessing the surrounding landscape-scale attributes through the use of aerial imagery, GIS mapping and spatial analysis. The following parameters were used to assess landscape-scale attributes; however, their use differs according to whether the subregion is fragmented or intact. The subregion in which Hamilton Park is located is the BBN12 Nebo-Connors Ranges subregion, within the Brigalow Belt bioregion. This subregion is classed as fragmented within Section 11.6 of the *Guide to Determining Terrestrial Habitat Quality*. Therefore, only four of the five attributes listed were used to describe the surrounding landscape (highlighted in bold). The maximum scores for each attribute are provided in Table 2. • **Size of patch:** Size of the area (being assessed) and any directly connecting remnant vegetation. • **Connectedness:** Used only for fragmented subregions. This assessment involves measuring the proportion of the sites boundary which is connected to remnant vegetation. • **Context:** Assessment involves measuring the percent of remnant vegetation within a 1km buffer around the site. Distance permanent watering point: Only scored for intact landscapes hence was not used during our assessment at Hamilton Park. Usually, however permanent water points include dams, earth tanks, raised ring-tanks, troughs on pipelines and natural permanent water supplies (rivers and waterholes). This parameter is up to a 5km radius. • **Ecological corridors:** This is determined by the proximity of the site to state, bioregional, regional or sub-regional corridors (terrestrial or riparian). The site can be either located within, share a common boundary with. or not within a corridor. • **Threats to the species:** For each species, the absence of threats were calculated as a score out of 25 using the risk matrix below. The score was than adjusted to a score out of 15. Threats per species included: o Koala – threats posed by vehicles, predators, fire and habitat fragmentation o Greater Glider – threats posed by predators, fire, habitat fragmentation and barbed wire fencing o Squatter Pigeon – threats posed by vehicles, predators, weeds, fire and habitat fragmentation

THREATS TO SPECIES							
THREATS MATRIX			Severity				
			Very High	High	Medium	Low	Very Low
			1	2	3	4	5
Scope	Very High	1	1	2	3	4	5
	High	2	2	4	6	8	10
	Medium	3	3	6	9	12	15
	Low	4	4	8	12	16	20
	Very Low	5	5	10	15	20	25

	• **Species mobility capacity:** This attribute was assigned a score out of 10, based on the average score from the following criteria: o Habitat connectivity – score out of 10 from: 0 - 2 (isolated), 2 - 4 partially isolated, 4 - 6 (periodically isolated), 6 - 8 (major connectivity), 8 - 10 (totally connected). o Behavioural deterrents to movement – scored out of 10 considering the risk of likely movement due to disturbance: 0 - 2 (extreme risk), 2 - 4 (high risk), 4 - 6 (moderate risk), 6 - 8 (low risk), 8 - 10 (zero risk). o Physical deterrents to movement – scored out of 10 based on physical barriers: 0 - 2 (total barrier), 2 – 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (active movement pathway – i.e. watercourse or linear corridor).
Species Stocking Rate	Species stocking rate is a measure of the presence of a species at the site and its value to the greater population to ensure viability. In accordance with the requirements of DCCEEW, species stocking rate is assessed on a scale of 0 – 4, based on: • **Presence detected on or adjacent to site (neighbouring property with connecting habitat):** Presence detected was based on survey evidence, and previous known records. Target search

Attribute	Methods
	methods for the species undertaken on the property are described in *Section 2.2.3 Survey Methodology.* • **Species usage of the site (habitat type and evidenced usage):** The usage of the offset area was assessed for each species, assigning it to one of four categories - not habitat (0), dispersal (5), foraging (10) or breeding (15) habitat. This was based on the quality of the habitat present and its connectivity to other suitable habitat within the surrounding landscape. • **Role of the site population in relation to the overall species population** (including whether the population was a key source for breeding or dispersal, necessary for maintaining genetic diversity or near the limit of the species range: The scoring of these criteria were derived from available information about each species in general and in the region, considering the geographic location and connectivity of the local population in the context of the species' broader range. Large areas of contiguous habitat with confirmed records were considered source populations for breeding. Areas of high value habitat with high connectivity to external areas were considered source populations for dispersal. Populations that represented one of only a few representatives of the species in a geographic area were considered important for maintaining genetic diversity. The distribution of the species, as mapped in the Commonwealth Species Profile and Threat Database for each species was used to determine whether the population was near the limits of the species' known range.

RESULTS AND DISCUSSION

3.1 KOALA

3.1.1 Koala Presence

Within the Hamilton Park property, the Koala was directly recorded on five occasions within woodland habitats, three of these were within the proposed offset area (Map 3, Appendix A). The identification of scratches on Eucalypts and scats were also recorded throughout most of the property (Map 3, Appendix A).

The Eco Logical Australia survey of the Hamilton Park property in 2017 also identified the presence of Koalas (Eco Logical Australia, 2017). One direct observation of a Koala occurred in RE11.3.25a along a tributary of Denison Creek within the southern extent of the study area (Map 3, Appendix A). Koala SAT assessments across the property also confirmed utilisation in the form of recent scats or scratches. Approximately 71% of the Koala habitat assessments conducted (from a total of 18 assessments) revealed the presence of Koala across four REs (RE 11.3.25, RE 11.3.25a, RE 11.3.4 and RE 11.5.3; Eco Logical Australia, 2017).

In addition to the above confirmed sightings, numerous anecdotal sightings have occurred on the property by site personnel operating the Braeside Borefield. And in close proximity to the Hamilton Park property there were also other recent records for the species, less than 5km from the property (Atlas of Living Australia; Map 3, Appendix A).

Confirmed presence of Koalas (i.e., direct sightings, scats or scratches) on the property by Trend and Eco Logical Australia occurred within REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.25a, 11.3.9, 11.4.2, 11.5.3 and 11.5.9.

3.1.2 Koala Habitat Presence

The Koala has a large distribution throughout eastern Queensland, New South Wales, the Australian Capital Territory, Victoria and South Australia, inhabiting forests and woodlands of predominantly *Eucalyptus* species. Koala habitat is defined by the vegetation containing locally important food trees and ancillary habitat trees, which are defined in Youngentob and colleagues (2021).

Vegetation communities containing locally important food trees and ancillary habitat trees was considered suitable Koala habitat within the Hamiilton Park property. Hamilton Park contains two extensive creek systems: Nebo Creek (stream order 5) and Denison Creek (stream order 6) which supports an extensive alluvial acquifer (Sinclair Knight Merz, 2009). The aquifer occurs at a consistent depth of approximately 15m throughout its extent and provides a continual water source (Eco Logical Australia, 2017). It is likely that many of the large eucalypts on the Hamilton Park property have access to this acquifer during dry periods via their tap roots, including but not limited to *Eucalyptus tereticornis, Eucalyptus camaldulensis, Eucalyptus raveretiana* and *Eucalytpus coolabah.*

Vegetation communities that were identified on the property containing locally important food trees and ancillary habitat trees included:

- RE11.3.2 – *Eucalyptus populnea,* sometimes *Eucalyptus crebra* and *Eucalyptus melanophloia*
- RE11.3.3 – *E. coolabah* and sometimes *E. populnea*
- RE11.3.4 – *E. tereticornis, Corymbia tessellaris,* sometimes *E. camaldulensis* and *E. crebra.*
- RE11.3.25 and 11.3.25a – *E. tereticornis* and *E. camaldulensis*
- RE11.3.9 – *Eucalyptus platyphylla* and *Corymbia intermedia*
- RE11.4.2 – *E. populnea, Eucalyptus brownii, E. melanophloia, Corymbia dallachiana, C. tessellaris, E. crebra* and *E. platyphylla*
- RE11.5.3 – *E. populnea, E. melanophloia* and *C. dallachiana*
- RE11.5.9 – *E. crebra, C. intermedia* and *C. dallachiana*
- RE11.5.12a – *E. crebra* and *C. tessellaris*; and
- RE11.8.14 – *E. crebra* and *C. dallachiana.*

These REs contained two or more recognised food or habitat trees, with these species dominating >50% of the canopy cover. These REs covered most of the vegetated areas on the Hamilton Park property (Map series 2, Appendix A) with 3,525ha of Koala habitat recognised that could provide for a suitable offset site. The remaining RE that occurred within the property was 11.4.9 which contained a dominant canopy cover of *Casuarina cristata* (Belah) which does not provide a recognised foraging or shelter resource for the Koala. Other areas of the property were non-remnant and lacked canopy trees and could provide sufficient shelter for Koalas to utilise. The condition of the canopy layers within the remnant and regrowth REs varied but mostly was considered to be in good condition. The ground layer however was heavily degraded and dominated by exotic grasses and forbs.

3.1.3 Koala Habitat Offset Values

Habitat condition surveys were conducted at within each of the eleven assessment units, at the densities defined in the *Guide to Determining Terrestrial Habitat Quality Version 1.3* (Department of Environment and Science, 2020). The location of each of the sites are provided in Map series 2, Appendix A.

The final habitat quality scores determined using site condition, site context attributes and species stocking rates for each site are provided in Appendix C. As previously mentioned, the habitat quality scores for the impact site at SWC MRA2C were recalculated to keep scoring consistent between the impact and offset sites. The recalculation of scores for the impact site to include species stocking rates and the use of weighted scores for site condition, site context and species stocking rates, resulted in the same the habitat quality score of the impact site as was defined in the EPBC Approval conditions for SWC MRA2C (2017/7957, dated 30 October 2019; 6 out of 10; recalculated impact site scoring provided in Appendix C).

The proposed offset area contains:

- 1,254ha of remnant REs 11.3.3, 11.3.4, 11.3.9, 11.4.2, 11.5.3, 11.5.9 and 11.5.12a
- 416ha or regrowth REs 11.5.3, 11.5.9, 11.8.14.

These REs were calculated to have a habitat quality score of 7 for remnant areas and 4 for regrowth areas (offset site scoring provided in Appendix C) and are sufficient in size to acquit the balance of the offsets required for Stage 2 impacts to Koala habitat. The proposed offset area is made up of 1,254ha of remnant REs 11.3.3, 11.3.4, 11.3.9, 11.4.2, 11.5.3, 11.5.9 and 11.5.12a; and 416ha of regrowth REs 11.5.3, 11.5.9 and 11.8.14. Offset areas for the Koala are shown on Map 3 (Appendix A), with offset calculator results provided in Appendix C. The proposed future completion scores for remnant Koala habitat is 8, and the proposed future completion scores for regrowth Koala habitat is 7.

Habitat condition scores indicated generally moderate condition throughout remnant areas and low to moderate condition throughout regrowth areas. Site context scores overall were good due to the large tract of remnant habitat present throughout the Hamilton Park property. Species stocking rates for remnant REs were high due to presence of Koalas recorded throughout many remnant areas of the site, while species stocking rates for regrowth REs were low. Limited targeted surveys however have taken place within these regrowth areas for Koalas to date and this has potentially resulted in the low stocking rates recorded. Regardless, with high records within adjacent remnant areas it is likely these regrowth areas will be utilised by Koalas in the future once the canopy layer establishes during the offset period.

3.2 GREATER GLIDER

3.2.1 Greater Glider Presence

Within the Hamilton Park property, the Greater Glider was directly recorded on four occasions within woodland habitats, adjacent to Nebo and Denison Creeks (Map 4, Appendix A).

No confirmed sightings of the species has been recorded within 10km of the site, with the closest record near Nebo from 2012 (approximately 14km from the property; Atlas of Living Australia). While this is the case, the lack of records is likely the result of a lack of targeted surveys for the species adjacent to the site rather than a reflection of actual numbers of the species. Nebo and Denison Creeks contain extensive remnant riparian habitat with connected woodlands adjacent that contain large numbers of large DBH trees that support suitable large hollows. This vegetation, extending well beyond 10km north and south of the site provides sufficient denning and foraging habitat that the species likely occurs in.

Confirmed presence of Greater Gliders (i.e., direct sightings) on the property by Trend occurred within REs 11.3.2, 11.3.4 and 11.4.2.

3.2.2 Greater Glider Habitat Presence

The Greater Glider is an arboreal nocturnal marsupial that has a broad distribution throughout eastern Australia, from Proserpine in Queensland south through New South Wales, the Australian Capital Territory, to Wombat State Forest in central Victoria (McGregor, et al., 2020). The Greater Glider prefers taller, montane, moist Eucalypt forests on fertile soils with relatively old trees and an abundance of hollows. During the day, the species shelters in tree hollows, with a particular preference for large hollows (>10cm diameter; (Goldingay, 2012).

Vegetation communities containing suitable eucalypt tree species known to be used as denning or foraging habitat, within REs with confirmed Greater Glider records was considered suitable Greater Glider habitat within the Hamilton Park property. This definition is consistent with the *Guide to Greater Glider habitat in Queensland* (Eyre, et al., 2022) which states habitat attributes include live and dead holow-bearing trees for denning, feed trees, and habitat connectivity across the landscape. This guide identifies dominant or co-dominant trees species in the majority of Greater Glider habitat. For the Brigalow Belt bioregion, these species included *Corymbia trachyphloia, C. intermedia, Corymbia clarksoniana, E. tereticornis, Eucalyptus moluccana, E. crebra, Eucalyptus acmenoides* and *Lophostemon suaveolens.* Size of trees is also considered an important atribute for Queensland Greater Gliders, with trees >30 cm DBH preferentially selected for foraging and trees >50 cm DBH preferentially selected for denning. Trees >50 cm DBH are more likely to contain suitable hollows for sheltering by the species. In addition to the above preferred tree species, *E. populnea* was considered a suitable tree species within the Bowen Basin region where Greater Gliders have been recorded extensively within RE11.5.3 on the Pembroke Olive Downs Project (EMM Consulting, 2020).

Vegetation communities that were identified on the property containing suitable tree species with DBH >30cm include:

- RE11.3.2 – *Eucalyptus populnea,* sometimes *Eucalyptus crebra*
- RE11.3.3 – sometimes *E. populnea*
- RE11.3.4 – *E. tereticornis,* and sometimes *E. crebra.*
- RE11.3.25 and 11.3.25a – *E. tereticornis*
- RE11.3.9 – *Corymbia intermedia*
- RE11.4.2 – *E. populnea,* and *E. crebra*
- RE11.5.3 – *E. populnea*
- RE11.5.9 – *E. crebra* and *C. intermedia*
- RE11.5.12a – *E. crebra*
- RE11.8.14 – *E. crebra*

These REs contained recognised denning and foraging habitat trees. These REs cover most of the vegetated areas on the Hamilton Park property (Map series 2, Appendix A) with 3,525ha of Greater Glider habitat recognised that could provide for a suitable offset site. The remaining RE that occurred within the property was 11.4.9 which contained a dominant canopy cover of *C. cristata* which does not provide a recognised foraging or shelter resource for Greater Gliders. Other areas of the property were non-remnant which lacked canopy trees and could not provide sufficient shelter for the species to utilise. The condition of the canopy layers within the above REs varied but mostly was considered to be in good condition with sufficient tree hollows to support denning by the species. The ground layer however was heavily degraded and dominated by exotic grasses and forbs.

3.2.3 Greater Glider Offset Values

Habitat condition surveys were conducted at within each of the eleven assessment units, at the densities defined in the *Guide to Determining Terrestrial Habitat Quality Version 1.3* (Department of Environment and Science, 2020). The location of each of the sites are provided in Map series 2, Appendix A.

The final habitat quality scores determined using site condition, site context attributes and species stocking rates for each site are provided in Appendix C. As previously mentioned, the habitat quality scores for the impact site at SWC MRA2C were recalculated to keep scoring consistent between the impact and offset sites. The recalculation of scores for the impact site resulted in the same the habitat quality score as was defined in the EPBC Approval conditions for SWC MRA2C (2017/7957, dated 30 October 2019; seven out of ten; recalculated impact site scoring provided in Appendix C).

The proposed offset area contains 338ha of regrowth *RE 11.5.9 Eucalyptus crebra and other Eucalyptus spp. and Corymbia spp. woodland on Cainozoic sand plains and/or remnant surfaces.* The tree species in RE11.5.9 include *E. crebra, E. melanophloia, Corymbia clarksoniana, C. dallachiana* and *Corymbia erythrophloia.* The following Greater Glider usage of these species have been recorded throughout Queensland in the *Guide to Greater Glider habitat in Queensland* (Eyre, et al., 2022):

- *E. crebra* - recorded on 22 occasions as a feed tree, 8 occasions as a den tree and 90 occasions unspecified;

- *E. melanophloia* - recorded on one occasion as a feed tree, and three occasions unspecified;
- *C. clarksoniana* - recorded on 30 occasions unspecified;
- *C. dallachiana* - recorded on four occasions unspecified;
- *C. erythrophloia* - recorded on one occasion unspecified.

This evidence of tree use shows that RE11.5.9 is a suitable RE for offsets. This RE was calculated to have a habitat quality score of 3 for regrowth areas (offset site scoring provided in Appendix C) and was sufficient in size to acquit the balance of the offsets required for Stage 2 impacts to Greater Glider habitat. The proposed 338ha offset area is shown on Map 4 (Appendix A). The proposed future completion score for regrowth Greater Glider habitat is 6. Note, while proposed offsets for Greater Glider habitat are provided for within the 338ha of regrowth RE11.5.9, additional remnant and regrowth habitat for Greater Glider is being offset under the proposed Koala habitat offset areas. This provides an additional 1,254ha of remnant habitat (proposed to be increased to a score of 8) and 78ha of regrowth habitat (proposed to be increased to a 7) for the Greater Glider protected on the Hamilton Park property.

Habitat condition scores indicated generally low to moderate condition throughout regrowth areas. Site context scores overall were good due to the large tract of remnant habitat present throughout the Hamilton Park property. Species stocking rates for remnant REs were high due to presence of Greater Glider recorded throughout many remnant areas of the site, while species stocking rates for regrowth REs were low. Limited targeted surveys however have taken place within these regrowth areas for Greater Gliders to date. With records within adjacent remnant areas however, it is likely these regrowth areas will be utilised by Greater Gliders in the future when they provide suitable habitat characteristics (hollows). The regrowth areas will be managed appropriately under the OAMP so they naturally regenerate to provide additional foraging resources for the species and will be enhanced with nest boxes to provide artificial denning habitat for the species in the interim until natural hollows can form. These regrowth areas to be the subject of the offsets for Greater Glider are situated adjacent to remnant areas so will increase patch size of Greater Glider habitat on the property over time, improving connectivity between habitat patches and making the species more resilient to edge effects.

3.3 SQUATTER PIGEON

3.3.1 Squatter Pigeon Presence

Within the Hamilton Park property, the Squatter Pigeon was directly recorded on one occasion within woodland habitats, adjacent to the western boundary of the property (Map 5, Appendix A). There are two other confirmed sightings of the species adjacent to the Dipperu National Park (Atlas of Living Australia; Map 5, Appendix A). The species was recorded (i.e., direct sighting) on the property within RE 11.3.2.

3.3.2 Squatter Pigeon Habitat Presence

The Squatter Pigeon's distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland (Cooper, et al., 2014). The species habitat is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated by Eucalyptus, Corymbia, Acacia or Callitris species; remnant, regrowth or partly modified vegetation communities; and within 3km of water bodies or watercourses.

Vegetation communities within a suitable land zone, with adequate open canopy cover and access to a water source (whether permanent, semi-permnant or ephemeral) was considered suitable Squatter Pigeon habitat within the Hamilton Park property. This definition is consistent with the definition of habitat provided by DCCEEW SPRAT. The REs on the property that would provide suitable breeding and foraging habitat for the Squatter Pigeon include REs 11.3.2, 11.3.3, 11.3.4, 11.3.25a, 11.3.9, 11.5.3, 11.5.9 and 11.5.12a.

These REs cover much of the vegetated areas of the Hamilton Park property (Map series 2, Appendix A) with 3,345ha of Squatter Pigeon habitat recognised that could provide for a suitable offset site. The remaining REs that occurred within the property were 11.4.2, 11.4.9 and 11.8.14 which do not provide a recognised land zone suitable for breedina and foraging for the species, though these habitats may provide some dispersal habitat for the species throughout the property. The condition of the canopy layers within the suitable REs varied but mostly was considered to be in good condition. The ground layer however was heavily degraded and dominated by exotic grasses and forbs in many areas.

While the direct observation of the species recorded on the site is outside of the proposed offset area for Squatter Pigeon, we have opted to place the offset area where habitat is directly connected to Nebo and Denison Creeks and farm dams to act as water sources for the Squatter Pigeon which need to drink daily. The proposed offset area also provides connectivity

via a remnant vegetation corridor to Dipperu National Park where it is anticipated that a local Squatter Pigeon population occurs. Directly adjacent to Dipperu National Park, there were recent records for the species, including on two occasions in 2023 less than 5km from the Hamilton Park property (Map 5, Appendix A). It is also expected that the Squatter Pigeon is capable of flying the distance between where it has previously been recorded and the offset site. Within the property, it was determined that Squatter Pigeon habitat includes remnant and regrowth woodlands within suitable land zones (3, 5 and 7). These included REs 11.3.2, 11.3.3, 11.3.4, 11.3.25a, 11.3.9, 11.5.3, 11.5.9 and 11.5.12a.

3.3.3 Squatter Pigeon Offset Values

Habitat condition surveys were conducted at within each of the eleven assessment units, at the densities defined in the *Guide to Determining Terrestrial Habitat Quality Version 1.3* (Department of Environment and Science, 2020). The location of each of the sites are provided in Map series 2, Appendix A.

The final habitat quality scores determined using site condition, site context attributes and species stocking rates for each site are provided in Appendix C. As previously mentioned, the habitat quality scores for the impact site at SWC MRA2C were recalculated to keep scoring consistent between the impact and offset sites. The recalculation of scores for the impact site resulted in a reduction of the habitat quality score of the impact site from a 7 as was defined in the EPBC Approval conditions for SWC MRA2C (2017/7957, dated 30 October 2019; 7 out of 10; recalculated impact site scoring provided in Appendix C) to a habitat quality score of 6 (offset site scoring also provided in Appendix C).

The proposed offset area for Squatter Pigeon contains REs 11.3.3, 11.3.4, 11.3.9, 11.5.3 and 11.5.9. The proposed offset area is made up of 906ha of remnant REs 11.3.3, 11.3.4, 11.3.9, 11.5.3 and 11.5.9; and 390ha of regrowth REs 11.5.3 and 11.5.9. These areas are suitable as breeding, foraging and dispersal habitat for the species. The starting habitat quality score for remnant vegetation is 7, and for regrowth vegetation is 4 (scoring provided in Appendix C). The proposed offset area was calculated to be a sufficient size to acquit Stage 1 and 2 impacts to Squatter Pigeon habitat. The proposed future completion scores for remnant Squatter Pigeon habitat is 8, and the proposed future completion scores for regrowth Squatter Pigeon habitat is 7. Offset areas are shown on Map 5 (Appendix A).

Habitat condition scores indicated generally moderate condition throughout remnant areas and low to moderate condition throughout regrowth areas. Landscape-scale scores overall were good due to the large tract of remnant habitat present throughout the Hamilton Park property. Species stocking rates for remnant REs were high due to the presence of Squatter Pigeon detected in adjacent habitats, while species stocking rates for regrowth REs were low. Limited targeted surveys however have taken place within these regrowth areas for Squatter Pigeons to date and this has potentially resulted in the low stocking rates recorded. With records within adjacent remnant areas, it is likely these regrowth areas may be utilised by Squatter Pigeons currently or will be in the future when the area provides suitable foraging groundcovers. The regrowth areas will be managed appropriately under the OAMP with weed control measures one of the main management measures implemented to control exotic invasive weed cover and promote the recruitment of native grasses and forb species that the Squatter Pigeon relies on for foraging.

3.4 OFFSET ASSESSMENT GUIDE RESULTS

The results of the habitat quality assessments informed the completion of the *EPBC Act Offset Assessment Guide*. Inputs for the guide are provided in Table 4 with justification of why the values were chosen.

3.4.1 Koala

The Offsets Assessment Guide outputs (provided in Appendix C) indicated that the 1,254ha of remnant REs and 416ha of regrowth REs at Hamilton Park would acquit 104.3% of the required offsets for the SWC MRA2C Project Stage 2 impacts to Koala habitat. The offset habitat scored a rounded habitat quality 7 for remnant areas and 4 for regrowth areas, which are projected to increase in quality to a score of 8 and 7 respectively throughout the life of the offset.

Table 4 Offset Assessment Guide inputs and results for Koala habitat offsets

	INPUTS		
Attributes	**Remnant**	**Regrowth**	**Justification**
Impact area (ha)	670.9		The SWC MRA2C Project will result in a direct impact to 670.9ha of Koala habitat. Offset requirements are defined in the Variation of Conditions attached to Approval (EPBC 2017/7957) dated 6 August 2021. Offsets for Stage 1 impacts have been approved on the Clive and Brigalow properties. These account for 23.99% of total

	INPUTS		
Attributes	**Remnant**	**Regrowth**	**Justification**
			impacts to Koala habitat. The offsets proposed at Hamilton Park will account for the remaining 76.01% of impacts from Stage 2 of the SWC MRA2C Project.
Quality of impact area	6		An assessment of the habitat quality of the impact area at MRA2C was undertaken by Eco Logical Australia in 2018 and recalculated by Trend, resulting in an average habitat quality score of 6 in both instances.
Quality of offset area	7	4	An assessment of the site condition, site context and species stocking rates in the proposed offset site was undertaken and an average habitat quality score of 7 for remnant and 4 for regrowth areas determined.
Future quality without offset management	6	3	A drop in likely condition of the offset area would be expected in the absence of any management. Without active management it is likely that weed encroachment will further increase, and overall recruitment of woody tree species would continue to decline.
Future quality with offset management	8	7	The offset area will be improved through a range of ecological restoration works including weed control which can improve native seedling recruitment and regeneration of degraded areas. It was calculated that a reduction in non-native plant cover, an increase in recruitment, and an increase in native grass and forb species richness and cover would result in an increase to a habit quality score of 8 in remnant areas and 7 in regrowth areas, over a 20-year period.
Confidence in result – future quality	90%	90%	A high degree of confidence in conservation outcomes is achieved through active management of weed species in the ground layer which will have flow on effects on native seedling recruitment.
Risk of loss without offset	0%	0%	While the vegetated areas on Hamilton Park property may degrade over time without the offset they are unlikely to be lost.
Risk of loss with offset	0%	0%	The risk of losing the habitat if under an offset agreement is unlikely. The offset area will be legally secured with the proponent bound by the Offset Agreement as well as the Commonwealth approval, which ensures active management in perpetuity. Also clearing activities will be prohibited and grazing managed further reducing the risk of loss.
Confidence in result – risk of loss	90%	90%	A high degree of confidence in a low risk of loss is the result of the security provided by the proposed agreement between the proponent and the Minister of the Environment.
Time over with loss is averted (years)	20	20	The maximum time of 20 years was chosen, as the impact consists of the removal of Koala habitat in perpetuity at the impact site, due to the impacted area being used for mining. Therefore, the risk to habitat will remain greater than 20 years.
Time until ecological benefit (years)	10	20	Conservation gains will be achieved over both the short and long term. With respect to remnant areas, an ecological benefit is expected to be seen within 10 years. The majority and the most significant gains are expected in the first two years of active management via the removal of weeds and reduction in threats to the species, which in the longer term will result in an increase in native groundcovers and recruitment of canopy species. For regrowth areas however an ecological benefit is expected to take longer, up to 20 years due to the time for new canopy recruits to grow and fill in gaps in the canopy. These trees will also take time to become large to be suitable as shelter trees for the Koala.

RESULTS					
Offset area (ha)	Remnant	1,254ha	**Percent acquittal (Stage 2)**	Remnant	49.77%
	Regrowth	416ha		Regrowth	29.31%
				TOTAL (Stage 2)	**79.08%**

3.4.2 Greater Glider

The Offsets Assessment Guide outputs (provided in Appendix C) indicated that the 338ha of regrowth REs at Hamilton Park would acquit 123.59% of the required offsets for the SWC MRA2C Project Stage 2 impacts to Greater Glider habitat. The offset habitat scored a rounded habitat quality 3 for regrowth areas, which is projected to increase in quality to a score of 6 throughout the life of the offset.

Table 5 Offset Assessment Guide inputs and results for Greater Glider habitat offsets

	INPUTS	
Attributes	**Regrowth**	**Justification**
Impact area (ha)	151	The SWC MRA2C Project will result in a direct impact to 151ha of Greater Glider habitat. Offset requirements are defined in the Variation of Conditions attached to Approval (EPBC 2017/7957), dated 6 August 2021. Offsets for Stage 1 impacts have been approved on the Clive and Brigalow properties. These account for 44.99% of total impacts to Greater Glider habitat. The offsets proposed at Hamilton Park will account for the remaining 76.01% of impacts from Stage 2 of the SWC MRA2C Project.
Quality of impact area	7	An assessment of the habitat quality of the impact area was undertaken by Eco Logical Australia in 2018 and recalculated by Trend, resulting in an average habitat quality score of 7 in both instances.
Quality of offset area	3	Assessment of site condition, context and species stocking rates in the proposed offset site was undertaken and an average habitat quality score of 3 for regrowth areas determined.
Future quality without offset management	3	Regrowth areas are unlikely to decline to the extent of a drop in quality with current regenerating trees expected to increase in size and cover overtime
Future quality with offset management	6	The offset area will be improved through a range of ecological restoration works including weed control which will improve native seedling recruitment . As such it was calculated that a reduction in non-native plant cover, an increase in native seedling recruitment, and an increase in native grass and forb species richness and cover would result in an increase to a habit quality score of 6 over a 20-year period. Note, while proposed offsets for Greater Glider habitat are provided for within the 338ha of regrowth RE11.5.9, additional remnant and regrowth habitat for Greater Glider is being offset under the proposed Koala habitat offset areas. This provides an additional 1,254ha of remnant habitat (proposed to be increased to a score of 8) and 78ha of regrowth habitat (proposed to be increased to a 7) for the Greater Glider protected on the Hamilton Park property.
Confidence in result – future quality	90%	A high degree of confidence in conservation outcomes is achieved through active management of weed species which will have flow on effects on native seedling recruitment.
Risk of loss without offset	0%	While the vegetated areas may decline over time without the offset they are unlikely to be lost.
Risk of loss with offset	0%	The risk of losing the habitat if under an offset agreement is negligible. The offset area will be legally secured with the proponent bound by the Offset Agreement as well as the Commonwealth approval, which ensures active management in perpetuity. Also clearing activities will be prohibited and grazing managed.
Confidence in result – risk of loss	90%	A high degree of confidence in a low risk of loss is a result of the security provided by the proposed agreement between the proponent and the Minister of the Environment.
Time over with loss is averted (years)	20	The maximum time of 20 years was chosen, as the impact site consists of the removal of Greater Glider habitat in perpetuity, due to the impacted area being used for mining, therefore the risk to habitat will remain greater than 20 years.
Time until ecological benefit (years)	20	Conservation gains will be achieved over both the short and long term. For regrowth areas, an ecological benefit is expected to take up to 20 years due to the time for new canopy recruits to grow and fill in gaps. These trees will also take time to become large and be suitable as foraging for the Greater Glider. It will take much longer than 20 years in order for suitable den hollows to form, however nest boxes will be provided as an artificial substitute for denning habitat in the interim.
RESULTS	**Offset area (ha)** Regrowth 338ha	**Percent acquittal (Stage 2)** Regrowth 68.01%
		TOTAL (Stage 2) 68.01%

3.4.3 Squatter Pigeon

The Offsets Assessment Guide outputs (provided in Appendix C) indicated that the 906ha of remnant REs and 390ha of regrowth REs at Hamilton Park would acquit 100.01% of the required offsets for the SWC MRA2C Project Stage 1 and 2 impacts to Squatter Pigeon habitat. The offset habitat scored a rounded habitat quality 7 for remnant areas and 4 for regrowth areas, which are projected to increase in quality to a score of 8 and 7 respectively throughout the life of the offset.

Table 6 Offset Assessment Guide inputs and results for Squatter Pigeon habitat offsets

	INPUTS		
Attributes	**Remnant**	**Regrowth**	**Justification**
Impact area (ha)	301.8		The SWC MRA2C Project will result in a direct impact to 301.8ha of Stage 1 and 2 Squatter Pigeon habitat. Offset requirements are defined in the Variation of Conditions attached to Approval (EPBC 2017/7957), dated 6 August 2021.
Quality of impact area	6		An assessment of the habitat quality of the impact area at MRA2C was undertaken by Eco Logical Australia in 2018 and recalculated by Trend. Eco Logical's scoring was 7 (as per approval EPBC 2017/7957), while the recalculated score was 6.
Quality of offset area	7	4	An assessment of the site condition, site context and species stocking rates in the proposed offset site was undertaken and an average habitat quality score of 7 for remnant and 4 for regrowth areas determined.
Future quality without offset management	7	4	Areas are unlikely to decline to the extent of a drop in quality with the presence of weed species being the determining factor for degradation of Squatter Pigeon foraging habitat. Weed invasion throughout the Hamilton Park property is already extensive, hence is unlikely to increase dramatically causing a further decline in quality over time.
Future quality with offset management	8	7	The offset area will be improved through a range of ecological restoration works including weed control which would improve native seedling recruitment; and regeneration of degraded areas. As such it has been calculated that a reduction in non-native plant cover, an increase in native seedling recruitment, and an increase in native grass and forb species richness and cover would result in an increase to a habit quality score of 8 in remnant areas and 7 in regrowth areas, over a 20-year period.
Confidence in result – future quality	90%	90%	A high degree of confidence in conservation outcomes is achieved through active management of weed species in the ground layer which will have flow on effects on seedling recruitment.
Risk of loss without offset	0%	0%	While the vegetated areas on Hamilton Park property may degrade over time without the offset they are unlikely to be lost.
Risk of loss with offset	0%	0%	The risk of losing the habitat if under an offset agreement is negligible. The offset area will be legally secured with the proponent bound by the Offset Agreement as well as the Commonwealth approval, which ensures active management in perpetuity. Also clearing activities will be prohibited and grazing managed.
Confidence in result – risk of loss	90%	90%	A high degree of confidence in a low risk of loss is a result of the security provided by the proposed agreement between the proponent and the Minister of the Environment.
Time over with loss is averted (years)	20	20	The maximum time of 20 years was chosen, as the impact consists of the removal of Squatter Pigeon habitat in perpetuity, due to the impacted area being used for mining, therefore the risk to habitat will remain greater than 20 years.
Time until ecological benefit (years)	10	20	Conservation gains will be achieved over both the short and long term. With respect to remnant areas, an ecological benefit is expected to be seen within 10 years. The majority, and the most significant gains are expected in the first two years of active management via the removal of weeds and reduction in threats to the species, which in the longer term will result in an increase in native groundcovers and recruitment of canopy species. For regrowth areas however an ecological benefit is expected to take longer, up to 20 years due to the time for new canopy recruits to grow and fill in gaps.

RESULTS	**Offset area (ha)**	Remnant	906ha	**Percent acquittal (Stage 1 and 2)**	Remnant	44.14%
		Regrowth	390ha		Regrowth	55.87%
					TOTAL (Stage 1 and 2)	**100.01%**

CONCLUSIONS AND RECOMMENDATIONS

Surveys of the Hamilton Park property identified the prevalence of Koala, Greater Glider and Squatter Pigeon habitat. Within the property, it was confirmed that 3,564ha of Koala habitat, 3,525ha of Greater Glider habitat and 3,345ha of Squatter Pigeon habitat occurred, most of which was connected habitat throughout the property. As such, the Hamilton Park property is considered suitable to provide offsets for the SWC MRA2C impacts to these offset matters.

The Offsets Assessment Guide calculated the following offset areas were required to acquit the balance of impacts from the SWC MRA2C Project:

- 1,254ha of remnant REs and 416ha of regrowth REs for Koala habitat offsets (acquits 104.03% of Stage 2 impacts)
- 338ha of regrowth REs forming Greater Glider habitat offsets (acquits 113% of Stage 2 impacts)
- 906ha of remnant REs and 390ha of regrowth REs forming Squatter Pigeon habitat offsets (acquits 100.01% of Stage 1 and 2 impacts).

These offset areas have been co-located where possible (Map 6, Appendix A) and have been chosen on the eastern side of Denison Creek, away from most operational areas of the proerty (i.e., operational bores for the Braeside Borefield).

Within the chosen offset area, Stanmore will manage historical and current threatening processes, which include cattle grazing and non-native plant presence, to improve the condition of the habitat and recruitment of native groundcover and canopy cover species. Nest boxes will also be required in regrowth offset areas for the Greater Glider to provide arteficial denning habitat until such time that large trees can form natural hollows for the species.

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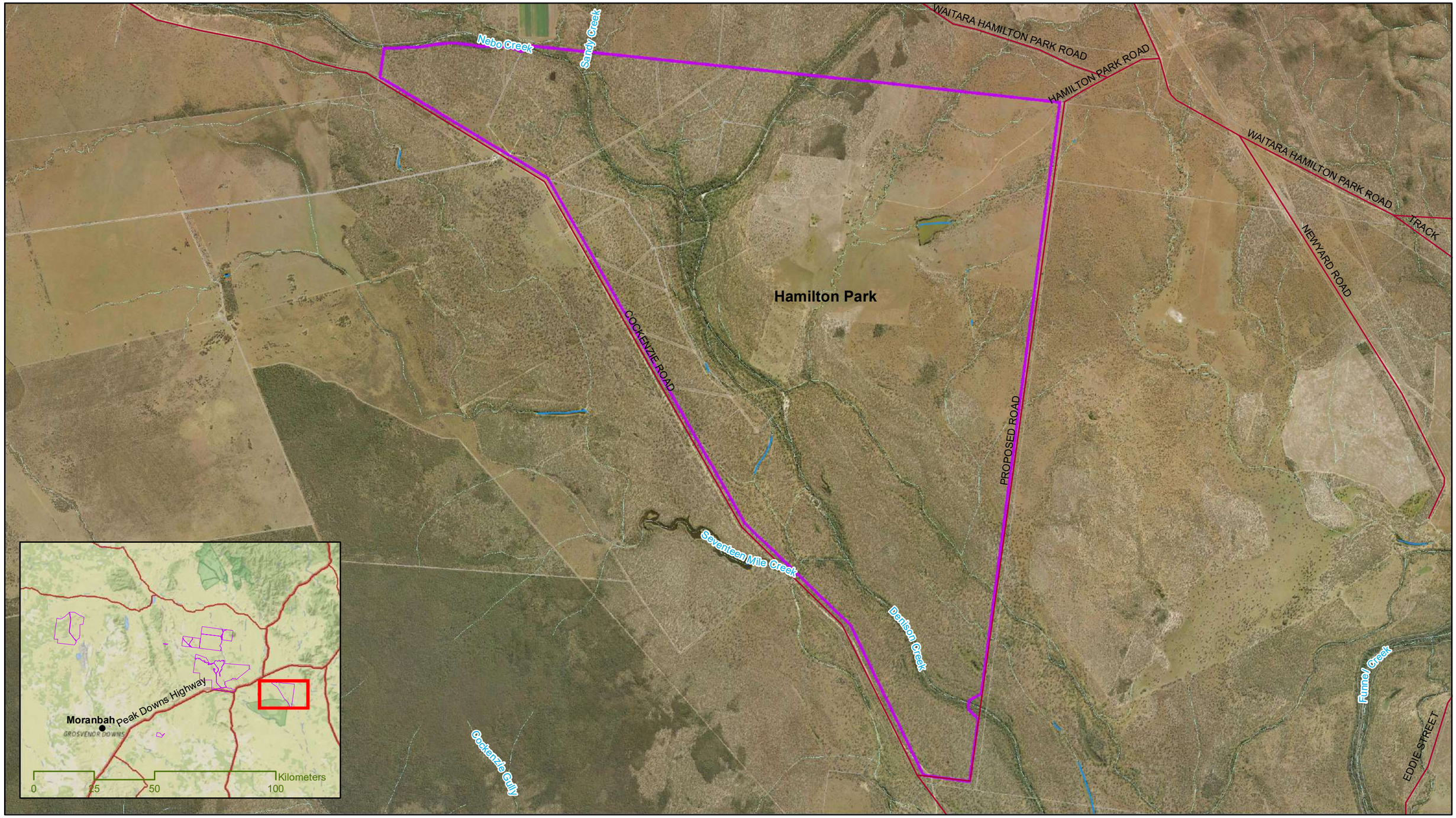
APPENDIX

A

MAPS

LOCATION MAP



Legend

- Towns
- Roads
- Property Boundaries
- Stanmore Holdings
- Mining Lease Areas
- Perennial
- Non Perennial

N

0 500 1,000 2,000
Metres

Scale: 1:50,000 at A3

Coordinate System: GDA2020 MGA Zone 55

BHP EPBC APPROVALS AND OFFSET AREAS
HAMILTON PARK
LOCATION

Source:
Roads from IQ_QLD_ROAD_BASELINES© State of Queensland (Department of Resources) 2022
Cadastral Boundaries and BHP Holdings from QLD_CADASTRE_DCDB© State of Queensland (Department of Resources) 2022
Vegetation_management_watercourse_and_drainage_feature_map_100K© State of Queensland (Department of Resources) 2022
Mining Lease areas from Mining_lease_surface_areas.shp © State of Queensland (Department of Resources) 2022

Prepared for Trend Environmental Consultants

Trend Environmental Consultants

ecoSpatial

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Version: 1.0
Date Edited: 16/11/2022 Edited by: MG

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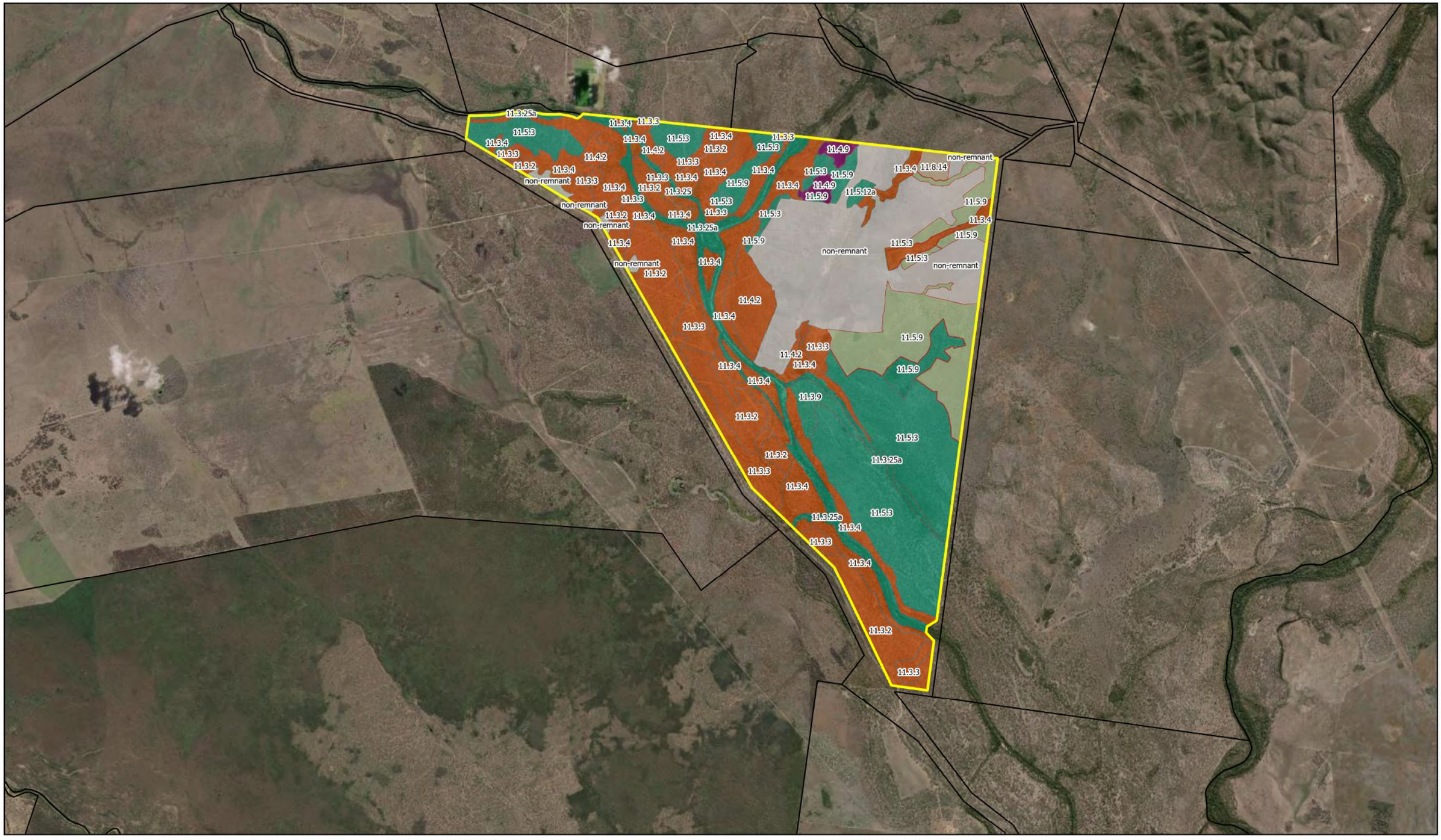
REGIONAL ECOSYTEMS MAP SERIES



Legend

- Land parcel
- Stanmore Holdings

GTRE (v3.0)

Vegetation Category

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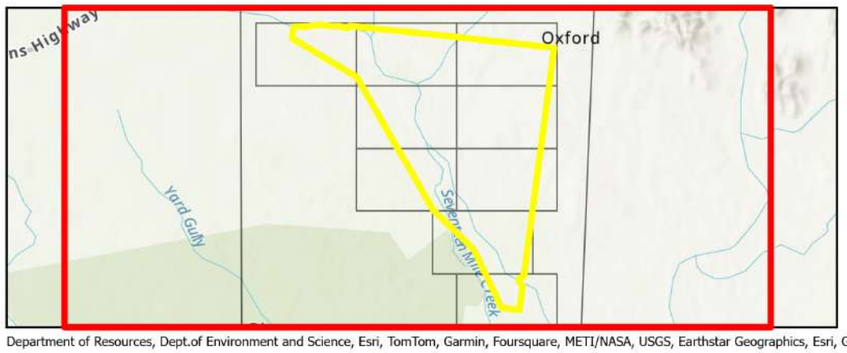
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing of concern
- Category C or R that is of least concern
- non-remnant



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Earthstar Geographics, Esri, Geoscience Australia, NASA,

HAMILTON PARK OFFSETS GROUND-TRUTHED REGIONAL ECOSYSTEM MAP

Trend Environmental Consultants

0 0.30.5
Kilometers

Scale: 1:65,000

N

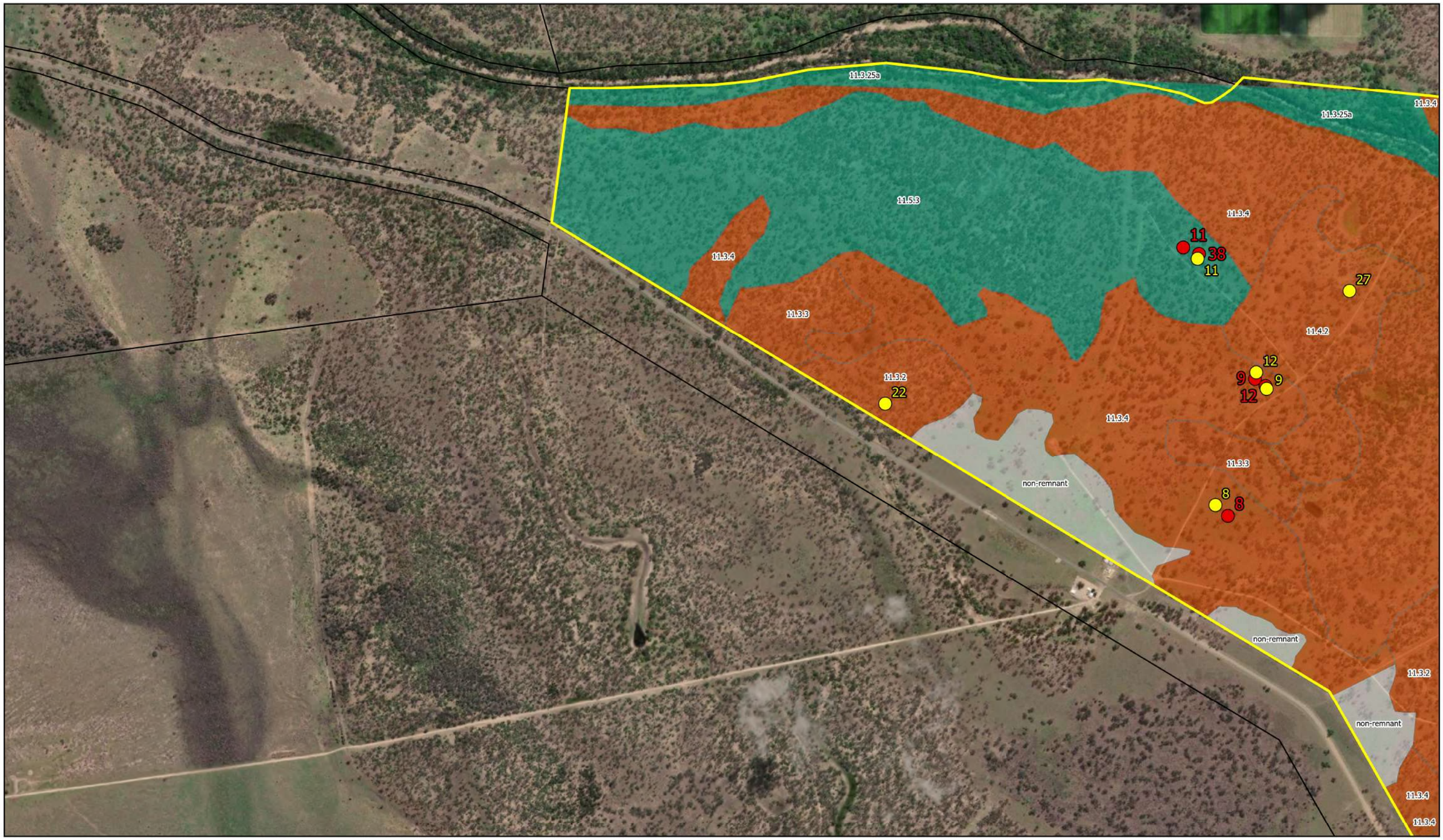
ABN 43 622 414 046
94 Kennedy Esplanade South Mission Beach, QLD 4852

Prepared: MG
Checked: EK

Date: 30 Jan 2024

Coordinate System: GDA 1994 MGA Zone 55

Data presented is for information only, and is not to be used for navigation.
No liability is accepted for use outside of the intended purpose.



Legend

- Land parcel
- Stanmore Holdings
- Survey Sites
- BioConditioning Sites

GTRE (v3.0)

Vegetation Category

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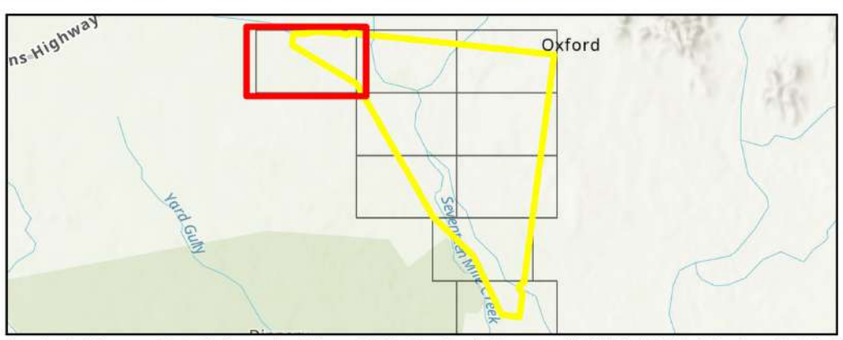
- Category A or B that is of least concern
- non-remnant



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Esri, Geoscience Australia, NASA, NGA, USGS, Maxar

HAMILTON PARK OFFSETS GROUND-TRUTHED REGIONAL ECOSYSTEM MAP

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Scale: 1:11,000

Trend Environmental Consultants

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94 Kennedy Esplanade South Mission Beach, QLD 4852

Prepared: MG
Checked: EK

Date: 30 Jan 2024

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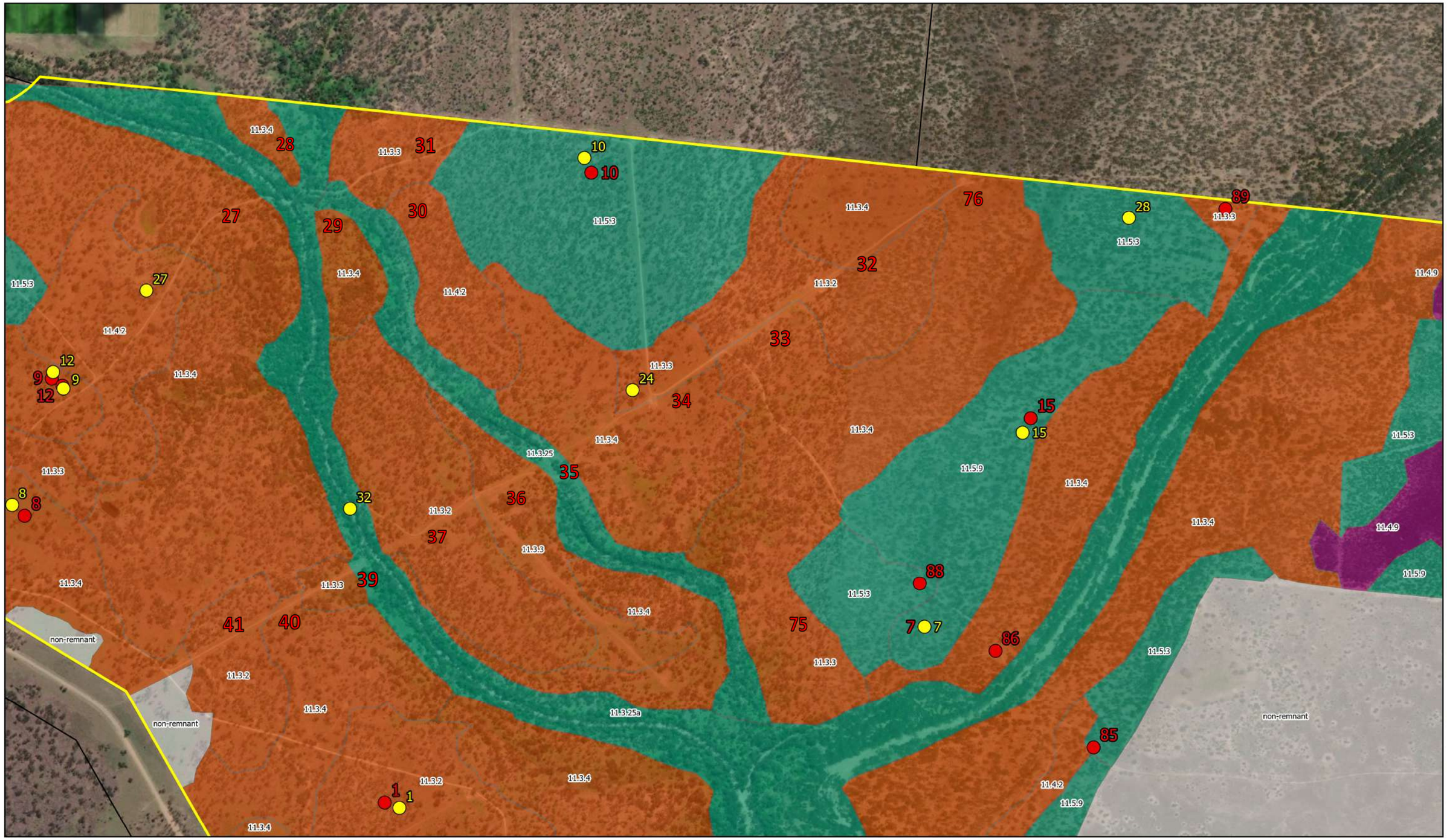

Legend

- Land parcel
- Stanmore Holdings
- Survey Sites
- BioConditioning Sites

GTRE (v3.0)

Vegetation Category

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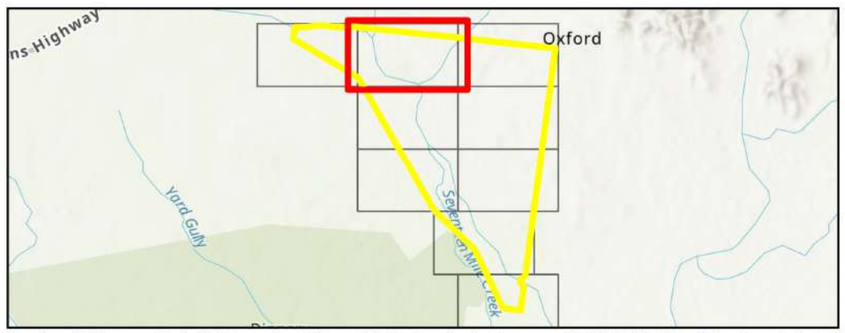
- Category A or B containing of concern
- Category A or B that is of least concern
- non-remnant



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Esri, Geoscience Australia, NASA, NGA, USGS, Maxar

HAMILTON PARK OFFSETS GROUND-TRUTHED REGIONAL ECOSYSTEM MAP

0 0.3 0.5 Kilometers

N

Scale: 1:11,000

Trend Environmental Consultants

ABN 43 622 414 046
94 Kennedy Esplanade South Mission Beach, QLD 4852

Prepared: MG
Checked: EK

Date: 30 Jan 2024

Coordinate System: GDA 1994 MGA Zone 55

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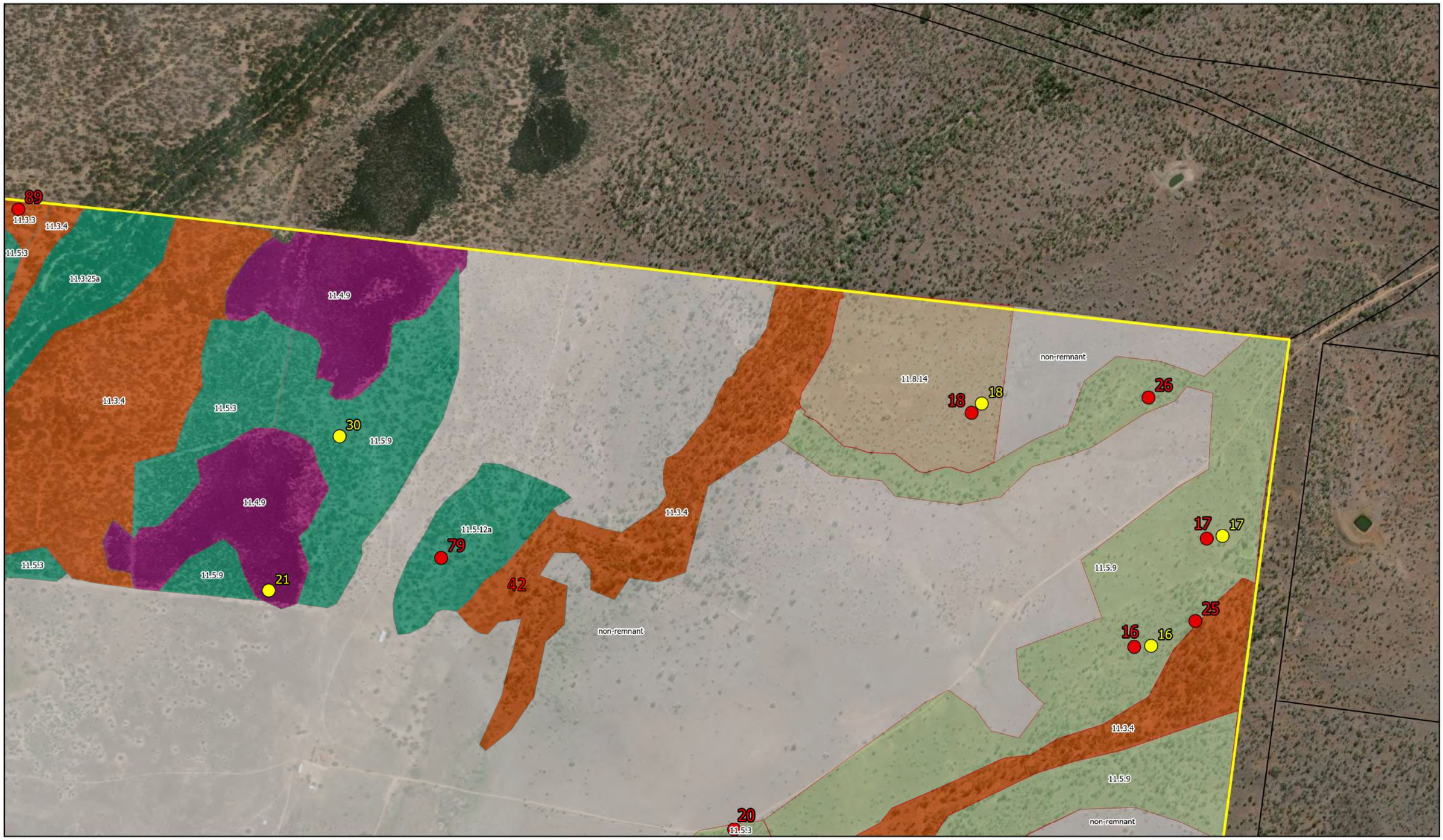


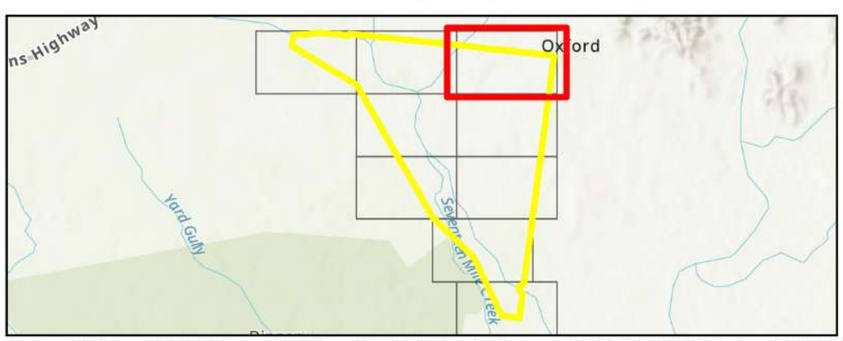
Legend

- Land parcel
- Stanmore Holdings
- Survey Sites
- BioConditioning Sites

GTRE (v3.0)

Vegetation Category

- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing of concern
- Category C or R that is of least concern
- non-remnant



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Esri, Geoscience Australia, NASA, NGA, USGS, Maxar

HAMILTON PARK OFFSETS GROUND-TRUTHED REGIONAL ECOSYSTEM MAP

0 0.3 0.5 N
Kilometers

Scale: 1:11,000

Trend Environmental Consultants

ABN 43 622 414 046
94 Kennedy Esplanade South Mission Beach, QLD 4852

Prepared: MG
Checked: EK

Date: 30 Jan 2024

Coordinate System: GDA 1994 MGA Zone 55

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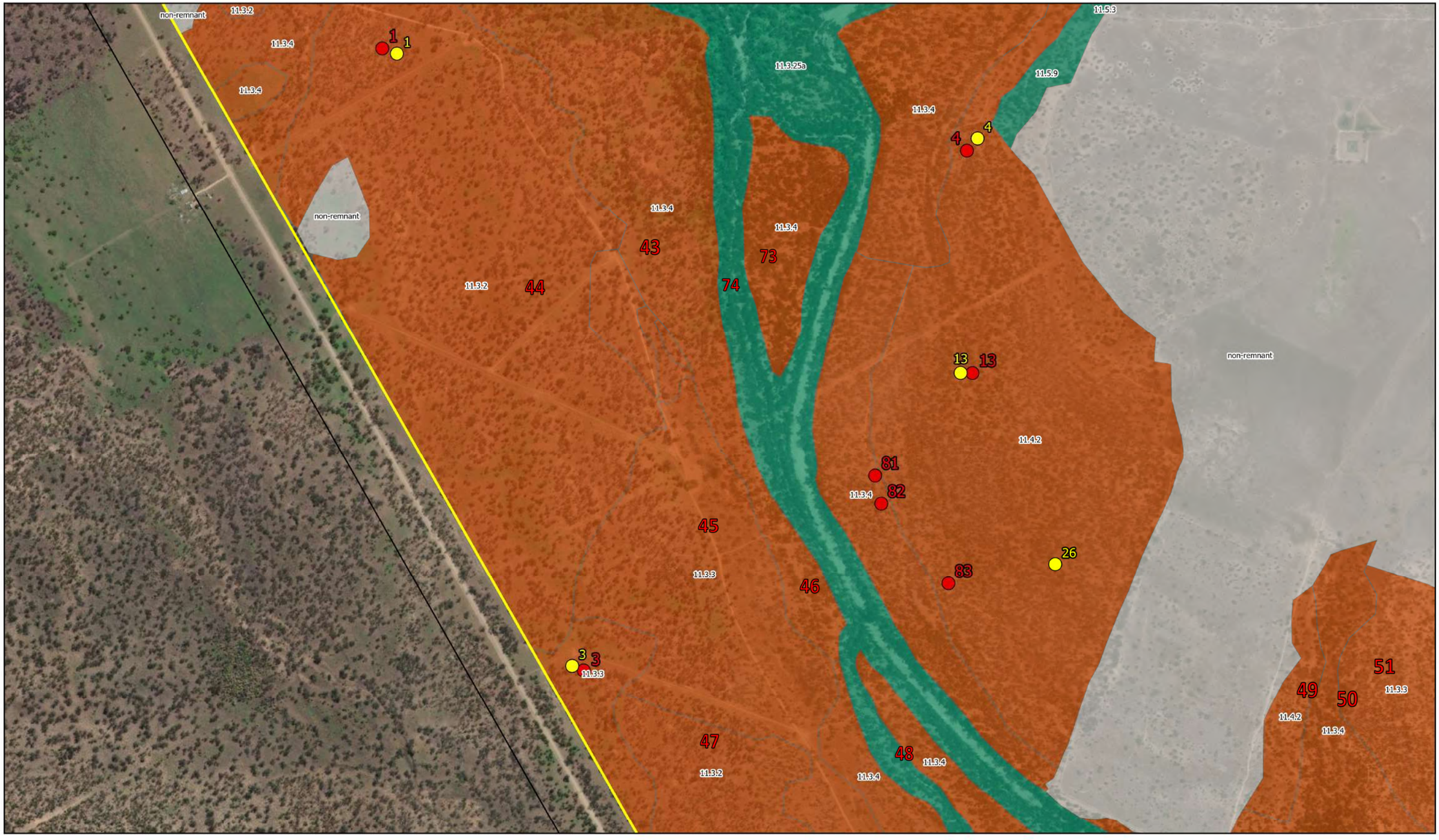


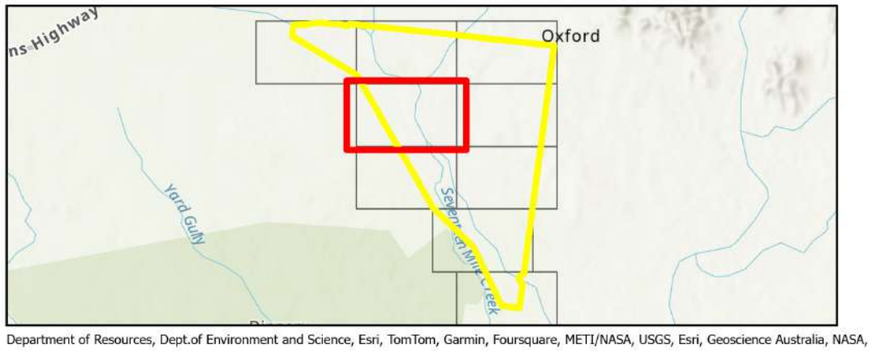
Legend

- Land parcel
- Stanmore Holdings
- Survey Sites
- BioConditioning Sites

GTRE (v3.0)

Vegetation Category

- Category A or B containing of concern
- Category A or B that is of least concern
- non-remnant



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Esri, Geoscience Australia, NASA, NGA, USGS, Maxar

HAMILTON PARK OFFSETS GROUND-TRUTHED REGIONAL ECOSYSTEM MAP

0 0.3 0.5 Kilometers

N

Scale: 1:11,000

Trend Environmental Consultants

ABN 43 622 414 046
94 Kennedy Esplanade South Mission Beach, QLD 4852

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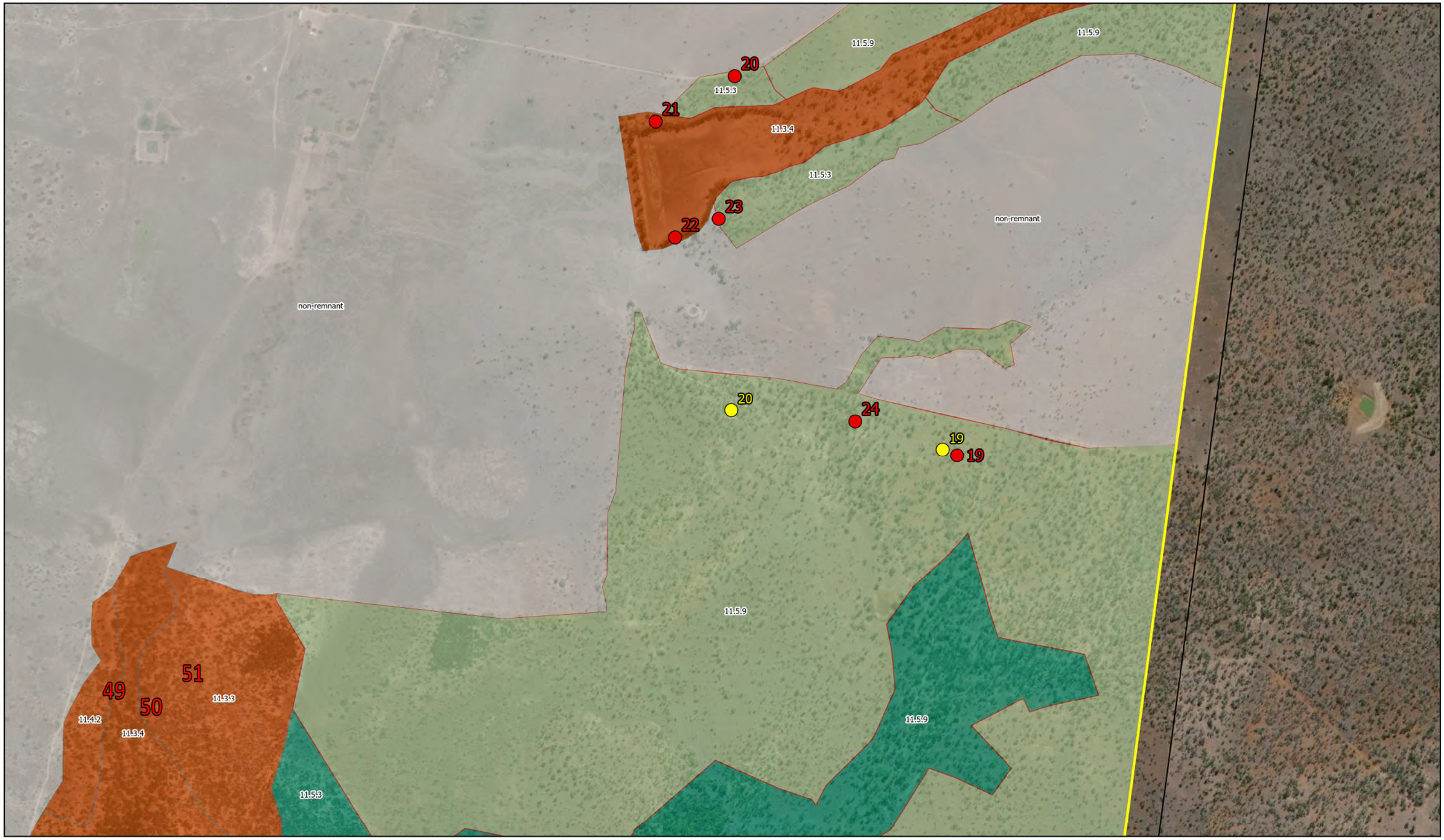

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- Survey Sites
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GTRE (v3.0)

Vegetation Category

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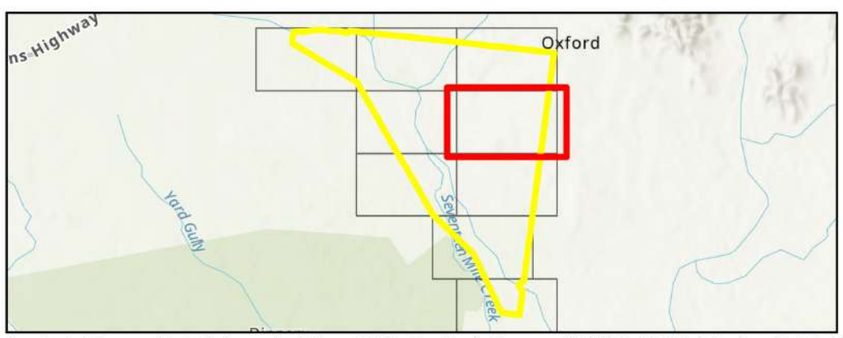
- Category A or B that is of least concern
- Category C or R that is of least concern
- non-remnant



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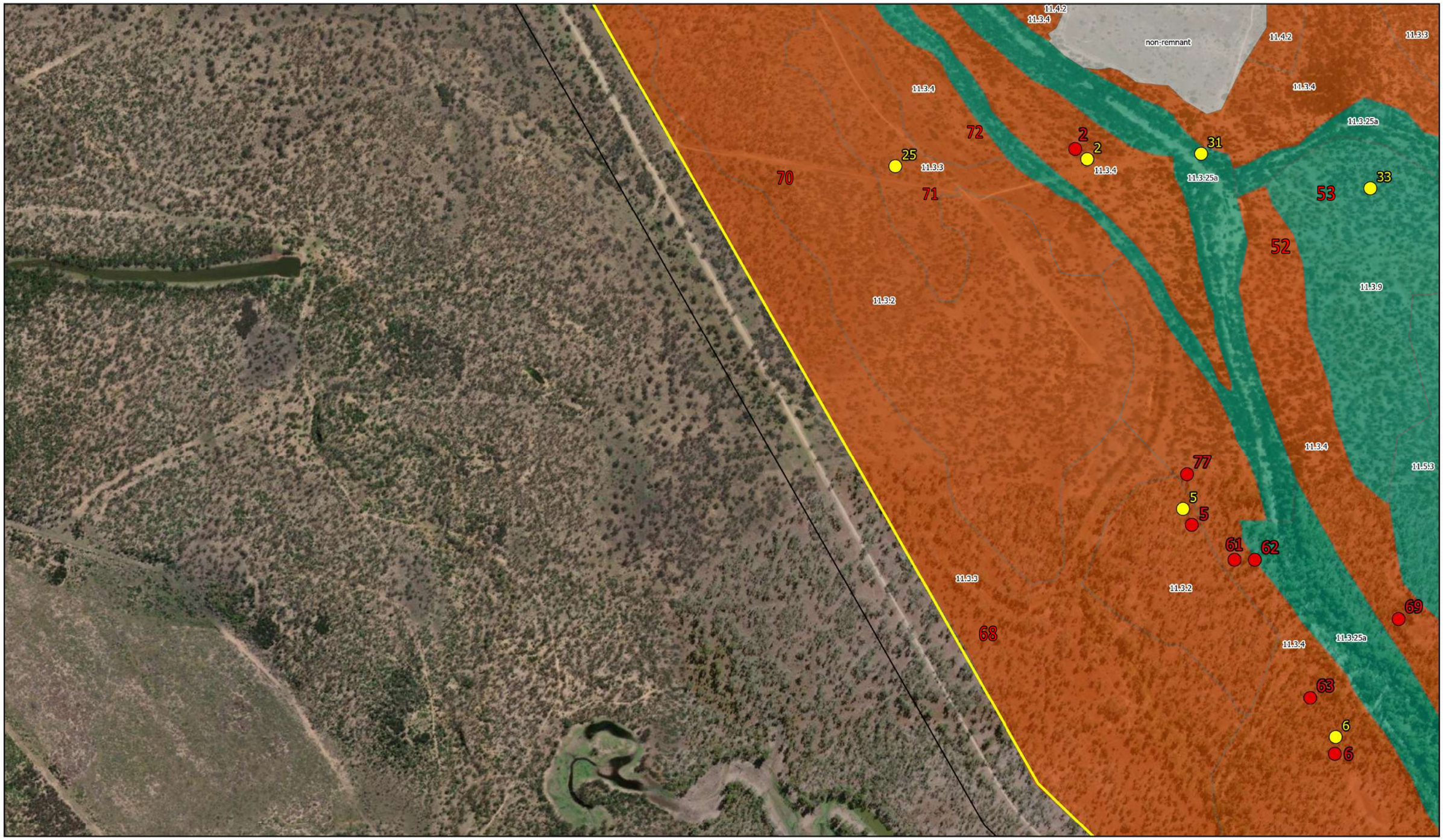

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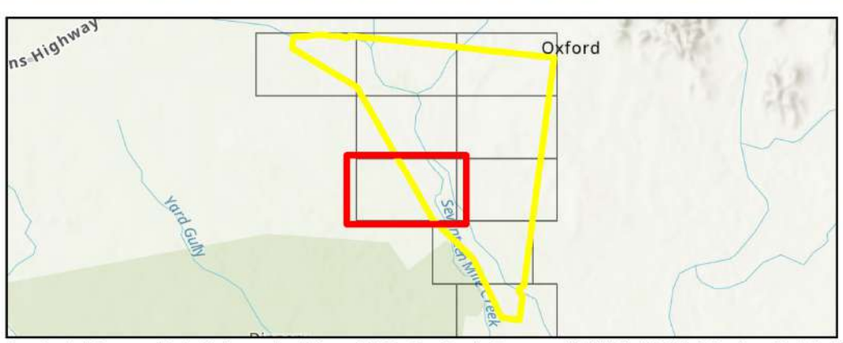

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non-remnant
11.4.2
11.3.3
11.3.4
11.5.9
11.5.9
33
11.3.25a
11.3.9
11.3.4
11.3.25a
11.5.3
11.3.4
61
62
55
54
69
11.5.3
11.3.2
11.3.25a
63
11.3.3
11.3.4
6
6
14
14

Legend

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- Stanmore Holdings
- Survey Sites
- BioConditioning Sites

GTRE (v3.0)

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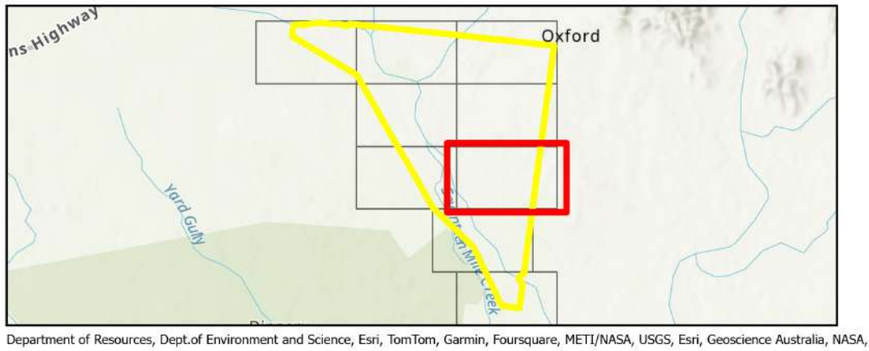
- Category A or B that is of least concern
- Category C or R that is of least concern
- non-remnant



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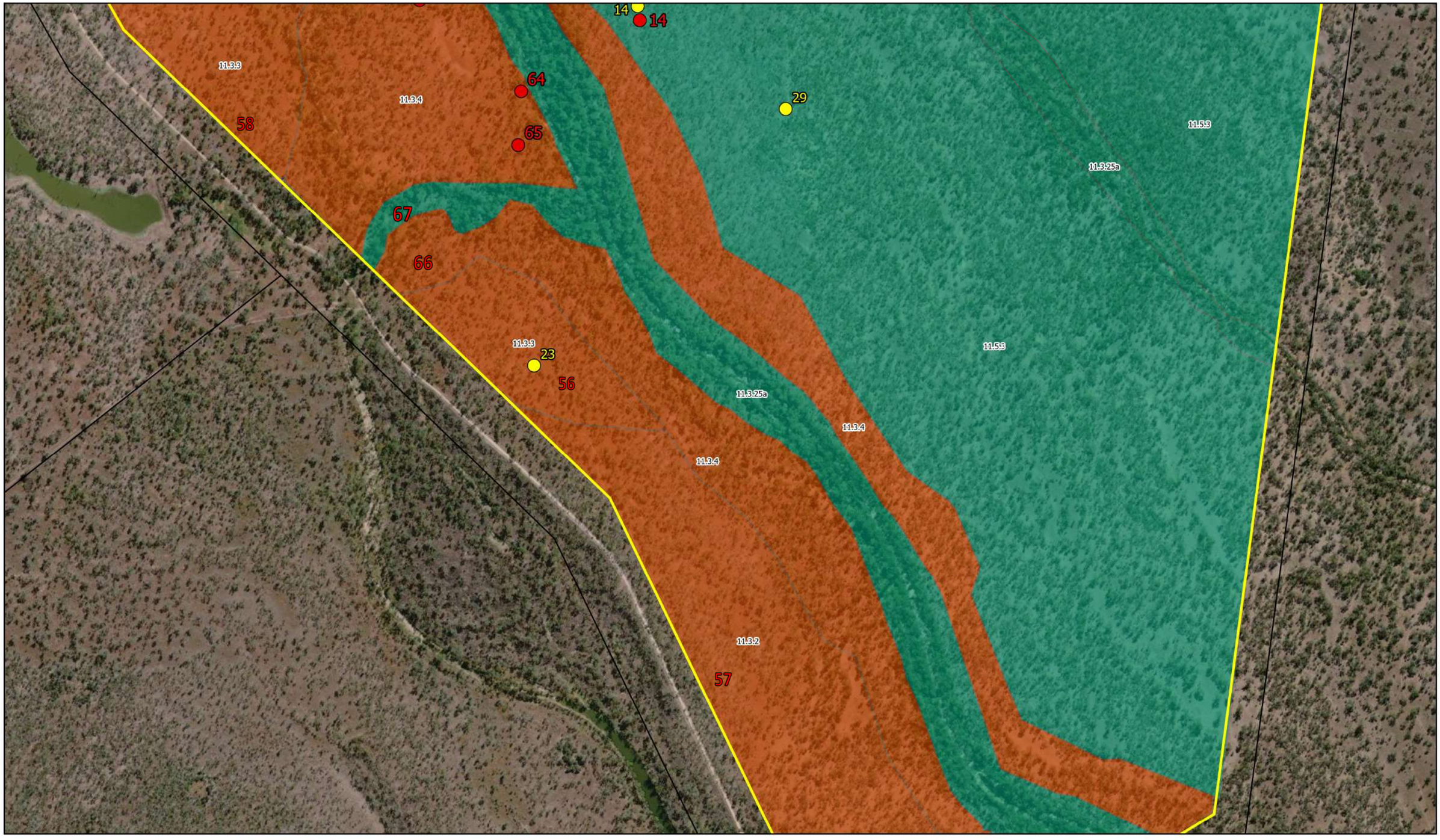

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GTRE (v3.0)

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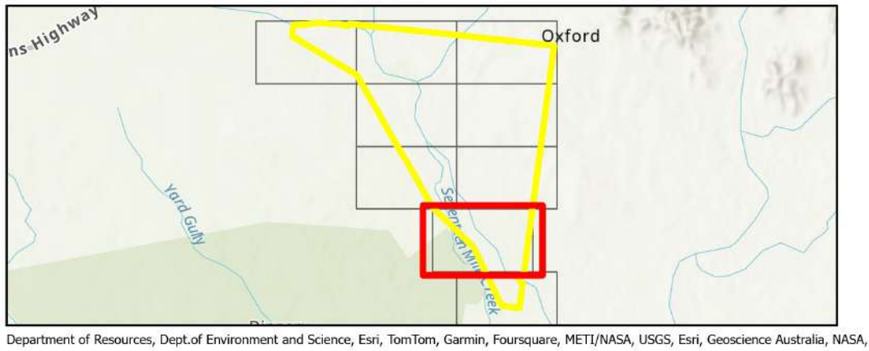

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11.5.3
11.3.4
11.3.25a
11.3.4
11.3.2
11.3.3
59
60

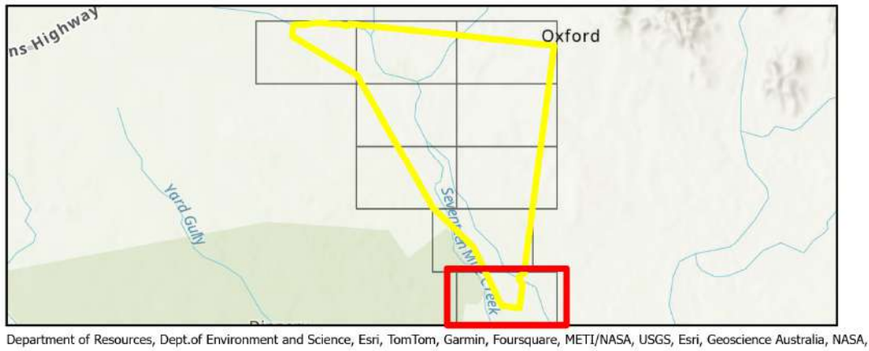
Legend

- Land parcel
- Stanmore Holdings
- Survey Sites
- BioConditioning Sites

GTRE (v3.0)

Vegetation Category

- Category A or B containing of concern
- Category A or B that is of least concern



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HAMILTON PARK OFFSETS GROUND-TRUTHED REGIONAL ECOSYSTEM MAP

Trend Environmental Consultants

0 0.3 0.5 Kilometers N

Scale: 1:11,000

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KOALA OFFSETS MAP

148°40'30" 148°41' 148°41'30" 148°42' 148°42'30" 148°43' 148°43'30" 148°44' 148°44'30" 148°45' 148°45'30" 148°46' 148°46'30" 148°47' 148°47'30" 148°48' 148°48'30" 148°49' 148°49'30" 148°50' 148°50'30" 148°51'

-21°50' -21°50'30" -21°51' -21°51'30" -21°52' -21°52'30" -21°53' -21°53'30" -21°54' -21°54'30" -21°55' -21°55'30"

V PADDOCK
Nebo Creek
TOP END
HORSE
SWAMP
SORGHUM
AERODROME
BULL
TURKEYS NEST
BACK IRRIGATION
IRRIGATION
BOTTOM DRY
BOTTOM END
Denison Creek
Dipperu National Park (scientific)

11.3.4 11.4.2 11.5.3 11.5.9 11.5.12a 11.8.14 11.3.3 11.3.9

Legend

- Land parcel
- Stanmore Holdings
- Braeside Paddocks
- ML permit granted
- Black Ironbox Offset Extent (61.2 ha) (pending DCCEEW approval)
- Connectivity area (13 ha)
- Koala habitat (416 ha HVR, 1254 ha Remnant)

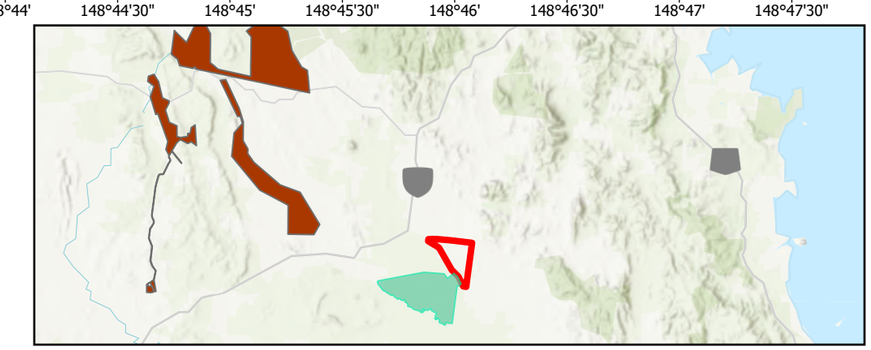
Offset Area Records

Species
- Koala
- Koala scratches

Other Species Records
- Koala

Ground Truthed Regional Ecosystems

Vegetation Category
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing of concern
- Category C or R that is of least concern



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, CGIAR, Maxar

MRA2C EPBC Act Offsets - Koala
Offset areas on the Hamilton Park property

Trend Environmental Consultants

0 1 2 Kilometers

N

Scale: 1:47,000

Prepared: MG
Checked: EK

Date: 26 Mar 2024

Coordinate System: GDA 1994 MGA Zone 55

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GREATER GLIDER OFFSETS MAP

148°40'30" 148°41' 148°41'30" 148°42' 148°42'30" 148°43' 148°43'30" 148°44' 148°44'30" 148°45' 148°45'30" 148°46' 148°46'30" 148°47' 148°47'30" 148°48' 148°48'30" 148°49' 148°49'30" 148°50' 148°50'30" 148°51'

-21°50' -21°50'30" -21°51' -21°51'30" -21°52' -21°52'30" -21°53' -21°53'30" -21°54' -21°54'30" -21°55' -21°55'30"

V PADDOCK
Nebo Creek
AERODROME
BULL
11.5.9
TOP END
HORSE
SWAMP
TURKEYS NEST
SORGHUM
BACK IRRIGATION
IRRIGATION
11.5.9
BOTTOM DRY
Denison Creek
BOTTOM END
Dipperu National Park (scientific)

148°40'30" 148°41' 148°41'30" 148°42' 148°42'30" 148°43' 148°43'30" 148°44' 148°44'30" 148°45' 148°45'30" 148°46' 148°46'30" 148°47' 148°47'30" 148°48' 148°48'30" 148°49' 148°49'30" 148°50' 148°50'30" 148°51'

Legend

- Land parcel
- Stanmore Holdings
- Braeside Paddocks
- ML permit granted
- Black Ironbox Offset Extent (61.2 ha) (pending DCCEEW approval)
- Connectivity area (13 ha)
- Greater Glider habitat (338 ha HVR)

Offset Area Records

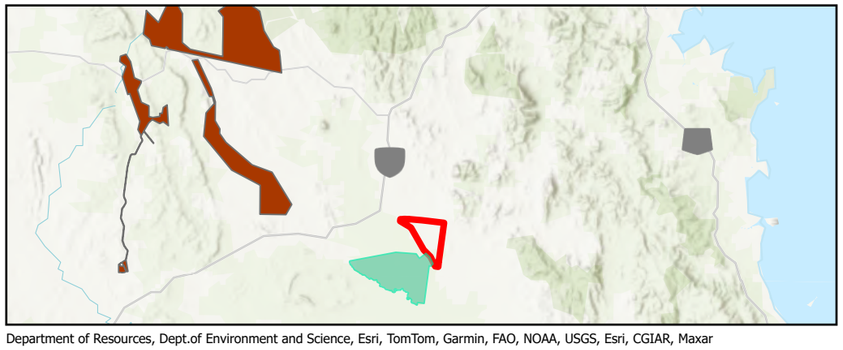
Species

- Greater Glider

Ground Truthed Regional Ecosystems

Vegetation Category

- Category C or R that is of least concern



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, CGIAR, Maxar

MRA2C EPBC Act Offsets - Greater Glider
Offset areas on the Hamilton Park property

Trend Environmental Consultants

0 1 2
Kilometers

N

Scale: 1:47,000

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94 Kennedy Esplanade South Mission Beach, QLD 4852

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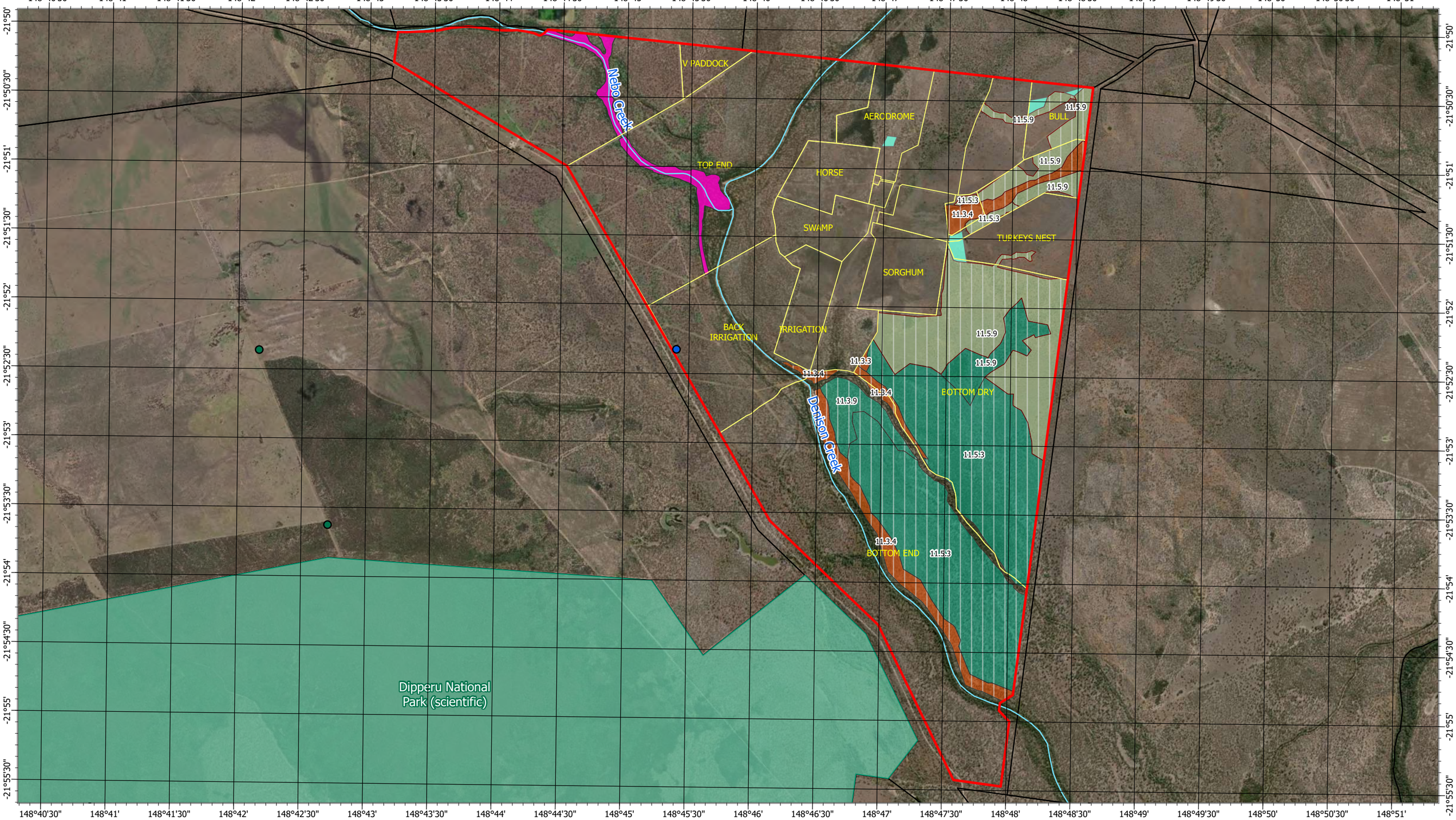
SQUATTER PIGEON OFFSETS MAP



Legend

- Land parcel
- Stanmore Holdings
- Braeside Paddocks
- ML permit granted
- Black Ironbox Offset Extent (61.2 ha) (pending DCCEEW approval)
- Connectivity area (13 ha)

Squatter Pigeon habitat

- MRA2C (390 ha HVR 906ha Remnant)

Offset Area Records

Species

- Squatter Pigeon

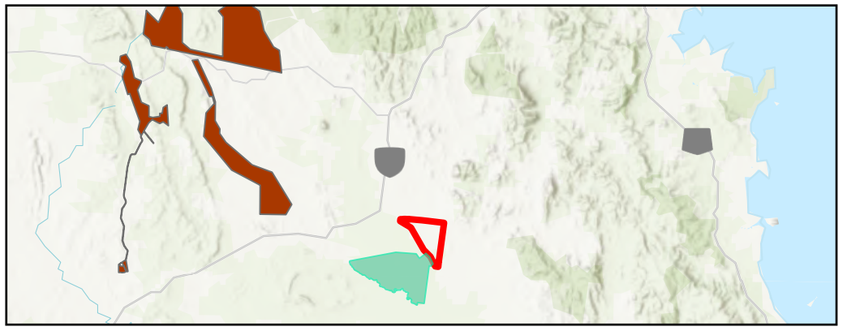
Other Species Records

- Squatter Pigeon

Ground-truthed Regional Ecosystems

Vegetation Category

- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R that is of least concern



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, CGIAR, Maxar

MRA2C EPBC Act Offsets - Squatter Pigeon Offset areas on the Hamilton Park property

Trend Environmental Consultants

0 1 2 Kilometers

N

Scale: 1:47,000

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ALL MATTERS OFFSETS MAP

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V PADDOCK
Nebo Creek
TOP END
HORSE
SWAMP
SORGHUM
AERODROME
BULL
TURKEYS NEST
BACK IRRIGATION
IRRIGATION
BOTTOM DRY
BOTTOM END
Denison Creek
Dipperu National Park (scientific)

11.3.4 11.5.3 11.5.9 11.5.12a 11.8.14 11.4.2 11.3.3 11.3.9

Legend

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- Koala habitat (416 ha HVR, 1254 ha Remnant)
- Squatter Pigeon habitat
  - MRA2C (390 ha HVR 906ha Remnant)

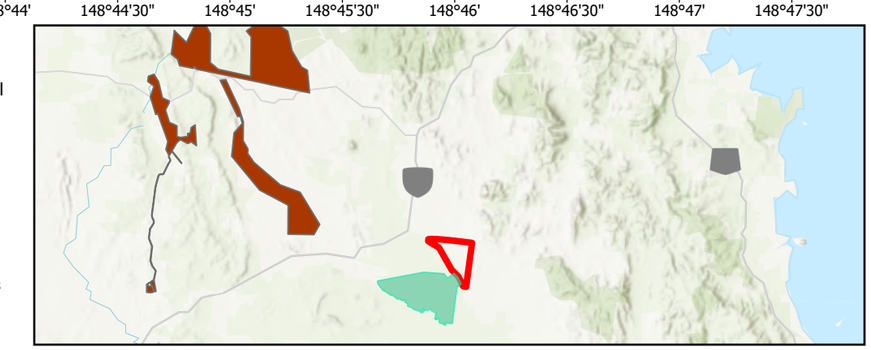
Offset Area Records

Species
- Greater Glider
- Koala
- Koala scratches
- Squatter Pigeon

Other Species Records
- Koala
- Squatter Pigeon

Ground Truthed Regional Ecosystems

Vegetation Category
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing of concern
- Category C or R that is of least concern



Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS, Earthstar Geographics, Esri, USGS

MRA2C EPBC Act Offsets
Offset areas on the Hamilton Park property

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0 1 2 Kilometers

N

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APPENDIX

B

DESKTOP DATABASE SEACH RESULTS

resources.QLD.GOV.AU

Vegetation management report

For Lot: 4 Plan: WHS354

28/03/2024

Queensland Government

Recent changes

Updated mapping

Updated vegetation mapping was released on 22 November 2023 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, essential habitat, wetland and high-value regrowth mapping.

The Department of Environment and Science have also updated their koala protection mapping to align with the Queensland Herbarium scientific updates.

The latest version (v10) of the Protected Plants Flora Survey Trigger Map (trigger map) was released on 6 September 2023.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

Property details - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s) and catchment(s);

Vegetation management framework - an explanation of the application of the framework and contact details for the Department of Resources who administer the framework;

Vegetation management framework details for the specified Lot on Plan including:

- the vegetation management categories on the property;
- the vegetation management regional ecosystems on the property;
- vegetation management watercourses or drainage features on the property;
- vegetation management wetlands on the property;
- vegetation management essential habitat on the property;
- whether any area management plans are associated with the property;
- whether the property is coastal or non-coastal; and
- whether the property is mapped as Agricultural Land Class A or B;

Protected plant framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework, including:

- high risk areas on the protected plant flora survey trigger map for the property;

Koala protection framework - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework; and

Koala protection framework details for the specified Lot on Plan including:

- the koala district the property is located in;
- koala priority areas on the property;
- core and locally refined koala habitat areas on the property;
- whether the lot is located in an identified koala broad-hectare area; and
- koala habitat regional ecosystems on the property for core koala habitat areas.

This information will assist you to determine your options for managing vegetation under:

- the vegetation management framework, which may include:

- exempt clearing work;
- accepted development vegetation clearing code;
- an area management plan;
- a development approval;

- the protected plant framework, which may include:

- the need to undertake a flora survey;
- exempt clearing;
- a protected plant clearing permit;

- the koala protection framework, which may include:

- exempted development;
- a development approval;
- the need to undertake clearing sequentially and in the presence of a koala spotter.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 8 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

Table of Contents

1. Property details

1.1 Tenure and title area

All of the lot, plan, tenure and title area information associated with property Lot: 4 Plan: WHS354, are listed in Table 1.

Table 1: Lot, plan, tenure and title area information for the property

Lot	Plan	Tenure	Property title area (sq metres)
4	WHS354	Freehold	43,859,830
B	WHS496	Easement	349,300
A	WHS496	Easement	30,880

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

Does this property have a freehold tenure and is in the Wet Tropics of Queensland World Heritage Area?

No, this property is not located in the Wet Tropics of Queensland World Heritage Area.

1.2 Property location

Table 2 provides a summary of the locations for property Lot: 4 Plan: WHS354, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)
Isaac Regional

Bioregion(s)	Subregion(s)
Brigalow Belt	Isaac - Comet Downs

Catchment(s)
Fitzroy

2. Vegetation management framework (administered by the Department of Resources)

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2023, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem identified in the Vegetation Management Regional Ecosystem Description Database (VM REDD) as having a grassland structure; and
- a mangrove.

2.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify the Department of Resources or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 4.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact the Department of Resources before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at
https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/exemptions.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact the Department of Resources prior to clearing in any of these areas.

2.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at
https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/codes

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify the Department of Resources before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at
https://vegetation-apps.dnrm.qld.gov.au

2.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an Area Management Plan applies to your property for which you can make a new notification, it will be listed in Section 3.6 of this report. Before clearing under one of these AMPs, you must first notify the Department of Resources and then follow the conditions and requirements listed in the AMP.
https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/area-management-plans

2.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at
https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/development

2.5. Contact information for the Department of Resources

For further information on the vegetation management framework:
Phone 135VEG (135 834)
Email vegetation@resources.qld.gov.au
Visit https://www.resources.qld.gov.au/?contact=vegetation to submit an online enquiry.

3. Vegetation management framework for Lot: 4 Plan: WHS354

3.1 Vegetation categories

The vegetation categories on your property are shown on the regulated vegetation management map in section 4.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property. Total area: 4390.26ha

Vegetation category	Area (ha)
Category B	3287.4
Category C	93.8
Category R	81.6
Category X	927.5

Table 4: Description of vegetation categories

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact the Department of Resources to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact the Department of Resources to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

The following Property Map of Assessable Vegetation (PMAVs) may be present on this property:

Reference number

2022/000433

2022/000894

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 4.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
11.3.1	Endangered	B	547.38	Acacia harpophylla and/or Casuarina cristata open forest on alluvial plains	Mid-dense
11.3.10	Least concern	B	680.64	Eucalyptus brownii woodland on alluvial plains	Sparse
11.3.10	Least concern	C	38.41	Eucalyptus brownii woodland on alluvial plains	Sparse
11.3.10	Least concern	R	4.48	Eucalyptus brownii woodland on alluvial plains	Sparse
11.3.25	Least concern	B	346.55	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Sparse
11.3.25	Least concern	C	1.48	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Sparse
11.3.25	Least concern	R	1.08	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Sparse
11.3.3	Of concern	B	510.94	Eucalyptus coolabah woodland on alluvial plains	Sparse
11.3.3	Of concern	C	8.87	Eucalyptus coolabah woodland on alluvial plains	Sparse
11.3.3	Of concern	R	0.14	Eucalyptus coolabah woodland on alluvial plains	Sparse
11.3.4	Of concern	B	288.12	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Sparse
11.3.4	Of concern	C	4.44	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Sparse
11.3.4	Of concern	R	0.07	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Sparse
11.4.13	Least concern	B	274.38	Eucalyptus orgadophila open woodland on Cainozoic clay plains	Very sparse
11.4.13	Least concern	C	5.31	Eucalyptus orgadophila open woodland on Cainozoic clay plains	Very sparse
11.4.13	Least concern	R	41.92	Eucalyptus orgadophila open woodland on Cainozoic clay plains	Very sparse
11.4.2	Of concern	C	4.89	Eucalyptus spp. and/or Corymbia spp. grassy or shrubby woodland on Cainozoic clay plains	Sparse
11.4.2	Of concern	R	0.15	Eucalyptus spp. and/or Corymbia spp. grassy or shrubby woodland on Cainozoic clay plains	Sparse
11.4.9	Endangered	B	126.24	Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains	Sparse

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
11.4.9	Endangered	C	11.51	Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains	Sparse
11.4.9	Endangered	R	0.08	Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains	Sparse
11.5.3	Least concern	B	513.10	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	Sparse
11.5.3	Least concern	C	18.92	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	Sparse
11.5.3	Least concern	R	33.67	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	Sparse
non-rem	None	X	927.47	None	None

Please note:

1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work;
- accepted development vegetation clearing codes;
- performance outcomes in State Code 16 of the State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 4.2.

3.4 Wetlands

Vegetation management wetlands are present on this property and are shown on the vegetation management supporting map in section 4.2 of this report.

3.5 Essential habitat

Under the VMA, essential habitat for protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA) as critically endangered, endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 4.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential

habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map -

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or

2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
483	Denisonia maculata	ornamental snake	V	Riparian woodland/open forest and shrub/woodland including Brigalow Acacia harpophylla; into drier habitats in summer.	100-450m.	Cracking clay with gilgai/soil crack microrelief and sandy loam substrates.	Near freshwater waterholes/creeks and low lying poorly drained areas that are frequently inundated by freshwater.
860	Phascolarctos cinereus	koala	E	Open forests and woodlands containing Eucalyptus, Corymbia, Lophostemon or Melaleuca trees having a trunk of a diameter of more than 10cm at 1.3m above the ground. Tree species used for food and habitat varies across the state and can include: Corymbia citriodora, Corymbia henryi, Corymbia intermedia, Eucalyptus acmenoides, Eucalyptus bancroftii, Eucalyptus biturbinata, Eucalyptus blakelyi, Eucalyptus brownii, Eucalyptus camaldulensis, Eucalyptus carnea, Eucalyptus chloroclada, Eucalyptus coolabah, Eucalyptus crebra, Eucalyptus dealbata, Eucalyptus drepanophylla, Eucalyptus dunnii, Eucalyptus eugenioides, Eucalyptus exserta, Eucalyptus fibrosa, Eucalyptus grandis, Eucalyptus helidonica, Eucalyptus latisinensis, Eucalyptus longirostrata, Eucalyptus major, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus microcarpa, Eucalyptus microcorys, Eucalyptus microtheca, Eucalyptus moluccana, Eucalyptus montivaga, Eucalyptus orgadophila, Eucalyptus papuana, Eucalyptus pilularis, Eucalyptus platyphylla, Eucalyptus populnea, Eucalyptus portuensis, Eucalyptus propinqua, Eucalyptus racemosa, Eucalyptus resinifera, Eucalyptus robusta, Eucalyptus saligna, Eucalyptus seeana, Eucalyptus siderophloia, Eucalyptus sideroxylon, Eucalyptus tereticornis, Eucalyptus thozetiana, Eucalyptus tindaliae, Eucalyptus umbra, Lophostemon confertus, Melaleuca leucadendra, Melaleuca quinquenervia.	Sea level to 1000m.	None	Riparian areas, plains and hill/escarpment slopes.
1785	Geophaps scripta scripta	squatter pigeon (southern subspecies)	V	Dry eucalypt woodland (including poplar box, spotted gum, yellow box, acacia and callitris), with sparse short grass, often on sandy areas near to permanent water; grassy eucalypt woodlands. Nest on ground near or under grass tussock, log or low bush.	None	None	Gravelly ridges, traprock and river flats.

Label	Regional Ecosystem (mandatory unless otherwise specified)
483	10.3.2, 10.3.3, 10.3.4, 10.3.7, 10.3.13, 10.3.14, 10.3.15, 10.3.16, 10.3.27, 10.3.30, 10.3.31, 10.4.1, 10.4.2, 10.4.3, 10.4.4, 10.4.5, 10.4.6, 10.4.7, 10.4.8, 10.5.5, 10.9.1. 10.9.6. 10.9.7, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.9, 11.3.10, 11.3.12, 11.3.15, 11.3.21, 11.3.23, 11.3.24, 11.3.25, 11.3.27, 11.3.28, 11.3.31, 11.3.34, 11.3.37, 11.3.38, 11.3.40, 11.4.2, 11.4.3, 11.4.4, 11.4.6, 11.4.7, 11.4.8, 11.4.9, 11.4.11, 11.5.2, 11.5.3, 11.5.16, 11.8.11, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.7, 11.9.11, 11.9.12, 11.9.14, 11.11.15, 11.12.6
860	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8, 4.3.10, 4.3.11, 4.5.3, 4.5.5, 4.5.6, 4.5.8, 4.5.9, 4.7.1, 4.7.7, 4.7.8, 4.9.6, 4.9.10, 4.9.12, 4.9.17, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.7, 6.3.8, 6.3.9, 6.3.11, 6.3.12, 6.3.17, 6.3.18, 6.3.22, 6.3.24, 6.3.25, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.6, 6.5.7, 6.5.8, 6.5.9, 6.5.10, 6.5.11, 6.5.13, 6.5.14, 6.5.15, 6.5.16, 6.5.17, 6.5.18, 6.5.19, 6.6.2, 6.7.1, 6.7.2, 6.7.5, 6.7.6, 6.7.7, 6.7.9, 6.7.11, 6.7.12, 6.7.13, 6.7.14, 6.7.17, 6.9.3, 7.2.3, 7.2.4, 7.2.7, 7.2.11, 7.3.7, 7.3.8, 7.3.9, 7.3.12, 7.3.13, 7.3.14, 7.3.16, 7.3.19, 7.3.20, 7.3.21, 7.3.25, 7.3.26, 7.3.39, 7.3.40, 7.3.42, 7.3.43, 7.3.44, 7.3.45, 7.3.47, 7.3.48, 7.3.50, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.8.7, 7.8.8, 7.8.10, 7.8.15, 7.8.16, 7.8.17, 7.8.18, 7.8.19, 7.11.5, 7.11.6, 7.11.13, 7.11.14, 7.11.16, 7.11.18, 7.11.19, 7.11.20, 7.11.21, 7.11.31, 7.11.32, 7.11.33, 7.11.34, 7.11.35, 7.11.37, 7.11.41, 7.11.42, 7.11.43, 7.11.44, 7.11.45, 7.11.46, 7.11.47, 7.11.48, 7.11.49, 7.11.50, 7.11.51, 7.12.4, 7.12.5, 7.12.17, 7.12.21, 7.12.22, 7.12.23, 7.12.24, 7.12.25, 7.12.26, 7.12.27, 7.12.28, 7.12.29, 7.12.30, 7.12.33, 7.12.34, 7.12.35, 7.12.51, 7.12.52, 7.12.53, 7.12.54, 7.12.55, 7.12.56, 7.12.57, 7.12.58, 7.12.59, 7.12.60, 7.12.61, 7.12.62, 7.12.63, 7.12.65, 7.12.66, 7.12.69, 8.1.5, 8.2.3, 8.2.6, 8.2.7, 8.2.8, 8.2.11, 8.2.12, 8.2.13, 8.2.14, 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.8, 8.3.10, 8.3.11, 8.3.13, 8.5.1, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.5.7, 8.9.1, 8.10.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.11.10, 8.11.12, 8.12.4, 8.12.5, 8.12.6, 8.12.7, 8.12.8, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 8.12.26, 8.12.27, 8.12.29, 8.12.31, 8.12.32, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.10, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.27, 9.4.1, 9.4.2, 9.5.1, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.15, 9.5.16, 9.5.17, 9.7.1, 9.7.2, 9.7.3, 9.7.4, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.3, 9.8.4, 9.8.5, 9.8.9, 9.8.10, 9.8.11, 9.8.13, 9.10.1, 9.10.3, 9.10.4, 9.10.5, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.12, 9.11.13, 9.11.14, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.21, 9.11.22, 9.11.23, 9.11.24, 9.11.25, 9.11.26, 9.11.28, 9.11.29, 9.11.30, 9.11.31, 9.11.32, 9.12.1, 9.12.2, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.14, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.25, 9.12.26, 9.12.27, 9.12.28, 9.12.29, 9.12.30, 9.12.31, 9.12.32, 9.12.33, 9.12.35, 9.12.36, 9.12.37, 9.12.38, 9.12.39, 9.12.44, 10.3.2, 10.3.3, 10.3.4, 10.3.5, 10.3.6, 10.3.8, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.16, 10.3.17, 10.3.20, 10.3.22, 10.3.27, 10.3.28, 10.4.2, 10.4.3, 10.4.5, 10.4.8, 10.4.9, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.8, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.1, 10.7.2, 10.7.3, 10.7.4, 10.7.5, 10.7.7, 10.7.9, 10.7.10, 10.7.11, 10.7.12, 10.7.13, 10.9.2, 10.9.3, 10.9.5, 10.10.1, 10.10.3, 10.10.4, 10.10.5, 10.10.7, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.5, 11.3.6, 11.3.7, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.21, 11.3.23, 11.3.25, 11.3.26, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.32, 11.3.33, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.7, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.18, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.3, 11.7.4, 11.7.6, 11.7.7, 11.8.1, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.6, 11.9.7, 11.9.9, 11.9.10, 11.9.11, 11.9.13, 11.9.14, 11.10.1, 11.10.2, 11.10.3, 11.10.4, 11.10.5, 11.10.6, 11.10.7, 11.10.9, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.2, 11.11.3, 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12.11.27, 12.11.28, 12.12.2, 12.12.3, 12.12.4, 12.12.5, 12.12.6, 12.12.7, 12.12.8, 12.12.9, 12.12.11, 12.12.12, 12.12.14, 12.12.15, 12.12.23, 12.12.24, 12.12.25, 12.12.28, 13.3.1, 13.3.2, 13.3.3, 13.3.4, 13.3.5, 13.3.7, 13.9.2, 13.11.1, 13.11.2, 13.11.3, 13.11.4, 13.11.5, 13.11.6, 13.11.8, 13.11.9, 13.12.1, 13.12.2, 13.12.3, 13.12.4, 13.12.5, 13.12.6, 13.12.8, 13.12.9, 13.12.10.
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3.6 Area Management Plan(s)

Nil

3.7 Coastal or non-coastal

For the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP), this property is regarded as*

Non Coastal

*See also Map 4.3

3.8 Agricultural Land Class A or B

The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?

No Class A

No Class B

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See Map 4.4 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 4 Plan: WHS354.

4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:
https://www.resources.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form

Regulated vegetation management map

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new property maps of assessable vegetation (PMAV).

Vegetation management supporting map

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

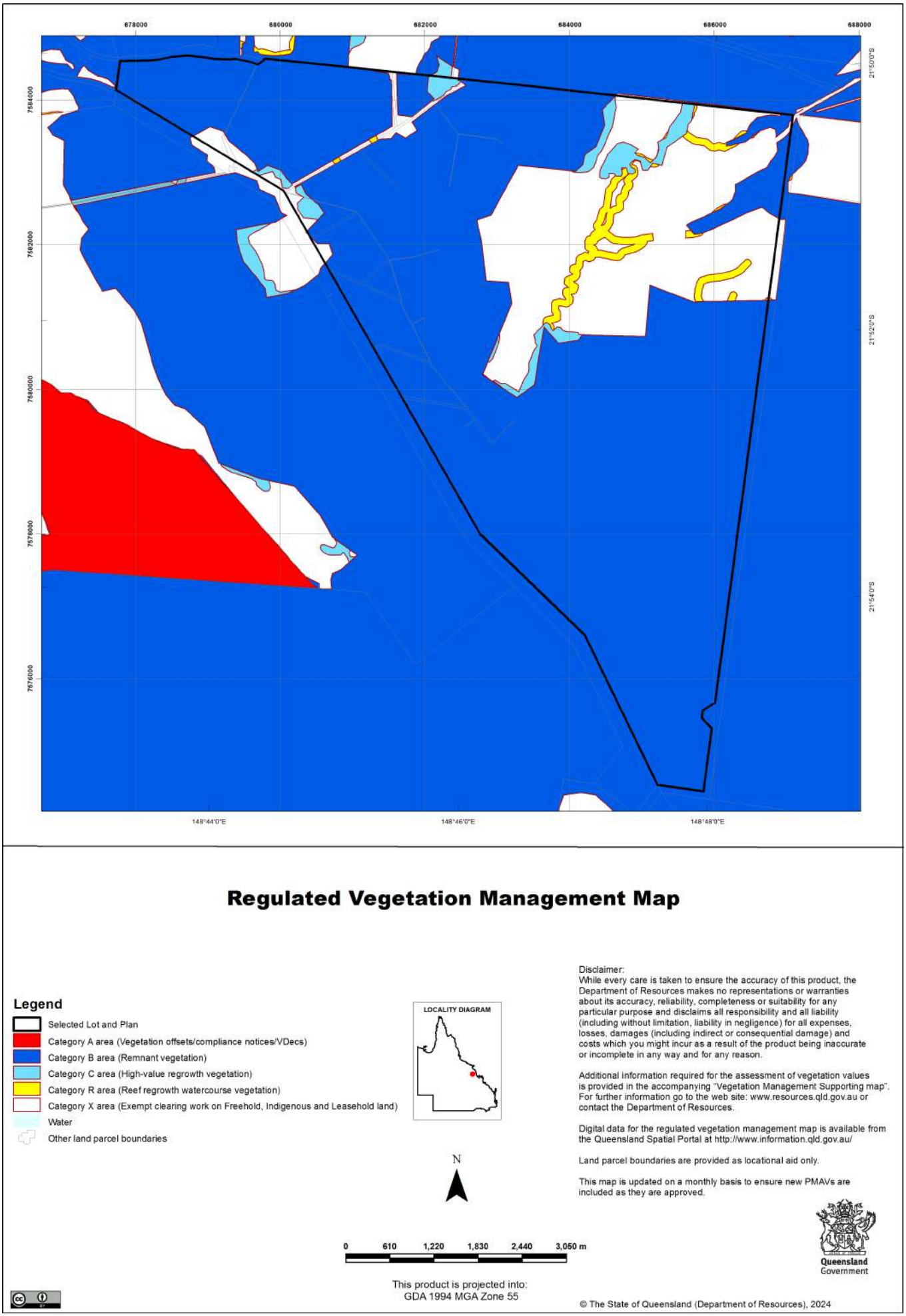
Coastal/non-coastal map

The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP).

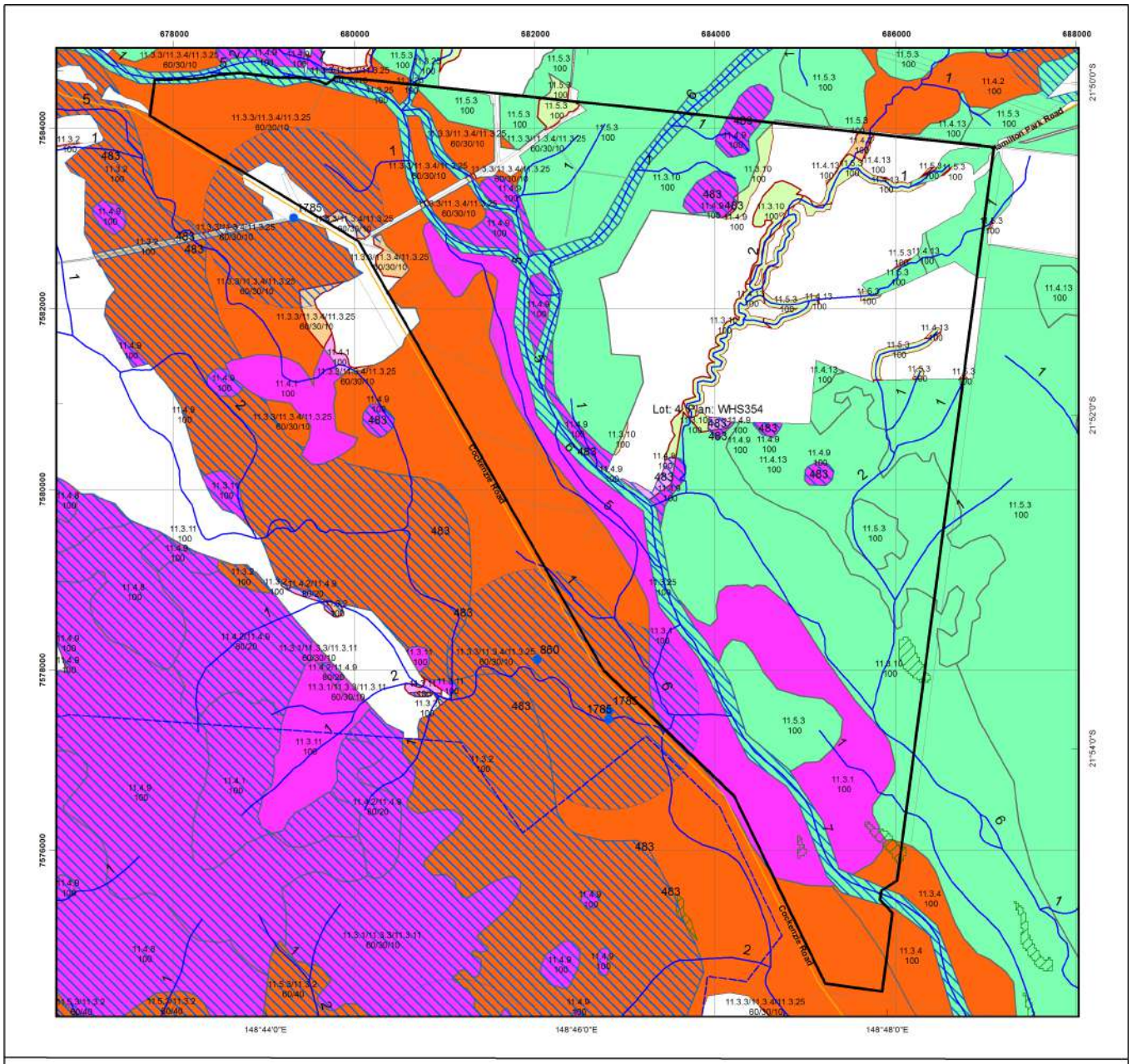
Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture

The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

4.1 Regulated vegetation management map



4.2 Vegetation management supporting map



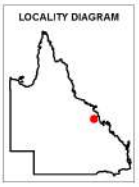
Vegetation Management Supporting Map

Legend

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
- Highway
- Connector
- Street/Local Road
- National Parks, State Forest and other reserves
- Other land parcel boundaries

Queensland Government

LOCALITY DIAGRAM



N

0 440 880 1,320 1,760 2,200 m

This product is projected into: GDA 1994 MGA Zone 55

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

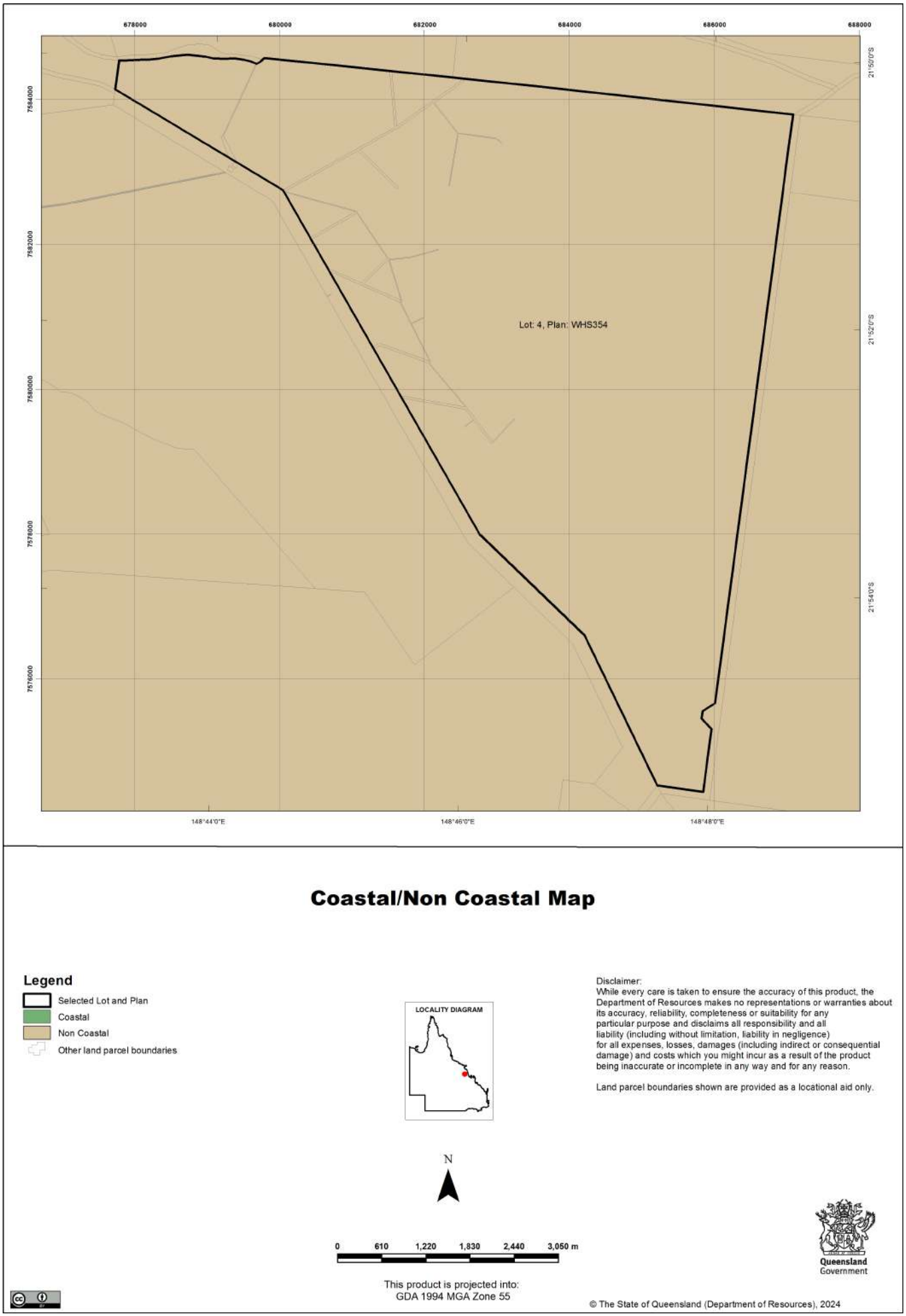
Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

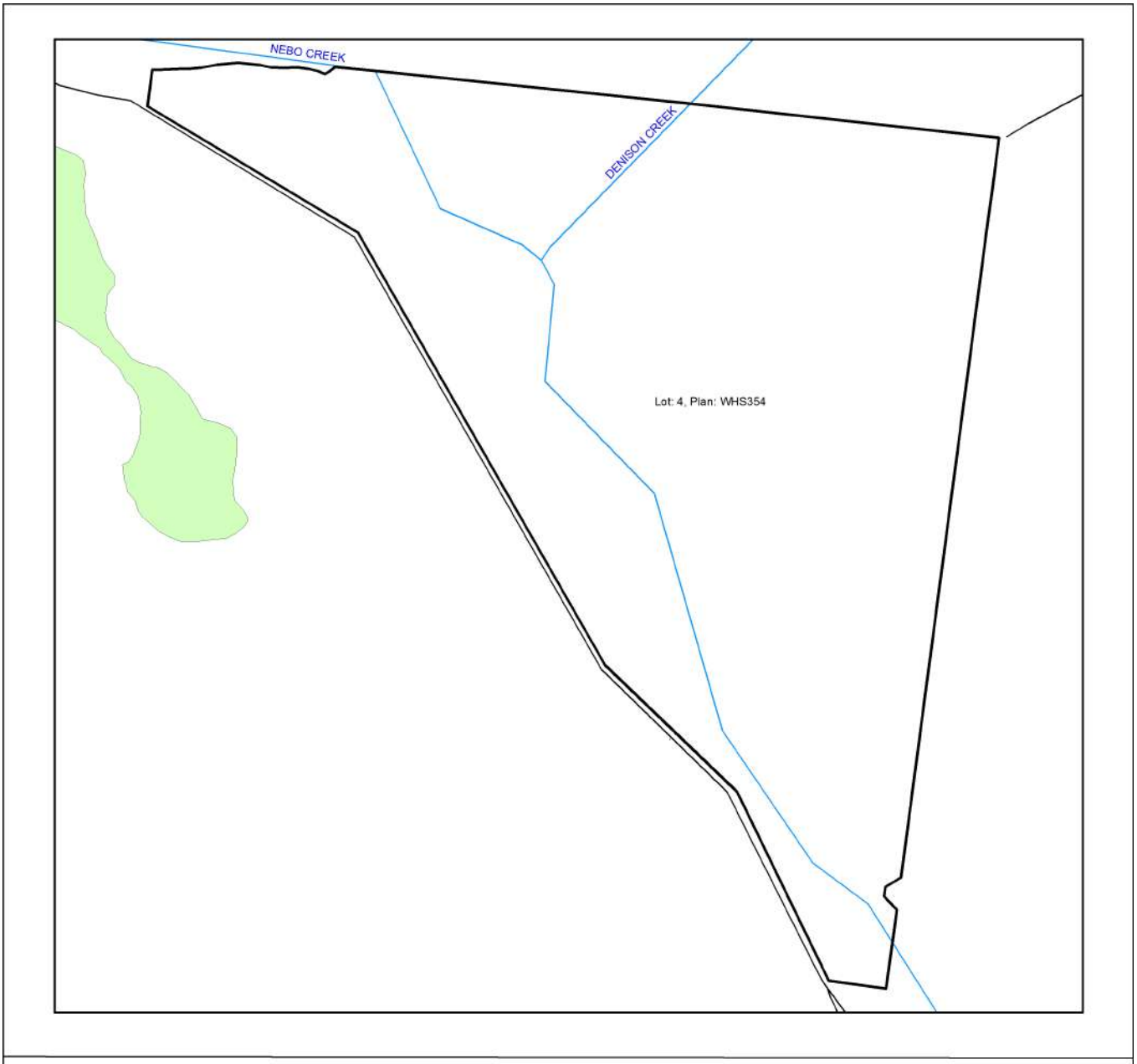
Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

4.3 Coastal/non-coastal map



4.4 Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture



5. Protected plants framework (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992* (NCA). The NCA regulates the clearing of protected plants 'in the wild' (see Operational policy: When a protected plant in Queensland is considered to be 'in the wild') that are listed as critically endangered, endangered, vulnerable or near threatened under the Act.

Please note that the protected plant clearing framework applies irrespective of the classification of the vegetation under the *Vegetation Management Act 1999* and any approval or exemptions given under another Act, for example, the *Vegetation Management Act 1999* or *Planning Regulation 2017*.

5.1 Clearing in high risk areas on the flora survey trigger map

The flora survey trigger map identifies high-risk areas for threatened and near threatened plants. These are areas where threatened or near threatened plants are known to exist or are likely to exist based on the habitat present. The flora survey trigger map for this property is provided in section 5.5.

If you are proposing to clear an area shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken by a suitably qualified person in accordance with the Flora survey guidelines. The main objective of a flora survey is to locate any threatened or near threatened plants that may be present in the clearing impact area.

If the flora survey identifies that threatened or near threatened plants are not present within the clearing impact area or clearing within 100m of a threatened or near threatened plant can be avoided, the clearing activity is exempt from a permit. An exempt clearing notification form must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that threatened or near threatened plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the clearing permit application form.

5.2 Clearing outside high risk areas on the flora survey trigger map

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that threatened or near threatened plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

5.3 Exemptions

Many activities are 'exempt' under the protected plant clearing framework, which means that clearing of native plants that are in the wild can be undertaken for these activities with no need for a flora survey or a protected plant clearing permit. The Information sheet - General exemptions for the take of protected plants provides some of these exemptions.

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) under the *Vegetation Management Act 1999* (i.e. listed in Schedule 21 of the Planning Regulations 2017) while some are different.

5.4 Contact information for DES

For further information on the protected plants framework:
Phone 1300 130 372 (and select option four)
Email palm@des.qld.gov.au
Visit https://www.qld.gov.au/environment/plants-animals/plants/protected-plants

5.5 Protected plants flora survey trigger map

This map included may also be requested individually at: https://apps.des.qld.gov.au/map-request/flora-survey-trigger/.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the Queensland Spatial Catalogue, the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the clearing of protected plants for more information.

Protected Plants Flora Survey Trigger Map

Legend

- Selected Lot and Plan
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets

N

0 400 800 1,200 1,600 2,000 m

This product is projected into:
GDA 1994 MGA Zone 55

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@des.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

6. Koala protection framework (administered by the Department of Environment and Science (DES))

The koala (*Phascolarctos cinereus*) is listed in Queensland as endangered by the Queensland Government under *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Queensland Government's koala protection framework is comprised of the *Nature Conservation Act 1992*, the Nature Conservation (Animals) Regulation 2020, the Nature Conservation (Koala) Conservation Plan 2017, the *Planning Act 2016* and the Planning Regulation 2017.

6.1 Koala mapping

6.1.1 Koala districts

The parts of Queensland where koalas are known to occur has been divided into three koala districts - koala district A, koala district B and koala district C. Each koala district is made up of areas with comparable koala populations (e.g. density, extent and significance of threatening processes affecting the population) which require similar management regimes.

Section 7.1 identifies which koala district your property is located in.

6.1.2 Koala habitat areas

Koala habitat areas are areas of vegetation that have been determined to contain koala habitat that is essential for the conservation of a viable koala population in the wild based on the combination of habitat suitability and biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water). In order to protect this important koala habitat, clearing controls have been introduced into the Planning Regulation 2017 for development in koala habitat areas.

Please note that koala habitat areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

There are two different categories of koala habitat area (core koala habitat area and locally refined koala habitat), which have been determined using two different methodologies. These methodologies are described in the document Spatial modelling in South East Queensland.

Section 7.2 shows any koala habitat area that exists on your property.

Under the Nature Conservation (Koala) Conservation Plan 2017, an owner of land (or a person acting on the owner's behalf with written consent) can request to make, amend or revoke a koala habitat area determination if they believe, on reasonable grounds, that the existing determination for all or part of their property is incorrect.

More information on requests to make, amend or revoke a koala habitat area determination can be found in the document Guideline - Requests to make, amend or revoke a koala habitat area determination.

The koala habitat area map will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

Changes to the koala habitat area map which occur between annual updates because of a request to make, amend or revoke a koala habitat area determination can be viewed on the register of approved requests to make, amend or revoke a koala habitat area available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/koalamaps. The register includes the lot on plan for the change, the date the decision was made and the map issued to the landholder that shows areas determined to be koala habitat areas.

6.1.3 Koala priority areas

Koala priority areas are large, connected areas that have been determined to have the highest likelihood of achieving conservation outcomes for koalas based on the combination of habitat suitability, biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water) and a koala conservation cost benefit analysis.

Conservation efforts will be prioritised in these areas to ensure the conservation of viable koala populations in the wild including a focus on management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring. This includes a prohibition on clearing in koala habitat areas that are in koala priority areas under the Planning Regulation 2017 (subject to some exemptions).

Please note that koala priority areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley,

Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Section 7.2 identifies if your property is in a koala priority area.

6.1.4 Identified koala broad-hectare areas

There are seven identified koala broad-hectare areas in SEQ. These are areas of koala habitat that are located in areas committed to meet development targets in the SEQ Regional Plan to accommodate SEQ's growing population including bring-forward Greenfield sites under the Queensland Housing Affordability Strategy and declared master planned areas under the repealed *Sustainable Planning Act 2009* and the repealed *Integrated Planning Act 1997*.

Specific assessment benchmarks apply to development applications for development proposed in identified koala broad-hectare areas to ensure koala conservation measures are incorporated into the proposed development.

Section 7.2 identifies if your property is in an identified koala broad-hectare area.

6.2 Koala habitat planning controls

On 7 February 2020, the Queensland Government introduced new planning controls to the Planning Regulation 2017 to strengthen the protection of koala habitat in South East Queensland (i.e. koala district A).

More information on these planning controls can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

As a high-level summary, the koala habitat planning controls make:

- development that involves interfering with koala habitat (defined below) in an area that is both a koala priority area and a koala habitat area, prohibited development (i.e. development for which a development application cannot be made);
- development that involves interfering with koala habitat (defined below) in an area that is a koala habitat area but is not a koala priority area, assessable development (i.e. development for which development approval is required); and
- development that is for extractive industries where the development involves interfering with koala habitat (defined below) in an area that is both a koala habitat area and a key resource area, assessable development (i.e. development for which development approval is required).

Interfering with koala habitat means:

1) Removing, cutting down, ringbarking, pushing over, poisoning or destroying in anyway, including by burning, flooding or draining native vegetation in a koala habitat area; but
2) Does not include destroying standing vegetation by stock or lopping a tree.

However, these planning controls do not apply if the development is exempted development as defined in Schedule 24 of the Planning Regulation 2017. More information on exempted development can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

There are also assessment benchmarks that apply to development applications for:

- building works, operational works, material change of use or reconfiguration of a lot where:
  - the local government planning scheme makes the development assessable;
  - the premises includes an area that is both a koala priority area and a koala habitat area; and
  - the development does not involve interfering with koala habitat (defined above); and

- development in identified koala broad-hectare areas.

The Guideline - Assessment Benchmarks in relation to Koala Habitat in South East Queensland assessment benchmarks outlines these assessment benchmarks, the intent of these assessment benchmarks and advice on how proposed development may meet these assessment benchmarks.

6.3 Koala Conservation Plan clearing requirements

Section 10 and 11 of the Nature Conservation (Koala) Conservation Plan 2017 prescribes requirements that must be met when clearing koala habitat in koala district A and koala district B.

These clearing requirements are independent to the koala habitat planning controls introduced into the Planning Regulation 2017, which means they must be complied with irrespective of any approvals or exemptions offered under other legislation.

Unlike the clearing controls prescribed in the Planning Regulation 2017 that are to protect koala habitat, the clearing requirements prescribed in the Nature Conservation (Koala) Conservation Plan 2017 are in place to prevent the injury or death of koalas when koala habitat is being cleared.

6.4 Contact information for DES

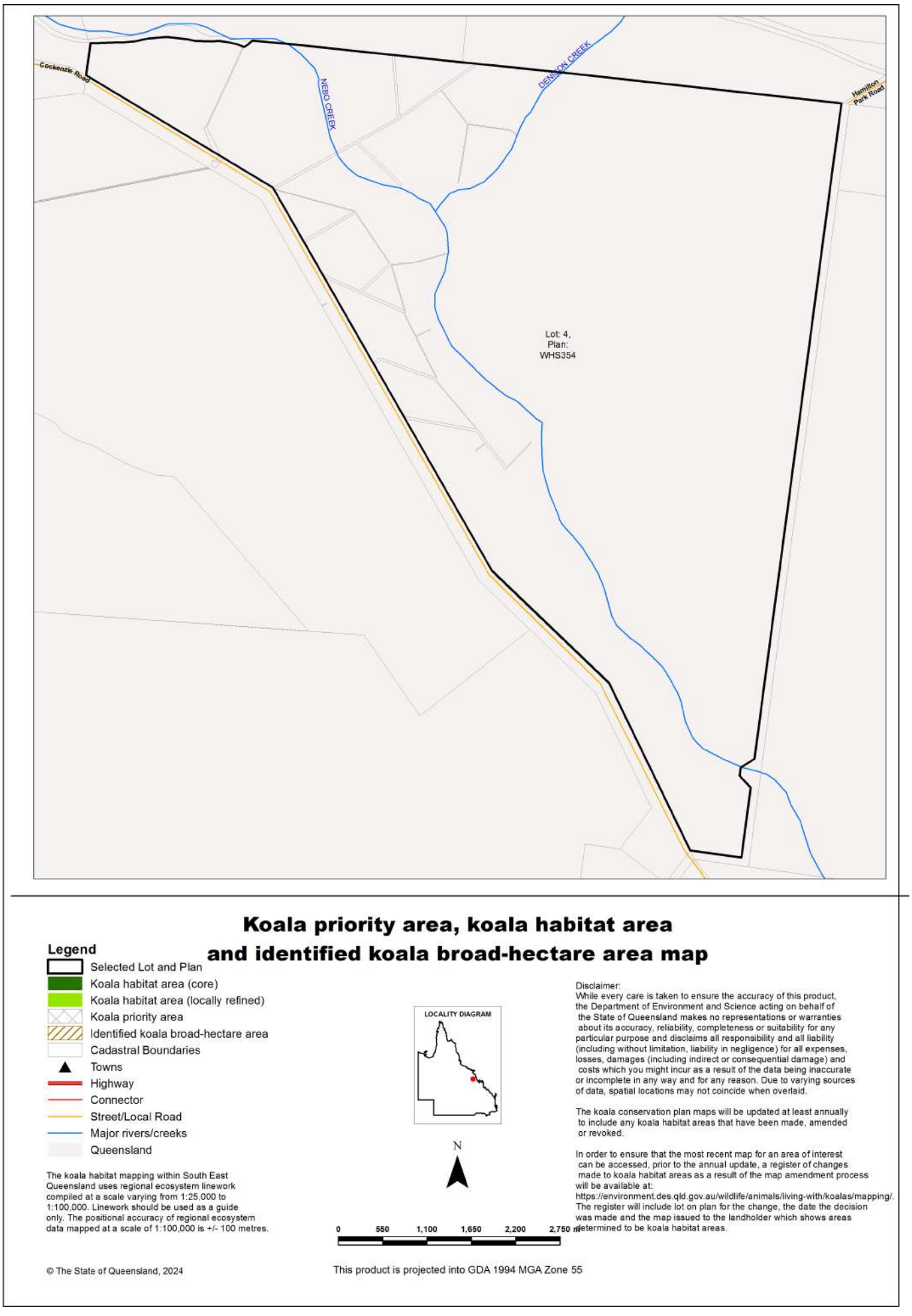
For further information on the koala protection framework:
Phone 13 QGOV (13 74 68)
Email koala.assessment@des.qld.gov.au
Visit https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

7. Koala protection framework details for Lot: 4 Plan: WHS354

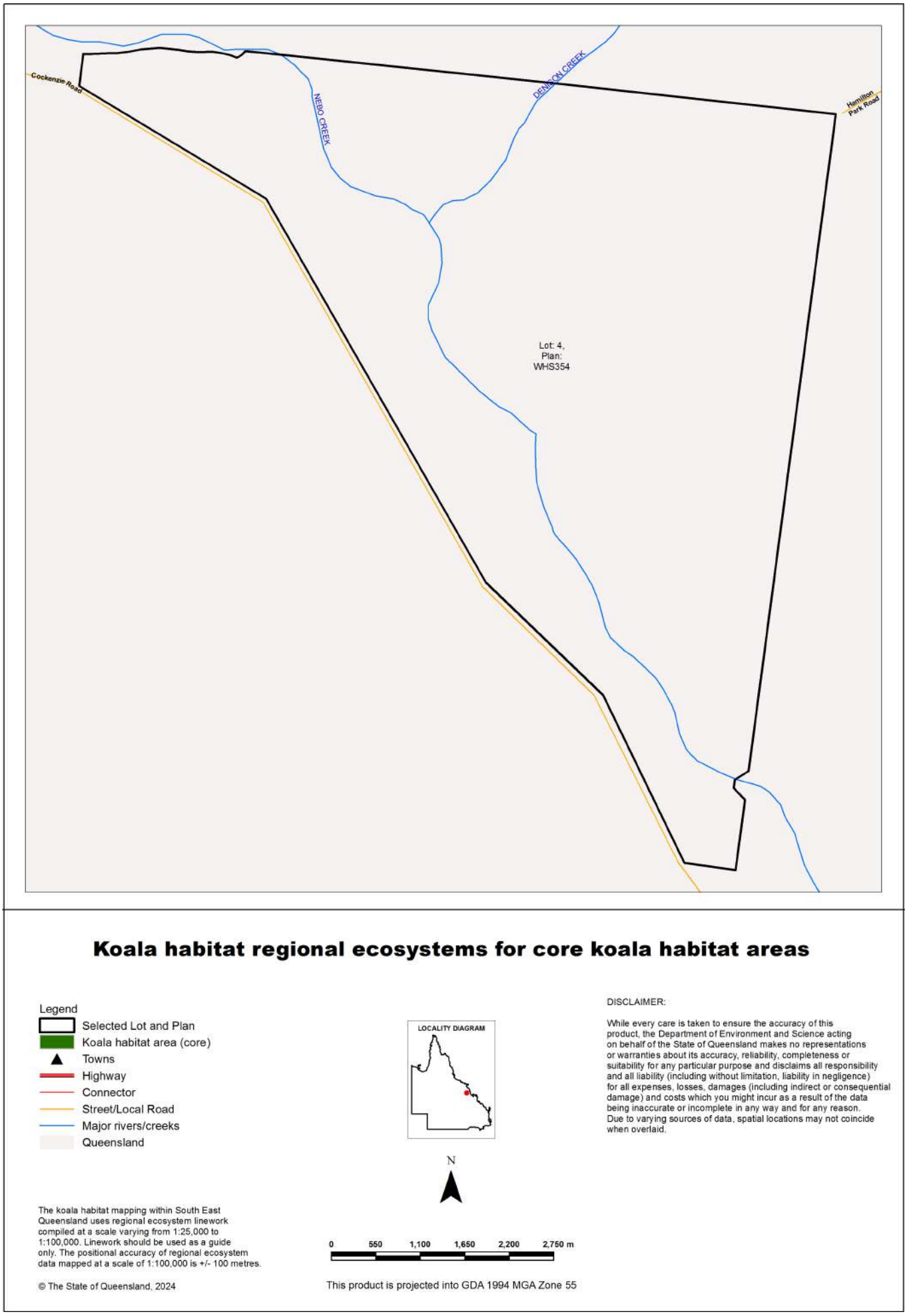
7.1 Koala districts

Koala District C

7.2 Koala priority area, koala habitat area and identified koala broad-hectare area map



7.3 Koala habitat regional ecosystems for core koala habitat areas



8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
• Interference with overland flow • Earthworks, significant disturbance	*Water Act 2000* *Soil Conservation Act 1986*	Department of Regional Development, Manufacturing and Water (Queensland Government) Department of Resources (Queensland Government)	Ph: 13 QGOV (13 74 68) www.rdmw.qld.gov.au www.resources.qld.gov.au
• Indigenous Cultural Heritage	*Aboriginal Cultural Heritage Act 2003* *Torres Strait Islander Cultural Heritage Act 2003*	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
• Mining and environmentally relevant activities • Infrastructure development (coastal) • Heritage issues	*Environmental Protection Act 1994* *Coastal Protection and Management Act 1995* *Queensland Heritage Act 1992*	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
• Protected plants and protected areas	*Nature Conservation Act 1992*	Department of Environment and Science (Queensland Government)	Ph: 1300 130 372 (option 4) palm@des.qld.gov.au www.des.qld.gov.au
• Koala mapping and regulations	*Nature Conservation Act 1992*	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) Koala.assessment@des.qld.gov.au
• Interference with fish passage in a watercourse, mangroves • Forestry activities on State land tenures	*Fisheries Act 1994* *Forestry Act 1959*	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
• Matters of National Environmental Significance including listed threatened species and ecological communities	*Environment Protection and Biodiversity Conservation Act 1999*	Department of Agriculture, Water and the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
• Development and planning processes	*Planning Act 2016* *State Development and Public Works Organisation Act 1971*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
• Local government requirements	*Local Government Act 2009* *Planning Act 2016*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office
• Harvesting timber in the Wet Tropics of Qld World Heritage area	*Wet Tropics World Heritage Protection and Management Act 1993*	Wet Tropics Management Authority	Ph: (07) 4241 0500 www.wettropics.gov.au

APPENDIX

C

HABITAT QUALITY SCORES

KOALA

Habitat Quality Scores

SWC MRA2C IMPACT SITE

KOALA Habitat Quality Scores

Updated impact scores to meet guidelines with score errors corrected

Assessment Unit - Regional Ecosystem	AU 1 - RE 11.3.2 remnant					
Site Reference	Benchmark	Mrb1			Average	Average
	11.3.2	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	18	14	77.8	10	14.0	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	9					
Tree canopy height (average score)	13.5	17	125.9	5	17.0	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	37	57.4	155.1	5	57.4	5
Tree subcanopy (T2) cover (%)	7		0.0		0.0	
Tree canopy cover (average score)	22	57.4	77.55	5	28.7	5
Native shrub cover (%)	4	0.6	15.0	3	0.6	3
Coarse woody debis	281	128	45.6	2	128.0	2
Native plant species richness - trees	2	2	100.0	5	5.0	5
Native plant species richness - shrubs	2	8	400.0	5	8.0	5
Native plant species richness - grasses	9	10	111.1	5	10.0	5
Native plant species richness - forbs	15	5	33.3	2.5	5.0	2.5
Non-native plant cover	0	5	na	5	5.0	5
Native perennial grass cover (%)	26		0.0	3	0.0	3
Organic litter cover (%)	35	41	117.1	5	41.0	5
Quality and availability of food and foraging habitat		25.00		8.33		8.33
Quality and availability of shelter		5		6		6
		1				
Site Condition Score						74.83
Maximum Site Condition Score						*100*
Site Condition Score - out of 3						**2.24**

Assessment Unit - Regional Ecosystem	AU 2 - RE 11.3.4a remnant									
Site Reference	Benchmark	Mrb15			Benchmark	Mrb18			Average	Average
	11.3.4	Raw Data	% Benchmark	Score	11.3.4a	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	35	6	33.3	5	35	8	44.4	5	7.0	5
Tree canopy (T1) height (m)	22				22					
Tree subcanopy (T2) height (m)	12				12					
Tree canopy height (average score)	17	19	140.7	5	17	20	148.1	5	19.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	17	41.2	111.4	3	17	51.4	138.9	3		
Tree subcanopy (T2) cover (%)	5	4.7	67.1		5		0.0			
Tree canopy cover (average score)	11	22.95	89.25	3	11	51.4	69.45	3	37.2	3
Native shrub cover (%)	1	0.0	0.0	0	1	1.5	37.5	5	0.8	2.5
Coarse woody debis	384	145	51.6	2	384	30	10.7	0	87.5	1
Native plant species richness - trees	4	3	150.0	2.5	4	4	200.0	5	3.5	3.75
Native plant species richness - shrubs	2	2	100.0	5	2	3	150.0	5	2.5	5
Native plant species richness - grasses	7	4	44.4	2.5	7	5	55.6	2.5	4.5	2.5
Native plant species richness - forbs	10	1	6.7	0	10	1	6.7	0	1.0	0
Non-native plant cover	0	70	na	0	0	60	na	0	7.0	0
Native perennial grass cover (%)	43	0.0	0.0	0	43	0.0	0.0	0	7.0	0
Organic litter cover (%)	20	42	120.0	3	20	35	100.0	5	7.0	4
Quality and availability of food and foraging habitat		22.50		7.50		25.00		8.33		7.92
Quality and availability of shelter		5		6		5		6		6
		1				1				
Site Condition Score										50.67
Maximum Site Condition Score										*100*
Site Condition Score - out of 3										**1.52**

Assessment Unit - Regional Ecosystem	AU 3 - RE 11.3.9 remnant					
Site Reference	Benchmark	Mrb3			Average	Average
	11.3.9	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	15	12	66.7	10	66.7	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	18	20	148.1	5	148.1	5
Recruitment of woody perennial species in EDL	100	80	80.0	5	80.0	5
Tree canopy (T1) cover (%)	28	64.6	174.6	3	174.6	3
Tree subcanopy (T2) cover (%)	na	na	na	na	na	na
Tree canopy cover (average score)	28	64.6	174.6	3		3
Native shrub cover (%)	1	0.0	0.0	0	0.0	0
Coarse woody debis	151	384	136.7	2	136.7	2
Native plant species richness - trees	5	5	250.0	5	450.0	5
Native plant species richness - shrubs	6	9	450.0	5	450.0	5
Native plant species richness - grasses	9	8	88.9	2.5	88.9	2.5
Native plant species richness - forbs	17	13	86.7	2.5	86.7	2.5
Non-native plant cover	0	7	na	5	na	5
Native perennial grass cover (%)	34		0.0	3	0.0	3
Organic litter cover (%)	32	62.6	178.9	5	178.9	5
Quality and availability of food and foraging habitat		25.00		8.33		8.33
Quality and availability of shelter		5		10		10
		5				
Site Condition Score						71.33
Maximum Site Condition Score						*100*
Site Condition Score - out of 3						**2.14**

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.3.25a remnant									
Site Reference	Benchmark	Mrb17			Benchmark	Mrb21			Average	Average
	11.3.25b	Raw Data	% Benchmark	Score	11.3.25b	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	34	26	144.4	10	34	34	188.9	15	30.0	12.5
Tree canopy (T1) height (m)	24				24					
Tree subcanopy (T2) height (m)	10				10					
Tree canopy height (average score)	17	28	207.4	5	17	29	214.8	5	28.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	45	77.0	208.1	5	45	87.0	235.1	5		
Tree subcanopy (T2) cover (%)	10	13.0	185.7	5	10	48.0	685.7	3		
Tree canopy cover (average score)	27.5	45	196.9	5	27.5	67.5	460.4	4	56.3	4.5
Native shrub cover (%)	6	0.0	0.0	0	6	2.0	50.0	3	1.0	1.5
Coarse woody debis	148	10	3.6	0	148	185	65.8	5	97.5	2.5
Native plant species richness - trees	8	8	400.0	5	8	8	400.0	5	8.0	5
Native plant species richness - shrubs	4	1	50.0	2.5	4	1	50.0	2.5	1.0	2.5
Native plant species richness - grasses	7		0.0	0	7		0.0	0		0
Native plant species richness - forbs	13	2	13.3	0	13	4	26.7	2.5	3.0	1.25
Non-native plant cover	0	99	na	0	0	99	na	0	7.0	0
Native perennial grass cover (%)	10	0.0	0.0	0	10	0.0	0.0	0	7.0	0
Organic litter cover (%)	35	7	20.0	3	35	22	62.9	5	7.0	4
Quality and availability of food and foraging habitat		25.00		8.33		25.00		8.33		8.33
Quality and availability of shelter		5		8		5		10		9
		3				5				
Site Condition Score										61.08
Maximum Site Condition Score										*100*
Site Condition Score - out of 3										**1.83**

Assessment Unit - Regional Ecosystem	AU 5 - RE 11.3.27b remnant					
Site Reference	Benchmark	Mrb13			Average	Average
	11.3.27b	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	34	4	22.2	5	22.2222	5
Tree canopy (T1) height (m)	15					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	15	18	133.3	5	133.333	5
Recruitment of woody perennial species in EDL	100	66	66.0	3	66	3
Tree canopy (T1) cover (%)	42	24.9	67.3	5	67.2973	5
Tree subcanopy (T2) cover (%)	na	3.5	na	na	na	na
Tree canopy cover (average score)	42	14.2	67.3	5		5
Native shrub cover (%)	7		0.0	0	0	0
Coarse woody debis	484	280	99.6	5	99.6441	5
Native plant species richness - trees	2	2	100.0	5	300	5
Native plant species richness - shrubs	1	1	50.0	5	50	5
Native plant species richness - grasses	2	9	100.0	5	100	5
Native plant species richness - forbs	7	2	13.3	2.5	13.3333	2.5
Non-native plant cover	0	30	na	3	na	3
Native perennial grass cover (%)	10		0.0	5	0	5
Organic litter cover (%)	12	15	42.9	5	42.8571	5
Quality and availability of food and foraging habitat		25.00		8.33		8.33
Quality and availability of shelter		3		4		4
		1				
Site Condition Score						65.83
Maximum Site Condition Score						*100*
Site Condition Score - out of 3						**1.97**

Assessment Unit - Regional Ecosystem	AU 6 - RE 11.4.9 remnant													
Site Reference	Benchmark	Mrb9			Benchmark	Mrb10			Benchmark	SWC3			Average	Average
	11.4.9	Raw Data	% Benchmark	Score	11.4.9	Raw Data	% Benchmark	Score	11.4.9	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	47	6	33.3	5	47	20	111.1	5	47			5	13	5
Tree canopy (T1) height (m)	10				10				10					
Tree subcanopy (T2) height (m)	6				6				6					
Tree canopy height (average score)	8	16	118.5	5	8	16	118.5	5	8			5	16	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100			5	100	5
Tree canopy (T1) cover (%)	25	81.4	220.0	3	25	74.9	202.4	3	25					
Tree subcanopy (T2) cover (%)	11	15.7	224.3	5	11	9.0	128.6	5	11					
Tree canopy cover (average score)	18	48.55	222.15	4	18	41.95	165.5	4	18			5	45.25	4.33333
Native shrub cover (%)	5	14.9	372.5	3	5	17.0	425.0	3	5			3	15.95	3
Coarse woody debis	980	1685	599.6	5	980	1670	594.3	5	980			5	1677.5	5
Native plant species richness - trees	2	2	100.0	5	2	2	100.0	5	2			5	2	5
Native plant species richness - shrubs	5	6	300.0	5	5	13	650.0	5	5			0	9.5	3.33333
Native plant species richness - grasses	5	4	44.4	2.5	5	10	111.1	5	5			5	7	4.16667
Native plant species richness - forbs	10	8	53.3	2.5	10	10	66.7	5	10			5	9	4.16667
Non-native plant cover	0	5	na	5	0	5	na	5	0			5	5	5
Native perennial grass cover (%)	16		0.0	1	16		0.0	1	16			5		2.33333
Organic litter cover (%)	45	83.6	238.9	5	45	63.6	181.7	5	45			5	73.6	5
Quality and availability of food and foraging habitat		25.00		8.33		25.00		8.33						8.33
Quality and availability of shelter		5		8		5		6						7
		3				1								
Site Condition Score														71.6633
Maximum Site Condition Score														*100*
Site Condition Score - out of 3														**2.15**

Assessment Unit - Regional Ecosystem	AU 7 - RE 11.5.2a remnant									
Site Reference	Benchmark	Mrb6			Average	Average	Benchmark	Mrb4		
		Raw Data	% Benchmark	Score	Raw	Score	11.5.3	Raw Data	% Benchmark	Score
Large trees per hectare		2		5	2	5	10	20	111.1	15
Tree canopy (T1) height (m)							16			
Tree subcanopy (T2) height (m)							na			
Tree canopy height (average score)		13		5	13	5	16	16	118.5	5
Recruitment of woody perennial species in EDL		100		5	100	5	100	100	100.0	5
Tree canopy (T1) cover (%)		60.7			60.7		20	21.7	58.6	5
Tree subcanopy (T2) cover (%)		22.1			22.1		na	na	na	na
Tree canopy cover (average score)		41.4		5		5	20	21.7	58.6	5
Native shrub cover (%)		5.8		5	5.8	5	3	20.1	502.5	3
Coarse woody debis		120		2	120	2	314	45	16.0	2
Native plant species richness - trees		8		5	8	5	6	6	300.0	5
Native plant species richness - shrubs		10		5	10	5	6	5	250.0	2.5
Native plant species richness - grasses		12		5	12	5	6	3	33.3	2.5
Native plant species richness - forbs		9		5	9	5	10	5	33.3	2.5
Non-native plant cover		1		10	1	10	0	5	na	5
Native perennial grass cover (%)		0.0		5	0	5	19		0.0	3
Organic litter cover (%)		41		5	41	5	20	16	45.7	5
Quality and availability of food and foraging habitat						0.83		25.00		8.33
Quality and availability of shelter		5		8		5		3		8
		3						5		
Site Condition Score						72.83				
Maximum Site Condition Score						*100*				
Site Condition Score - out of 3						**2.18**				

Site Context	AU1 Value	AU1 Score	AU2 Value	AU2 Score	AU3 Value	AU3 Score	AU4 Value	AU4 Score	AU5 Value	AU5 Score	AU6 Value	AU6 Score	AU7 Value	AU7 Score
Size of patch (total out of 10)	>200 ha	10		7.5	>200 ha	10	>200 ha	7.5	>200 ha	10	>200 ha	10	>200 ha	10
Connectedness (total out of 5)	>75%	5	>75%	5	>75%	5	>75%	5	50-75%	4	>75%	5	>75%	5
Context (% remnant within 1km) (total out of 5)	>75%	5	>30%-75%	4	>75%	5	>30%-75%	4	>30%-75%	4	>75%	4.66667	>75%	5
Ecological Corridors (total out of 6)	Outside	0	Within	6	Outside	0	Within	6	Outside	0	Outside	0	Outside	0
Threats to the species (total out of 15)	15-20	10	15-20	10	15-20	10	15-20	10	15-20	10	15-20	10	15-20	10
Species mobility capacity (total out of 10)		6.7		6.7		6.7		6.7		6.7		6.7		6.7
Site Context Score		36.7		39.2		36.7		39.2		34.7		36.3667		36.7
MAX Site Context Score		*51*		*51*		*51*		*51*		*51*		*51*		*51*
Site Context Score - out of 3		**2.16**		**2.31**		**2.16**		**2.31**		**2.04**		**2.14**		**2.16**

Species Stocking Rate (SSR)	REMNANT AREAS					Site scores	REGROWTH AREAS					Site scores
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0 (No)		10 (Yes)		10	Score	0 (No)		10 (Yes)		5
Species usage of the site (habitat type & evidenced usage)	Score	0 Not habitat	5 Dispersal	10 Foraging	15 Breeding	15	Score	0 Not habitat	5 Dispersal	10 Foraging	15 Breeding	0
Role of the site population in relation to the overall species population*	Score (Total from supplementary table below)	0 (0)	5 (1-15)	10 (16-35)	15 (36-45)	5	Score (Total from supplementary table below)	0 (0)	5 (1-15)	10 (16-35)	15 (36-45)	0
Total Species Stocking Rate score						30						5
Maximum Species Stocking Rate Score						40						40
Species Stocking Rate Score (out of 4)						3						0.5

*Role of site location to species overall population in the state					Site scores
*Key source population for breeding	Score	0 (No)	10 (Yes/ Possibly)		0
*Key source population for dispersal	Score	0 (No)	5 (Yes/ Possibly)		5
*Necessary for maintaining genetic diversity	Score	0 (No)	15 (Yes/ Possibly)		0
*Near the limit of the species range	Score	0 (No)	15 (Yes)		0
TOTAL	0 (0)	5 (5 - 15)	10 (20 - 35)	15 (40 - 45)	5

11.5.2a removed as not Koala habitat

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5	AU6		AU8	AU9	AU10	AU11	AU12	AU13	AU14	Remnant	Regrowth	FINAL
	RE 11.3.2	RE 11.3.4a	RE 11.3.9	RE 11.3.25a	RE 11.3.27b	RE 11.4.9		RE 11.5.3	RE 11.5.8b	RE 11.5.8c	RE 11.5.9	HVR RE 11.5.3	HVR RE 11.5.8c	RE 11.3.35 non-rem			(Average)
Site Condition score (out of 3)	2.24	1.52	2.14	1.83	1.97	2.15		2.42	2.18	1.80	2.42	1.85	1.53	1.82	*2.07*	*1.73*	
Site Context Score (out of 3)	1.71	2.31	2.16	2.31	2.04	2.14		2.11	2.10	2.16	1.89	1.92	1.92	1.92	*2.09*	*1.92*	
Species Stocking Rate Score (out of 4)	3.00	3.00	3.00	3.00	3.00	3.00		3.00	3.00	3.00	3.00	0.50	0.50	0.50	*3.00*	*0.50*	
Habitat Quality score (out of 10)	6.95	6.83	7.30	7.14	7.01	7.29		7.53	7.28	6.96	7.31	4.27	3.95	4.24	*7.16*	*4.15*	
Impact area (ha)	82.75	268.54	33.65	95.86	6.14	37.17		361.91	78.17	291.38	85.55	119.75	44.85	1.96	*1341.12*	*166.56*	
Size weighting	0.06	0.20	0.03	0.07	0.00	0.03		0.27	0.06	0.22	0.06	0.72	0.27	0.01	*1.00*	*1.00*	
Weighted Habitat Quality Score	***0.42***	***1.37***	***0.22***	***0.50***	***0.00***	***0.22***		***2.03***	***0.44***	***1.53***	***0.44***	***3.07***	***1.07***	***0.04***	***7.17***	***4.18***	5.68
Weighted Habitat Quality Score (rounded)															7	4	6

QUALITY AND AVAILABILITY OF FOOD AND SHELTER

Quality and availability of food and foraging habitat	Score
Relative abundance of food trees (divide raw tree richness by benchmark tree richness, convert to score out of 10)	10
Relative diversity of food trees present (convert to score out of 10)	10
^Ease of movement (estimate based on connectivity of vegetation and physical or behavioural barriers to movement)	10
TOTAL	30
TOTAL out of 10	10

^scores from 0 – 10 where 0 – 2 = (movement totally restricted), 2 - 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (along a koala movement corridor).

Quality and availability of shelter				Score
Tree canopy cover	1 (<10%)	3 (10-30%)	5 (>30)	5
Raw subcanopy cover	1 (<10%)	3 (10-30%)	5 (>30)	5
			TOTAL	10

CONTEXT

Size of Patch (from BioCondition Manual)	Score
<5ha remnant and/or regrowth	0
>=5-25ha remnant and/or regrowth	2
>=25-100ha remannt OF >=25-200ha remnant and regrowth OR >=25-200ha regrowth	5
>=100-200ha remnant OR >200ha remnant and regrowth OR >200ha regrowth	7
>=200ha remnant	10

Connectivity (from BioCondition Manual)	Score
Low - AU is not connected using any of the below descriptions	0
Medium - AU is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR remnant vegetation along <10% of its perimeter and with regrowth native vegetation >25% of its pe	2
High - AU is connected with adjacent remnant vegetation along 50% to 75% of its perimeter	4
Very high - AU is connected with adjacent remnant vegetation along >75% of its perimeter OR includes>500ha remnant vegetation	5

Landscape Context (from BioCondition Manual)	Score
Low - <10% remnant vegetation and <30% native non-remnant vegetation (regrowth)	0
Medium - >=10% to 30% remnant vegetation and <30% regrowth OR <10% remnant vegetation and >=30% regrowth	2
High - >=30% to 75% remnant vegetation OR >=10% to 30% remnant vegetation and >=30% regrowth vegetation	4
Very high - >75% remnant vegetation	5

ECOLOGICAL CORRIDORS

Landscape Context (from BioCondition Manual)	Score
Outside of Statewide Biodiversity corridor (Qld Globe)	0
Within Statewide Biodiversity corridor (Qld Globe)	6

SPECIES MOBILITY

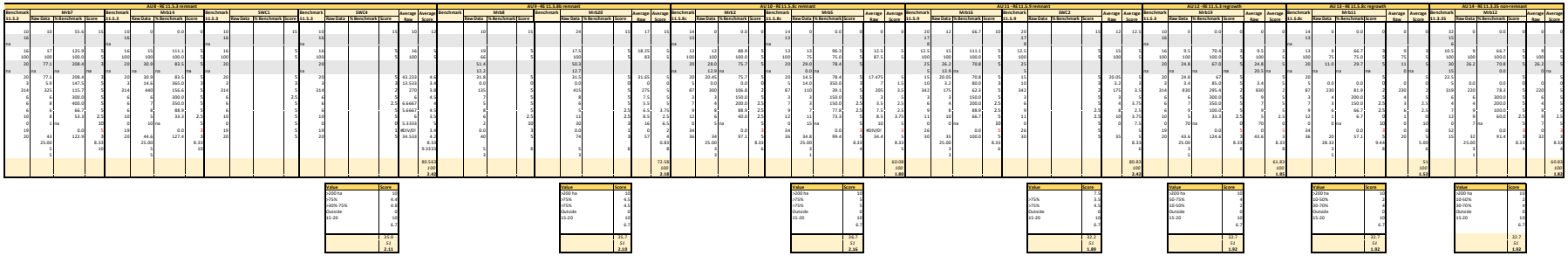
SPECIES MOBILITY		Score	Site scores
Habitat connectivity	Isolated	0-2	7
	Partially isolated	3-4	
	Periodically isolated	5-6	
	Major connectivity	7-8	
	Totally connected	9-10	
Behavioural deterrents to movement	Extreme risk of disturbance resulting in movement	0-2	3
	High risk	3-4	
	Moderate risk	5-6	
	Low Risk	7-8	
	Nil Risk	9-10	
Physical deterrents to movement	Total barrier	0-2	10
	Substantial frequent barrier	3-4	
	Moderate, occasional barrrier	5-6	
	Negligible barrier	7-8	
	Active movement pathway - i.e., watercourse or linear corridor	9-10	
	TOTAL (invert to a score out of 10)		6.666667

THREATS TO SPECIES

THREATS TO SPECIES							
THREATS MATRIX			Severity				
			Very High	High	Medium	Low	Very Low
			1	2	3	4	5
Scope	Very High	1	1	2	3	4	5
	High	2	2	4	6	8	10
	Medium	3	3	6	9	12	15
	Low	4	4	8	12	16	20
	Very Low	5	5	10	15	20	25

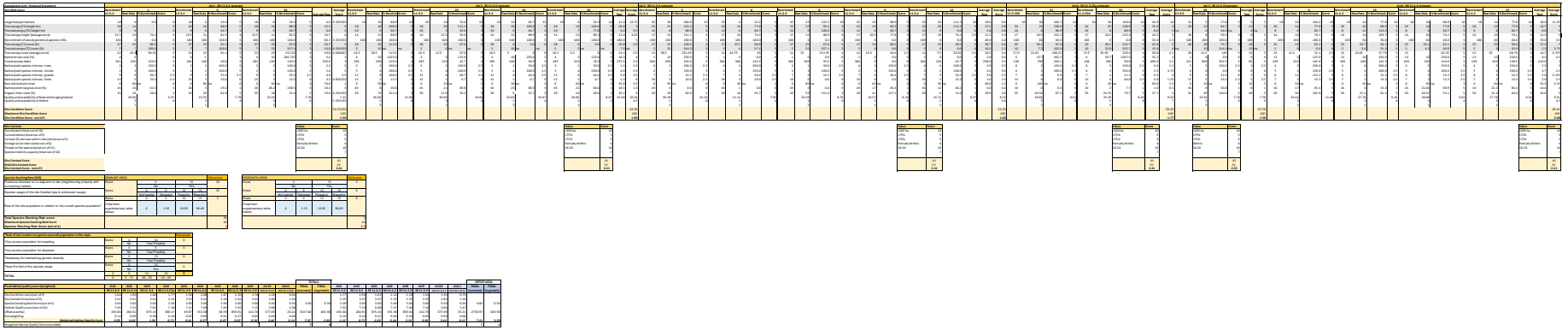
Threats to Koalas			Score	Total	Site scores
Vehicles	Proximity to public road	<1.5km	1	3	3
		>1.5km	3		
	Traffic Volume	High - >10 vehicles per hour	1	3	1
		Low - <10 vehicles per hour	3		
	Traffic Speed	40km	6	6	4
		60km	4		
		80km	2		
		100km	0		
	Exclusion Fencing	Present	0	1	1
		Not Present	1		
	Signage	Present	0	1	1
		Not Present	1		
Wild and domestic dogs	Proximity to houses	<1km	1	3	3
		>1km	3		
	Wild dog presence on	Present	0	1	0
		Not Present	1		
Fire	Relative fuel load	High	0	1	0
		Low	1		
	Level of public access	High	0	1	1
		Low	1		
	Firebreaks	Not adequate	0	1	1
		Adequate	1		
Habitat Loss	Isolation	Isolated Habitat	0	2	2
		Connected habitat	2		
	Disease	Noticable disease	0	1	1
		None	1		
	Disturbance	Presence of disturbance (eg cattle, land clearing)	0	1	0
		Limited disturbance	1		
			TOTAL	25	18

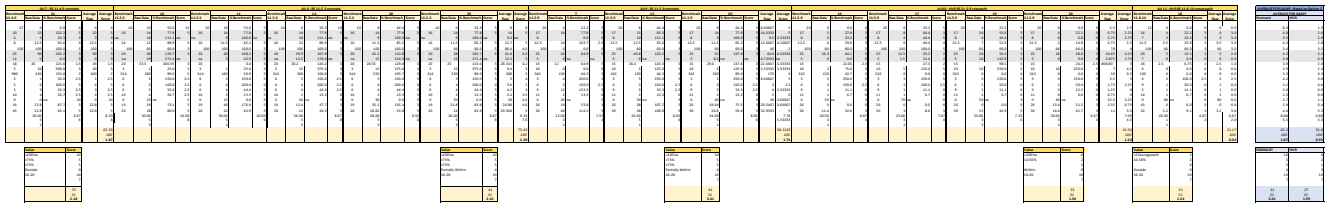
TOTAL	0	5	10	15
	0	5 - 15	16-20	21-25



HAMILTON PARK OFFSET SITE

KOALA Habitat Quality Scores





GREATER GLIDER

Habitat Quality Scores

SWC MRA2C IMPACT SITE

GREATER GLIDER Habitat Quality Scores

Updated impact scores to meet guidelines with score errors corrected

Assessment Unit - Regional Ecosystem	AU 1 - RE 11.3.2 remnant					
Site Reference	Benchmark	Mrb1				
	11.3.2	Raw Data	% Benchmark	Score	Average Raw	Average Score
Large trees per hectare	18	14	77.8	10	14.0	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	9					
Tree canopy height (average score)	13.5	17	125.9	5	17.0	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	37	57.4	155.1	5	57.4	5
Tree subcanopy (T2) cover (%)	7		0.0		0.0	
Tree canopy cover (average score)	22	57.4	77.55	5	28.7	5
Native shrub cover (%)	4	0.6	15.0	3	0.6	3
Coarse woody debis	281	128	45.6	2	128.0	2
Native plant species richness - trees	2	2	100.0	5	5.0	5
Native plant species richness - shrubs	2	8	400.0	5	8.0	5
Native plant species richness - grasses	9	10	111.1	5	10.0	5
Native plant species richness - forbs	15	5	33.3	2.5	5.0	2.5
Non-native plant cover	0	5	na	5	5.0	5
Native perennial grass cover (%)	26		0.0	3	0.0	3
Organic litter cover (%)	35	41	117.1	5	41.0	5
Quality and availability of food and foraging habitat		7.78	10.00	5.00		7.59
Quality and availability of shelter		5.00	1.00			6.00
Site Condition Score						74.09
Maximum Site Condition Score						*100.00*
Site Condition Score - out of 3						**2.22**

Assessment Unit - Regional Ecosystem	AU 2 - RE 11.3.4a remnant									
Site Reference	Benchmark	Mrb15			Benchmark	Mrb18			Average	Average
	11.3.4	Raw Data	% Benchmark	Score	11.3.4a	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	35	6	33.3	5	35	8	44.4	5	7.0	5
Tree canopy (T1) height (m)	22				22					
Tree subcanopy (T2) height (m)	12				12					
Tree canopy height (average score)	17	19	140.7	5	17	20	148.1	5	19.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	17	41.2	111.4	3	17	51.4	138.9	3		
Tree subcanopy (T2) cover (%)	5	4.7	67.1		5		0.0			
Tree canopy cover (average score)	11	22.95	89.25	3	11	51.4	69.45	3	37.2	3
Native shrub cover (%)	1	0.0	0.0	0	1	1.5	37.5	5	0.8	2.5
Coarse woody debis	384	145	51.6	2	384	30	10.7	0	87.5	1
Native plant species richness - trees	4	3	150.0	2.5	4	4	200.0	5	3.5	3.75
Native plant species richness - shrubs	2	2	100.0	5	2	3	150.0	5	2.5	5
Native plant species richness - grasses	7	4	44.4	2.5	7	5	55.6	2.5	4.5	2.5
Native plant species richness - forbs	10	1	6.7	0	10	1	6.7	0	1.0	0
Non-native plant cover	0	70	na	0	0	60	na	0	7.0	0
Native perennial grass cover (%)	43	0.0	0.0	0	43	0.0	0.0	0	7.0	0
Organic litter cover (%)	20	42	120.0	3	20	35	100.0	5	7.0	4
Quality and availability of food and foraging habitat		1.71	10.00	5.00		2.29	10.00	5.00		0.57
Quality and availability of shelter		5.00	1.00			5.00	1.00			6.00
Site Condition Score										43.32
Maximum Site Condition Score										*100.00*
Site Condition Score - out of 3										**1.30**

Assessment Unit - Regional Ecosystem	AU 3 - RE 11.3.9 remnant					
Site Reference	Benchmark	Mrb3			Average	Average
	11.3.9	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	15	12	66.7	10	66.7	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	18	20	148.1	5	148.1	5
Recruitment of woody perennial species in EDL	100	80	80.0	5	80.0	5
Tree canopy (T1) cover (%)	28	64.6	174.6	3	174.6	3
Tree subcanopy (T2) cover (%)	na	na	na	na	na	na
Tree canopy cover (average score)	28	64.6	174.6	3		3
Native shrub cover (%)	1	0.0	0.0	0	0.0	0
Coarse woody debis	151	384	136.7	2	136.7	2
Native plant species richness - trees	5	5	250.0	5	450.0	5
Native plant species richness - shrubs	6	9	450.0	5	450.0	5
Native plant species richness - grasses	9	8	88.9	2.5	88.9	2.5
Native plant species richness - forbs	17	13	86.7	2.5	86.7	2.5
Non-native plant cover	0	7	na	5	na	5
Native perennial grass cover (%)	34		0.0	3	0.0	3
Organic litter cover (%)	32	62.6	178.9	5	178.9	5
Quality and availability of food and foraging habitat		8.00	10.00	5.00		0.83
Quality and availability of shelter		5.00				10.00
Site Condition Score						63.83
Maximum Site Condition Score						*100.00*
Site Condition Score - out of 3						**1.91**

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.3.25a remnant									
Site Reference	Benchmark	Mrb17			Benchmark	Mrb21			Average	Average
	11.3.25b	Raw Data	% Benchmark	Score	11.3.25b	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	34	26	144.4	10	34	34	188.9	15	30.0	12.5
Tree canopy (T1) height (m)	24				24					
Tree subcanopy (T2) height (m)	10				10					
Tree canopy height (average score)	17	28	207.4	5	17	29	214.8	5	28.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	45	77.0	208.1	5	45	87.0	235.1	5		
Tree subcanopy (T2) cover (%)	10	13.0	185.7	5	10	48.0	685.7	3		
Tree canopy cover (average score)	27.5	45	196.9	5	27.5	67.5	460.4	4	56.3	4.5
Native shrub cover (%)	6	0.0	0.0	0	6	2.0	50.0	3	1.0	1.5
Coarse woody debis	148	10	3.6	0	148	185	65.8	5	97.5	2.5
Native plant species richness - trees	8	8	400.0	5	8	8	400.0	5	8.0	5
Native plant species richness - shrubs	4	1	50.0	2.5	4	1	50.0	2.5	1.0	2.5
Native plant species richness - grasses	7		0.0	0	7		0.0	0	#DIV/0!	0
Native plant species richness - forbs	13	2	13.3	0	13	4	26.7	2.5	3.0	1.25
Non-native plant cover	0	99	na	0	0	99	na	0	7.0	0
Native perennial grass cover (%)	10	0.0	0.0	0	10	0.0	0.0	0	7.0	0
Organic litter cover (%)	35	7	20.0	3	35	22	62.9	5	7.0	4
Quality and availability of food and foraging habitat		7.65	10.00	5.00		10.00	10.00	5.00		0.79
Quality and availability of shelter		5.00	3.00			5.00	5.00			9.00
Site Condition Score										53.54
Maximum Site Condition Score										*100.00*
Site Condition Score - out of 3										**1.61**

Assessment Unit - Regional Ecosystem	AU 5 - RE 11.3.27b remnant					
Site Reference	Benchmark	Mrb13			Average	Average
	11.3.27b	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	34	4	22.2	5	22.22222	5
Tree canopy (T1) height (m)	15					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	15	18	133.3	5	133.3333	5
Recruitment of woody perennial species in EDL	100	66	66.0	3	66	3
Tree canopy (T1) cover (%)	42	24.9	67.3	5	67.2973	5
Tree subcanopy (T2) cover (%)	na	3.5	na	na	na	na
Tree canopy cover (average score)	42	14.2	67.3	5		5
Native shrub cover (%)	7		0.0	0	0	0
Coarse woody debis	484	280	99.6	5	99.64413	5
Native plant species richness - trees	2	2	100.0	5	300	5
Native plant species richness - shrubs	1	1	50.0	5	50	5
Native plant species richness - grasses	2	9	100.0	5	100	5
Native plant species richness - forbs	7	2	13.3	2.5	13.33333	2.5
Non-native plant cover	0	30	na	3	na	3
Native perennial grass cover (%)	10		0.0	5	0	5
Organic litter cover (%)	12	15	42.9	5	42.85714	5
Quality and availability of food and foraging habitat		1.18	10.00	5.00		0.83
Quality and availability of shelter		3.00	1.00			4.00
Site Condition Score						58.33
Maximum Site Condition Score						*100.00*
Site Condition Score - out of 3						**1.75**

Assessment Unit - Regional Ecosystem	AU 6 - RE 11.4.9 remnant													
Site Reference	Benchmark	Mrb9			Benchmark	Mrb10			Benchmark	SWC3			Average	Average
	11.4.9	Raw Data	% Benchmark	Score	11.4.9	Raw Data	% Benchmark	Score	11.4.9	Raw Data	% Benchmark	Score	Raw	Score
Large trees per hectare	47	6	33.3	5	47	20	111.1	5	47			5	13	5
Tree canopy (T1) height (m)	10				10				10					
Tree subcanopy (T2) height (m)	6				6				6					
Tree canopy height (average score)	8	16	118.5	5	8	16	118.5	5	8			5	16	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100			5	100	5
Tree canopy (T1) cover (%)	25	81.4	220.0	3	25	74.9	202.4	3	25					
Tree subcanopy (T2) cover (%)	11	15.7	224.3	5	11	9.0	128.6	5	11					
Tree canopy cover (average score)	18	48.55	222.15	4	18	41.95	165.5	4	18			5	45.25	4.333333
Native shrub cover (%)	5	14.9	372.5	3	5	17.0	425.0	3	5			3	15.95	3
Coarse woody debis	980	1685	599.6	5	980	1670	594.3	5	980			5	1677.5	5
Native plant species richness - trees	2	2	100.0	5	2	2	100.0	5	2			5	2	5
Native plant species richness - shrubs	5	6	300.0	5	5	13	650.0	5	5			0	9.5	3.333333
Native plant species richness - grasses	5	4	44.4	2.5	5	10	111.1	5	5			5	7	4.166667
Native plant species richness - forbs	10	8	53.3	2.5	10	10	66.7	5	10			5	9	4.166667
Non-native plant cover	0	5	na	5	0	5	na	5	0			5	5	5
Native perennial grass cover (%)	16		0.0	1	16		0.0	1	16			5		2.333333
Organic litter cover (%)	45	83.6	238.9	5	45	63.6	181.7	5	45			5	73.6	5
Quality and availability of food and foraging habitat		1.28	10.00	5.00		4.26	10.00	5.00						0.59
Quality and availability of shelter		5.00	3.00			5.00	1.00							7.00
Site Condition Score														63.92
Maximum Site Condition Score														*100.00*
Site Condition Score - out of 3														**1.92**

Assessment Unit - Regional Ecosystem	AU 7 - RE 11.5.2a remnant							
Site Reference	Benchmark	Mrb6			Average	Average	Benchmark	
		Raw Data	% Benchmark	Score	Raw	Score	11.5.3	Raw Data
Large trees per hectare		2		5	2	5	10	20
Tree canopy (T1) height (m)							16	
Tree subcanopy (T2) height (m)							na	
Tree canopy height (average score)		13		5	13	5	16	16
Recruitment of woody perennial species in EDL		100		5	100	5	100	100
Tree canopy (T1) cover (%)		60.7			60.7		20	21.7
Tree subcanopy (T2) cover (%)		22.1			22.1		na	na
Tree canopy cover (average score)		41.4		5		5	20	21.7
Native shrub cover (%)		5.8		5	5.8	5	3	20.1
Coarse woody debis		120		2	120	2	314	45
Native plant species richness - trees		8		5	8	5	6	6
Native plant species richness - shrubs		10		5	10	5	6	5
Native plant species richness - grasses		12		5	12	5	6	3
Native plant species richness - forbs		9		5	9	5	10	5
Non-native plant cover		1		10	1	10	0	5
Native perennial grass cover (%)		0.0		5	0	5	19	
Organic litter cover (%)		41		5	41	5	20	16
Quality and availability of food and foraging habitat						0.83		20.00
Quality and availability of shelter		5.00	3.00			8.00		3.00
Site Condition Score						75.83		
Maximum Site Condition Score						*100.00*		
Site Condition Score - out of 3						**2.27**		

Site Context	AU1 Value	AU1 Score	AU2 Value	AU2 Score	AU3 Value	AU3 Score	AU4 Value	AU4 Score	AU5 Value	AU5 Score	AU6 Value	AU6 Score	AU7 Value	AU7 Score
Size of patch (total out of 10)	>200 ha	10		7.5	>200 ha	10	>200 ha	7.5	>200 ha	10	>200 ha	10	>200 ha	10
Connectedness (total out of 5)	>75%	5	>75%	5	>75%	5	>75%	5	50-75%	4	>75%	5	>75%	5
Context (% remnant within 1km) (total out of 5)	>75%	5	>30%-75%	4	>75%	5	>30%-75%	4	>30%-75%	4	>75%	4.666667	>75%	5
Ecological Corridors (total out of 6)	Outside	0	Within	6	Outside	0	Within	6	Outside	0	Outside	0	Outside	0
Threats to the species (total out of 15)		5		5		5		5		5		5		5
Species mobility capacity (total out of 10)		7		7		7		7		7		7		7
Site Context Score		32		34.5		32		34.5		30		31.66667		32
MAX Site Context Score		*51*		*51*		*51*		*51*		*51*		*51*		*51*
Site Context Score - out of 3		**1.88**		**2.03**		**1.88**		**2.03**		**1.76**		**1.86**		**1.88**

Species Stocking Rate (SSR)	REMNANT AREAS					Site scores
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		10		10
		No		Yes		
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	15
		Not habitat	Dispersal	Foraging	Breeding	
Role of the site population in relation to the overall species population*	Score	0	5	10	15	5
	(Total from supplementary table below)	0	1-15	16-35	36-45	
Total Species Stocking Rate score						30
Maximum Species Stocking Rate Score						40
Species Stocking Rate Score (out of 4)						3

REGROWTH AREAS					Site scores
Score	0		10		5
	No		Yes		
Score	0	5	10	15	0
	Not habitat	Dispersal	Foraging	Breeding	
Score	0	5	10	15	0
(Total from supplementary table below)	0	1-15	16-35	36-45	
					5
					40
					0.5

*Role of site location to species oveerall population in the state					Site scores
*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		0
		No	Yes/ Possibly		
*Near the limit of the species range	Score	0	15		0
		No	Yes		
TOTAL	0	5	10	15	5
	0	5 - 15	20 - 35	40 - 45	

11.5.2a removed as not GG habitat

11.4.9 removed as not GG habitat

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5			AU8	AU9	AU10	AU11	AU12	AU13	AU14	FINAL
	RE 11.3.2	RE 11.3.4a	RE 11.3.9	RE 11.3.25a	RE 11.3.27b			RE 11.5.3	RE 11.5.8b	RE 11.5.8c	RE 11.5.9	VR RE 11.5	VR RE 11.5.	.35 non-re	(remnant)
Site Condition score (out of 3)	2.22	1.30	1.91	1.61	1.75			2.17	2.18	1.57	2.20	1.56	1.40	1.59	
Site Context Score (out of 3)	1.71	2.03	1.88	2.03	1.76			1.84	1.82	1.88	1.62	1.65	1.65	1.65	
Species Stocking Rate Score (out of 4)	3.00	3.00	3.00	3.00	3.00			3.00	3.00	3.00	3.00	0.50	0.50	0.50	3.50
Habitat Quality score (out of 10)	6.93	6.33	6.79	6.64	6.51			7.01	7.00	6.45	6.82	3.71	3.55	3.74	
Impact area (ha)	82.75	268.54	33.65	95.86	6.14			361.91	78.17	291.38	85.55	119.75	44.85	1.96	1303.95
Size weighting	0.063461	0.2059435	0.025806	0.073515	0.00470877			0.277548986	0.059949	0.223459	0.065608				
Weighted Habitat Quality Score	***0.44***	***1.30***	***0.18***	***0.49***	***0.03***			***1.95***	***0.42***	***1.44***	***0.45***				***6.70***
Weighted Habitat Quality Score (rounded)															7

QUALITY AND AVAILABILITY OF FOOD AND SHELTER

Quality and availability of food and foraging habitat	Score
Relative abundance of food trees (divide raw tree richness by benchmark tree richness, convert to score out of 10)	10
Relative diversity of food trees present - 1 food tree species = 5, 2+ food tree species = 10 (convert to score out of 10)	10
^Ease of movement (estimate based on connectivity of vegetation and physical or behavioural barriers to movement)	10
TOTAL	30
TOTAL out of 10	10

^scores from 0 – 10 where 0 – 2 = (movement totally restricted), 2 - 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (along a koala movement corridor).

Quality and availability of shelter				Score
Tree canopy cover	1	3	5	5
	<10%	10-30%	>30	
Raw subcanopy cover	1	3	5	5
	<10%	10-30%	>30	
			TOTAL	10

CONTEXT

Size of Patch (from BioCondition Manual)	Score
<5ha remnant and/or regrowth	0
>=5-25ha remnant and/or regrowth	2
>=25-100ha remannt OF >=25-200ha remnant and regrowth OR >=25-200ha regrowth	5
>=100-200ha remnant OR >200ha remnant and regrowth OR >200ha regrowth	7
>=200ha remnant	10

Connectivity (from BioCondition Manual)	Score
Low - AU is not connected using any of the below descriptions	0
Medium - AU is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR remnant vegetation along <10% of its perimeter and with regrowth native vegetation >25% of its per	2
High - AU is connected with adjacent remnant vegetation along 50% to 75% of its perimeter	4
Very high - AU is connected with adjacent remnant vegetation along >75% of its perimeter OR includes>500ha remnant vegetation	5

Landscape Context (from BioCondition Manual)	Score
Low - <10% remnant vegetation and <30% native non-remnant vegetation (regrowth)	0
Medium - >=10% to 30% remnant vegetation and <30% regrowth OR <10% remnant vegetation and >=30% regrowth	2
High - >=30% to 75% remnant vegetation OR >=10% to 30% remnant vegetation and >=30% regrowth vegetation	4
Very high - >75% remnant vegetation	5

ECOLOGICAL CORRIDORS

Landscape Context (from BioCondition Manual)	Score
Outside of Statewide Biodiversity corridor (Qld Globe)	0
Within Statewide Biodiversity corridor (Qld Globe)	6

SPECIES MOBILITY

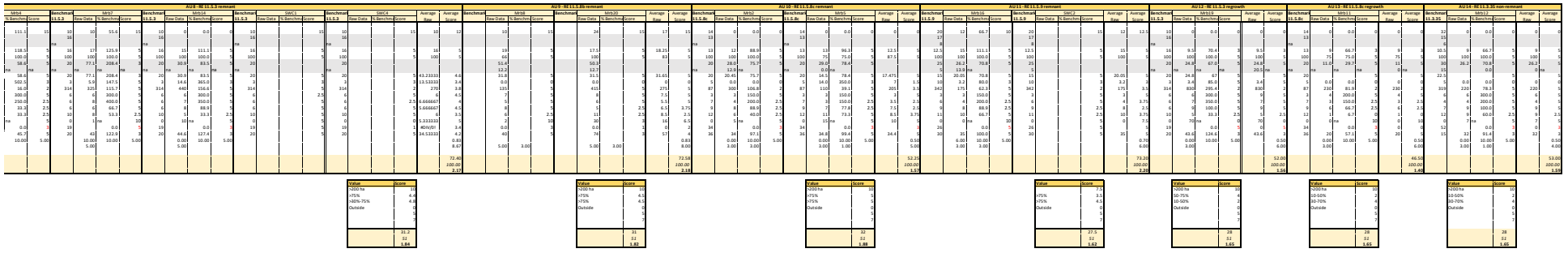
SPECIES MOBILITY		Score	Site scores
Habitat connectivity	Isolated	0-2	7
	Partially isolated	3-4	
	Periodically isolated	5-6	
	Major connectivity	7-8	
	Totally connected	9-10	
Behavioural deterrents to movement	Extreme risk of disturbance resulting in movement	0-2	4
	High risk	3-4	
	Moderate risk	5-6	
	Low Risk	7-8	
	Nil Risk	9-10	
Physical deterrents to movement	Total barrier	0-2	10
	Substantial frequent barrier	3-4	
	Moderate, occasional barrrier	5-6	
	Negligible barrier	7-8	
	Active movement pathway - i.e., watercourse or linear corridor	9-10	
	TOTAL (invert to a score out of 10)		7

THREATS TO SPECIES

THREATS TO SPECIES							
THREATS MATRIX			Severity				
			Very High	High	Medium	Low	Very Low
			1	2	3	4	5
Scope	Very High	1	1	2	3	4	5
	High	2	2	4	6	8	10
	Medium	3	3	6	9	12	15
	Low	4	4	8	12	16	20
	Very Low	5	5	10	15	20	25

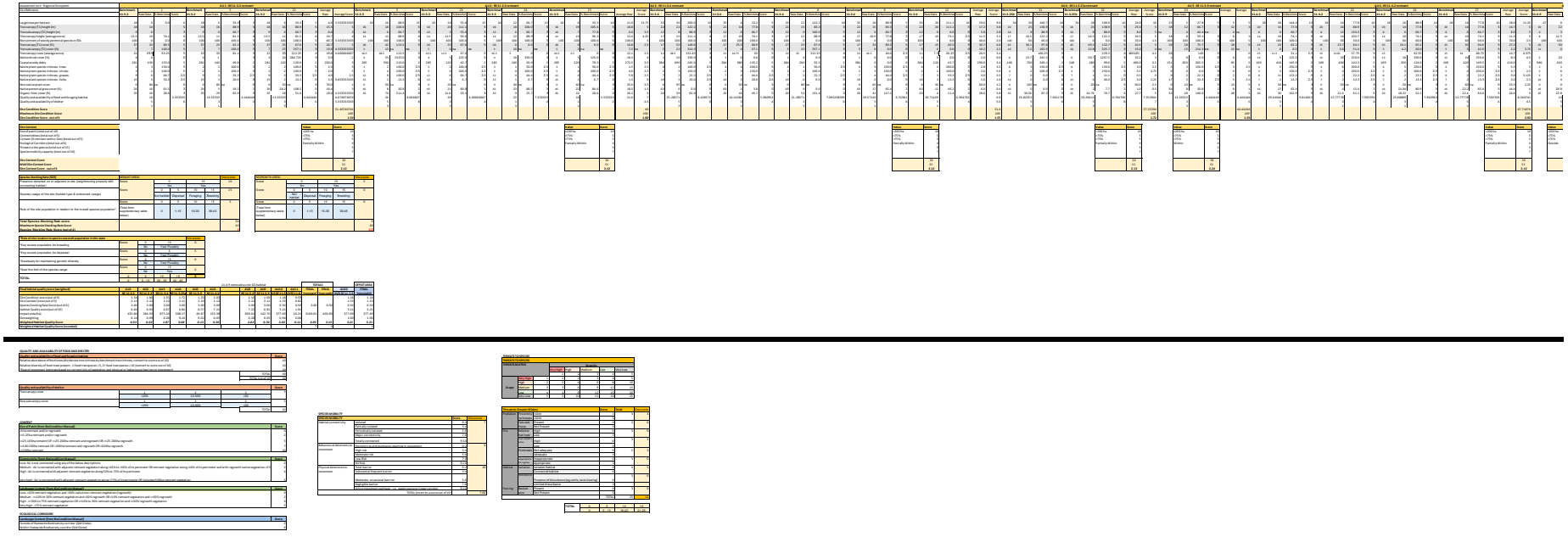
Threats to Greater Gliders			Score	Total	Site scores
Predation	Proximity to houses	<1km	1	3	3
		>1km	3		
	Cats and Foxes	Present	0	3	0
		Not Present	3		
Fire	Relative fuel load	High	0	3	0
		Low	3		
	Level of public access	High	0	3	1
		Low	3		
	Firebreaks	Not adequate	0	3	1
		Adequate	3		
	Inappropriate fire regimes	Inappropriate	0	3	0
		Appropriate	3		
Habitat Loss	Isolation	Isolated Habitat	0	4	2
		Connected habitat	4		
	Disturbance	Presence of disturbance (eg cattle, land clearin	0	3	0
		Limited disturbance	3		
Fencing	Barbed wire	Present	0	3	0
		Not Present	3		
			TOTAL	25	7

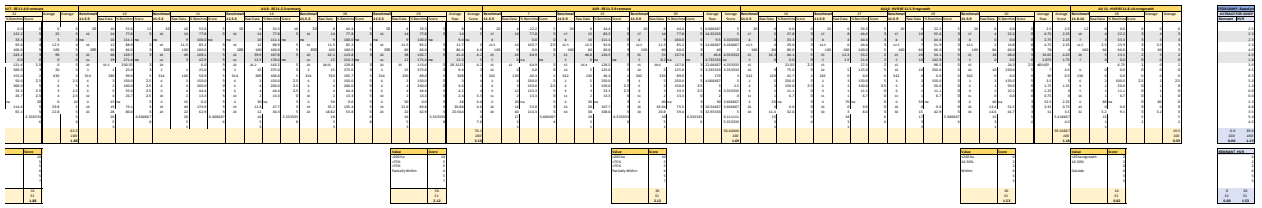
TOTAL	0	5	10	15
	0	5 - 15	16-20	21-25



HAMILTON PARK OFFSET SITE

GREATER GLIDER Habitat Quality Scores





SQUATTER PIGEON

Habitat Quality Scores

SWC MRA2C IMPACT SITE

SQUATTER PIGEON Habitat Quality Scores

Updated impact scores to meet guidelines with score errors corrected

Assessment Unit - Regional Ecosystem	AU 1 - RE 11.3.2 remnant					
Site Reference	Benchmark	Mrb1				
	11.3.2	Raw Data	% Benchma	Score	Average Raw	Average Score
Large trees per hectare	18	14	77.8	10	14.0	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	9					
Tree canopy height (average score)	13.5	17	125.9	5	17.0	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	37	57.4	155.1	5	57.4	5
Tree subcanopy (T2) cover (%)	7		0.0		0.0	
Tree canopy cover (average score)	22	57.4	77.55	5	28.7	5
Native shrub cover (%)	4	0.6	15.0	3	0.6	3
Coarse woody debis	281	128	45.6	2	128.0	2
Native plant species richness - trees	2	2	100.0	5	5.0	5
Native plant species richness - shrubs	2	8	400.0	5	8.0	5
Native plant species richness - grasses	9	10	111.1	5	10.0	5
Native plant species richness - forbs	15	5	33.3	2.5	5.0	2.5
Non-native plant cover	0	5	na	5	5.0	5
Native perennial grass cover (%)	26		0.0	3	0.0	3
Organic litter cover (%)	35	41	117.1	5	41.0	5
Quality and availability of food and foraging habitat		30.00		10.00		10.00
Quality and availability of shelter		5	1			6
Site Condition Score						53.5
Maximum Site Condition Score						*70*
Site Condition Score - out of 3						**2.29**

Assessment Unit - Regional Ecosystem	AU 2 - RE 11.3.4a remnant									
Site Reference	Benchmark	Mrb15			Benchmark	Mrb18				Average
	11.3.4	Raw Data	% Benchma	Score	11.3.4a	Raw Data	% Benchmark	Score	Average Raw	Score
Large trees per hectare	35	6	33.3	5	35	8	44.4	5	7.0	5
Tree canopy (T1) height (m)	22				22					
Tree subcanopy (T2) height (m)	12				12					
Tree canopy height (average score)	17	19	140.7	5	17	20	148.1	5	19.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	17	41.2	111.4	3	17	51.4	138.9	3		
Tree subcanopy (T2) cover (%)	5	4.7	67.1		5		0.0			
Tree canopy cover (average score)	11	22.95	89.25	3	11	51.4	69.45	3	37.2	3
Native shrub cover (%)	1	0.0	0.0	0	1	1.5	37.5	5	0.8	2.5
Coarse woody debis	384	145	51.6	2	384	30	10.7	0	87.5	1
Native plant species richness - trees	4	3	150.0	2.5	4	4	200.0	5	3.5	3.75
Native plant species richness - shrubs	2	2	100.0	5	2	3	150.0	5	2.5	5
Native plant species richness - grasses	7	4	44.4	2.5	7	5	55.6	2.5	4.5	2.5
Native plant species richness - forbs	10	1	6.7	0	10	1	6.7	0	1.0	0
Non-native plant cover	0	70	na	0	0	60	na	0	7.0	0
Native perennial grass cover (%)	43	0.0	0.0	0	43	0.0	0.0	0	7.0	0
Organic litter cover (%)	20	42	120.0	3	20	35	100.0	5	7.0	4
Quality and availability of food and foraging habitat		25.71		8.57		27.14		9.05		8.81
Quality and availability of shelter		5	1			5	1			6
Site Condition Score										31.31
Maximum Site Condition Score										*70*
Site Condition Score - out of 3										**1.34**

Assessment Unit - Regional Ecosystem	AU 3 - RE 11.3.9 remnant					
Site Reference	Benchmark	Mrb3			Average	Average
	11.3.9	Raw Data	% Benchma	Score	Raw	Score
Large trees per hectare	15	12	66.7	10	66.7	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	18	20	148.1	5	148.1	5
Recruitment of woody perennial species in EDL	100	80	80.0	5	80.0	5
Tree canopy (T1) cover (%)	28	64.6	174.6	3	174.6	3
Tree subcanopy (T2) cover (%)	na	na	na	na	na	na
Tree canopy cover (average score)	28	64.6	174.6	3		3
Native shrub cover (%)	1	0.0	0.0	0	0.0	0
Coarse woody debis	151	384	136.7	2	136.7	2
Native plant species richness - trees	5	5	250.0	5	450.0	5
Native plant species richness - shrubs	6	9	450.0	5	450.0	5
Native plant species richness - grasses	9	8	88.9	2.5	88.9	2.5
Native plant species richness - forbs	17	13	86.7	2.5	86.7	2.5
Non-native plant cover	0	7	na	5	na	5
Native perennial grass cover (%)	34		0.0	3	0.0	3
Organic litter cover (%)	32	62.6	178.9	5	178.9	5
Quality and availability of food and foraging habitat		28.89		9.63		9.63
Quality and availability of shelter		5				10
Site Condition Score						52.63
Maximum Site Condition Score						*70*
Site Condition Score - out of 3						**2.26**

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.3.25a remnant									
Site Reference	Benchmark	Mrb17			Benchmark	Mrb21			Average	Average
	11.3.25b	Raw Data	% Benchmark	Score	11.3.25b	Raw Data	% Benchma	Score	Raw	Score
Large trees per hectare	34	26	144.4	10	34	34	188.9	15	30.0	12.5
Tree canopy (T1) height (m)	24				24					
Tree subcanopy (T2) height (m)	10				10					
Tree canopy height (average score)	17	28	207.4	5	17	29	214.8	5	28.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	45	77.0	208.1	5	45	87.0	235.1	5		
Tree subcanopy (T2) cover (%)	10	13.0	185.7	5	10	48.0	685.7	3		
Tree canopy cover (average score)	27.5	45	196.9	5	27.5	67.5	460.4	4	56.3	4.5
Native shrub cover (%)	6	0.0	0.0	0	6	2.0	50.0	3	1.0	1.5
Coarse woody debis	148	10	3.6	0	148	185	65.8	5	97.5	2.5
Native plant species richness - trees	8	8	400.0	5	8	8	400.0	5	8.0	5
Native plant species richness - shrubs	4	1	50.0	2.5	4	1	50.0	2.5	1.0	2.5
Native plant species richness - grasses	7	0	0.0	0	7	0	0.0	0	0.0	0
Native plant species richness - forbs	13	2	13.3	0	13	4	26.7	2.5	3.0	1.25
Non-native plant cover	0	99	na	0	0	99	na	0	7.0	0
Native perennial grass cover (%)	10	0.0	0.0	0	10	0.0	0.0	0	7.0	0
Organic litter cover (%)	35	7	20.0	3	35	22	62.9	5	7.0	4
Quality and availability of food and foraging habitat		10.00		3.33		10.00		3.33		3.33
Quality and availability of shelter		5	3			5	5			9
Site Condition Score										38.08
Maximum Site Condition Score										*70*
Site Condition Score - out of 3										**1.63**

Assessment Unit - Regional Ecosystem	AU 5 - RE 11.3.27b remnant					
Site Reference	Benchmark	Mrb13			Average	Average
	11.3.27b	Raw Data	% Benchma	Score	Raw	Score
Large trees per hectare	34	4	22.2	5	22.22222	5
Tree canopy (T1) height (m)	15					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	15	18	133.3	5	133.3333	5
Recruitment of woody perennial species in EDL	100	66	66.0	3	66	3
Tree canopy (T1) cover (%)	42	24.9	67.3	5	67.2973	5
Tree subcanopy (T2) cover (%)	na	3.5	na	na	na	na
Tree canopy cover (average score)	42	14.2	67.3	5		5
Native shrub cover (%)	7		0.0	0	0	0
Coarse woody debis	484	280	99.6	5	99.64413	5
Native plant species richness - trees	2	2	100.0	5	300	5
Native plant species richness - shrubs	1	1	50.0	5	50	5
Native plant species richness - grasses	2	9	100.0	5	100	5
Native plant species richness - forbs	7	2	13.3	2.5	13.33333	2.5
Non-native plant cover	0	30	na	3	na	3
Native perennial grass cover (%)	10		0.0	5	0	5
Organic litter cover (%)	12	15	42.9	5	42.85714	5
Quality and availability of food and foraging habitat		30.00		10.00		10.00
Quality and availability of shelter		3	1			4
Site Condition Score						49.5
Maximum Site Condition Score						*70*
Site Condition Score - out of 3						**2.12**

Assessment Unit - Regional Ecosystem	AU 6 - RE 11.4.9 remnant													
Site Reference	Benchmark	Mrb9			Benchmark	Mrb10			Benchmark	SWC3			Average	Average
	11.4.9	Raw Data	% Benchma	Score	11.4.9	Raw Data	% Benchma	Score	11.4.9	Raw Data	% Benchma	Score	Raw	Score
Large trees per hectare	47	6	33.3	5	47	20	111.1	5	47			5	13	5
Tree canopy (T1) height (m)	10				10				10					
Tree subcanopy (T2) height (m)	6				6				6					
Tree canopy height (average score)	8	16	118.5	5	8	16	118.5	5	8			5	16	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100			5	100	5
Tree canopy (T1) cover (%)	25	81.4	220.0	3	25	74.9	202.4	3	25					
Tree subcanopy (T2) cover (%)	11	15.7	224.3	5	11	9.0	128.6	5	11					
Tree canopy cover (average score)	18	48.55	222.15	4	18	41.95	165.5	4	18			5	45.25	4.333333
Native shrub cover (%)	5	14.9	372.5	3	5	17.0	425.0	3	5			3	15.95	3
Coarse woody debis	980	1685	599.6	5	980	1670	594.3	5	980			5	1677.5	5
Native plant species richness - trees	2	2	100.0	5	2	2	100.0	5	2			5	2	5
Native plant species richness - shrubs	5	6	300.0	5	5	13	650.0	5	5			0	9.5	3.333333
Native plant species richness - grasses	5	4	44.4	2.5	5	10	111.1	5	5			5	7	4.166667
Native plant species richness - forbs	10	8	53.3	2.5	10	10	66.7	5	10			5	9	4.166667
Non-native plant cover	0	5	na	5	0	5	na	5	0			5	5	5
Native perennial grass cover (%)	16		0.0	1	16		0.0	1	16			5		2.333333
Organic litter cover (%)	45	83.6	238.9	5	45	63.6	181.7	5	45			5	73.6	5
Quality and availability of food and foraging habitat		28.00		9.33		30.00		10.00						9.67
Quality and availability of shelter		5	3			5	1							7
Site Condition Score														51.67
Maximum Site Condition Score														*70*
Site Condition Score - out of 3														**2.21**

Assessment Unit - Regional Ecosystem	AU 7 - RE 11.5.2a remnant									
Site Reference	Benchmark	Mrb6			Average	Average	Benchmark	Mrb4		
		Raw Data	% Benchma	Score	Raw	Score	11.5.3	Raw Data	% Benchma	Score
Large trees per hectare		2		5	2	5	10	20	111.1	15
Tree canopy (T1) height (m)							16			
Tree subcanopy (T2) height (m)							na			
Tree canopy height (average score)		13		5	13	5	16	16	118.5	5
Recruitment of woody perennial species in EDL		100		5	100	5	100	100	100.0	5
Tree canopy (T1) cover (%)		60.7			60.7		20	21.7	58.6	5
Tree subcanopy (T2) cover (%)		22.1			22.1		na	na	na	na
Tree canopy cover (average score)		41.4		5		5	20	21.7	58.6	5
Native shrub cover (%)		5.8		5	5.8	5	3	20.1	502.5	3
Coarse woody debis		120		2	120	2	314	45	16.0	2
Native plant species richness - trees		8		5	8	5	6	6	300.0	5
Native plant species richness - shrubs		10		5	10	5	6	5	250.0	2.5
Native plant species richness - grasses		12		5	12	5	6	3	33.3	2.5
Native plant species richness - forbs		9		5	9	5	10	5	33.3	2.5
Non-native plant cover		1		10	1	10	0	5	na	5
Native perennial grass cover (%)		0.0		5	0	5	19		0.0	3
Organic litter cover (%)		41		5	41	5	20	16	45.7	5
Quality and availability of food and foraging habitat						9.00		25.00		5.00
Quality and availability of shelter		5	3			8		3		
Site Condition Score						59				
Maximum Site Condition Score						*70*				
Site Condition Score - out of 3						**2.53**				

Site Context	AU1 Value	AU1 Score	AU2 Value	AU2 Score	AU3 Value	AU3 Score	AU4 Value	AU4 Score	AU5 Value	AU5 Score	AU6 Value	AU6 Score	AU7 Value	AU7 Score
Size of patch (total out of 10)	>200 ha	10		7.5	>200 ha	10	>200 ha	7.5	>200 ha	10	>200 ha	10	>200 ha	10
Connectedness (total out of 5)	>75%	5	>75%	5	>75%	5	>75%	5	50-75%	4	>75%	5	>75%	5
Context (% remnant within 1km) (total out of 5)	>75%	5	>30%-75%	4	>75%	5	>30%-75%	4	>30%-75%	4	>75%	4.666667	>75%	5
Ecological Corridors (total out of 6)	Outside	0	Within	6	Outside	0	Within	6	Outside	0	Outside	0	Outside	0
Threats to the species (total out of 15)		5		5		5		5		5		5		5
Species mobility capacity (total out of 10)		7.3		7.3		7.3		7.3		7.3		7.3		7.3
Site Context Score		32.3		34.8		32.3		34.8		30.3		31.96667		32.3
MAX Site Context Score		*51*		*51*		*51*		*51*		*51*		*51*		*51*
Site Context Score - out of 3		**1.90**		**2.05**		**1.90**		**2.05**		**1.78**		**1.88**		**1.90**

Species Stocking Rate (SSR)	REMNANT AREAS					Site scores
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		10		10
		No		Yes		
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	15
		Not habitat	Dispersal	Foraging	Breeding	
Role of the site population in relation to the overall species population*	Score	0	5	10	15	5
	(Total from supplementary table below)	0	1-15	16-35	36-45	
Total Species Stocking Rate score						30
Maximum Species Stocking Rate Score						40
Species Stocking Rate Score (out of 3)						2.25

REGROWTH AREAS					Site scores
Score	0		10		5
	No		Yes		
Score	0	5	10	15	10
	Not habitat	Dispersal	Foraging	Breeding	
Score	0	5	10	15	0
(Total from supplementary table below)	0	5 - 15	20 - 35	40 - 45	
					15
					40
					1.5

*Role of site location to species oveerall population in the state					Site scores
*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		5
		No	Yes/ Possibly		
*Near the limit of the species range	Score	0	15		0
		No	Yes		
TOTAL	0	5	10	15	10
	0	5 - 15	20 - 35	40 - 45	

11.4.9 removed as not SP habitat

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5		AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	FINAL (remnant)	FINAL (regrowth)
	RE 11.3.2	RE 11.3.4a	RE 11.3.9	RE 11.3.25a	RE 11.3.27b		RE11.5.2a	RE 11.5.3	RE 11.5.8b	RE 11.5.8c	RE 11.5.9	HVR RE 11.5.3	HVR RE 11.5.8c	RE 11.3.35 non-rem		
Site Condition score (out of 3)	2.29	1.34	2.26	1.63	2.12		2.53	2.38	2.65	2.29	2.29	2.29	2.29	2.29		
Site Context Score (out of 3)	1.90	2.05	1.90	2.05	1.78		1.90	1.85	1.84	1.90	1.64	1.66	1.66	1.66		
Species Stocking Rate Score (out of 4)	2.25	2.25	2.25	2.25	2.25		2.25	2.25	2.25	2.25	2.25	1.50	1.50	1.50	2.25	1.50
Habitat Quality score (out of 10)	6.44	5.64	6.41	5.93	6.15		6.68	6.48	6.74	6.44	6.18	5.45	5.45	5.45		
Impact area (ha)	82.75	268.54	33.65	95.86	6.14		11.33	361.91	78.17	291.38	85.55	119.75	44.85	1.96	1315.28	166.56
Size weighting	0.06	0.20	0.03	0.07	0.00		0.01	0.28	0.06	0.22	0.07	0.72	0.27	0.01		
Weighted Habitat Quality Score	***0.39***	***1.13***	***0.19***	***0.42***	***0.00***		***0.07***	***1.81***	***0.40***	***1.42***	***0.43***	***3.92***	***1.47***	***0.05***	***6.26***	***5.44***
Weighted Habitat Quality Score (rounded)															6	6

QUALITY AND AVAILABILITY OF FOOD AND SHELTER

Quality and availability of food and foraging habitat	Score
Relative abundance of native grasses (divide raw grass richness by benchmark grass richness, convert to score out of 10)	10
Relative diversity of food grases present - 1 food grass species = 5, 2+ food grass species = 10 (convert to score out of 10)	10
^Ease of movement (estimate based on connectivity of vegetation and physical or behavioural barriers to movement)	10
TOTAL	30
TOTAL out of 10	10

^scores from 0 – 10 where 0 – 2 = (movement totally restricted), 2 - 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (along a koala movement corridor).

Quality and availability of shelter				Score
Tree canopy cover	1	3	5	5
	<10%	10-30%	>30	
Raw subcanopy cover	1	3	5	5
	<10%	10-30%	>30	
			TOTAL	10

CONTEXT

Size of Patch (from BioCondition Manual)	Score
<5ha remnant and/or regrowth	0
>=5-25ha remnant and/or regrowth	2
>=25-100ha remannt OF >=25-200ha remnant and regrowth OR >=25-200ha regrowth	5
>=100-200ha remnant OR >200ha remnant and regrowth OR >200ha regrowth	7
>=200ha remnant	10

Connectivity (from BioCondition Manual)	Score
Low - AU is not connected using any of the below descriptions	0
Medium - AU is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR remnant vegetation along <10% of its perimeter and with regrowth native vegetation >25% of its per	2
High - AU is connected with adjacent remnant vegetation along 50% to 75% of its perimeter	4
Very high - AU is connected with adjacent remnant vegetation along >75% of its perimeter OR includes>500ha remnant vegetation	5

Landscape Context (from BioCondition Manual)	Score
Low - <10% remnant vegetation and <30% native non-remnant vegetation (regrowth)	0
Medium - >=10% to 30% remnant vegetation and <30% regrowth OR <10% remnant vegetation and >=30% regrowth	2
High - >=30% to 75% remnant vegetation OR >=10% to 30% remnant vegetation and >=30% regrowth vegetation	4
Very high - >75% remnant vegetation	5

ECOLOGICAL CORRIDORS

Landscape Context (from BioCondition Manual)	Score
Outside of Statewide Biodiversity corridor (Qld Globe)	0
Within Statewide Biodiversity corridor (Qld Globe)	6

SPECIES MOBILITY

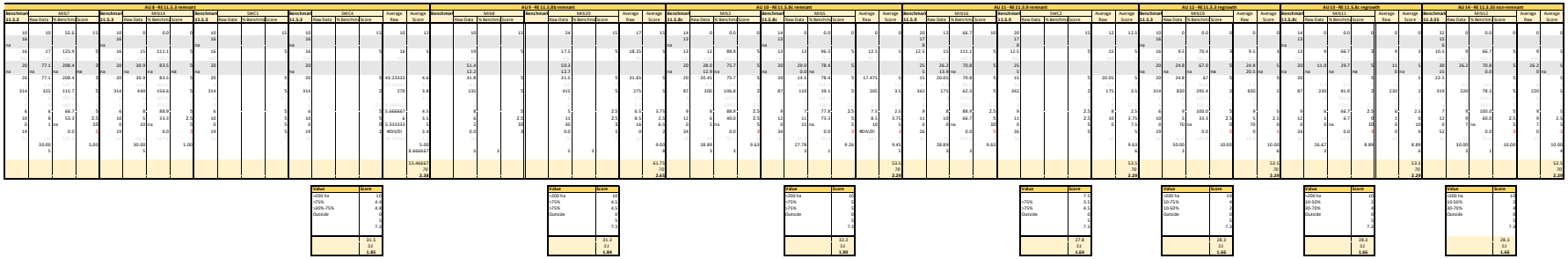
SPECIES MOBILITY		Score	Site scores
Habitat connectivity	Isolated	0-2	7
	Partially isolated	3-4	
	Periodically isolated	5-6	
	Major connectivity	7-8	
	Totally connected	9-10	
Behavioural deterrents to movement	Extreme risk of disturbance resulting in movement	0-2	7
	High risk	3-4	
	Moderate risk	5-6	
	Low Risk	7-8	
	Nil Risk	9-10	
Physical deterrents to movement	Total barrier	0-2	8
	Substantial frequent barrier	3-4	
	Moderate, occasional barrrier	5-6	
	Negligible barrier	7-8	
	Active movement pathway - i.e., watercourse or linear corridor	9-10	
	TOTAL (invert to a score out of 10)		7.333333

THREATS TO SPECIES

THREATS TO SPECIES							
THREATS MATRIX			Severity				
			Very High	High	Medium	Low	Very Low
			1	2	3	4	5
Scope	Very High	1	1	2	3	4	5
	High	2	2	4	6	8	10
	Medium	3	3	6	9	12	15
	Low	4	4	8	12	16	20
	Very Low	5	5	10	15	20	25

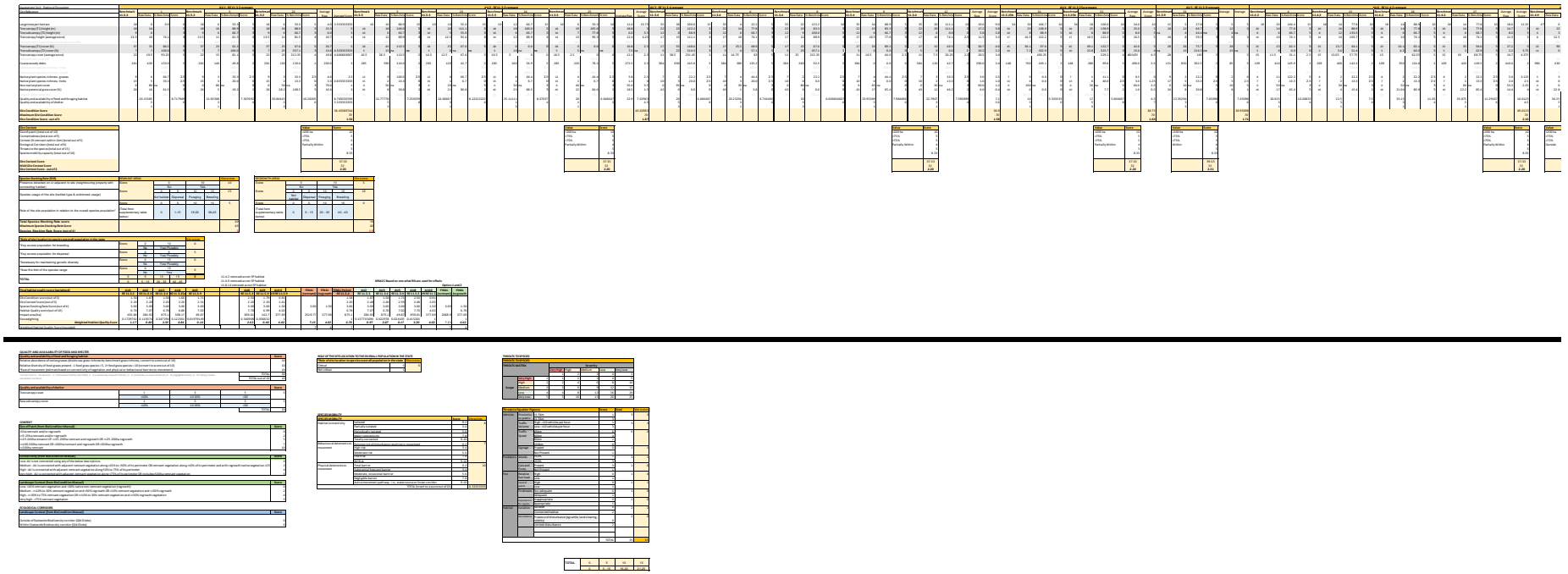
Threats to Squatter Pigeons			Score	Total	Site scores
Vehicles	Proximity to public road	<1.5km	1	3	3
		>1.5km	3		
	Traffic Volume	High - >10 vehicles per hour	1	3	1
		Low - <10 vehicles per hour	3		
	Traffic Speed	40km	6	6	4
		60km	4		
		80km	2		
		100km	0		
	Signage	Present	0	1	1
		Not Present	1		
Predators	Weeds	>50%	1	3	1
		<50%	3		
	Cats and Foxes	Present	0	1	0
		Not Present	1		
Fire	Relative fuel load	High	0	1	0
		Low	1		
	Level of public access	High	0	1	1
		Low	1		
	Firebreaks	Not adequate	0	1	1
		Adequate	1		
	Inappropriate fire regimes	Inappropriate	0	1	0
		Appropriate	1		
Habitat Loss	Isolation	Isolated	0	2	2
		Connected habitat	2		
	Disturbance	Presence of disturbance (eg cattle, land clearing, rabbits)	0	2	0
		Limited disturbance	2		
			TOTAL	25	14

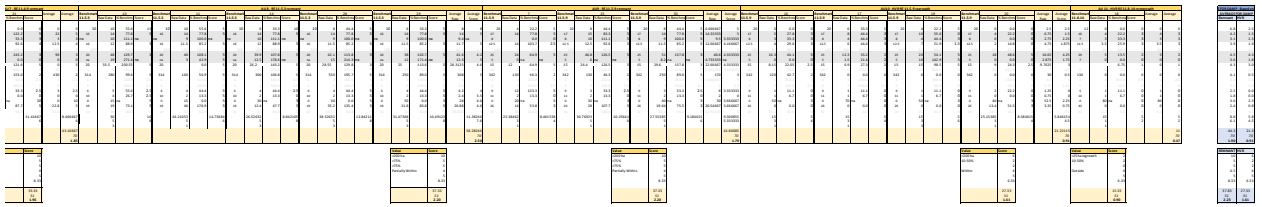
TOTAL	0	5	10	15
	0	5 - 15	16-20	21-25



HAMILTON PARK OFFSET SITE

SQUATTER PIGEON Habitat Quality Scores





DOCUMENT INFORMATION

Prepared for	Stanmore SMC
Project Name	EPBC 2017/7957 South Walker Creek MRA2C impacts to Koala, Greater Glider and Squatter Pigeon habitat
Document Name	Offset Ecological Assessment Report
Date	April 2024

DOCUMENT CONTROL

Version	Date	Author	Details
1	28/03/24	Maxim Gunther	GIS Mapping
2	5/03/24	Emily Krunes	Document Draft
3	28/03/24	Emily Krunes	Draft Finalisation
4	22/04/24	Emily Krunes	Finalisation after client review

CITATION

Trend Environmental. (2024). Offset Ecological Assessment Report. EPBC 2017/7957 South Walker Creek MRA2C impacts to Koala, Greater Glider and Squatter Pigeon habitat. Prepared on behalf of Stanmore SMC. April 2024.

PHOTOGRAPHS

All photographs © Emily Krunes, Trend Environmental 2023.

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APPENDIX

D

OFFSET ASSESSMENT GUIDE
CALCULATOR RESULTS

KOALA

Updated impact scores to meet guidelines with score errors corrected

Assessment Unit - Regional Ecosystem: AU 1 - RE 11.3.2 remnant

Site Reference	Benchmark 11.3.2	Mrb1 Raw Data	Mrb1 % Benchmark	Mrb1 Score	Average Raw	Average Score
Large trees per hectare	18	14	77.8	10	14.0	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	9					
Tree canopy height (average score)	13.5	17	125.9	5	17.0	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	37	57.4	155.1	5	57.4	5
Tree subcanopy (T2) cover (%)	7		0.0		0.0	
Tree canopy cover (average score)	22	57.4	77.55	5	28.7	5
Native shrub cover (%)	4	0.6	15.0	3	0.6	3
Coarse woody debis	281	128	45.6	2	128.0	2
Native plant species richness - trees	2	2	100.0	5	5.0	5
Native plant species richness - shrubs	2	8	400.0	5	8.0	5
Native plant species richness - grasses	9	10	111.1	5	10.0	5
Native plant species richness - forbs	15	5	33.3	2.5	5.0	2.5
Non-native plant cover	0	5	na	5	5.0	5
Native perennial grass cover (%)	26		0.0	3	0.0	3
Organic litter cover (%)	35	41	117.1	5	41.0	5
Quality and availability of food and foraging habitat		25.00		8.33		8.33
Quality and availability of shelter		5		6		6
		1				
Site Condition Score						74.83
Maximum Site Condition Score						*100*
Site Condition Score - out of 3						**2.24**

AU 2 - RE 11.3.4a remnant

Site Reference	Benchmark 11.3.4	Mrb15 Raw Data	Mrb15 % Benchmark	Mrb15 Score	Benchmark 11.3.4a	Mrb18 Raw Data	Mrb18 % Benchmark	Mrb18 Score	Average Raw	Average Score
Large trees per hectare	35	6	33.3	5	35	8	44.4	5	7.0	5
Tree canopy (T1) height (m)	22				22					
Tree subcanopy (T2) height (m)	12				12					
Tree canopy height (average score)	17	19	140.7	5	17	20	148.1	5	19.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	17	41.2	111.4	3	17	51.4	138.9	3		
Tree subcanopy (T2) cover (%)	5	4.7	67.1		5		0.0			
Tree canopy cover (average score)	11	22.95	89.25	3	11	51.4	69.45	3	37.2	3
Native shrub cover (%)	1	0.0	0.0	0	1	1.5	37.5	5	0.8	2.5
Coarse woody debis	384	145	51.6	2	384	30	10.7	0	87.5	1
Native plant species richness - trees	4	3	150.0	2.5	4	4	200.0	5	3.5	3.75
Native plant species richness - shrubs	2	2	100.0	5	2	3	150.0	5	2.5	5
Native plant species richness - grasses	7	4	44.4	2.5	7	5	55.6	2.5	4.5	2.5
Native plant species richness - forbs	10	1	6.7	0	10	1	6.7	0	1.0	0
Non-native plant cover	0	70	na	0	0	60	na	0	7.0	0
Native perennial grass cover (%)	43	0.0	0.0	0	43	0.0	0.0	0	7.0	0
Organic litter cover (%)	20	42	120.0	3	20	35	100.0	5	7.0	4
Quality and availability of food and foraging habitat		22.50		7.50		25.00		8.33		7.92
Quality and availability of shelter		5		6		5		6		6
		1				1				
Site Condition Score										50.67
Maximum Site Condition Score										*100*
Site Condition Score - out of 3										**1.52**

AU 3 - RE 11.3.9 remnant

Site Reference	Benchmark 11.3.9	Mrb3 Raw Data	Mrb3 % Benchmark	Mrb3 Score	Average Raw	Average Score
Large trees per hectare	15	12	66.7	10	66.7	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	18	20	148.1	5	148.1	5
Recruitment of woody perennial species in EDL	100	80	80.0	5	80.0	5
Tree canopy (T1) cover (%)	28	64.6	174.6	3	174.6	3
Tree subcanopy (T2) cover (%)	na	na	na	na	na	na
Tree canopy cover (average score)	28	64.6	174.6	3		3
Native shrub cover (%)	1	0.0	0.0	0	0.0	0
Coarse woody debis	151	384	136.7	2	136.7	2
Native plant species richness - trees	5	5	250.0	5	450.0	5
Native plant species richness - shrubs	6	9	450.0	5	450.0	5
Native plant species richness - grasses	9	8	88.9	2.5	88.9	2.5
Native plant species richness - forbs	17	13	86.7	2.5	86.7	2.5
Non-native plant cover	0	7	na	5	na	5
Native perennial grass cover (%)	34		0.0	3	0.0	3
Organic litter cover (%)	32	62.6	178.9	5	178.9	5
Quality and availability of food and foraging habitat		25.00		8.33		8.33
Quality and availability of shelter		5		10		10
		5				
Site Condition Score						71.33
Maximum Site Condition Score						*100*
Site Condition Score - out of 3						**2.14**

AU 4 - RE 11.3.25a remnant

Site Reference	Benchmark 11.3.25b	Mrb17 Raw Data	Mrb17 % Benchmark	Mrb17 Score	Benchmark 11.3.25b	Mrb21 Raw Data	Mrb21 % Benchmark	Mrb21 Score	Average Raw	Average Score
Large trees per hectare	34	26	144.4	10	34	34	188.9	15	30.0	12.5
Tree canopy (T1) height (m)	24				24					
Tree subcanopy (T2) height (m)	10				10					
Tree canopy height (average score)	17	28	207.4	5	17	29	214.8	5	28.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	45	77.0	208.1	5	45	87.0	235.1	5		
Tree subcanopy (T2) cover (%)	10	13.0	185.7	5	10	48.0	685.7	3		
Tree canopy cover (average score)	27.5	45	196.9	5	27.5	67.5	460.4	4	56.3	4.5
Native shrub cover (%)	6	0.0	0.0	0	6	2.0	50.0	3	1.0	1.5
Coarse woody debis	148	10	3.6	0	148	185	65.8	5	97.5	2.5
Native plant species richness - trees	8	8	400.0	5	8	8	400.0	5	8.0	5
Native plant species richness - shrubs	4	1	50.0	2.5	4	1	50.0	2.5	1.0	2.5
Native plant species richness - grasses	7		0.0	0	7		0.0	0		0
Native plant species richness - forbs	13	2	13.3	0	13	4	26.7	2.5	3.0	1.25
Non-native plant cover	0	99	na	0	0	99	na	0	7.0	0
Native perennial grass cover (%)	10	0.0	0.0	0	10	0.0	0.0	0	7.0	0
Organic litter cover (%)	35	7	20.0	3	35	22	62.9	5	7.0	4
Quality and availability of food and foraging habitat		25.00		8.33		25.00		8.33		8.33
Quality and availability of shelter		5		8		5		10		9
		3				5				
Site Condition Score										61.08
Maximum Site Condition Score										*100*
Site Condition Score - out of 3										**1.83**

AU 5 - RE 11.3.27b remnant

Site Reference	Benchmark 11.3.27b	Mrb13 Raw Data	Mrb13 % Benchmark	Mrb13 Score	Average Raw	Average Score
Large trees per hectare	34	4	22.2	5	22.2222	5
Tree canopy (T1) height (m)	15					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	15	18	133.3	5	133.333	5
Recruitment of woody perennial species in EDL	100	66	66.0	3	66	3
Tree canopy (T1) cover (%)	42	24.9	67.3	5	67.2973	5
Tree subcanopy (T2) cover (%)	na	3.5	na	na	na	na
Tree canopy cover (average score)	42	14.2	67.3	5		5
Native shrub cover (%)	7		0.0	0	0	0
Coarse woody debis	484	280	99.6	5	99.6441	5
Native plant species richness - trees	2	2	100.0	5	300	5
Native plant species richness - shrubs	1	1	50.0	5	50	5
Native plant species richness - grasses	2	9	100.0	5	100	5
Native plant species richness - forbs	7	2	13.3	2.5	13.3333	2.5
Non-native plant cover	0	30	na	3	na	3
Native perennial grass cover (%)	10		0.0	5	0	5
Organic litter cover (%)	12	15	42.9	5	42.8571	5
Quality and availability of food and foraging habitat		25.00		8.33		8.33
Quality and availability of shelter		3		4		4
		1				
Site Condition Score						65.83
Maximum Site Condition Score						*100*
Site Condition Score - out of 3						**1.97**

AU 6 - RE 11.4.9 remnant

Site Reference	Benchmark 11.4.9	Mrb9 Raw Data	Mrb9 % Benchmark	Mrb9 Score	Benchmark 11.4.9	Mrb10 Raw Data	Mrb10 % Benchmark	Mrb10 Score	Benchmark 11.4.9	SWC3 Raw Data	SWC3 % Benchmark	SWC3 Score	Average Raw	Average Score
Large trees per hectare	47	6	33.3	5	47	20	111.1	5	47			5	13	5
Tree canopy (T1) height (m)	10				10				10					
Tree subcanopy (T2) height (m)	6				6				6					
Tree canopy height (average score)	8	16	118.5	5	8	16	118.5	5	8			5	16	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100			5	100	5
Tree canopy (T1) cover (%)	25	81.4	220.0	3	25	74.9	202.4	3	25					
Tree subcanopy (T2) cover (%)	11	15.7	224.3	5	11	9.0	128.6	5	11					
Tree canopy cover (average score)	18	48.55	222.15	4	18	41.95	165.5	4	18			5	45.25	4.33333
Native shrub cover (%)	5	14.9	372.5	3	5	17.0	425.0	3	5			3	15.95	3
Coarse woody debis	980	1685	599.6	5	980	1670	594.3	5	980			5	1677.5	5
Native plant species richness - trees	2	2	100.0	5	2	2	100.0	5	2			5	2	5
Native plant species richness - shrubs	5	6	300.0	5	5	13	650.0	5	5			0	9.5	3.33333
Native plant species richness - grasses	5	4	44.4	2.5	5	10	111.1	5	5			5	7	4.16667
Native plant species richness - forbs	10	8	53.3	2.5	10	10	66.7	5	10			5	9	4.16667
Non-native plant cover	0	5	na	5	0	5	na	5	0			5	5	5
Native perennial grass cover (%)	16		0.0	1	16		0.0	1	16			5		2.33333
Organic litter cover (%)	45	83.6	238.9	5	45	63.6	181.7	5	45			5	73.6	5
Quality and availability of food and foraging habitat		25.00		8.33		25.00		8.33						8.33
Quality and availability of shelter		5		8		5		6						7
		3				1								
Site Condition Score														71.6633
Maximum Site Condition Score														*100*
Site Condition Score - out of 3														**2.15**

AU 7 - RE 11.5.2a remnant

Site Reference	Benchmark	Mrb6 Raw Data	Mrb6 % Benchmark	Mrb6 Score	Average Raw	Average Score	Benchmark 11.5.3	Mrb4 Raw Data	Mrb4 % Benchmark	Mrb4 Score
Large trees per hectare		2		5	2	5	10	20	111.1	15
Tree canopy (T1) height (m)							16			
Tree subcanopy (T2) height (m)							na			
Tree canopy height (average score)		13		5	13	5	16	16	118.5	5
Recruitment of woody perennial species in EDL		100		5	100	5	100	100	100.0	5
Tree canopy (T1) cover (%)		60.7			60.7		20	21.7	58.6	5
Tree subcanopy (T2) cover (%)		22.1			22.1		na	na	na	na
Tree canopy cover (average score)		41.4		5		5	20	21.7	58.6	5
Native shrub cover (%)		5.8		5	5.8	5	3	20.1	502.5	3
Coarse woody debis		120		2	120	2	314	45	16.0	2
Native plant species richness - trees		8		5	8	5	6	6	300.0	5
Native plant species richness - shrubs		10		5	10	5	6	5	250.0	2.5
Native plant species richness - grasses		12		5	12	5	6	3	33.3	2.5
Native plant species richness - forbs		9		5	9	5	10	5	33.3	2.5
Non-native plant cover		1		10	1	10	0	5	na	5
Native perennial grass cover (%)		0.0		5	0	5	19		0.0	3
Organic litter cover (%)		41		5	41	5	20	16	45.7	5
Quality and availability of food and foraging habitat						0.83		25.00		8.33
Quality and availability of shelter		5		8		5		3		8
		3						5		
Site Condition Score						72.83				
Maximum Site Condition Score						*100*				
Site Condition Score - out of 3						**2.18**				

Site Context	AU1 Value	AU1 Score	AU2 Value	AU2 Score	AU3 Value	AU3 Score	AU4 Value	AU4 Score	AU5 Value	AU5 Score	AU6 Value	AU6 Score	AU7 Value	AU7 Score
Size of patch (total out of 10)	>200 ha	10		7.5	>200 ha	10	>200 ha	7.5	>200 ha	10	>200 ha	10	>200 ha	10
Connectedness (total out of 5)	>75%	5	>75%	5	>75%	5	>75%	5	50-75%	4	>75%	5	>75%	5
Context (% remnant within 1km) (total out of 5)	>75%	5	>30%-75%	4	>75%	5	>30%-75%	4	>30%-75%	4	>75%	4.66667	>75%	5
Ecological Corridors (total out of 6)	Outside	0	Within	6	Outside	0	Within	6	Outside	0	Outside	0	Outside	0
Threats to the species (total out of 15)	15-20	10	15-20	10	15-20	10	15-20	10	15-20	10	15-20	10	15-20	10
Species mobility capacity (total out of 10)		6.7		6.7		6.7		6.7		6.7		6.7		6.7
Site Context Score		36.7		39.2		36.7		39.2		34.7		36.3667		36.7
MAX Site Context Score		*51*		*51*		*51*		*51*		*51*		*51*		*51*
Site Context Score - out of 3		**2.16**		**2.31**		**2.16**		**2.31**		**2.04**		**2.14**		**2.16**

Species Stocking Rate (SSR)	REMNANT AREAS					Site scores
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		10		10
		No		Yes		
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	15
		Not habitat	Dispersal	Foraging	Breeding	
Role of the site population in relation to the overall species population*	Score	0	5	10	15	5
	(Total from supplementary table below)	0	1-15	16-35	36-45	
Total Species Stocking Rate score						30
Maximum Species Stocking Rate Score						40
Species Stocking Rate Score (out of 4)						3

REGROWTH AREAS					Site scores
Score	0		10		5
	No		Yes		
Score	0	5	10	15	0
	Not habitat	Dispersal	Foraging	Breeding	
Score	0	5	10	15	0
(Total from supplementary table below)	0	1-15	16-35	36-45	
					5
					40
					0.5

*Role of site location to species oveerall population in the state					Site scores
*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		0
		No	Yes/ Possibly		
*Near the limit of the species range	Score	0	15		0
		No	Yes		
TOTAL	0	5	10	15	5
	0	5 - 15	20 - 35	40 - 45	

11.5.2a removed as not Koala habitat

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5	AU6		AU8	AU9	AU10	AU11	AU12	AU13	AU14	Remnant	Regrowth	FINAL (Average)
	RE 11.3.2	RE 11.3.4a	RE 11.3.9	RE 11.3.25a	RE 11.3.27b	RE 11.4.9		RE 11.5.3	RE 11.5.8b	RE 11.5.8c	RE 11.5.9	HVR RE 11.5.3	HVR RE 11.5.8c	RE 11.3.35 non-rem			
Site Condition score (out of 3)	2.24	1.52	2.14	1.83	1.97	2.15		2.42	2.18	1.80	2.42	1.85	1.53	1.82	*2.07*	*1.73*	
Site Context Score (out of 3)	1.71	2.31	2.16	2.31	2.04	2.14		2.11	2.10	2.16	1.89	1.92	1.92	1.92	*2.09*	*1.92*	
Species Stocking Rate Score (out of 4)	3.00	3.00	3.00	3.00	3.00	3.00		3.00	3.00	3.00	3.00	0.50	0.50	0.50	*3.00*	*0.50*	
Habitat Quality score (out of 10)	6.95	6.83	7.30	7.14	7.01	7.29		7.53	7.28	6.96	7.31	4.27	3.95	4.24	*7.16*	*4.15*	
Impact area (ha)	82.75	268.54	33.65	95.86	6.14	37.17		361.91	78.17	291.38	85.55	119.75	44.85	1.96	*1341.12*	*166.56*	
Size weighting	0.06	0.20	0.03	0.07	0.00	0.03		0.27	0.06	0.22	0.06	0.72	0.27	0.01	*1.00*	*1.00*	
Weighted Habitat Quality Score	***0.42***	***1.37***	***0.22***	***0.50***	***0.00***	***0.22***		***2.03***	***0.44***	***1.53***	***0.44***	***3.07***	***1.07***	***0.04***	***7.17***	***4.18***	**5.68**
Weighted Habitat Quality Score (rounded)															7	4	6

QUALITY AND AVAILABILITY OF FOOD AND SHELTER

Quality and availability of food and foraging habitat	Score
Relative abundance of food trees (divide raw tree richness by benchmark tree richness, convert to score out of 10)	10
Relative diversity of food trees present (convert to score out of 10)	10
^Ease of movement (estimate based on connectivity of vegetation and physical or behavioural barriers to movement)	10
TOTAL	30
TOTAL out of 10	10

^scores from 0 – 10 where 0 – 2 = (movement totally restricted), 2 - 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (along a koala movement corridor).

Quality and availability of shelter				Score
Tree canopy cover	1	3	5	5
	<10%	10-30%	>30	
Raw subcanopy cover	1	3	5	5
	<10%	10-30%	>30	
			TOTAL	10

CONTEXT

Size of Patch (from BioCondition Manual)	Score
<5ha remnant and/or regrowth	0
>=5-25ha remnant and/or regrowth	2
>=25-100ha remannt OF >=25-200ha remnant and regrowth OR >=25-200ha regrowth	5
>=100-200ha remnant OR >200ha remnant and regrowth OR >200ha regrowth	7
>=200ha remnant	10

Connectivity (from BioCondition Manual)	Score
Low - AU is not connected using any of the below descriptions	0
Medium - AU is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR remnant vegetation along <10% of its perimeter and with regrowth native vegetation >25% of its pe	2
High - AU is connected with adjacent remnant vegetation along 50% to 75% of its perimeter	4
Very high - AU is connected with adjacent remnant vegetation along >75% of its perimeter OR includes>500ha remnant vegetation	5

Landscape Context (from BioCondition Manual)	Score
Low - <10% remnant vegetation and <30% native non-remnant vegetation (regrowth)	0
Medium - >=10% to 30% remnant vegetation and <30% regrowth OR <10% remnant vegetation and >=30% regrowth	2
High - >=30% to 75% remnant vegetation OR >=10% to 30% remnant vegetation and >=30% regrowth vegetation	4
Very high - >75% remnant vegetation	5

ECOLOGICAL CORRIDORS

Landscape Context (from BioCondition Manual)	Score
Outside of Statewide Biodiversity corridor (Qld Globe)	0
Within Statewide Biodiversity corridor (Qld Globe)	6

SPECIES MOBILITY

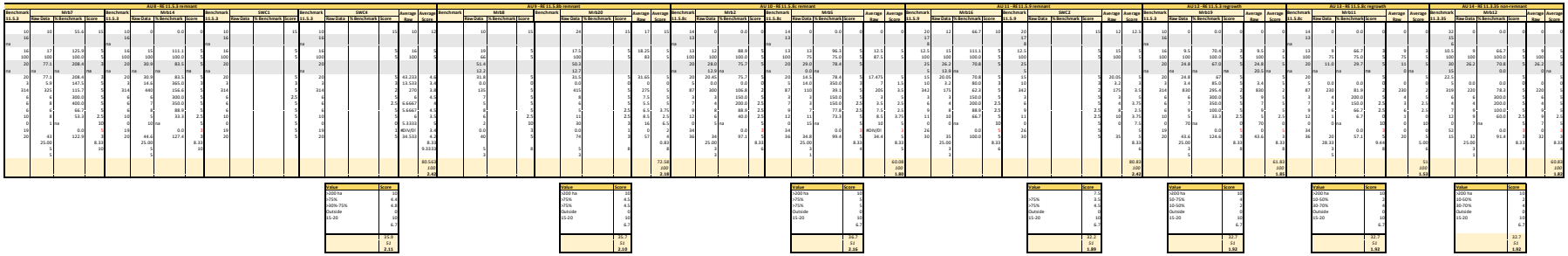
SPECIES MOBILITY		Score	Site scores
Habitat connectivity	Isolated	0-2	7
	Partially isolated	3-4	
	Periodically isolated	5-6	
	Major connectivity	7-8	
	Totally connected	9-10	
Behavioural deterrents to movement	Extreme risk of disturbance resulting in movement	0-2	3
	High risk	3-4	
	Moderate risk	5-6	
	Low Risk	7-8	
	Nil Risk	9-10	
Physical deterrents to movement	Total barrier	0-2	10
	Substantial frequent barrier	3-4	
	Moderate, occasional barrrier	5-6	
	Negligible barrier	7-8	
	Active movement pathway - i.e., watercourse or linear corridor	9-10	
	TOTAL (invert to a score out of 10)		6.666667

THREATS TO SPECIES

THREATS TO SPECIES							
THREATS MATRIX			Severity				
			Very High	High	Medium	Low	Very Low
			1	2	3	4	5
Scope	Very High	1	1	2	3	4	5
	High	2	2	4	6	8	10
	Medium	3	3	6	9	12	15
	Low	4	4	8	12	16	20
	Very Low	5	5	10	15	20	25

Threats to Koalas			Score	Total	Site scores
Vehicles	Proximity to public road	<1.5km	1	3	3
		>1.5km	3		
	Traffic Volume	High - >10 vehicles per hour	1	3	1
		Low - <10 vehicles per hour	3		
	Traffic Speed	40km	6	6	4
		60km	4		
		80km	2		
		100km	0		
	Exclusion Fencing	Present	0	1	1
		Not Present	1		
	Signage	Present	0	1	1
		Not Present	1		
Wild and domestic dogs	Proximity to houses	<1km	1	3	3
		>1km	3		
	Wild dog presence on	Present	0	1	0
		Not Present	1		
Fire	Relative fuel load	High	0	1	0
		Low	1		
	Level of public access	High	0	1	1
		Low	1		
	Firebreaks	Not adequate	0	1	1
		Adequate	1		
Habitat Loss	Isolation	Isolated Habitat	0	2	2
		Connected habitat	2		
	Disease	Noticable disease	0	1	1
		None	1		
	Disturbance	Presence of disturbance (eg cattle, land clearing)	0	1	0
		Limited disturbance	1		
			TOTAL	25	18

TOTAL	0	5	10	15
	0	5 - 15	16-20	21-25



Assessment Unit - Regional Ecosystem	AU 1 - RE 11.3.2 remnant													
Site Reference	Benchmark	1			Benchmark	5			Benchmark	22			Average Raw	Average Score
	11.3.2	Raw Data	% Benchmark	Score	11.3.2	Raw Data	% Benchmark	Score	11.3.2	Raw Data	% Benchmark	Score		
Large trees per hectare	18	0	0.0	0	18	6	33.3	5	18	6	33.3	5	4.0	3.333333
Tree canopy (T1) height (m)	18	14		5	18	16	88.9	5	18	16	88.9	5	15.3	5
Tree subcanopy (T2) height (m)	9	6		3	9	6	66.7	3	9	6	66.7	3	6.0	3
Tree canopy height (average score)	13.5	10	74.1	4	13.5	11	81.5	4	13.5	11	81.5	4	10.7	4
Recruitment of woody perennial species in EDL	100	0	0.0	0	100	100	100.0	5	100	100	100.0	5	66.7	3.333333
Tree canopy (T1) cover (%)	37	32	86.5	5	37	23	62.2	5	37	25	67.6	5	26.7	5
Tree subcanopy (T2) cover (%)	7	7	100.0	5	7	7	100.0	5	7	25	357.1	3	13.0	4.333333
Tree canopy cover (average score)	22	19.5	93.25	5	22	15	81.1	5	22	25	212.35	4	19.8	4.666667
Native shrub cover (%)	4	0		0	4	1		3	4	10	284.725	3	5.0	2
Coarse woody debis	281	430	153.0	5	281	140	49.8	2	281	120	120.0	2	230.0	3
Native plant species richness - trees	2	3	150.0	5	2	2	100.0	5	2	2	100.0	5	2.3	5
Native plant species richness - shrubs	2	2	100.0	5	2	2	100.0	5	2	2	100.0	5	2.0	5
Native plant species richness - grasses	9	6	66.7	2.5	9	3	33.3	2.5	9	3	33.3	2.5	4.0	2.5
Native plant species richness - forbs	15	5	33.3	2.5	15	3	20.0	0	15	2	13.3	0	3.3	0.833333
Non-native plant cover	0	80	na	0	0	80	na	0	0	50	na	3	70.0	1
Native perennial grass cover (%)	26	16	61.5	3	26	5	19.2	1	26	28.2	108.5	5	16.4	3
Organic litter cover (%)	35	10	28.6	3	35	29	82.9	5	35	18	51.4	5	19.0	4.333333
Quality and availability of food and foraging habitat		20.00		6.67		23.33		7.78		23.33		7.78		7.41
Quality and availability of shelter		5		6		3		4		3		6		5.333333
		1				1				3				
Site Condition Score														54.74333
Maximum Site Condition Score														*100*
Site Condition Score - out of 3														**1.64**

Assessment Unit - Regional Ecosystem	AU 2 - RE 11.3.3 remnant																	
Site Reference	Benchmark	3			Benchmark	23			Benchmark	24			Benchmark	25			Average Raw	Average Score
	11.3.3	Raw Data	% Benchmark	Score	11.3.3	Raw Data	% Benchmark	Score	11.3.3	Raw Data	% Benchmark	Score	11.3.3	Raw Data	% Benchmark	Score		
Large trees per hectare	10	16	88.9	15	10	10	55.6	15	10	12	66.7	15	10	6	33.3	10	11.0	13.75
Tree canopy (T1) height (m)	18	18	100.0	5	18	20	111.1	5	18	18	100.0	5	18	19	105.6	5	18.8	5
Tree subcanopy (T2) height (m)	10	6	66.7	3	10	5	55.6	3	10	6	66.7	3	10	7	77.8	5	6.0	3.5
Tree canopy height (average score)	14	12	88.9	4	14	12.5	92.6	4	14	12	88.9	4	14	13	96.3	5	12.4	4.25
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	28	42	113.5	5	28	25	67.6	5	28	0	0.0	0	28	0	0.0	0	16.8	2.5
Tree subcanopy (T2) cover (%)	5	15	na	na	5	0	na	na	5	10	na	na	5	5	na	na	7.5	na
Tree canopy cover (average score)	16.5	28.5	113.5	5	16.5	12.5	67.6	5	16.5	5	0	0	16.5	2.5	0	0	12.1	2.5
Native shrub cover (%)	4	53	1325.0	3	4	5	125.0	5	4	10	250.0	3	4	5	125.0	5	18.3	4
Coarse woody debis	285	590	210.0	2	285	120	42.7	2	285	160	56.9	5	285	220	78.3	5	272.5	3.5
Native plant species richness - trees	3	2	100.0	2.5	3	2	100.0	2.5	3	1	50.0	2.5	3	1	50.0	2.5	1.5	2.5
Native plant species richness - shrubs	5	4	200.0	2.5	5	4	200.0	2.5	5	4	200.0	2.5	5	4	200.0	2.5	4.0	2.5
Native plant species richness - grasses	12	9	100.0	2.5	12	6	66.7	2.5	12	4	44.4	2.5	12	4	44.4	2.5	5.8	2.5
Native plant species richness - forbs	15	2	13.3	0	15	1	6.7	0	15	1	6.7	0	15	1	6.7	0	1.3	0
Non-native plant cover	0	50	na	3	0	20	na	5	0	30	na	3	0	40	na	3	35.0	3.5
Native perennial grass cover (%)	45	8	30.8	1	45	21	80.8	1	45	23	88.5	3	45	22	84.6	1	18.5	1.5
Organic litter cover (%)	30	74	211.4	3	30	11.6	33.1	3	30	9	25.7	3	30	10	28.6	3	26.2	3
Quality and availability of food and foraging habitat		36.00		12.00		30.00		10.00		32.00		10.67		26.00		8.67	31.00	10.34
Quality and availability of shelter		5		8		3		4		1		4		1		2		4.5
		3				1				3				1				
Site Condition Score																		63.34
Maximum Site Condition Score																		*100*
Site Condition Score - out of 3																		**1.90**

Assessment Unit - Regional Ecosystem	AU 3 - RE 11.3.4 remnant																					
Site Reference	Benchmark	2			Benchmark	6			Benchmark	8			Benchmark	9			Benchmark	12			Average Raw	Average Score
	11.3.4	Raw Data	% Benchmark	Score	11.3.4	Raw Data	% Benchmark	Score	11.3.4	Raw Data	% Benchmark	Score	11.3.4	Raw Data	% Benchmark	Score	11.3.4	Raw Data	% Benchmark	Score		
Large trees per hectare	35	36	200.0	15	35	4	22.2	5	35	22	122.2	10	35	16	88.9	5	35	20	111.1	10	19.6	9.0
Tree canopy (T1) height (m)	22	22	122.2	5	22	14	77.8	3	22	15	83.3	3	22	15	83.3	3	22	20	111.1	5	17.2	3.8
Tree subcanopy (T2) height (m)	12	8	88.9	3	12	6	66.7	3	12	9	100.0	5	12	6	66.7	3	12	0	0.0	0	5.8	2.8
Tree canopy height (average score)	17	15	111.1	4	17	10	74.1	3	17	12	88.9	4	17	10.5	77.8	3	17	10	74.1	2.5	11.5	3.3
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100	0	0.0	0	100	0	0.0	0	100	0	0.0	0	40.0	2.0
Tree canopy (T1) cover (%)	17	55	148.6	3	17	25.5	68.9	5	17	25	67.6	5	17	33	89.2	5	17	15	40.5	5	30.7	4.6
Tree subcanopy (T2) cover (%)	5	22	314.3	3	5	4	57.1	5	5	25	357.1	3	5	0	0.0	0	5	0	0.0	0	10.2	2.2
Tree canopy cover (average score)	11	38.5	231.45	3	11	14.75	63	5	11	25	212.35	4	11	16.5	44.6	2.5	11	7.5	20.25	2.5	20.5	3.4
Native shrub cover (%)	1	10	250.0	3	1	0	0.0	0	1	0	0.0	0	1	0	0.0	0	1	0	0.0	0	2.0	0.6
Coarse woody debis	384	690	245.6	5	384	380	135.2	5	384	260	92.5	5	384	0	0.0	0	384	120	42.7	2	290.0	3.4
Native plant species richness - trees	4	2	100.0	2.5	4	4	200.0	5	4	1	50.0	2.5	4	3	150.0	2.5	4	4	200.0	5	2.8	3.5
Native plant species richness - shrubs	2	3	150.0	5	2	3	150.0	5	2	2	100.0	5	2	3	150.0	5	2	2	100.0	5	2.6	5.0
Native plant species richness - grasses	7	2	22.2	2.5	7	4	44.4	2.5	7	2	22.2	2.5	7	4	44.4	2.5	7	3	33.3	2.5	3.0	2.5
Native plant species richness - forbs	10	3	20.0	2.5	10	3	20.0	2.5	10	0	0.0	0	10	0	0.0	0	10	2	13.3	0	1.6	1.0
Non-native plant cover	0	95	na	0	0	30	na	3	0	80	na	0	0	65	na	0	0	30	na	3	60.0	1.2
Native perennial grass cover (%)	43	0	0.0	0	43	1	3.8	0	43	0	0.0	0	43	17	65.4	1	43	12	46.2	1	6.0	0.4
Organic litter cover (%)	20	29	82.9	5	20	16	45.7	5	20	53	151.4	3	20	41	117.1	3	20	4	11.4	3	28.6	3.8
Quality and availability of food and foraging habitat		30.29		10.10		21.14		7.05		26.29		8.76		24.57		8.19		25.71		8.57		8.53
Quality and availability of shelter		5		8		3		4		3		6		5		6		3		4		5.6
		3				1				3				1				1				
Site Condition Score																						53.23
Maximum Site Condition Score																						*100*
Site Condition Score - out of 3																						**1.60**

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.3.25a remnant									
Site Reference	Benchmark	31			Benchmark	32			Average Raw	Average Score
	11.3.25b	Raw Data	% Benchmark	Score	11.3.25b	Raw Data	% Benchmark	Score		
Large trees per hectare	34	30	166.7	10	34	18	100.0	10	24.0	10
Tree canopy (T1) height (m)	24	25	138.9	5	24	25	138.9	5	25.0	5
Tree subcanopy (T2) height (m)	10	8	88.9	5	10	8	88.9	5	8.0	5
Tree canopy height (average score)	17	16.5	122.2	5	17	16.5	122.2	5	16.5	5
Recruitment of woody perennial species in EDL	100	66	66.0	3	100	0	0.0	0	33.0	1.5
Tree canopy (T1) cover (%)	45	36.1	97.6	5	45	49.1	132.7	5	42.6	5
Tree subcanopy (T2) cover (%)	10	7.2	102.9	5	10	22.8	325.7	3	15.0	4
Tree canopy cover (average score)	27.5	21.65	100.25	5	27.5	35.95	229.2	4	28.8	4.5
Native shrub cover (%)	6	13.7	342.5	3	6	50.7	1267.5	3	32.2	3
Coarse woody debis	148	700	249.1	2	148	280	99.6	5	490.0	3.5
Native plant species richness - trees	8	3	150.0	2.5	8	3	150.0	2.5	3.0	2.5
Native plant species richness - shrubs	4	2	100.0	2.5	4	5	250.0	5	3.5	3.75
Native plant species richness - grasses	7	0	0.0	0	7	1	11.1	0	0.5	0
Native plant species richness - forbs	13	0	0.0	0	13	6	40.0	2.5	3.0	1.25
Non-native plant cover	0	100	na	0	0	20	na	5	60.0	2.5
Native perennial grass cover (%)	10	0	0.0	0	10	2	7.7	1	1.0	0.5
Organic litter cover (%)	35	30.56	87.3	5	35	24.76	70.7	5	27.7	5
Quality and availability of food and foraging habitat		28.82		9.61		25.29		8.43		9.02
Quality and availability of shelter		5		6		5		8		7
		1				3				
Site Condition Score										59.02
Maximum Site Condition Score										*100*
Site Condition Score - out of 3										**1.77**

Assessment Unit - Regional Ecosystem	AU 5 - RE 11.3.9 remnant					
Site Reference	Benchmark	33			Average Raw	Average Score
	11.3.9	Raw Data	% Benchmark	Score		
Large trees per hectare	15	5	27.8	5	5	5
Tree canopy (T1) height (m)	18	12	66.7	3	12	3
Tree subcanopy (T2) height (m)	na	4	44.4	na	4	na
Tree canopy height (average score)	18	8	59.3	3	8	3
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	5
Tree canopy (T1) cover (%)	28	28	75.7	5	28	5
Tree subcanopy (T2) cover (%)	na	15	214.3	na	15	na
Tree canopy cover (average score)	28	21.5	145	5	15	5
Native shrub cover (%)	1	0	0.0	0	0	0
Coarse woody debis	151	850	302.5	2	85	5
Native plant species richness - trees	5	3	150.0	2.5	3	2.5
Native plant species richness - shrubs	6	0	0.0	0	0	0
Native plant species richness - grasses	9	2	22.2	0	2	0
Native plant species richness - forbs	17	5	33.3	2.5	5	2.5
Non-native plant cover	0	10	na	5	10	5
Native perennial grass cover (%)	34	8	30.8	1	8	1
Organic litter cover (%)	32	49	140.0	5	49	5
Quality and availability of food and foraging habitat		23.33		7.78		7.78
Quality and availability of shelter		3		6		6
		3				
Site Condition Score						52.78
Maximum Site Condition Score						*100*
Site Condition Score - out of 3						**1.58**

Assessment Unit - Regional Ecosystem	AU 6 - RE 11.4.2 remnant																	
Site Reference	Benchmark	4			Benchmark	13			Benchmark	26			Benchmark	27			Average Raw	Average Score
	11.4.2	Raw Data	% Benchmark	Score	11.4.2	Raw Data	% Benchmark	Score	11.4.2	Raw Data	% Benchmark	Score	11.4.2	Raw Data	% Benchmark	Score		
Large trees per hectare	18	26	144.4	15	18	14	77.8	10	18	16	88.9	10	18	14	77.8	10	18.0	11.25
Tree canopy (T1) height (m)	20	14	77.8	5	20	16	88.9	5	20	14	77.8	5	20	14	77.8	5	14.7	5
Tree subcanopy (T2) height (m)	8	6	66.7	5	8	12	133.3	5	8	6	66.7	5	8	6	66.7	5	8.0	5
Tree canopy height (average score)	14	10	74.1	5	14	14	103.7	5	14	10	74.1	5	14	10	74.1	5	11.3	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	50	50.0	3	100	60	60.0	3	100	60	60.0	3	70.0	3.5
Tree canopy (T1) cover (%)	25	23	62.2	5	25	23.7	64.1	5	25	24.1	65.1	5	25	35	94.6	5	27.2	5
Tree subcanopy (T2) cover (%)	5	0	0.0	0	5	3.6	51.4	5	5	4.2	60.0	5	5	3	42.9	5	2.2	3.75
Tree canopy cover (average score)	15	11.5	31.1	2.5	15	13.65	57.75	5	15		62.55	5	15	19	68.75	5	14.7	4.375
Native shrub cover (%)	13	5	125.0	3	13	10	250.0	5	13	10	250.0	5	13	10	250.0	5	8.3	4.5
Coarse woody debis	109	410	145.9	2	109	400	142.3	2	109	350	124.6	2	109	420	149.5	2	410.0	2
Native plant species richness - trees	4	5	250.0	5	4	6	300.0	5	4	5	250.0	5	4	5	250.0	5	5.3	5
Native plant species richness - shrubs	5	3	150.0	2.5	5	4	200.0	2.5	5	4	200.0	2.5	5	4	200.0	2.5	3.7	2.5
Native plant species richness - grasses	8	11	122.2	5	8	2	22.2	2.5	8	2	22.2	2.5	8	2	22.2	2.5	5.0	3.125
Native plant species richness - forbs	7	2	13.3	2.5	7	2	13.3	2.5	7	2	13.3	2.5	7	2	13.3	2.5	2.0	2.5
Non-native plant cover	0	50	na	3	0	50	na	3	0	50	na	3	0	60	na	0	53.3	2.25
Native perennial grass cover (%)	16	17	65.4	5	16	4	15.4	1	16	21.04	80.9	5	16	22.2	85.4	5	14.4	4
Organic litter cover (%)	30	36	102.9	5	30	21.4	61.1	5	30	18.22	52.1	5	30	22.4	64.0	5	26.6	5
Quality and availability of food and foraging habitat		34.44		11.48		27.78		9.26		28.89		9.63		27.78		9.26		9.91
Quality and availability of shelter		3		4		3		4		3		4		5		6		4.5
		1				1				1				1				
Site Condition Score																		69.41
Maximum Site Condition Score																		*100*
Site Condition Score - out of 3																		**2.08**

Site Context	AU 1 Value	Score	AU 2 Value	Score	AU 3 Value	Score	AU 4 Value	Score	AU 5 Value	Score	AU 6 Value	Score
Size of patch (total out of 10)	>200 ha	10	>200 ha	10	>200 ha	10	>200 ha	10	>200 ha	10	>200 ha	10
Connectedness (total out of 5)	>75%	5	>75%	5	>75%	5	>75%	5	>75%	5	>75%	5
Context (% remnant within 1km) (total out of 5)	>75%	5	>75%	5	>75%	5	>75%	5	>75%	5	>75%	5
Ecological Corridors (total out of 6)	Partially Within	4	Partially Within	4	Partially Within	4	Partially Within	4	Within	6	Partially Within	4
Threats to the species (total out of 15)	16-20	10	16-20	10	16-20	10	16-20	10	16-20	10	16-20	10
Species mobility capacity (total out of 10)		7		7		7		7		7		7
Site Context Score		41		41		41		41		43		41
MAX Site Context Score		*51*		*51*		*51*		*51*		*51*		*51*
Site Context Score - out of 3		**2.41**		**2.41**		**2.41**		**2.41**		**2.53**		**2.41**

Species Stocking Rate (SSR)	REMNANT AREAS					Site scores
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		10		10
		No		Yes		
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	15
		Not habitat	Dispersal	Foraging	Breeding	
Role of the site population in relation to the overall species population*	Score	0	5	10	15	5
	(Total from supplementary table below)	0	1-15	16-35	36-45	
Total Species Stocking Rate score						30
Maximum Species Stocking Rate Score						40
Species Stocking Rate Score (out of 4)						3

Species Stocking Rate (SSR)	REGROWTH AREAS					Site scores
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		10		5
		No		Yes		
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	0
		Not habitat	Dispersal	Foraging	Breeding	
Role of the site population in relation to the overall species population*	Score	0	5	10	15	0
	(Total from supplementary table below)	0	1-15	16-35	36-45	
Total Species Stocking Rate score						5
Maximum Species Stocking Rate Score						40
Species Stocking Rate Score (out of 4)						0.5

*Role of site location to species overall population in the state					Site scores
*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		0
		No	Yes/ Possibly		
*Near the limit of the species range	Score	0	15		0
		No	Yes		
TOTAL	0	5	10	15	5
	0	5 - 15	20 - 35	40 - 45	

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5	AU6	AU6	AU8	AU9	AU10	AU11	TOTALS FINAL	FINAL
	RE 11.3.2	RE 11.3.3	RE 11.3.4	RE 11.3.25a	RE 11.3.9	RE 11.4.2	RE 11.4.9	RE 11.5.3	RE 11.5.9	HVR RE 11.5.9	HVR RE 11.8.14	(remnant)	(regrowth)
Site Condition score (out of 3)	1.64	1.90	1.60	1.77	1.58	2.08	1.87	2.20	1.74	1.24	0.64		
Site Context Score (out of 3)	2.41	2.41	2.41	2.41	2.53	2.41	2.18	2.41	2.41	1.94	1.24		
Species Stocking Rate Score (out of 4)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	0.50	0.50	3.00	0.50
Habitat Quality score (out of 10)	7.05	7.31	7.01	7.18	7.11	7.49	7.05	7.61	7.15	3.68	2.38		
Offset area (ha)	435.86	284.92	875.10	308.17	49.87	153.38	38.59	859.01	142.70	377.69	26.21	3147.60	403.90
Size weighting	0.14	0.09	0.28	0.10	0.02	0.05	0.01	0.27	0.05	0.94	0.06		
Weighted Habitat Quality Score	***0.99***	***0.66***	***1.96***	***0.72***	***0.14***	***0.37***	***0.07***	***2.05***	***0.36***	***3.46***	***0.14***	***7.32***	***3.60***
Weighted Habitat Quality Score (rounded)												7	4

Final habitat quality score (weighted)	AU1	AU2	AU3	AU6	AU8	AU9	AU10	AU11	OFFSET AREA FINAL	FINAL
	RE 11.3.2	RE 11.3.3	RE 11.3.4	RE 11.4.2	RE 11.5.3	RE 11.5.9	HVR RE 11.5.9	HVR RE 11.8.14	(remnant)	(regrowth)
Site Condition score (out of 3)	1.77	1.94	1.63	2.12	2.19	1.91	1.34	0.79		
Site Context Score (out of 3)	2.25	2.25	2.25	2.25	2.25	2.25	1.82	1.18		
Species Stocking Rate Score (out of 4)	3.00	3.00	3.00	3.00	3.00	3.00	0.50	0.50	3.00	0.50
Habitat Quality score (out of 10)	7.02	7.19	6.88	7.37	7.44	7.16	3.66	2.47		
Offset area (ha)	435.86	284.92	875.10	153.38	859.01	142.70	377.69	26.21	2750.97	403.90
Size weighting	0.16	0.10	0.32	0.06	0.31	0.05	0.94	0.06		
Weighted Habitat Quality Score	***1.12***	***0.72***	***2.20***	***0.44***	***2.31***	***0.36***	***3.44***	***0.15***	***7.15***	***3.59***
Weighted Habitat Quality Score (rounded)									7	4

QUALITY AND AVAILABILITY OF FOOD AND SHELTER

Quality and availability of food and foraging habitat	Score
Relative abundance of shelter trees (divide raw tree richness by benchmark tree richness, convert to score out of 10)	10
Relative diversity of food trees present (convert to score out of 10)	10
^Ease of movement (estimate based on connectivity of vegetation and physical or behavioural barriers to movement)	10
TOTAL	30
TOTAL out of 10	10

^scores from 0 – 10 where 0 – 2 = (movement totally restricted), 2 - 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (along a koala movement corridor).

Quality and availability of shelter				Score
Tree canopy cover	1	3	5	5
	<10%	10-30%	>30	
Raw subcanopy cover	1	3	5	5
	<10%	10-30%	>30	
			TOTAL	10

CONTEXT

Size of Patch (from BioCondition Manual)	Score
<5ha remnant and/or regrowth	0
>=5-25ha remnant and/or regrowth	2
>=25-100ha remannt OF >=25-200ha remnant and regrowth OR >=25-200ha regrowth	5
>=100-200ha remnant OR >200ha remnant and regrowth OR >200ha regrowth	7
>=200ha remnant	10

Connectivity (from BioCondition Manual)	Score
Low - AU is not connected using any of the below descriptions	0
Medium - AU is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR remnant vegetation along <10% of its perimeter and with regrowth native vegetation >25%	2
High - AU is connected with adjacent remnant vegetation along 50% to 75% of its perimeter	4
Very high - AU is connected with adjacent remnant vegetation along >75% of its perimeter OR includes>500ha remnant vegetation	5

Landscape Context (from BioCondition Manual)	Score
Low - <10% remnant vegetation and <30% native non-remnant vegetation (regrowth)	0
Medium - >=10% to 30% remnant vegetation and <30% regrowth OR <10% remnant vegetation and >=30% regrowth	2
High - >=30% to 75% remnant vegetation OR >=10% to 30% remnant vegetation and >=30% regrowth vegetation	4
Very high - >75% remnant vegetation	5

ECOLOGICAL CORRIDORS

Landscape Context (from BioCondition Manual)	Score
Outside of Statewide Biodiversity corridor (Qld Globe)	0
Within Statewide Biodiversity corridor (Qld Globe)	6

SPECIES MOBILITY

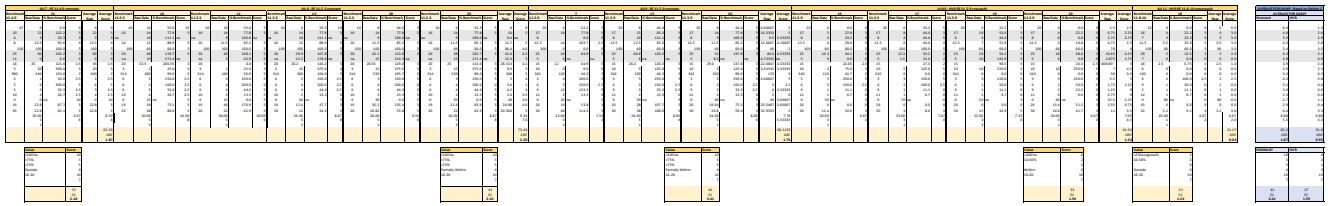
SPECIES MOBILITY		Score	Site scores
Habitat connectivity	Isolated	0-2	8
	Partially isolated	3-4	
	Periodically isolated	5-6	
	Major connectivity	7-8	
	Totally connected	9-10	
Behavioural deterrents to movement	Extreme risk of disturbance resulting in movement	0-2	3
	High risk	3-4	
	Moderate risk	5-6	
	Low Risk	7-8	
	Nil Risk	9-10	
Physical deterrents to movement	Total barrier	0-2	10
	Substantial frequent barrier	3-4	
	Moderate, occasional barrrier	5-6	
	Negligible barrier	7-8	
	Active movement pathway - i.e., watercourse or linear corridor	9-10	
	TOTAL (invert to a score out of 10)		7

THREATS TO SPECIES

THREATS TO SPECIES							
THREATS MATRIX			Severity				
			Very High	High	Medium	Low	Very Low
			1	2	3	4	5
Scope	Very High	1	1	2	3	4	5
	High	2	2	4	6	8	10
	Medium	3	3	6	9	12	15
	Low	4	4	8	12	16	20
	Very Low	5	5	10	15	20	25

Threats to Koalas			Score	Total	Site scores
Vehicles	Proximity to public road	<1.5km	1	3	3
		>1.5km	3		
	Traffic Volume	High - >10 vehicles per hour	1	3	3
		Low - <10 vehicles per hour	3		
	Traffic Speed	40km	6	6	4
		60km	4		
		80km	2		
		100km	0		
	Exclusion Fencing	Present	0	1	1
		Not Present	1		
	Signage	Present	0	1	1
		Not Present	1		
Wild and domestic dogs	Proximity to houses	<1km	1	3	3
		>1km	3		
	Wild dog presence on	Present	0	1	0
		Not Present	1		
Fire	Relative fuel load	High	0	1	0
		Low	1		
	Level of public access	High	0	1	1
		Low	1		
	Firebreaks	Not adequate	0	1	1
		Adequate	1		
Habitat Loss	Isolation	Isolated Habitat	0	2	2
		Connected habitat	2		
	Disease	Noticable disease	0	1	1
		None	1		
	Disturbance	Presence of disturbance (eg cattle, land clearing)	0	1	0
		Limited disturbance	1		
			TOTAL	25	20

TOTAL	0	5	10	15
	0	5 - 15	16-20	21-25



GREATER GLIDER

Updated impact scores to meet guidelines with score errors corrected

Assessment Unit - Regional Ecosystem	AU 1 - RE 11.3.2 remnant					
Site Reference	Benchmark	Mrb1				
	11.3.2	Raw Data	% Benchma	Score	Average Raw	Average Score
Large trees per hectare	18	14	77.8	10	14.0	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	9					
Tree canopy height (average score)	13.5	17	125.9	5	17.0	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	37	57.4	155.1	5	57.4	5
Tree subcanopy (T2) cover (%)	7		0.0		0.0	
Tree canopy cover (average score)	22	57.4	77.55	5	28.7	5
Native shrub cover (%)	4	0.6	15.0	3	0.6	3
Coarse woody debis	281	128	45.6	2	128.0	2
Native plant species richness - trees	2	2	100.0	5	5.0	5
Native plant species richness - shrubs	2	8	400.0	5	8.0	5
Native plant species richness - grasses	9	10	111.1	5	10.0	5
Native plant species richness - forbs	15	5	33.3	2.5	5.0	2.5
Non-native plant cover	0	5	na	5	5.0	5
Native perennial grass cover (%)	26		0.0	3	0.0	3
Organic litter cover (%)	35	41	117.1	5	41.0	5
Quality and availability of food and foraging habitat		7.78	10.00	5.00		7.59
Quality and availability of shelter		5.00	1.00			6.00
Site Condition Score						74.09
Maximum Site Condition Score						*100.00*
Site Condition Score - out of 3						**2.22**

Assessment Unit - Regional Ecosystem	AU 2 - RE 11.3.4a remnant									
Site Reference	Benchmark	Mrb15			Benchmark	Mrb18			Average	Average
	11.3.4	Raw Data	% Benchma	Score	11.3.4a	Raw Data	% Benchma	Score	Raw	Score
Large trees per hectare	35	6	33.3	5	35	8	44.4	5	7.0	5
Tree canopy (T1) height (m)	22				22					
Tree subcanopy (T2) height (m)	12				12					
Tree canopy height (average score)	17	19	140.7	5	17	20	148.1	5	19.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	17	41.2	111.4	3	17	51.4	138.9	3		
Tree subcanopy (T2) cover (%)	5	4.7	67.1		5		0.0			
Tree canopy cover (average score)	11	22.95	89.25	3	11	51.4	69.45	3	37.2	3
Native shrub cover (%)	1	0.0	0.0	0	1	1.5	37.5	5	0.8	2.5
Coarse woody debis	384	145	51.6	2	384	30	10.7	0	87.5	1
Native plant species richness - trees	4	3	150.0	2.5	4	4	200.0	5	3.5	3.75
Native plant species richness - shrubs	2	2	100.0	5	2	3	150.0	5	2.5	5
Native plant species richness - grasses	7	4	44.4	2.5	7	5	55.6	2.5	4.5	2.5
Native plant species richness - forbs	10	1	6.7	0	10	1	6.7	0	1.0	0
Non-native plant cover	0	70	na	0	0	60	na	0	7.0	0
Native perennial grass cover (%)	43	0.0	0.0	0	43	0.0	0.0	0	7.0	0
Organic litter cover (%)	20	42	120.0	3	20	35	100.0	5	7.0	4
Quality and availability of food and foraging habitat		1.71	10.00	5.00		2.29	10.00	5.00		0.57
Quality and availability of shelter		5.00	1.00			5.00	1.00			6.00
Site Condition Score										43.32
Maximum Site Condition Score										*100.00*
Site Condition Score - out of 3										**1.30**

Assessment Unit - Regional Ecosystem	AU 3 - RE 11.3.9 remnant					
Site Reference	Benchmark	Mrb3			Average	Average
	11.3.9	Raw Data	% Benchma	Score	Raw	Score
Large trees per hectare	15	12	66.7	10	66.7	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	18	20	148.1	5	148.1	5
Recruitment of woody perennial species in EDL	100	80	80.0	5	80.0	5
Tree canopy (T1) cover (%)	28	64.6	174.6	3	174.6	3
Tree subcanopy (T2) cover (%)	na	na	na	na	na	na
Tree canopy cover (average score)	28	64.6	174.6	3		3
Native shrub cover (%)	1	0.0	0.0	0	0.0	0
Coarse woody debis	151	384	136.7	2	136.7	2
Native plant species richness - trees	5	5	250.0	5	450.0	5
Native plant species richness - shrubs	6	9	450.0	5	450.0	5
Native plant species richness - grasses	9	8	88.9	2.5	88.9	2.5
Native plant species richness - forbs	17	13	86.7	2.5	86.7	2.5
Non-native plant cover	0	7	na	5	na	5
Native perennial grass cover (%)	34		0.0	3	0.0	3
Organic litter cover (%)	32	62.6	178.9	5	178.9	5
Quality and availability of food and foraging habitat		8.00	10.00	5.00		0.83
Quality and availability of shelter		5.00				10.00
Site Condition Score						63.83
Maximum Site Condition Score						*100.00*
Site Condition Score - out of 3						**1.91**

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.3.25a remnant									
Site Reference	Benchmark	Mrb17			Benchmark	Mrb21			Average	Average
	11.3.25b	Raw Data	% Benchmark	Score	11.3.25b	Raw Data	% Benchma	Score	Raw	Score
Large trees per hectare	34	26	144.4	10	34	34	188.9	15	30.0	12.5
Tree canopy (T1) height (m)	24				24					
Tree subcanopy (T2) height (m)	10				10					
Tree canopy height (average score)	17	28	207.4	5	17	29	214.8	5	28.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	45	77.0	208.1	5	45	87.0	235.1	5		
Tree subcanopy (T2) cover (%)	10	13.0	185.7	5	10	48.0	685.7	3		
Tree canopy cover (average score)	27.5	45	196.9	5	27.5	67.5	460.4	4	56.3	4.5
Native shrub cover (%)	6	0.0	0.0	0	6	2.0	50.0	3	1.0	1.5
Coarse woody debis	148	10	3.6	0	148	185	65.8	5	97.5	2.5
Native plant species richness - trees	8	8	400.0	5	8	8	400.0	5	8.0	5
Native plant species richness - shrubs	4	1	50.0	2.5	4	1	50.0	2.5	1.0	2.5
Native plant species richness - grasses	7		0.0	0	7		0.0	0	#DIV/0!	0
Native plant species richness - forbs	13	2	13.3	0	13	4	26.7	2.5	3.0	1.25
Non-native plant cover	0	99	na	0	0	99	na	0	7.0	0
Native perennial grass cover (%)	10	0.0	0.0	0	10	0.0	0.0	0	7.0	0
Organic litter cover (%)	35	7	20.0	3	35	22	62.9	5	7.0	4
Quality and availability of food and foraging habitat		7.65	10.00	5.00		10.00	10.00	5.00		0.79
Quality and availability of shelter		5.00	3.00			5.00	5.00			9.00
Site Condition Score										53.54
Maximum Site Condition Score										*100.00*
Site Condition Score - out of 3										**1.61**

Assessment Unit - Regional Ecosystem	AU 5 - RE 11.3.27b remnant					
Site Reference	Benchmark	Mrb13			Average	Average
	11.3.27b	Raw Data	% Benchma	Score	Raw	Score
Large trees per hectare	34	4	22.2	5	22.22222	5
Tree canopy (T1) height (m)	15					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	15	18	133.3	5	133.3333	5
Recruitment of woody perennial species in EDL	100	66	66.0	3	66	3
Tree canopy (T1) cover (%)	42	24.9	67.3	5	67.2973	5
Tree subcanopy (T2) cover (%)	na	3.5	na	na	na	na
Tree canopy cover (average score)	42	14.2	67.3	5		5
Native shrub cover (%)	7		0.0	0	0	0
Coarse woody debis	484	280	99.6	5	99.64413	5
Native plant species richness - trees	2	2	100.0	5	300	5
Native plant species richness - shrubs	1	1	50.0	5	50	5
Native plant species richness - grasses	2	9	100.0	5	100	5
Native plant species richness - forbs	7	2	13.3	2.5	13.33333	2.5
Non-native plant cover	0	30	na	3	na	3
Native perennial grass cover (%)	10		0.0	5	0	5
Organic litter cover (%)	12	15	42.9	5	42.85714	5
Quality and availability of food and foraging habitat		1.18	10.00	5.00		0.83
Quality and availability of shelter		3.00	1.00			4.00
Site Condition Score						58.33
Maximum Site Condition Score						*100.00*
Site Condition Score - out of 3						**1.75**

Assessment Unit - Regional Ecosystem	AU 6 - RE 11.4.9 remnant														
Site Reference	Benchmark	Mrb9			Benchmark	Mrb10			Benchmark	SWC3			Average	Average
	11.4.9	Raw Data	% Benchma	Score	11.4.9	Raw Data	% Benchma	Score	11.4.9	Raw Data	% Benchma	Score	Raw	Score
Large trees per hectare	47	6	33.3	5	47	20	111.1	5	47			5	13	5
Tree canopy (T1) height (m)	10				10				10					
Tree subcanopy (T2) height (m)	6				6				6					
Tree canopy height (average score)	8	16	118.5	5	8	16	118.5	5	8			5	16	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100			5	100	5
Tree canopy (T1) cover (%)	25	81.4	220.0	3	25	74.9	202.4	3	25					
Tree subcanopy (T2) cover (%)	11	15.7	224.3	5	11	9.0	128.6	5	11					
Tree canopy cover (average score)	18	48.55	222.15	4	18	41.95	165.5	4	18			5	45.25	4.333333
Native shrub cover (%)	5	14.9	372.5	3	5	17.0	425.0	3	5			3	15.95	3
Coarse woody debis	980	1685	599.6	5	980	1670	594.3	5	980			5	1677.5	5
Native plant species richness - trees	2	2	100.0	5	2	2	100.0	5	2			5	2	5
Native plant species richness - shrubs	5	6	300.0	5	5	13	650.0	5	5			0	9.5	3.333333
Native plant species richness - grasses	5	4	44.4	2.5	5	10	111.1	5	5			5	7	4.166667
Native plant species richness - forbs	10	8	53.3	2.5	10	10	66.7	5	10			5	9	4.166667
Non-native plant cover	0	5	na	5	0	5	na	5	0			5	5	5
Native perennial grass cover (%)	16		0.0	1	16		0.0	1	16			5		2.333333
Organic litter cover (%)	45	83.6	238.9	5	45	63.6	181.7	5	45			5	73.6	5
Quality and availability of food and foraging habitat		1.28	10.00	5.00		4.26	10.00	5.00						0.59
Quality and availability of shelter		5.00	3.00			5.00	1.00							7.00
Site Condition Score														63.92
Maximum Site Condition Score														*100.00*
Site Condition Score - out of 3														**1.92**

Assessment Unit - Regional Ecosystem	AU 7 - RE 11.5.2a remnant							
Site Reference	Benchmark	Mrb6			Average	Average	Benchmark	
		Raw Data	% Benchma	Score	Raw	Score	11.5.3	Raw Data
Large trees per hectare		2		5	2	5	10	20
Tree canopy (T1) height (m)							16	
Tree subcanopy (T2) height (m)							na	
Tree canopy height (average score)		13		5	13	5	16	16
Recruitment of woody perennial species in EDL		100		5	100	5	100	100
Tree canopy (T1) cover (%)		60.7			60.7		20	21.7
Tree subcanopy (T2) cover (%)		22.1			22.1		na	na
Tree canopy cover (average score)		41.4		5		5	20	21.7
Native shrub cover (%)		5.8		5	5.8	5	3	20.1
Coarse woody debis		120		2	120	2	314	45
Native plant species richness - trees		8		5	8	5	6	6
Native plant species richness - shrubs		10		5	10	5	6	5
Native plant species richness - grasses		12		5	12	5	6	3
Native plant species richness - forbs		9		5	9	5	10	5
Non-native plant cover		1		10	1	10	0	5
Native perennial grass cover (%)		0.0		5	0	5	19	
Organic litter cover (%)		41		5	41	5	20	16
Quality and availability of food and foraging habitat						0.83		20.00
Quality and availability of shelter		5.00	3.00			8.00		3.00
Site Condition Score						75.83		
Maximum Site Condition Score						*100.00*		
Site Condition Score - out of 3						**2.27**		

Site Context	AU1 Value	AU1 Score	AU2 Value	AU2 Score	AU3 Value	AU3 Score	AU4 Value	AU4 Score	AU5 Value	AU5 Score	AU6 Value	AU6 Score	AU7 Value	AU7 Score
Size of patch (total out of 10)	>200 ha	10		7.5	>200 ha	10	>200 ha	7.5	>200 ha	10	>200 ha	10	>200 ha	10
Connectedness (total out of 5)	>75%	5	>75%	5	>75%	5	>75%	5	50-75%	4	>75%	5	>75%	5
Context (% remnant within 1km) (total out of 5)	>75%	5	>30%-75%	4	>75%	5	>30%-75%	4	>30%-75%	4	>75%	4.666667	>75%	5
Ecological Corridors (total out of 6)	Outside	0	Within	6	Outside	0	Within	6	Outside	0	Outside	0	Outside	0
Threats to the species (total out of 15)		5		5		5		5		5		5		5
Species mobility capacity (total out of 10)		7		7		7		7		7		7		7
Site Context Score		32		34.5		32		34.5		30		31.66667		32
MAX Site Context Score		*51*		*51*		*51*		*51*		*51*		*51*		*51*
Site Context Score - out of 3		**1.88**		**2.03**		**1.88**		**2.03**		**1.76**		**1.86**		**1.88**

Species Stocking Rate (SSR)	REMNANT AREAS					Site scores
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		10		10
		No		Yes		
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	15
		Not habitat	Dispersal	Foraging	Breeding	
Role of the site population in relation to the overall species population*	Score	0	5	10	15	5
	(Total from supplementary table below)	0	1-15	16-35	36-45	
Total Species Stocking Rate score						30
Maximum Species Stocking Rate Score						40
Species Stocking Rate Score (out of 4)						3

REGROWTH AREAS					Site scores
Score	0		10		5
	No		Yes		
Score	0	5	10	15	0
	Not habitat	Dispersal	Foraging	Breeding	
Score	0	5	10	15	0
(Total from supplementary table below)	0	1-15	16-35	36-45	
					5
					40
					0.5

*Role of site location to species oveerall population in the state					Site scores
*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		0
		No	Yes/ Possibly		
*Near the limit of the species range	Score	0	15		0
		No	Yes		
TOTAL	0	5	10	15	5
	0	5 - 15	20 - 35	40 - 45	

11.5.2a removed as not GG habitat
11.4.9 removed as not GG habitat

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5			AU8	AU9	AU10	AU11	AU12	AU13	AU14	FINAL
	RE 11.3.2	RE 11.3.4a	RE 11.3.9	RE 11.3.25a	RE 11.3.27b			RE 11.5.3	RE 11.5.8b	RE 11.5.8c	RE 11.5.9	VR RE 11.5	VR RE 11.5.	.35 non-re	(remnant)
Site Condition score (out of 3)	2.22	1.30	1.91	1.61	1.75			2.17	2.18	1.57	2.20	1.56	1.40	1.59	
Site Context Score (out of 3)	1.71	2.03	1.88	2.03	1.76			1.84	1.82	1.88	1.62	1.65	1.65	1.65	
Species Stocking Rate Score (out of 4)	3.00	3.00	3.00	3.00	3.00			3.00	3.00	3.00	3.00	0.50	0.50	0.50	3.50
Habitat Quality score (out of 10)	6.93	6.33	6.79	6.64	6.51			7.01	7.00	6.45	6.82	3.71	3.55	3.74	
Impact area (ha)	82.75	268.54	33.65	95.86	6.14			361.91	78.17	291.38	85.55	119.75	44.85	1.96	1303.95
Size weighting	0.063461	0.2059435	0.025806	0.073515	0.00470877			0.277548986	0.059949	0.223459	0.065608				
Weighted Habitat Quality Score	***0.44***	***1.30***	***0.18***	***0.49***	***0.03***			***1.95***	***0.42***	***1.44***	***0.45***				***6.70***
Weighted Habitat Quality Score (rounded)															7

QUALITY AND AVAILABILITY OF FOOD AND SHELTER

Quality and availability of food and foraging habitat	Score
Relative abundance of food trees (divide raw tree richness by benchmark tree richness, convert to score out of 10)	10
Relative diversity of food trees present - 1 food tree species = 5, 2+ food tree species = 10 (convert to score out of 10)	10
^Ease of movement (estimate based on connectivity of vegetation and physical or behavioural barriers to movement)	10
TOTAL	30
TOTAL out of 10	10

^scores from 0 – 10 where 0 – 2 = (movement totally restricted), 2 - 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (along a koala movement corridor).

Quality and availability of shelter				Score
Tree canopy cover	1	3	5	5
	<10%	10-30%	>30	
Raw subcanopy cover	1	3	5	5
	<10%	10-30%	>30	
			TOTAL	10

CONTEXT

Size of Patch (from BioCondition Manual)	Score
<5ha remnant and/or regrowth	0
>=5-25ha remnant and/or regrowth	2
>=25-100ha remannt OF >=25-200ha remnant and regrowth OR >=25-200ha regrowth	5
>=100-200ha remnant OR >200ha remnant and regrowth OR >200ha regrowth	7
>=200ha remnant	10

Connectivity (from BioCondition Manual)	Score
Low - AU is not connected using any of the below descriptions	0
Medium - AU is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR remnant vegetation along <10% of its perimeter and with regrowth native vegetation >25% of its per	2
High - AU is connected with adjacent remnant vegetation along 50% to 75% of its perimeter	4
Very high - AU is connected with adjacent remnant vegetation along >75% of its perimeter OR includes>500ha remnant vegetation	5

Landscape Context (from BioCondition Manual)	Score
Low - <10% remnant vegetation and <30% native non-remnant vegetation (regrowth)	0
Medium - >=10% to 30% remnant vegetation and <30% regrowth OR <10% remnant vegetation and >=30% regrowth	2
High - >=30% to 75% remnant vegetation OR >=10% to 30% remnant vegetation and >=30% regrowth vegetation	4
Very high - >75% remnant vegetation	5

ECOLOGICAL CORRIDORS

Landscape Context (from BioCondition Manual)	Score
Outside of Statewide Biodiversity corridor (Qld Globe)	0
Within Statewide Biodiversity corridor (Qld Globe)	6

SPECIES MOBILITY

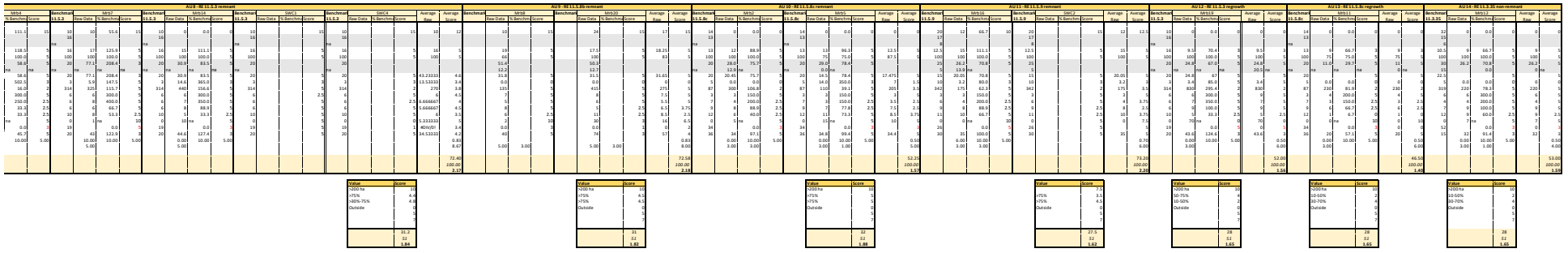
SPECIES MOBILITY		Score	Site scores
Habitat connectivity	Isolated	0-2	7
	Partially isolated	3-4	
	Periodically isolated	5-6	
	Major connectivity	7-8	
	Totally connected	9-10	
Behavioural deterrents to movement	Extreme risk of disturbance resulting in movement	0-2	4
	High risk	3-4	
	Moderate risk	5-6	
	Low Risk	7-8	
	Nil Risk	9-10	
Physical deterrents to movement	Total barrier	0-2	10
	Substantial frequent barrier	3-4	
	Moderate, occasional barrrier	5-6	
	Negligible barrier	7-8	
	Active movement pathway - i.e., watercourse or linear corridor	9-10	
	TOTAL (invert to a score out of 10)		7

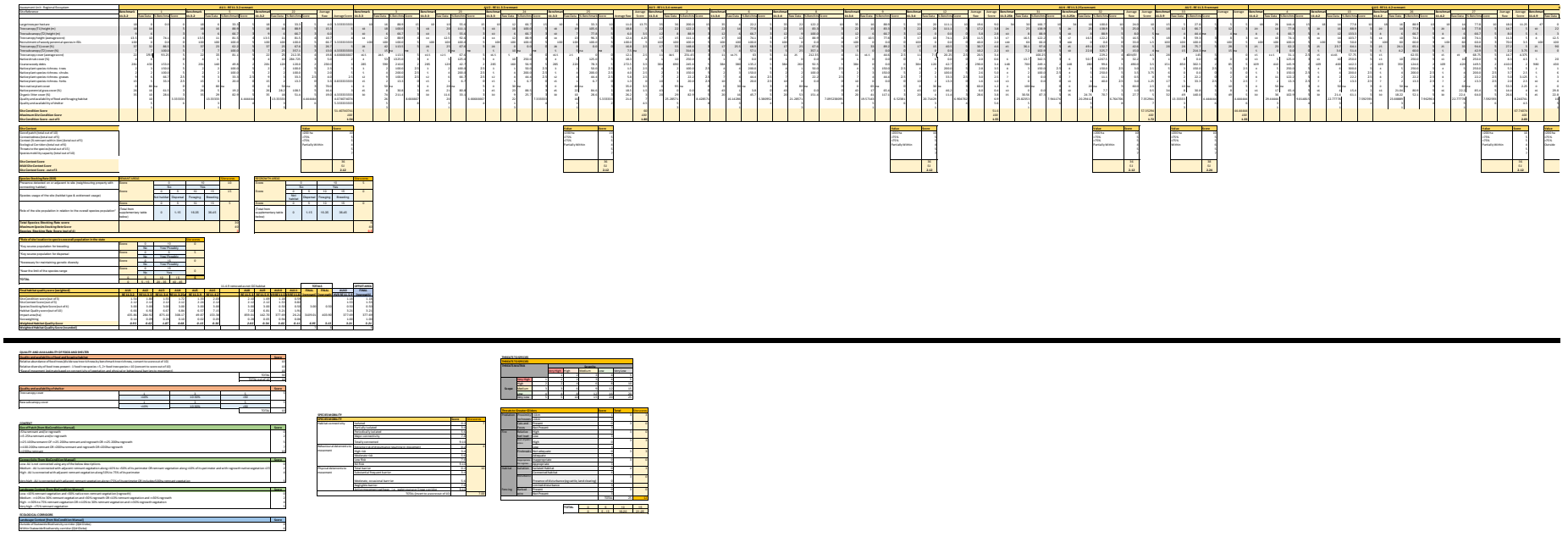
THREATS TO SPECIES

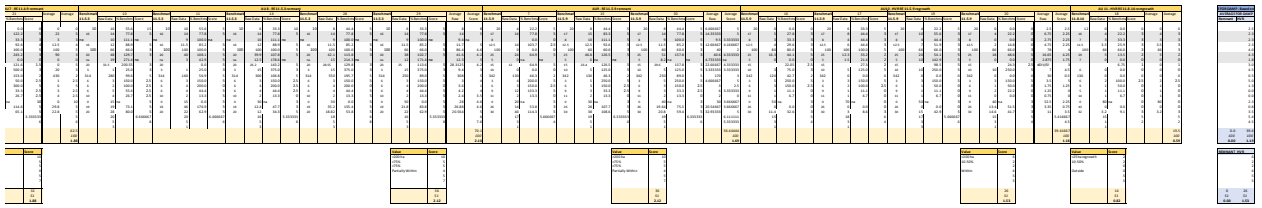
THREATS TO SPECIES							
THREATS MATRIX			Severity				
			Very High	High	Medium	Low	Very Low
			1	2	3	4	5
Scope	Very High	1	1	2	3	4	5
	High	2	2	4	6	8	10
	Medium	3	3	6	9	12	15
	Low	4	4	8	12	16	20
	Very Low	5	5	10	15	20	25

Threats to Greater Gliders			Score	Total	Site scores
Predation	Proximity to houses	<1km	1	3	3
		>1km	3		
	Cats and Foxes	Present	0	3	0
		Not Present	3		
Fire	Relative fuel load	High	0	3	0
		Low	3		
	Level of public access	High	0	3	1
		Low	3		
	Firebreaks	Not adequate	0	3	1
		Adequate	3		
	Inappropriate fire regimes	Inappropriate	0	3	0
		Appropriate	3		
Habitat Loss	Isolation	Isolated Habitat	0	4	2
		Connected habitat	4		
	Disturbance	Presence of disturbance (eg cattle, land clearin	0	3	0
		Limited disturbance	3		
Fencing	Barbed wire	Present	0	3	0
		Not Present	3		
			TOTAL	25	7

TOTAL	0	5	10	15
	0	5 - 15	16-20	21-25







SQUATTER PIGEON

Updated impact scores to meet guidelines with score errors corrected

Assessment Unit - Regional Ecosystem	AU 1 - RE 11.3.2 remnant					
Site Reference	Benchmark	Mrb1				
	11.3.2	Raw Data	% Benchmark	Score	Average Raw	Average Score
Large trees per hectare	18	14	77.8	10	14.0	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	9					
Tree canopy height (average score)	13.5	17	125.9	5	17.0	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	37	57.4	155.1	5	57.4	5
Tree subcanopy (T2) cover (%)	7		0.0		0.0	
Tree canopy cover (average score)	22	57.4	77.55	5	28.7	5
Native shrub cover (%)	4	0.6	15.0	3	0.6	3
Coarse woody debis	281	128	45.6	2	128.0	2
Native plant species richness - trees	2	2	100.0	5	5.0	5
Native plant species richness - shrubs	2	8	400.0	5	8.0	5
Native plant species richness - grasses	9	10	111.1	5	10.0	5
Native plant species richness - forbs	15	5	33.3	2.5	5.0	2.5
Non-native plant cover	0	5	na	5	5.0	5
Native perennial grass cover (%)	26		0.0	3	0.0	3
Organic litter cover (%)	35	41	117.1	5	41.0	5
Quality and availability of food and foraging habitat		30.00		10.00		10.00
Quality and availability of shelter		5	1			6
Site Condition Score						53.5
Maximum Site Condition Score						*70*
Site Condition Score - out of 3						**2.29**

Assessment Unit - Regional Ecosystem	AU 2 - RE 11.3.4a remnant									
Site Reference	Benchmark	Mrb15			Benchmark	Mrb18				
	11.3.4	Raw Data	% Benchmark	Score	11.3.4a	Raw Data	% Benchmark	Score	Average Raw	Average Score
Large trees per hectare	35	6	33.3	5	35	8	44.4	5	7.0	5
Tree canopy (T1) height (m)	22				22					
Tree subcanopy (T2) height (m)	12				12					
Tree canopy height (average score)	17	19	140.7	5	17	20	148.1	5	19.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	17	41.2	111.4	3	17	51.4	138.9	3		
Tree subcanopy (T2) cover (%)	5	4.7	67.1		5		0.0			
Tree canopy cover (average score)	11	22.95	89.25	3	11	51.4	69.45	3	37.2	3
Native shrub cover (%)	1	0.0	0.0	0	1	1.5	37.5	5	0.8	2.5
Coarse woody debis	384	145	51.6	2	384	30	10.7	0	87.5	1
Native plant species richness - trees	4	3	150.0	2.5	4	4	200.0	5	3.5	3.75
Native plant species richness - shrubs	2	2	100.0	5	2	3	150.0	5	2.5	5
Native plant species richness - grasses	7	4	44.4	2.5	7	5	55.6	2.5	4.5	2.5
Native plant species richness - forbs	10	1	6.7	0	10	1	6.7	0	1.0	0
Non-native plant cover	0	70	na	0	0	60	na	0	7.0	0
Native perennial grass cover (%)	43	0.0	0.0	0	43	0.0	0.0	0	7.0	0
Organic litter cover (%)	20	42	120.0	3	20	35	100.0	5	7.0	4
Quality and availability of food and foraging habitat		25.71		8.57		27.14		9.05		8.81
Quality and availability of shelter		5	1			5	1			6
Site Condition Score										31.31
Maximum Site Condition Score										*70*
Site Condition Score - out of 3										**1.34**

Assessment Unit - Regional Ecosystem	AU 3 - RE 11.3.9 remnant					
Site Reference	Benchmark	Mrb3				
	11.3.9	Raw Data	% Benchmark	Score	Average Raw	Average Score
Large trees per hectare	15	12	66.7	10	66.7	10
Tree canopy (T1) height (m)	18					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	18	20	148.1	5	148.1	5
Recruitment of woody perennial species in EDL	100	80	80.0	5	80.0	5
Tree canopy (T1) cover (%)	28	64.6	174.6	3	174.6	3
Tree subcanopy (T2) cover (%)	na	na	na	na	na	na
Tree canopy cover (average score)	28	64.6	174.6	3		3
Native shrub cover (%)	1	0.0	0.0	0	0.0	0
Coarse woody debis	151	384	136.7	2	136.7	2
Native plant species richness - trees	5	5	250.0	5	450.0	5
Native plant species richness - shrubs	6	9	450.0	5	450.0	5
Native plant species richness - grasses	9	8	88.9	2.5	88.9	2.5
Native plant species richness - forbs	17	13	86.7	2.5	86.7	2.5
Non-native plant cover	0	7	na	5	na	5
Native perennial grass cover (%)	34		0.0	3	0.0	3
Organic litter cover (%)	32	62.6	178.9	5	178.9	5
Quality and availability of food and foraging habitat		28.89		9.63		9.63
Quality and availability of shelter		5				10
Site Condition Score						52.63
Maximum Site Condition Score						*70*
Site Condition Score - out of 3						**2.26**

Assessment Unit - Regional Ecosystem	AU 4 - RE 11.3.25a remnant									
Site Reference	Benchmark	Mrb17			Benchmark	Mrb21				
	11.3.25b	Raw Data	% Benchmark	Score	11.3.25b	Raw Data	% Benchmark	Score	Average Raw	Average Score
Large trees per hectare	34	26	144.4	10	34	34	188.9	15	30.0	12.5
Tree canopy (T1) height (m)	24				24					
Tree subcanopy (T2) height (m)	10				10					
Tree canopy height (average score)	17	28	207.4	5	17	29	214.8	5	28.5	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100.0	5
Tree canopy (T1) cover (%)	45	77.0	208.1	5	45	87.0	235.1	5		
Tree subcanopy (T2) cover (%)	10	13.0	185.7	5	10	48.0	685.7	3		
Tree canopy cover (average score)	27.5	45	196.9	5	27.5	67.5	460.4	4	56.3	4.5
Native shrub cover (%)	6	0.0	0.0	0	6	2.0	50.0	3	1.0	1.5
Coarse woody debis	148	10	3.6	0	148	185	65.8	5	97.5	2.5
Native plant species richness - trees	8	8	400.0	5	8	8	400.0	5	8.0	5
Native plant species richness - shrubs	4	1	50.0	2.5	4	1	50.0	2.5	1.0	2.5
Native plant species richness - grasses	7	0	0.0	0	7	0	0.0	0	0.0	0
Native plant species richness - forbs	13	2	13.3	0	13	4	26.7	2.5	3.0	1.25
Non-native plant cover	0	99	na	0	0	99	na	0	7.0	0
Native perennial grass cover (%)	10	0.0	0.0	0	10	0.0	0.0	0	7.0	0
Organic litter cover (%)	35	7	20.0	3	35	22	62.9	5	7.0	4
Quality and availability of food and foraging habitat		10.00		3.33		10.00		3.33		3.33
Quality and availability of shelter		5	3			5	5			9
Site Condition Score										38.08
Maximum Site Condition Score										*70*
Site Condition Score - out of 3										**1.63**

Assessment Unit - Regional Ecosystem	AU 5 - RE 11.3.27b remnant					
Site Reference	Benchmark	Mrb13				
	11.3.27b	Raw Data	% Benchmark	Score	Average Raw	Average Score
Large trees per hectare	34	4	22.2	5	22.22222	5
Tree canopy (T1) height (m)	15					
Tree subcanopy (T2) height (m)	na					
Tree canopy height (average score)	15	18	133.3	5	133.3333	5
Recruitment of woody perennial species in EDL	100	66	66.0	3	66	3
Tree canopy (T1) cover (%)	42	24.9	67.3	5	67.2973	5
Tree subcanopy (T2) cover (%)	na	3.5	na	na	na	na
Tree canopy cover (average score)	42	14.2	67.3	5		5
Native shrub cover (%)	7		0.0	0	0	0
Coarse woody debis	484	280	99.6	5	99.64413	5
Native plant species richness - trees	2	2	100.0	5	300	5
Native plant species richness - shrubs	1	1	50.0	5	50	5
Native plant species richness - grasses	2	9	100.0	5	100	5
Native plant species richness - forbs	7	2	13.3	2.5	13.33333	2.5
Non-native plant cover	0	30	na	3	na	3
Native perennial grass cover (%)	10		0.0	5	0	5
Organic litter cover (%)	12	15	42.9	5	42.85714	5
Quality and availability of food and foraging habitat		30.00		10.00		10.00
Quality and availability of shelter		3	1			4
Site Condition Score						49.5
Maximum Site Condition Score						*70*
Site Condition Score - out of 3						**2.12**

Assessment Unit - Regional Ecosystem	AU 6 - RE 11.4.9 remnant													
Site Reference	Benchmark	Mrb9			Benchmark	Mrb10			Benchmark	SWC3				
	11.4.9	Raw Data	% Benchmark	Score	11.4.9	Raw Data	% Benchmark	Score	11.4.9	Raw Data	% Benchmark	Score	Average Raw	Average Score
Large trees per hectare	47	6	33.3	5	47	20	111.1	5	47			5	13	5
Tree canopy (T1) height (m)	10				10				10					
Tree subcanopy (T2) height (m)	6				6				6					
Tree canopy height (average score)	8	16	118.5	5	8	16	118.5	5	8			5	16	5
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	100.0	5	100			5	100	5
Tree canopy (T1) cover (%)	25	81.4	220.0	3	25	74.9	202.4	3	25					
Tree subcanopy (T2) cover (%)	11	15.7	224.3	5	11	9.0	128.6	5	11					
Tree canopy cover (average score)	18	48.55	222.15	4	18	41.95	165.5	4	18			5	45.25	4.333333
Native shrub cover (%)	5	14.9	372.5	3	5	17.0	425.0	3	5			3	15.95	3
Coarse woody debis	980	1685	599.6	5	980	1670	594.3	5	980			5	1677.5	5
Native plant species richness - trees	2	2	100.0	5	2	2	100.0	5	2			5	2	5
Native plant species richness - shrubs	5	6	300.0	5	5	13	650.0	5	5			0	9.5	3.333333
Native plant species richness - grasses	5	4	44.4	2.5	5	10	111.1	5	5			5	7	4.166667
Native plant species richness - forbs	10	8	53.3	2.5	10	10	66.7	5	10			5	9	4.166667
Non-native plant cover	0	5	na	5	0	5	na	5	0			5	5	5
Native perennial grass cover (%)	16		0.0	1	16		0.0	1	16			5		2.333333
Organic litter cover (%)	45	83.6	238.9	5	45	63.6	181.7	5	45			5	73.6	5
Quality and availability of food and foraging habitat		28.00		9.33		30.00		10.00						9.67
Quality and availability of shelter		5	3			5	1							7
Site Condition Score														51.67
Maximum Site Condition Score														*70*
Site Condition Score - out of 3														**2.21**

Assessment Unit - Regional Ecosystem	AU 7 - RE 11.5.2a remnant									
Site Reference	Benchmark	Mrb6					Benchmark	Mrb4		
		Raw Data	% Benchmark	Score	Average Raw	Average Score	11.5.3	Raw Data	% Benchmark	Score
Large trees per hectare		2		5	2	5	10	20	111.1	15
Tree canopy (T1) height (m)							16			
Tree subcanopy (T2) height (m)							na			
Tree canopy height (average score)		13		5	13	5	16	16	118.5	5
Recruitment of woody perennial species in EDL		100		5	100	5	100	100	100.0	5
Tree canopy (T1) cover (%)		60.7			60.7		20	21.7	58.6	5
Tree subcanopy (T2) cover (%)		22.1			22.1		na	na	na	na
Tree canopy cover (average score)		41.4		5		5	20	21.7	58.6	5
Native shrub cover (%)		5.8		5	5.8	5	3	20.1	502.5	3
Coarse woody debis		120		2	120	2	314	45	16.0	2
Native plant species richness - trees		8		5	8	5	6	6	300.0	5
Native plant species richness - shrubs		10		5	10	5	6	5	250.0	2.5
Native plant species richness - grasses		12		5	12	5	6	3	33.3	2.5
Native plant species richness - forbs		9		5	9	5	10	5	33.3	2.5
Non-native plant cover		1		10	1	10	0	5	na	5
Native perennial grass cover (%)		0.0		5	0	5	19		0.0	3
Organic litter cover (%)		41		5	41	5	20	16	45.7	5
Quality and availability of food and foraging habitat						9.00		25.00		5.00
Quality and availability of shelter		5	3			8		3		
Site Condition Score						59				
Maximum Site Condition Score						*70*				
Site Condition Score - out of 3						**2.53**				

Site Context	AU1 Value	AU1 Score	AU2 Value	AU2 Score	AU3 Value	AU3 Score	AU4 Value	AU4 Score	AU5 Value	AU5 Score	AU6 Value	AU6 Score	AU7 Value	AU7 Score
Size of patch (total out of 10)	>200 ha	10		7.5	>200 ha	10	>200 ha	7.5	>200 ha	10	>200 ha	10	>200 ha	10
Connectedness (total out of 5)	>75%	5	>75%	5	>75%	5	>75%	5	50-75%	4	>75%	5	>75%	5
Context (% remnant within 1km) (total out of 5)	>75%	5	>30%-75%	4	>75%	5	>30%-75%	4	>30%-75%	4	>75%	4.666667	>75%	5
Ecological Corridors (total out of 6)	Outside	0	Within	6	Outside	0	Within	6	Outside	0	Outside	0	Outside	0
Threats to the species (total out of 15)		5		5		5		5		5		5		5
Species mobility capacity (total out of 10)		7.3		7.3		7.3		7.3		7.3		7.3		7.3
Site Context Score		32.3		34.8		32.3		34.8		30.3		31.96667		32.3
MAX Site Context Score		*51*		*51*		*51*		*51*		*51*		*51*		*51*
Site Context Score - out of 3		**1.90**		**2.05**		**1.90**		**2.05**		**1.78**		**1.88**		**1.90**

Species Stocking Rate (SSR)	REMNANT AREAS					Site scores
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0		10		10
		No		Yes		
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	15
		Not habitat	Dispersal	Foraging	Breeding	
Role of the site population in relation to the overall species population*	Score	0	5	10	15	5
	(Total from supplementary table below)	0	1-15	16-35	36-45	
Total Species Stocking Rate score						30
Maximum Species Stocking Rate Score						40
Species Stocking Rate Score (out of 3)						2.25

REGROWTH AREAS					Site scores
Score	0		10		5
	No		Yes		
Score	0	5	10	15	10
	Not habitat	Dispersal	Foraging	Breeding	
Score	0	5	10	15	0
(Total from supplementary table below)	0	5 - 15	20 - 35	40 - 45	
					15
					40
					1.5

*Role of site location to species oveerall population in the state					Site scores
*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		5
		No	Yes/ Possibly		
*Near the limit of the species range	Score	0	15		0
		No	Yes		
TOTAL	0	5	10	15	10
	0	5 - 15	20 - 35	40 - 45	

11.4.9 removed as not SP habitat

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5		AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	FINAL (remnant)	FINAL (regrowth)
	RE 11.3.2	RE 11.3.4a	RE 11.3.9	RE 11.3.25a	RE 11.3.27b		RE11.5.2a	RE 11.5.3	RE 11.5.8b	RE 11.5.8c	RE 11.5.9	HVR RE 11.5.3	HVR RE 11.5.8c	RE 11.3.35 non-rem		
Site Condition score (out of 3)	2.29	1.34	2.26	1.63	2.12		2.53	2.38	2.65	2.29	2.29	2.29	2.29	2.29		
Site Context Score (out of 3)	1.90	2.05	1.90	2.05	1.78		1.90	1.85	1.84	1.90	1.64	1.66	1.66	1.66		
Species Stocking Rate Score (out of 4)	2.25	2.25	2.25	2.25	2.25		2.25	2.25	2.25	2.25	2.25	1.50	1.50	1.50	2.25	1.50
Habitat Quality score (out of 10)	6.44	5.64	6.41	5.93	6.15		6.68	6.48	6.74	6.44	6.18	5.45	5.45	5.45		
Impact area (ha)	82.75	268.54	33.65	95.86	6.14		11.33	361.91	78.17	291.38	85.55	119.75	44.85	1.96	1315.28	166.56
Size weighting	0.06	0.20	0.03	0.07	0.00		0.01	0.28	0.06	0.22	0.07	0.72	0.27	0.01		
Weighted Habitat Quality Score	***0.39***	***1.13***	***0.19***	***0.42***	***0.00***		***0.07***	***1.81***	***0.40***	***1.42***	***0.43***	***3.92***	***1.47***	***0.05***	***6.26***	***5.44***
Weighted Habitat Quality Score (rounded)															6	6

QUALITY AND AVAILABILITY OF FOOD AND SHELTER

Quality and availability of food and foraging habitat	Score
Relative abundance of native grasses (divide raw grass richness by benchmark grass richness, convert to score out of 10)	10
Relative diversity of food grases present - 1 food grass species = 5, 2+ food grass species = 10 (convert to score out of 10)	10
^Ease of movement (estimate based on connectivity of vegetation and physical or behavioural barriers to movement)	10
TOTAL	30
TOTAL out of 10	10

^scores from 0 – 10 where 0 – 2 = (movement totally restricted), 2 - 4 (substantial, frequent barrier), 4 - 6 (moderate, occasional barrier), 6 - 8 (negligible barrier), 8 - 10 (along a koala movement corridor).

Quality and availability of shelter				Score
Tree canopy cover	1	3	5	5
	<10%	10-30%	>30	
Raw subcanopy cover	1	3	5	5
	<10%	10-30%	>30	
			TOTAL	10

CONTEXT

Size of Patch (from BioCondition Manual)	Score
<5ha remnant and/or regrowth	0
>=5-25ha remnant and/or regrowth	2
>=25-100ha remannt OF >=25-200ha remnant and regrowth OR >=25-200ha regrowth	5
>=100-200ha remnant OR >200ha remnant and regrowth OR >200ha regrowth	7
>=200ha remnant	10

Connectivity (from BioCondition Manual)	Score
Low- AU is not connected using any of the below descriptions	0
Medium - AU is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR remnant vegetation along <10% of its perimeter and with regrowth native vegetation >25% of its per	2
High - AU is connected with adjacent remnant vegetation along 50% to 75% of its perimeter	4
Very high - AU is connected with adjacent remnant vegetation along >75% of its perimeter OR includes>500ha remnant vegetation	5

Landscape Context (from BioCondition Manual)	Score
Low- <10% remnant vegetation and <30% native non-remnant vegetation (regrowth)	0
Medium - >=10% to 30% remnant vegetation and <30% regrowth OR <10% remnant vegetation and >=30% regrowth	2
High - >=30% to 75% remnant vegetation OR >=10% to 30% remnant vegetation and >=30% regrowth vegetation	4
Very high - >75% remnant vegetation	5

ECOLOGICAL CORRIDORS

Landscape Context (from BioCondition Manual)	Score
Outside of Statewide Biodiversity corridor (Qld Globe)	0
Within Statewide Biodiversity corridor (Qld Globe)	6

SPECIES MOBILITY

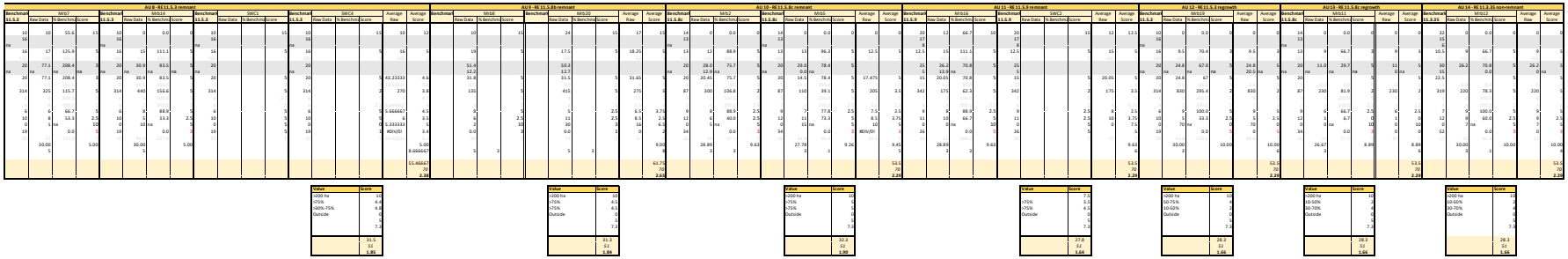
SPECIES MOBILITY		Score	Site scores
Habitat connectivity	Isolated	0-2	7
	Partially isolated	3-4	
	Periodically isolated	5-6	
	Major connectivity	7-8	
	Totally connected	9-10	
Behavioural deterrents to movement	Extreme risk of disturbance resulting in movement	0-2	7
	High risk	3-4	
	Moderate risk	5-6	
	Low Risk	7-8	
	Nil Risk	9-10	
Physical deterrents to movement	Total barrier	0-2	8
	Substantial frequent barrier	3-4	
	Moderate, occasional barrrier	5-6	
	Negligible barrier	7-8	
	Active movement pathway - i.e., watercourse or linear corridor	9-10	
	TOTAL (invert to a score out of 10)		7.333333

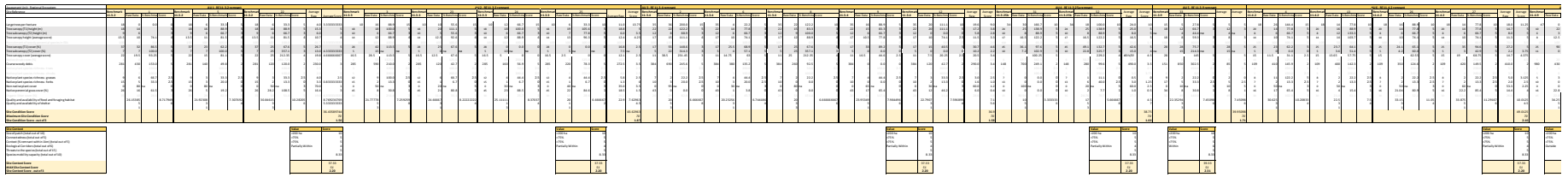
THREATS TO SPECIES

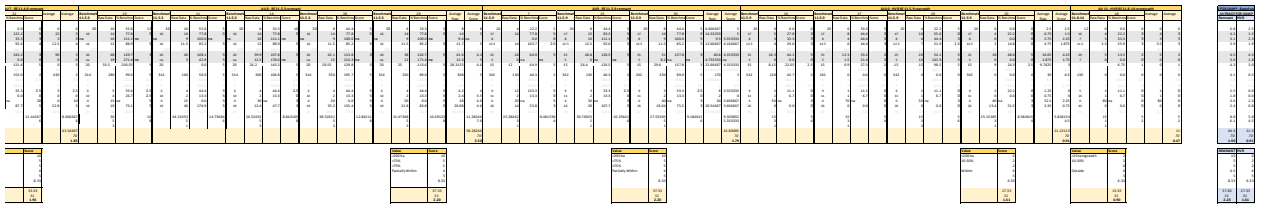
THREATS TO SPECIES							
THREATS MATRIX			Severity				
			Very High	High	Medium	Low	Very Low
			1	2	3	4	5
Scope	Very High	1	1	2	3	4	5
	High	2	2	4	6	8	10
	Medium	3	3	6	9	12	15
	Low	4	4	8	12	16	20
	Very Low	5	5	10	15	20	25

Threats to Squatter Pigeons			Score	Total	Site scores
Vehicles	Proximity to public road	<1.5km	1	3	3
		>1.5km	3		
	Traffic Volume	High - >10 vehicles per hour	1	3	1
		Low - <10 vehicles per hour	3		
	Traffic Speed	40km	6	6	4
		60km	4		
		80km	2		
		100km	0		
	Signage	Present	0	1	1
		Not Present	1		
Predators	Weeds	>50%	1	3	1
		<50%	3		
	Cats and Foxes	Present	0	1	0
		Not Present	1		
Fire	Relative fuel load	High	0	1	0
		Low	1		
	Level of public access	High	0	1	1
		Low	1		
	Firebreaks	Not adequate	0	1	1
		Adequate	1		
	Inappropriate fire regimes	Inappropriate	0	1	0
		Appropriate	1		
Habitat Loss	Isolation	Isolated	0	2	2
		Connected habitat	2		
	Disturbance	Presence of disturbance (eg cattle, land clearing, rabbits)	0	2	0
		Limited disturbance	2		
		TOTAL		25	14

TOTAL	0	5	10	15
	0	5 - 15	16-20	21-25







APPENDIX

E

FIRE MANAGEMENT GUIDELINES

FIRE MANAGEMENT WITHIN OFFSET AREAS

Table 19 describes the fire management guidelines provided by DES in each of the RE descriptions. The REs listed are those found within or adjacent to the offset area. RE Map provide in Map 2 of the Offset Ecological Assessment Report in Appendix C.

Table 19 Fire Management Guidelines

RE	Re Description	Fire Management
11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	**DO NOT BURN** **STRATEGY:** Manage surrounding country. **ISSUES:** This community does not need fire. Flood events drive recruitment of coolabah. Hollow trees are critical habitat. High intensity and extensive fires will degrade vegetation structure and destroy animal habitats. Restrict extent and intensity of fires.
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains	**REQUIRES LOW INTENSITY BURNS** **SEASON:** Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **INTENSITY:** Low to moderate. **INTERVAL:** 6-10 years (shorter in north of bioregion: 2 - 7 years). **STRATEGY:** Restrict to less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. Sometimes a small amount of wind may move the fire front quickly so that burn intensity is not too severe to destroy habitat trees. **ISSUES:** Burn interval for conservation purposes will differ from that for grazing purposes; the latter being much shorter. Management of this vegetation type should be based on maintaining vegetation composition, structural diversity, fauna habitats (in particular hollow-bearing trees and logs) and preventing extensive wildfire. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Fire can control shrub invasives (e.g., Eremophila spp. and A. stenophylla in the red soil country in particular). Fire will also control cypress. Low to moderate intensity burns with good soil moisture are necessary to minimise loss of hollow trees. Avoid burning riparian communities as these can be critical habitat for some species. Culturally significant (scar) trees may need protection, such as rake removal of ground fuels. Planned burns have traditionally been carried out in the winter dry season; further research required.
11.3.9	*Eucalyptus platyphylla, Corymbia* spp. woodland on alluvial plains	**REQUIRES LOW TO MODERATE INTENSITY BURNS** **SEASON:** Early dry season when there is good soil moisture, with some later fires in the early storm season or after good spring rains. **INTENSITY:** Primarily low to moderate, with occasional high intensity fires. **INTERVAL:** Typically, 2 - 7 years, with some areas longer unburnt. **STRATEGY:** A predominance of early dry season fires is recommended, although there is value in occasional late dry season fires, or storm burns, over small areas. Burning should begin very soon after the wet season, to secure boundaries and adjacent fire-sensitive vegetation. Subsequent repeat ignitions can be used within the same section of land weeks or months after the boundaries have been secured by early burning, to produce a mixture of burnt areas with multiple ignition dates. Use topographical features to ignite areas as soon as they dry out. This will create a mosaic of areas that were burnt at different dates and unburnt sections within the same area of woodland. Burn away from riparian communities, which can be critical habitat for some species. Approximately 25% of the grassy woodlands within a landscape should receive patchy fires in most years. **ISSUES:** These woodlands have a diverse native grass and herb layer that is maintained and promoted by regular fire. Burning that starts immediately after the wet season, with follow up small fires ignited progressively over multiple dates can increase the availability of grass and herb seed, which is a critical food source for many birds and small mammals. Recently burnt grass clumps tend to produce more seed than unburnt clumps and the earlier burnt grass usually seeds earlier than later burnt grass. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Low to moderate intensity burns with good soil moisture minimise the risk of losing hollow trees. An occasional late season burn will promote grasses and legumes. Ensure a diverse grass layer, maintenance of hollow-bearing trees and vegetation structure.

RE	Re Description	Fire Management
11.4.2	*Eucalyptus* spp. and/or *Corymbia* spp. grassy or shrubby woodland on Cainozoic clay plains	**REQUIRES LOW TO MODERATE INTENSITY BURNS** **SEASON:** Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains.. **INTENSITY:** Low to moderate. **INTERVAL:** 6-10 years (shorter intervals in north of bioregion: 2 - 7 years) **STRATEGY:** Restrict to less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. Sometimes a small amount of wind may move the fire front quickly so that burn intensity is not too severe to destroy habitat trees. **ISSUES:** Burn interval for conservation purposes will differ from that for grazing purposes; the latter being much shorter. Management of this vegetation type should be based on maintaining vegetation composition, structural diversity, fauna habitats (in particular hollow-bearing trees and logs) and preventing extensive wildfire. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Fire can control shrub invasives (e.g., Eremophila spp. and A. stenophylla in the red soil country in particular). Fire will also control cypress. Low to moderate intensity burns with good soil moisture are necessary to minimise loss of hollow trees. Avoid burning riparian communities as these can be critical habitat for some species. Culturally significant (scar) trees may need protection, such as rake removal of ground fuels. Planned burns have traditionally been carried out in the winter dry season; further research required.
11.5.3	*Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	**REQUIRES VARIOUS INTENSITY BURNS** **SEASON:** Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **INTENSITY:** Various. **INTERVAL:** 6-15 years (shorter intervals in north of bioregion: 5 - 10 years). No shrubby woodlands should receive two consecutive burns at intervals of < 6 years. **STRATEGY:** Once boundaries of the planned burning area are secure, ignite across the landscape in a patchwork, rather than continuous ignition strips. Use topographical features to help create a patchily burnt landscape. Where shrubby woodlands occur within a broader grassy landscape, attempt to burn the shrubby woodland during every second fire rotation in the grassy woodland, by burning early breaks around the shrubby areas. In sites with a history of wildfires recurring within 5 years, patchy burning in a few small strategic locations at 3- or 4-year intervals may reduce the incidence of extensive wildfires, while ensuring most shrubby woodland areas remain unburnt for > 5 years. b: Burn under mild conditions and primarily away from the edge into surrounding vegetation. Low intensity burning may be of benefit within the forests with native grasses and where Para grass density requires management. **ISSUES:** Shrubby woodlands require longer fire intervals than grassy woodlands, because of the presence of fire-killed shrubs and the time required for post-fire regrowth to return to a mature structure. The seedlings of many fire-killed shrubs (such as some wattles) require 5 years or more before they mature. The creation of a fine-scale patchy mosaic can be more difficult to achieve in shrubby compared to grassy woodlands. Ensure seedlings of fire-killed shrubs mature and persist in the woodland; ensure several years of mature shrubby woodland structure before the subsequent fire. b: Care is needed to ensure a low intensity fire, as high intensity fires can damage trees, e.g., Melaleuca spp. and Brigalow. Native grasses (e.g., Imperata cylindrica, Sporobolus virginicus) and sedges (e.g., Fimbristylis spp.) will benefit from occasional burning. Fire, coupled with herbicide spraying, is important for managing exotic wetland plants, such as Olive Hymenachne and Para grass. Burning temporarily opens gaps within exotic grass patches, allowing native flora to establish. Ensure native grass diversity is maintained and native trees are not damaged by fires.
11.5.9	*Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and/or remnant surfaces	**REQUIRES VARIOUS INTENSITY BURNS** **SEASON:** Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains **INTENSITY:** Various. **INTERVAL:** 6-15 years (shorter intervals in north of bioregion: 5 - 10 years). No shrubby woodlands should receive two consecutive burns at intervals of < 6 years. **STRATEGY:** Once boundaries of the planned burning area are secure, ignite across the landscape in a patchwork, rather than continuous ignition strips. Use topographical features

RE	Re Description	Fire Management
		to help create a patchily burnt landscape. Where shrubby woodlands occur within a broader grassy landscape, attempt to burn the shrubby woodland during every second fire rotation in the grassy woodland, by burning early breaks around the shrubby areas. In sites with a history of wildfires recurring within 5 years, patchy burning in a few small strategic locations at 3- or 4-year intervals may reduce the incidence of extensive wildfires, while ensuring most shrubby woodland areas remain unburnt for > 5 years. **ISSUES:** Shrubby woodlands require longer fire intervals than grassy woodlands, because of the presence of fire-killed shrubs and the time required for post-fire regrowth to return to a mature structure. The seedlings of many fire-killed shrubs (such as some wattles) require 5 years or more before they mature. The creation of a fine-scale patchy mosaic can be more difficult to achieve in shrubby compared to grassy woodlands. Ensure seedlings of fire-killed shrubs mature and persist in the woodland. Ensure several years of mature shrubby woodland structure before the subsequent fire..
11.5.12a	*Eucalyptus exserta* and/or *Corymbia clarksoniana* and/or *Eucalyptus crebra* and/or *Corymbia trachyphloia* and/or *C. citriodora* woodland. Occurs on colluvial lower slopes of Cainozoic sandplains.	**REQUIRES LOW TO MODERATE INTENSITY BURNS** **SEASON:** Late wet to early dry season when there is good soil moisture. Early storm season or after good spring rains. **INTENSITY:** Low to moderate. **INTERVAL:** 6-10 years. **STRATEGY:** Restrict to less than 30% in any year. Burn under conditions of good soil moisture and when plants are actively growing. Sometimes a small amount of wind may move the fire front quickly so that burn intensity is not too severe to destroy habitat trees. **ISSUES:** Burn interval for conservation purposes will differ from that for grazing purposes; the latter being much shorter. Management of this vegetation type should be based on maintaining vegetation composition, structural diversity, fauna habitats (in particular hollow-bearing trees and logs) and preventing extensive wildfire. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Fire can control shrub invasives (e.g., Eremophila spp. and A. stenophylla in the red soil country in particular). Fire will also control cypress. Low to moderate intensity burns with good soil moisture are necessary to minimise loss of hollow trees. Avoid burning riparian communities as these can be critical habitat for some species. Culturally significant (scar) trees may need protection, such as rake removal of ground fuels. Planned burns have traditionally been carried out in the winter dry season; further research required.
11.8.14	*Eucalyptus crebra, Corymbia dallachiana* woodland on Cainozoic igneous rocks	**REQUIRES LOW TO MODERATE INTENSITY BURNS** **SEASON:** Early dry season when there is good soil moisture, with some later fires in the early storm season or after good spring rains **INTENSITY:** Primarily low to moderate, with occasional high intensity fires. **INTERVAL:** Typically, 2 - 7 years, with some areas longer unburnt **STRATEGY:** A predominance of early dry season fires is recommended, although there is value in occasional late dry season fires, or storm burns, over small areas. Burning should begin very soon after the wet season, to secure boundaries and adjacent fire-sensitive vegetation. Subsequent repeat ignitions can be used within the same section of land weeks or months after the boundaries have been secured by early burning, to produce a mixture of burnt areas with multiple ignition dates. Use topographical features to ignite areas as soon as they dry out. This will create a mosaic of areas that were burnt at different dates and unburnt sections within the same area of woodland. Burn away from riparian communities, which can be critical habitat for some species. Approximately 25% of the grassy woodlands within a landscape should receive patchy fires in most years. **ISSUES:** These woodlands have a diverse native grass and herb layer that is maintained and promoted by regular fire. Burning that starts immediately after the wet season, with follow up small fires ignited progressively over multiple dates can increase the availability of grass and herb seed, which is a critical food source for many birds and small mammals. Recently burnt grass clumps tend to produce more seed than unburnt clumps and the earlier burnt grass usually seeds earlier than later burnt grass. Maintaining a fire mosaic will help ensure protection of habitat and mitigate against wildfires. Low to moderate intensity burns with good soil moisture minimise the risk of losing hollow trees. An occasional late season burn will promote grasses and legumes. Ensure a diverse grass layer; maintain hollow-bearing trees and vegetation structure.

APPENDIX

F

ACTIVE REVEGETATION SPECIES

Table 20 Suitable locally important native species that can be used for active regeneration

Type	Species Name	Common Name
Tree	*Corymbia clarksoniana*	Clarkson's Bloodwood
	Corymbia dallachiana	Dallachy's Gum
	Corymbia erythrophloia	Variable Barked Bloodwood
	Corymbia tessellaris	Moreton Bay Ash
	Eucalyptus camaldulensis	River Red Gum
	Eucalyptus coolabah	Coolabah
	Eucalyptus crebra	Narrow-leaved Ironbark
	Eucalyptus melanophloia	Silver-leaved Ironbark
	Eucalytpus platyphylla	Polar Gum
	Eucalyptus populnea	Poplar Box
	Eucalyptus raveretiana	Black Ironbox
	Eucalytpus tereticornis	Queensland Blue Gum
	Melaleuca fluviatilis	Pendulous Paperbark
	Melaleuca leucadendra	Weeping Paperbark
Shrub	*Acacia excelsa*	Ironwood
	Acacia leiocalyx	Early Flowering Black Wattle
	Acacia salicina	Broughton Willow
	Alectryon diversifolius	Scrub Boonaree
	Alphitonia excelsa	Soap Bush
	Atalaya hemiglauca	Whitewood
	Cassia brewsteri	Leichhardt Bean
	Dodonaea viscosa	Native Hope Bush
	Eremophila mitchellii	False Sandalwood
	Geijera parviflora	Wilga
	Grevillea striata	Beefwood
	Lysiphyllum carronii	Northern Bean Tree
	Psydrax oleifolia	Wild Lemon
	Sida hackettiana	Golden Sida
	Ventilago viminalis	Queensland Hemp
Groundcover	*Bothriochloa bladhii*^	Forest Bluegrass
	Bothriochloa decipiens^	Pitted Bluegrass
	Bothriochloa ewartiana^	Desert Bluegrass
	Brachyachne convergens^	Common Native Couch
	Carissa ovata	Currant Bush
	Chrysopogon fallax^	Golden Beard Grass
	Cymbopogon refractus	Barbed Wire Grass
	Dactyloctenium radulans^	Button Grass
	Dianella caerulea	Blue Flax Lily
	Dichanthium sericeum^	Silky Bluegrass
	Enneapogon polyphyllus^	Limeston Grass
	Enteropogon acicularis	Curly Windmill Grass
	Eriochloa pseudoacrotricha^	Spring Grass
	Eragrostis sororia^	Woodland Lovegrass
	Eulalia aurea^	Silky Brown Top
	Glycine tomentella^	Hairy Glycine
	Grewia latifolia	Dogs Balls
	Heteropogon contortus^	Black Speargrass

Type	Species Name	Common Name
	*Indigofera linnaei^*	Birdsville Indigo
	Panicum decompositum	Native Millet
	*Rhynchosia minima^*	Rhynchosia
	*Sporobolus caroli^*	Fairy Grass
	*Themeda triandra^*	Kangaroo Grass

^ Regarded as desirable perennial grass, intermediate value grass or other important plant for pastures. native pasture grass species (Future Beef)

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DOCUMENT CONTROL

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1	5/03/24	Emily Krunes	OAMP Draft
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3	29/03/24	Emily Krunes	Draft Finalisation
4	16/04/24	Emily Krunes	Finalisation after client review
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6	8/11/24	Emily Krunes and Richard Oldham	Revised following second round of DCCEEW comments (dated 7 November 2024)

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PERMISSIONS

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