



Offset Area Management Plan

Gregory Crinum M-Block Extension

14 April 2023

Prepared for:

Sojitz Blue Pty Ltd

Prepared by:

Stantec Australia Pty Ltd

OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

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V2	Revised mapping and area tables/figures	Rodney Norris	02/11/23	Ann Houston	02/11/23		



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

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M Osborne

Prepared by _____

Melissa Osborne – Graduate Environmental Scientist



Reviewed by _____

David Wassman – Senior Principal Ecologist



Declared area management plan

Vegetation Management Act 1999

Complete the following management plan for an area to be declared as an area of high nature conservation value or an area vulnerable to land degradation.

For guidance on declared areas see the Guide to declared areas at www.qld.gov.au. For guidance on legally securing an exchange area see the General guide to accepted development vegetation clearing codes at www.qld.gov.au (search 'vegetation management').

Note: Examples of information to include in this management plan are intended as guidance only. The level of detail or scope of the management plan will depend on the purpose of the declaration and the particular circumstances of the area being secured.

1. Owner's details

First name:	<input type="text"/>	Middle name:	<input type="text"/>	Surname:	<input type="text"/>
Company name:	<input type="text" value="Sojitz Gregory Crinum Pty Ltd"/>				
If a corporation then enter one of the following:		<input checked="" type="radio"/> ACN	<input type="radio"/> ARBN	<input type="text" value="626424048"/>	
Main phone:	<input type="text" value="07 3054 6901"/>	Other phone:	<input type="text"/>		
Address line 1:	<input type="text" value="Central Plaza One, Level 27"/>				
Address line 2:	<input type="text" value="345 Queen Street"/>				
Town/Suburb:	<input type="text" value="Brisbane"/>	State:	<input type="text" value="Queensland"/>	Postcode:	<input type="text" value="4000"/>
Email address:	<input type="text"/>				
Preferred method of contact		<input type="radio"/> Phone	<input type="radio"/> Email	<input checked="" type="radio"/> Letter	
Local government area:	<input type="text" value="Central Highlands Regional Council"/>				
Office use only:					
eLVAS case number:	<input type="text"/>				
Notification number:	<input type="text"/>				

2. Property description

This is the property on which the declared area is proposed. The declared area management plan should indicate the specific location of the proposed declared area on the property.

Extra pages may be attached to list additional lots.

Lot number	Plan number	Declared area in hectares	Tenure
<input type="text" value="7"/>	<input type="text" value="RP849020"/>	<input type="text" value="340.18"/>	<input type="text" value="Freehold"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text" value="45"/>	<input type="text" value="CP883753"/>	<input type="text" value="83.61"/>	<input type="text" value="Freehold"/>

Lot Number	Plan Number	Declared area in Hectares	Tenure
42	CP864579	249.4	Freehold
11	SP258266	30.39	Freehold
101	SP260668	45.9	Freehold

3. Description of declared area

Include enough information to allow the chief executive to map the boundary of the stated area, including a description of the area subject to the declared area and a map showing the location and extent of the area.

Spatial data supplied.

A map may be attached to this plan and submitted with the request for a declared area. Please provide spatial data in the format of a .kml or .shp file of your proposed area so that the exact extent can be used for the assessment.

4. Purpose of the declaration

The purpose of this declaration is to legally secure:

- ☒ an area of high nature conservation value
☐ an area vulnerable to land degradation

under sections 19E-19L of the *Vegetation Management Act 1999* (VMA)

5. Registered interest holders consent

A registered interest is one registered under the *Land Act 1994* or the *Land Title Act 1994*.

Registered interests include mortgages, leases, subleases, covenants, profit a prendres, easements and building management statements.

A declaration may not be made unless the holder of a registered interest (other than the owner) in the proposed declaration area has consented in writing to the making of the declaration.





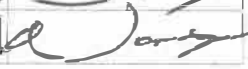
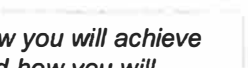
READ BEFORE SIGNING THIS SECTION

Acknowledgement and waiver by all registered interest holders.

By signing this section, those signing are taken to:

- acknowledge that a declared area resulting from a request for a declared area may have legal and financial implications for your interest in the property, and you agree that in no event shall the Department of Resources be liable for any special, indirect or consequential damages or any damages whatsoever rising out of or in connection with a request for a declared area or any subsequent declaration of the area in accordance with the request for a declared area.
- consent to the making of a declared area as proposed in the request for a declared area.

Extra pages may be attached to list additional lots and/or registered interest holders and provide their consent to the making of the declaration

Parcel (Lot & plan)	Type of registered interest	Registered interest holder's name	Contact details	Signature
7RP849020	Owner	Sojitz Gregory Crinum Pty Ltd	07 30546901	
				
11SP258266	Owner	Sojitz Gregory Crinum Pty Ltd	07 30546901	
101SP260668	Owner	Sojitz Gregory Crinum Pty Ltd	07 30546901	
42CP864579	Owner	Sojitz Gregory Crinum Pty Ltd	07 30546901	
45CP883753	Owner	Sojitz Gregory Crinum Pty Ltd	07 30546901	

Principles for drafting management plan: In the sections below you will need to outline how you will achieve the management outcomes, including details on what actions will be taken to achieve this and how you will mitigate any impacts and manage any potential risks that may hinder the specified outcome.

6. Management intent

The conservation objective is to protect and enhance the condition and extent of the biodiversity values of the Offset Sites within 20 years.

Examples:

1. The management intent for the area is the conservation of the native vegetation in the area. Conservation of the native vegetation will prevent the loss of biodiversity and maintain ecological processes.
2. The management intent for an area vulnerable to land degradation is to rehabilitate a degraded, unstable watercourse in an area subject to stream bank instability.

7. Management outcome

The key conservation outcomes from the long term management and protection of the Offset Sites are:

- Increased extent, condition and value of Brigalow TEC and Grassland TEC.
- Increased extent, condition and value of King Bluegrass habitat.
- Improved fauna movement and flora dispersal opportunities within the surrounding disturbed landscape.
- Increased condition and area of refuge for the Squatter Pigeon and other local fauna populations.

Principles for drafting management outcomes: The management outcomes for the area should be achievable, measurable and related to the to the conservation value or land degradation issue associated with the area.

Examples:

1. The management outcome for the area is that it achieves the definition of remnant vegetation.
2. The management outcome for the area is to establish (insert number) habitat trees and to have restored and enhanced (insert hectares) of natural area within (insert number) of years.

Note for exchange areas: If the declaration is to legally secure an exchange area, the management objective must be either of the following:

- i. If the exchange area is located in a category X area, category C area or category R area—to return the exchange area to remnant vegetation (a category B area on the regulated vegetation management map) as soon as possible and within 20 years
- ii. If the exchange area is located in a category B area—to achieve the nominated substantial conservation outcome or address the nominated significant land degradation issue as soon as possible

8. Activities and restrictions

As addressed in the Offset Area Management Plan

Example: To achieve the management outcome, the landholder will comply with the following activities and restrictions:

- 1. Clearing of native vegetation will not occur unless in accordance with an exemption listed in Schedule 21 of the Planning Regulation 2017 or a development approval under the Planning Act 2016.*
- 2. All reasonable measures will be taken to maintain and enhance the structure and function of the regional ecosystem. For example, minimizing the introduction, establishment and spread of non-native plants. Where non-native plants already occur in the area, all reasonable measures will be taken to control the non-native plants.*
- 3. Burning will only occur in accordance with the fire guideline/s specified in the Regional ecosystem description database (available at www.qld.gov.au) for the regional ecosystem/s in the declared area.*
- 4. Pest animals and pest plants considered an invasive biosecurity matter under the Biosecurity Act 2014 will be controlled.*
- 5. Livestock will be managed to ensure the growth of native vegetation and biodiversity is not impeded.*

Note for exchange areas: If the declaration is to legally secure an exchange area, this section of the management plan must include:

- Description of the works / management actions that will be undertaken to achieve the management objective, including the methods, timing, frequency, intended benefits etc.
- The conservation outcomes that will be achieved by the works / management actions
- Description of the management actions that will be undertaken to ensure that the effects of the works do not result in land degradation
- Details of who is responsible for all works and management actions, and the estimated length of time the area/s will be managed

9. Term

A management plan for a declared area has effect until the earlier of the following happens:

- the plan ends under its terms; or
- the declaration of the area as a declared area ends under section 19L of the VMA

The offsets must remain secured and the management plan implemented for the term of the approval under the EPBC Act - 31st December 2073.

Ending a declaration

Under section 19L of the VMA the chief executive may, by written notice given to the owner of the land the subject of a declaration, end the declaration if the chief executive considers:

- the declaration is not in the interests of the State, having regard to the public interest; or
- the management outcomes mentioned in section 19E(3)(c) of the VMA for the management plan relevant to the declaration have been achieved.

The chief executive may, by notice given to the owner of land declared as an area of high conservation value, end the declaration if:

- the area is, on or after the commencement of subsection 19L(2) of the VMA, a legally secured offset area; and
- a prescribed activity is, under an authority under another Act, to be carried out in or on the area; and
- the holder of the authority has entered into an agreed delivery arrangement in relation to an environmental offset for impacts to the area.

Note: If the landholder considers the management outcomes have been achieved, they may submit a request to end a declaration to the Department of Resources. The Department of Resources will assess whether the management outcomes have been met before removing the declaration. If the declaration is to legally secure an environmental offset and the Department of Resources is not the administering agency, the department should also be satisfied that the administering agency agrees the management outcomes have been met and agrees to the ending of the declaration in order for the department to end the declaration.

Once the declaration has ended this plan will cease to have effect and the department will remove the declaration notice from the title of the land. The landholder should submit a 20C PMAV application with the request to remove the declaration to replace the PMAV currently over the declared area and map the appropriate category of vegetation for the area (for example, category B).

10. Monitoring and record keeping

As detailed in the OAMP and the EPBC approval conditions (EPBC2021/9127).

Monitoring and record keeping should be undertaken to track the state of the declared area and progress towards achieving the management outcomes specified in this plan. The following information should also be provided:

- Monitoring and auditing processes including adaptive management approaches to rectify negative results from the monitoring and auditing processes
- Record keeping process for retaining appropriate records for monitoring and auditing processes.

Note: Providing the information above complies with the ADVCC requirements for legally securing an exchange area.

To apply for an area to be legally secured as an exchange area, complete the application to legally secure an exchange area at www.qld.gov.au (search 'vegetation management'). For guidance on legally securing an exchange area see the General guide to accepted development vegetation clearing codes at www.qld.gov.au (search 'vegetation management').

11. Additional information

The management plan may also include any other information the applicant considers will assist in the determination of the request. Additional information can be provided below or as an attachment to this plan.

12. Administering agency approval

If you are using a declared area to legally secure an environmental offset and the Department of Resources is not the administering agency, has the administering agency approved this management plan?

- ☒ Yes – Please include a copy of this approval with the request
- ☐ No – Please provide contact information for the administering agency and details of the offset delivery progress

Note: this management plan complies with the requirements for a declared area under the VMA, it does not fulfil the requirements of an offset management plan.

13. Signature of owner (applicant) and all registered owners







If there is more than one owner of the land on which the declared area is proposed, each owner must complete and sign this management plan. The owner of the land is the party/s registered on title as the registered owner.

Where the owner is a company, execution by the company must be provided in accordance with the requirements of the **Corporations Act 2001 (Commonwealth)**, section 127.

A company:

- may execute a document without using a common seal if the document is signed by two (2) directors of the company or a director and a company secretary; or for a proprietary company that has a sole director who is also the sole company secretary - that director; or
- with a company seal may execute a document if the seal is fixed to the document and the fixing of the seal is witnessed by two (2) directors of the company or a director and a company secretary; or for a proprietary company that has a sole director who is also the sole company secretary - that director.

If there are more owners, extra pages containing the additional signature(s) may be attached.

Lot	Plan number	Owner's name	If a corporation record one of the following:		Owner's signature	Date	Company seal (if applicable)
7	RP849020	Sojitz Gregory Crinum Pty Ltd	ACN	55 626 424 048		12/9/23	
						23	
45	CP883753	Sojitz Gregory Crinum Pty Ltd	ACN	55 626 424 048		12/9/23	
11	SP258266	Sojitz Gregory Crinum Pty Ltd	ACN	55 626 424 048		12/9/23	
101	SP260668	Sojitz Gregory Crinum Pty Ltd	ACN	55 626 424 048		12/9/23	
42	CP864579	Sojitz Gregory Crinum Pty Ltd	ACN	55 626 424 048		12/9/23	

Department of Resources (office use only)

Name	Position	Signature	Date

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OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Abbreviations

Brigalow TEC	Brigalow (<i>Acacia harpophylla</i> dominant and codominant)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GCM	Gregory Crinum Mine
Grassland TEC	Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin
ML	Mining Lease
MNES	Matters of National Environmental Significance
MSES	Matter of State Environmental Significance
NC Act	<i>Nature Conservation Act 1992</i>
OAMP	Offset Area Management Plan
PER	Public Environment Report
RE	Regional Ecosystem
SPRAT	Species Profile and Threats Database
TEC	Threatened Ecological Communities



Glossary

Impact Area	Areas within M-Block extension area that will be impacted by clearing or disturbance from open-cut mining
M-Block	Located wholly within ML 1923 and immediately east of the existing Gregory Crinum mining areas
Project	M-Block Extension
Offset Area	Areas allocated for M-Block offset requirements



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Introduction

1.0 INTRODUCTION

Sojitz Blue Pty Ltd (Sojitz) proposes to continue the existing Gregory Crinum coal mine (GCM) through the development of M-Block located within mining lease (ML) 1923 (the Project). GCM is located to the north east of Emerald, Queensland (**Figure 1**).

The proposal was submitted under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Minister for the Environment (the Minister) on 20 December 2021 and validated on 24 January 2022 (2021/9127). On 23 February 2022, the delegate of the Minister decided that further assessment is required as the action has the potential to have a significant impact on the following matters of national environmental significance (MNES) that are protected under Part 3 of the EPBC Act:

Listed threatened species and communities (sections 18 and 18A); and
A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E).

On that same date, the delegate of the Minister made the decision that the proposed action, the extension of the mine into M-Block, be assessed by Public Environment Report (PER). A requirement of the PER is the inclusion of a draft Offset Area Management Plan (OAMP) for the listed threatened ecological communities and species that are likely to be significantly impacted by the Project.

Stantec Australia Pty Ltd (Stantec) has been commissioned by Sojitz to produce an OAMP to address offset obligations for the Project. Between late 2020 and early 2022 Cardno, now Stantec completed a series of flora and fauna assessments within the M-Block extension area. These assessments concluded the Project will likely result in a residual significant impact on the following Matters of National Environmental Significance (MNES):

- Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community (Brigalow TEC).
- Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin ecological community (Grasslands TEC).
- King Bluegrass (*Dichanthium queenslandicum*).
- Squatter Pigeon (southern) (*Geophaps scripta scripta*).

This report will build upon Cardno, now Stantec's draft Biodiversity Offset Strategy (2022) and will outline the anticipated offset area management plan for the above MNES in relation to anticipated impacts resulting from the Project. The OAMP will specifically address Section 4 of the PER Guidelines. These have been outlined below in **Table 1** along with where they are addressed within the report.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Introduction

Table 1: PER Requirements and where they are addressed in OAMP

PER Guidelines	Where it is addressed
A description of the offset area/s, including location, size, condition, environmental values present and surrounding land uses;	Section 2.3
Baseline data and other supporting evidence, including the ecological field data, that documents the presence of the relevant MNES, and the quality of their habitat within the offset area/s;	Section 2.3
An assessment of the site habitat quality for the offset area/s using an appropriate methodology, with justification and supporting evidence;	Section 2.3
Details of how the offset area/s will provide connectivity with other habitats and biodiversity corridors and/or will contribute to a larger strategic offset for the relevant listed threatened species and communities;	Section 2.5
Maps and shapefiles to clearly define the location and boundaries of the offset area/s, accompanied by the offset attributes;	Section 2.3
Specific offset completion criteria derived from the site's habitat quality to demonstrate the improvement in the quality of habitat in the offset area/s over a 20-year period;	Section 3.1
Details of the management actions, and timeframes for implementation, to be carried out to meet the offset completion criteria;	Section 4.5
Interim milestones that set targets at 5-yearly intervals for progress towards achieving the offset completion criteria;	Section 3.1
Details of the nature, timing and frequency of monitoring to inform progress against achieving the 5-yearly interim milestones;	Section 4.5 Section 5.0
Proposed timing for the submission of monitoring reports which provide evidence demonstrating whether the interim milestones have been achieved;	Section 5.0
Timing for the implementation of corrective actions if monitoring activities indicate the interim milestones have not been achieved;	Section 4.5
Risk analysis and a risk management and mitigation strategy for all risks to the successful implementation of the OAMP and timely achievement of the offset completion criteria, including a rating of all initial and post-mitigation residual risks in accordance with a risk assessment matrix;	Section 6.0
If proposed for listed threatened species and communities, evidence of how the management actions and corrective actions take into account relevant approved conservation advices and are consistent with the objectives of relevant recovery plans and threat abatement plans; and	Section 4.0
Details of the legal mechanism for legally securing the proposed offset area/s, such that legal security remains in force over the offset area/s for a minimum of 20 years to provide enduring protection for the offset area/s against development incompatible with conservation.	Section 2.6



Introduction

1.1 PROJECT BACKGROUND

The Gregory Crinum mine is situated in Central Queensland's Bowen Basin, approximately 50km north-east by road from the town of Emerald. The Gregory Mine was initially registered as an open-cut mining operation on 23 April 1979, with the addition of underground mining at Crinum Mine registered on 26 June 1993. In March 2019, Sojitz purchased the mine from BMA and currently the mine produces about 2 million tonnes per annum of premium hard coking coal for export to customers throughout the world.

Sojitz is proposing to continue the Gregory Crinum Mine to an area known as 'M-Block' (the Project), located directly east of the existing mining area. M-Block is located on mining lease (ML) 1923 which was originally granted and approved for underground mining on 14 March 1985 with additional 'surface rights' granted under the *Mineral Resources Act 1989* (Qld) between 1986 and 2014. The Project is fully authorised at a State level and holds an environmental authority (EA) (EPML00945013) and water licence 577145 to enable dewatering of ML1923 (Water Licence).

The proposed layout of the open cut and underground operations, which are the subject of this report and ultimately referral to the Commonwealth, has been illustrated on **Figure 2**.

Mining of M-Block will utilise conventional open-cut mining methods for the first 3 years, with underground access to be established from the highwall. Gregory Crinum already has significant established infrastructure including rail loading, CHPP, tailings dams and workshops that will be utilised for M-Block. The use of existing infrastructure will keep the disturbance at M-Block to a minimum.

1.2 SITE DESCRIPTION

M-Block is located approximately 250 km west of Rockhampton in the Bowen Basin, Central Queensland and approximately 45 km north east of the township of Emerald adjacent to the current Gregory Crinum Mine. It sits within the Brigalow Belt North Bioregion, across the Basalt Downs and Isaac-Comet Downs subregions and incorporates the following land parcels:

- Lot 7 on TT376;
- Lot 4 on CP843145;
- Lot 3 on RP616357; and
- Lot 1 on SP258941.

The Brigalow Belt North Bioregion experiences a semiarid to tropical climate with predominantly summer rainfall. The landscapes in this bioregion are made up of undulating to rugged ranges and alluvial plains. Vegetation in this area is generally characterised by Brigalow (*Acacia harpophylla*) open forests and eucalypt woodland. The site of the proposed action is generally flat. Elevations range from 220 m in the south-west to approximately 240 m in the far north. The existing land use is principally cattle grazing with some minor auxiliary uses, such as access tracks, associated with the existing mine.



1.3 M-BLOCK IMPACT AREA DESCRIPTION

The total area of the M-Block extension footprint is 2,441.3 ha. The total impact area is 1,710.5 ha comprising 296.4 ha of open cut impact area and 1,414.1 ha of underground impact. As identified in the Ecohydrological Conceptual Model Report (Stantec 2022), the predicted groundwater impacts as a result of mining operations are not likely to result in any significant impacts to groundwater dependent MNES. This includes Brigalow TEC which has been assessed as not being reliant on ground water (3D Environmental 2022). Based on current surveys, the area of influence associated with M-Block does not appear to support significant stygofauna communities (4T Consultants 2022). The total avoidance footprint is 730.8 ha. The proposed layout of the open cut and underground operations has been illustrated on **Figure 2**.

1.3.1 MNES Impacts and Offset requirements

Table 2 outlines the total impact area and habitat condition for each MNES present within M-Block. These results were derived from Cardno, now Stantec's 2020/2021/2022 ecological assessments, the full methodology and results are provided in **Section 2.0**. **Table 2** also outlines the offset area required for each matter under the *EPBC Act Environmental Offsets Policy*. The associated offset area requirements for the listed MNES have been calculated in accordance with the *EPBC Act Offsets Assessment Guide*, further details are provided in **Section 2.7**.

Table 2: MNES impacted and offset area required

MNES	Total Area of Habitat in M-Block (ha)	Total Disturbance Estimate (ha)	Impacted MNES Condition (out of 10)	Required offset area (ha)
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) ecological community	156.4	58.7	6	165
Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin ecological community	819.6	133.5	6	375
King Bluegrass (<i>Dichanthium queenslandicum</i>)	1,029.1	174.9	6	495
Squatter Pigeon (southern) (<i>Geophaps scripta scripta</i>)	164.8	58.7	4	95



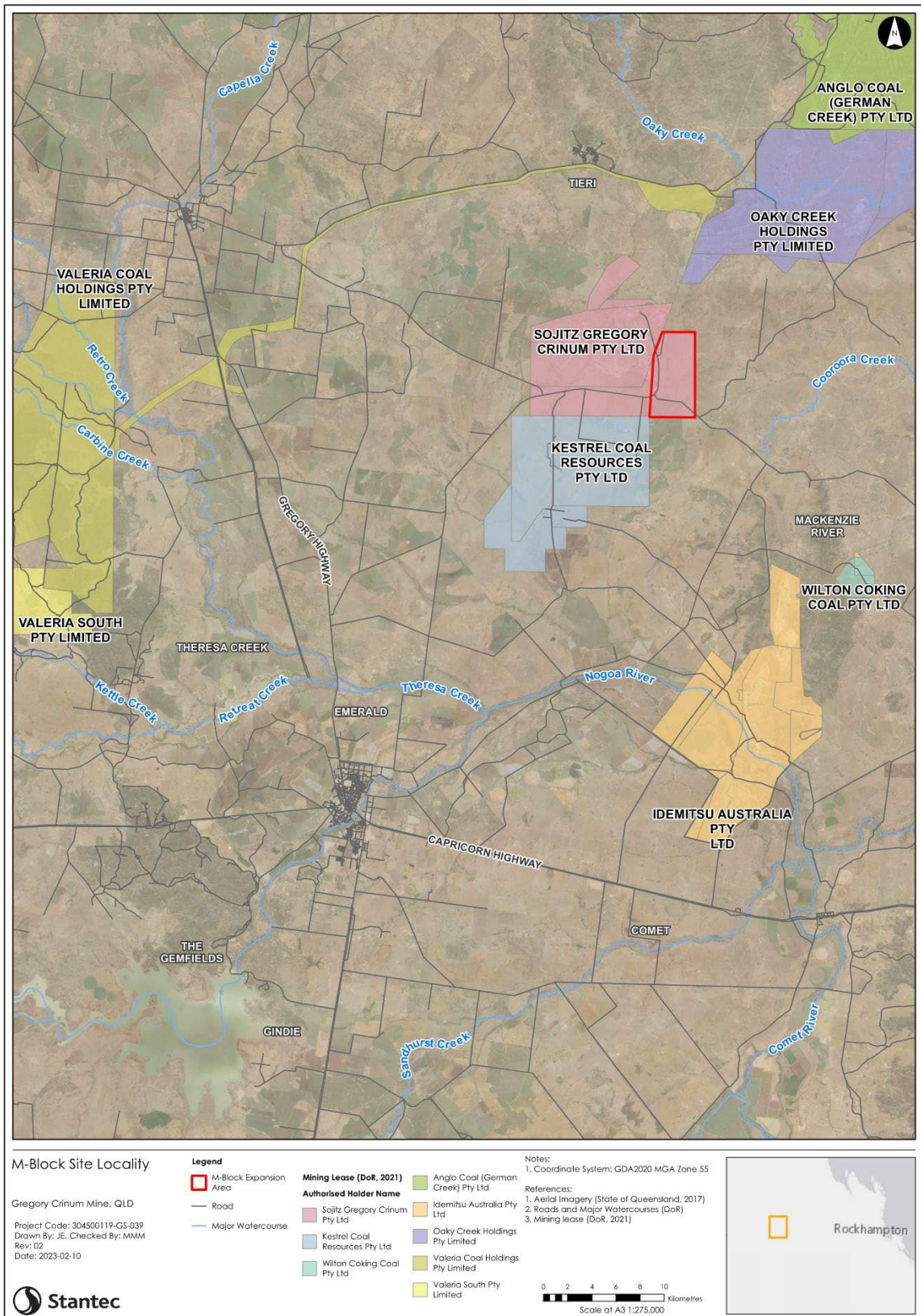


Figure 1: M-Block Site Locality



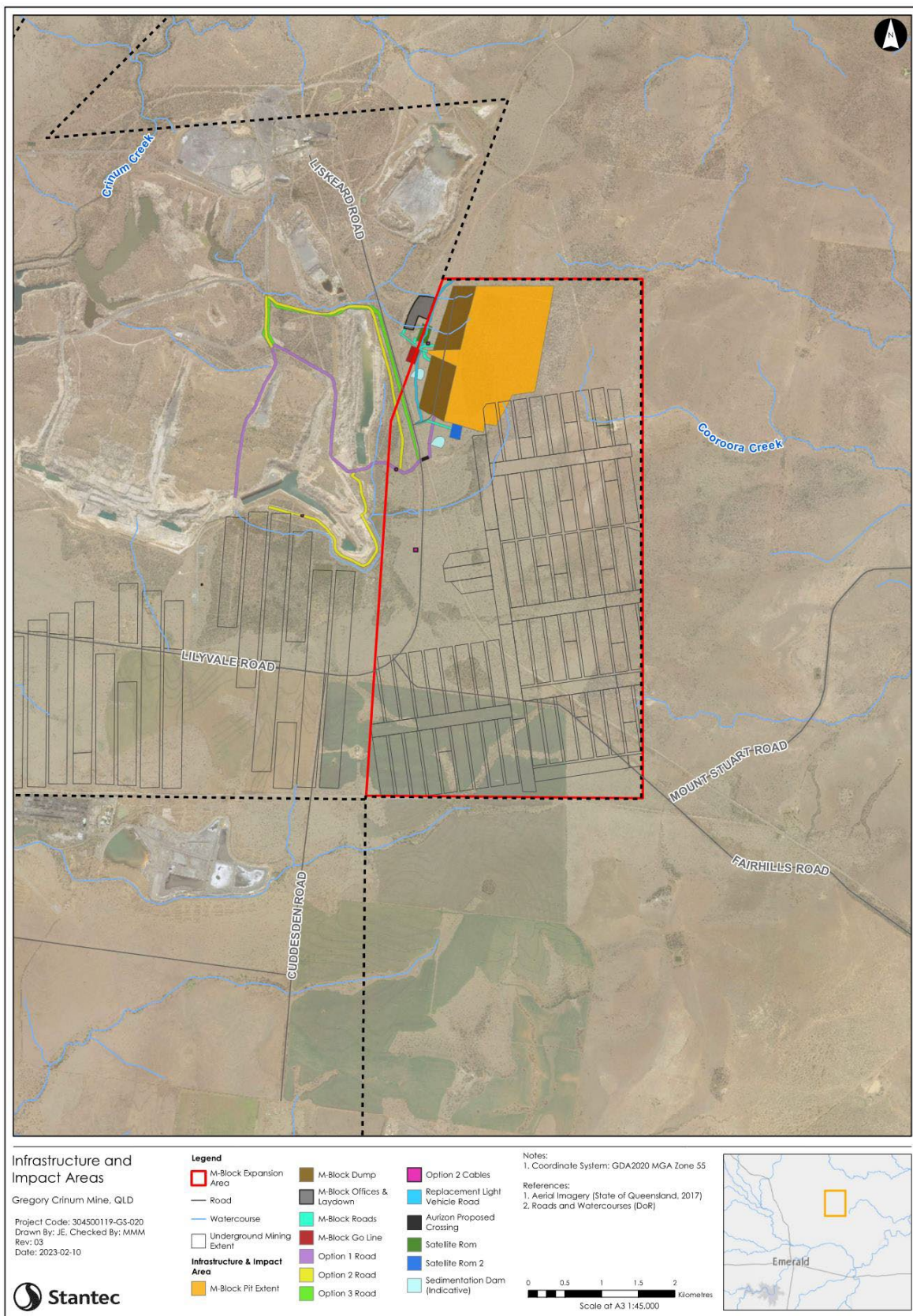


Figure 2: M-Block proposed open-cut and underground operations areas



2.0 DETAILS OF IMPACT AREAS AND OFFSET SITES

The Project intends to offset residual and unavoidable impacts on the MNES identified above through direct offsets. This strategy is considered to be the most effective, reliable and efficient approach to achieve the offsets required for the Project while meeting the requirements of The *EPBC Act Environmental Offsets Policy*. All unavoidable impacts and loss of biodiversity caused by the proposed 'M-Block' extension of the Gregory Crinum Mine will be compensated by the implementation of this offset strategy.

2.1 METHODOLOGY

2.1.1 BioCondition Assessments

The quantification of the ecological condition of both impact and offset sites is based on the execution of field and desktop methodologies outlined in the Queensland Herbarium's *BioCondition Assessment Manual* (Eyre et al. 2015).

BioCondition is a condition assessment framework for Queensland that provides a measure of how well a terrestrial ecosystem is functioning for biodiversity values. The BioCondition score is obtained by adding the scores obtained for each site-based and landscape level attribute and dividing by the maximum possible score for the RE, which standardises the total between 0 and 1. It is a site-based, quantitative procedure which can be used to provide a numeric condition rating of 1, 2, 3 or 4 with 1 being a 'functional' biodiversity condition and 4 being a 'dysfunctional' biodiversity condition (Eyre et al. 2015).

A total of 11 BioCondition assessments were conducted across the proposed impact area within remnant and regrowth vegetation across three regional ecosystems. Details are provided in **Table 3**. The locations of the BioCondition assessment sites within the proposed impact area are presented in **Figure 3**.

In addition to full BioCondition assessments, a number of supplementary quaternary level assessments were completed across both the proposed impact area and the potential offset sites. These additional sampling sites were used to streamline the number of full BioCondition assessment sites where an assessment unit contained multiple discrete polygons that are uniform or in the same general condition.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Details of Impact Areas and Offset Sites

Table 3: BioCondition assessments conducted across proposed M-Block extension area.

Target MNES	Associated Regional Ecosystem	Short description	Vegetation Class	BioCondition assessments conducted	Supplementary Quaternary Plots (2022)
Grassland TEC and <i>D. queenslandicum</i>	RE 11.8.11	<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks	Regrowth	4	0
Brigalow TEC and Squatter Pigeon	RE 11.9.1	<i>Acacia harpophylla-Eucalyptus cambageana</i> woodland to open forest on fine-grained sedimentary rocks	Regrowth	2	7
	RE 11.9.1	<i>Acacia harpophylla-Eucalyptus cambageana</i> woodland to open forest on fine-grained sedimentary rocks	Remnant	4	1
Squatter Pigeon	RE 11.8.5	<i>Eucalyptus orgadophila</i> open woodland on Cainozoic igneous rocks	Regrowth	1	2

A total of 10 BioCondition assessments were conducted across the Offset Sites within remnant and regrowth vegetation across three regional ecosystems. Details are provided in **Table 4**. The locations of the BioCondition assessment sites are presented in **Figure 4**.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Details of Impact Areas and Offset Sites

Table 4: BioCondition assessments conducted across Offset Sites

Target MNES	Regional Ecosystem	Short description	Vegetation Class	BioCondition assessments conducted	Supplementary Quaternary Plots
Grassland TEC and <i>D. queenslandicum</i>	RE 11.8.11	<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks	Regrowth	4	0
Brigalow TEC and Squatter Pigeon	RE 11.4.9	<i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	Regrowth	3	1
	RE 11.4.9	<i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	Remnant	2	0
	RE 11.9.1	<i>Acacia harpophylla-Eucalyptus cambageana</i> woodland to open forest on fine-grained sedimentary rocks	Regrowth	3	2

2.1.2 Habitat Quality Assessments

For the purpose of determining ecological equivalency at the impact and offset site for the Squatter Pigeon a range of Habitat Quality Indicators were derived according to the Queensland Government *Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy (2020)*. These indicators were used in the field to determine the quality of habitat available within the impact and offset area for the target species.

The full list of Habitat Quality Indicators used can be found in **Attachment A**, however the indicators were broadly sorted into four categories:

- Quality and availability of food and habitat required for foraging
- Quality and availability of habitat required for shelter and breeding
- Quality and availability of habitat required for mobility
- Absence of threats

The assessment of these attributes resulted in a habitat quality score out of 10, with 10 indicating a fully intact system. Scores of 4 to 6 indicate good quality regrowth or medium value habitat, and a minimum score of 0 would indicate a totally cleared or uninhabitable area.

For the purpose of this assessment, these have been broadly categorised as follows, scores of:

- 10 to 7 – High Quality Habitat
- 6 to 4 – Medium Quality Habitat;



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Details of Impact Areas and Offset Sites

- 1 to 3 – Low Quality Habitat.

The Habitat Assessment sites were located within the same BioCondition Plots within the proposed impact area and Offset Sites. This has enabled the use of the floristic data collected during the BioCondition assessments as supplementary data when considering habitat suitability for the Squatter Pigeon. The locations of the Habitat Assessment sites are presented in **Figure 3** and **Figure 4**.

2.1.3 Calculation of offset area

The *EPBC Act Environmental Offsets Policy* outlines the Australian Government's approach to the use of environmental offsets ('offsets') under the EPBC Act.

The policy is accompanied by the *Offsets Assessment Guide* (the guide). The guide has been developed in order to give effect to the requirements of the policy, utilising a balance sheet approach to estimate impacts and offsets for threatened species and ecological communities.

Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action. The required offset areas were calculated in accordance with the offsets assessment guide. The inputs used to assess the offset area required for each MNES are provided in **Attachment B**.



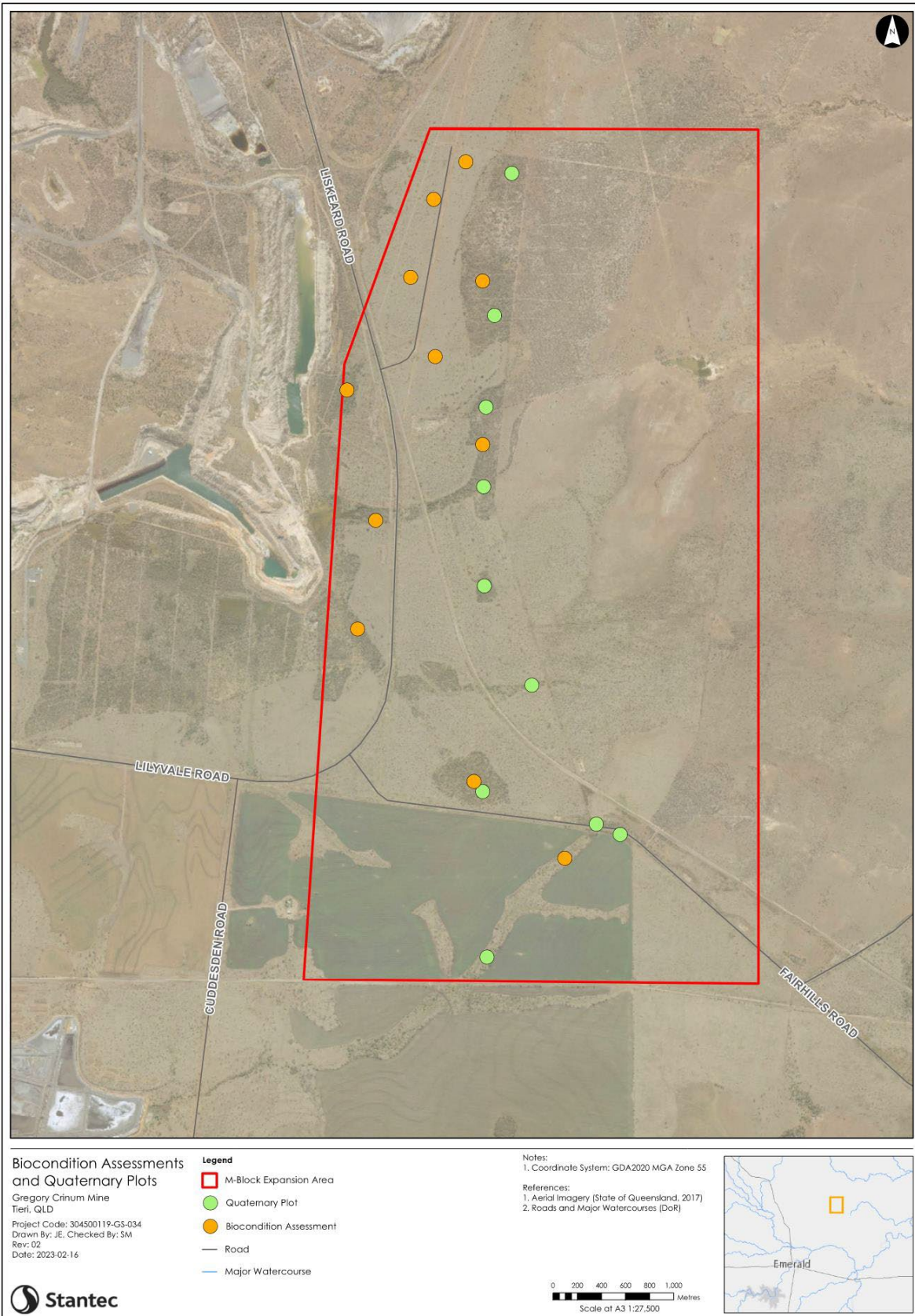


Figure 3: BioCondition assessment sites and quaternary plots within proposed impact area. Habitat assessments were conducted at each BioCondition site.



Offset Sites - Biocondition and Quarternary Points

Gregory Crinum Mine
Tieri, Queensland

- M Block extension
- Offset site
- Biocondition assessment site
- Quarternary Point



NORTH

0 1.6
kilometres

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GDA2020 MGA Zone 55

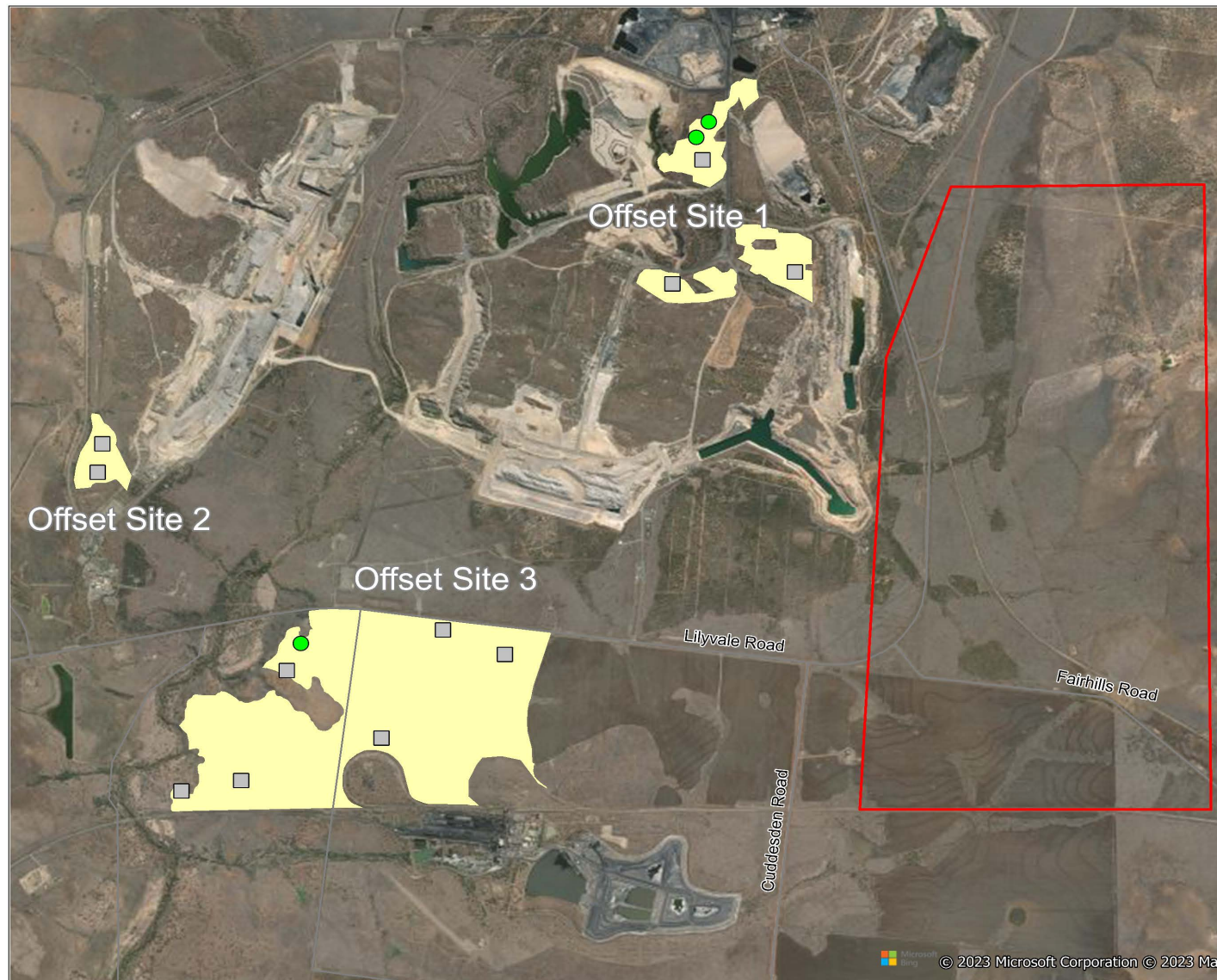


Figure 4: BioCondition assessment sites and quaternary points within Offset Sites. Habitat assessments were conducted at each BioCondition site.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Details of Impact Areas and Offset Sites

2.2 IMPACT AREA RESULTS

Table 5 summaries the BioCondition assessment results and Squatter Pigeon habitat quality results from the impact assessment sites within M-Block. These scores were used to determine the offset area required to offset the impacts associated with the development of M-Block. See **Attachment C** for delineated scoring results.

Table 5: BioCondition and Squatter Pigeon habitat quality assessment scores from impact sites within M-Block

Regional Ecosystem	Class	MNES present	BioCondition Score	BioCondition Class	Squatter Pigeon Habitat Quality Score
11.9.1	Regrowth	Brigalow TEC Squatter Pigeon Habitat	0.64	2	4
	Remnant	Brigalow TEC Squatter Pigeon Habitat	0.64	2	4
11.8.5	Regrowth	Brigalow TEC Squatter Pigeon Habitat	0.47	3	3
11.8.11	Regrowth	Grassland TEC King Bluegrass	0.56	3	N/A

2.3 DESCRIPTION OF OFFSET SITES

The Offset Sites chosen are located on the Gregory Crinum Mine lease (**Figure 4**). A description of each area is provided below.

Offset Site One

Offset Site One is located within Gregory Crinum's current mining operations (**Figure 4**). The current land use is mapped as Mining and Other Minimal Use. The surrounding land has been largely cleared for mining operations, however, the potential offset sites have areas of intact vegetation.

The vegetation across the site and immediate surrounds is mapped as non-remnant vegetation and regrowth RE 11.9.1 (*Acacia harpophylla-Eucalyptus cambageana* woodland to open forest on fine-grained sedimentary rocks) which was ground-truthed during Stantec's assessments in 2022 (**Plate 1 and 2**). Based on the field assessments completed by Stantec, this site supports approximately 118ha of this community with a BioCondition Class of '3' indicating a moderately functional biodiversity condition.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Details of Impact Areas and Offset Sites

The vegetation community met the key diagnostic characteristics and condition thresholds to be considered a Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community making it an appropriate location to offset the Brigalow TEC that will be impacted by the proposed action. The location of the TEC is shown in **Figure 5**.

This area also contains appropriate habitat features for the Squatter Pigeon according to the description outlined within the Threatened Species Scientific Committee's Species Profile and Threats Database, specifically:

- open-forests to sparse, open-woodlands and scrub;
- mostly dominated in the overstorey by Eucalyptus, Corymbia, Acacia or Callitris species;
- remnant, regrowth or partly modified vegetation communities, and
- within 3 km of water bodies or courses.

Stantec completed habitat surveys in the area and found Offset Site One had a Squatter Pigeon habitat quality score of '6', indicating a medium quality habitat. Although Squatter Pigeon have not been observed within this area yet, records exist 1.5km – 2.5km away (**Figure 5**). The Squatter Pigeon is considered sedentary where water and food resources are reliable in the local region. However, when these resources are unavailable the subspecies may disperse along vegetated corridors to access permanent water sources elsewhere in the region (Squatter Pigeon Workshop 2011). Due to this mobility, Offset Site One makes an appropriate offset location providing the habitat requirements necessary for the survival of the species. This property is therefore an appropriate site to offset the Squatter Pigeon habitat that will be impacted by the proposed action. The potential Squatter Pigeon habitat is shown in **Figure 5**.

Offset Site Two

Offset Site Two is located within Gregory Crinum's current mining operations (**Figure 3**). The current land use is mapped as Other Minimal Use and Grazing Native Vegetation. The surrounding land has been largely cleared for mining operations, however, the potential offset sites have areas of intact vegetation.

The vegetation across the site and immediate surrounds is mapped as non-remnant vegetation and remnant RE 11.4.9 (*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains) which was ground-truthed during Stantec's assessments (**Plate 2 and 3**). Based on the field assessments completed by Stantec, this site supports approximately 30ha of this community with a BioCondition Class of '2' indicating a moderately functional biodiversity condition.

The vegetation community met the key diagnostic characteristics and condition thresholds to be considered a Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community making it an appropriate location to offset the Brigalow TEC that will be impacted by the proposed action. The location of the TEC is shown in **Figure 5**.

Offset Site Three

Offset Site Three is located on the Gregory Crinum mining lease approximately 2.5km to the west of the southern end of M-Block. This offset site's current land use is mapped as Grazing Native Vegetation and



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Details of Impact Areas and Offset Sites

Cropping. To the north is Gregory Crinum’s current mining operations and to the south is the Kestrel Mine. There has been historical clearing through past agricultural practices, however, tracts of remnant vegetation and high-quality regrowth vegetation remains.

The vegetation across the site is mapped predominately as non-remnant vegetation with patches of remnant RE 11.3.37/11.3.3/11.3.2 and RE 11.8.11/11.8.5 to the western edge of the property and RE 11.8.5 to the eastern edge of the property. Cardno, now Stantec (2022) ground truthed the area as:

- 28.8ha of regrowth RE 11.4.9 – consistent with the Brigalow TEC (**Plate 5**);
- 552ha of regrowth RE 11.8.11 – consistent with the Grassland TEC (**Plate 6**);

The BioCondition class ranges from ‘2’ to ‘3’ across the area indicating a functional biodiversity condition to moderately functional biodiversity condition.

The area containing RE 11.4.9 met the key diagnostic characteristics and condition thresholds to be considered the Brigalow TEC making it an appropriate location to offset the Brigalow TEC that will be impacted by the proposed action. The location of the TEC is shown in **Figure 5**. The assessment sites containing RE 11.8.11 met the key diagnostic characteristics and condition thresholds to be considered a Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin ecological community making it an appropriate location to offset the Grassland TEC that will be impacted by the proposed action. Surveys completed by Stantec in 2022 also confirmed the presence of King Bluegrass (*Dichanthium queenslandicum*) on this site, making it a suitable location to offset the Projects impact on this MNES. The location of the TEC and potential habitat is shown in **Figure 5**.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Details of Impact Areas and Offset Sites



Plate 1: Offset Area One



Plate 2: Offset Area One



Plate 3: Offset Area Two



Plate 4: Offset Area Two



Plate 5: Offset Area Three Brigalow



Plate 6: Offset Area Three Grassland



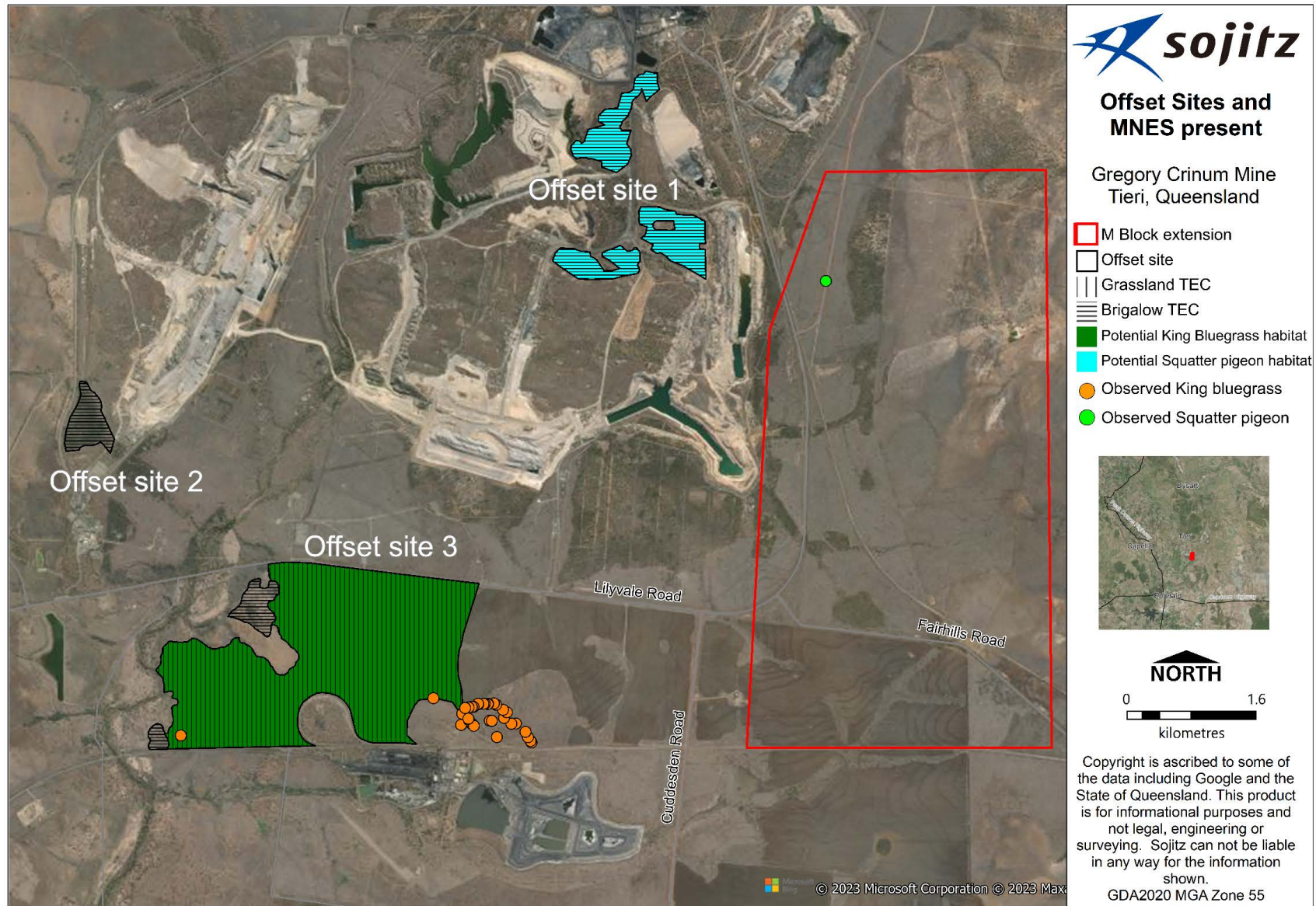


Figure 5: Offset Sites and MNES present



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Details of Impact Areas and Offset Sites

2.4 SUMMARY OF OFFSET SITES RESULTS

Table 6 summarises the environmental values present and environmental condition of each offset area. See **Attachment C** for delineated scoring results.

Table 6 Summary of Offset Sites and MNES present

Offset Area	Regional Ecosystem	Class	MNES present	Area (ha)	BioCondition Score	BioCondition Class	Squatter Pigeon Habitat Quality Score
Offset Site One	11.9.1	Regrowth	Brigalow TEC Squatter Pigeon Habitat	118ha	0.57	3	6
Offset Site Two	11.4.9	Remnant	Brigalow TEC	30ha	0.6	2	N/A
Offset Site Three	11.4.9	Regrowth	Brigalow TEC	28.8	0.55	3	N/A
	11.8.11	Regrowth	Grassland TEC King Bluegrass	552.3	0.48	3	N/A



2.5 HABITAT CONNECTIVITY

To enable the ongoing viability and maximise the ecological gain of the Offset Sites it is necessary that the locations have habitat connectivity with habitat on adjoining land. All of the Offset Sites have some degree of habitat connectivity helping to ensure that the MNES values being protected and enhanced will benefit from and provide benefit to other areas of important habitat. As shown in **Figure 6**, the Offset Sites chosen are directly connected to or in close proximity to areas of potential MNES habitat as defined by the Regional Ecosystem mapping.

In addition to the above, the Offset Sites are strategically located around Crinum Creek which is an important riparian corridor in the locality providing critical north – south connectivity between the Nogoa River riparian zone and the larger areas of native remnant vegetation to the north of Tieri. There are several minor ephemeral watercourses that flow through the selected Offset Sites. These ultimately provide seasonal connectivity to the higher order streams in the locality and ultimately Crinum Creek. They also have some connectivity to reservoirs within the mining lease.

Further, all of the proposed offset sites are within the active mining lease. Consequently Sojitz has a greater ability to protect the offset sites and adjoining land from potentially conflicting land-use. For example, alternative offset sites that were assessed earlier in the Project would have been located within and adjoining existing agricultural leases. It would have been a requirement that the rights and land management practices of these operations be preserved alongside the delivery of the offset. As such any offset management measures or changes to same would have required negotiation, potentially resulting in delays and leading to potential conflict between the objectives of the two land uses.

By delivering the offset sites within the active mining lease they can be efficiently incorporated into the overall rehabilitation management effort being delivered across the broader mine. Sojitz has already begun progressive rehabilitation, as detailed in their Rehabilitation Management Plan, within the broader area (**Figure 6**). Specifically the land surrounding Offset Site 1 and 2 has been rehabilitated and supports areas of Open Woodland and Grassy open Woodland. Offset Site 3 has been rehabilitated and supports open grasslands and is currently subject to period low intensity grazing. Upon delivery of the offset, these sites, combined with the existing areas of surrounding rehabilitation will provide a higher quality corridor and improved linkages from the mining operations to larger areas of more contiguous habitat.

It should be recognised that the broader locality is characterised by a sparse, somewhat isolated patchwork of stepping stone habitats and corridors – particularly west of the Crinum Mine. This is largely due to historical landuse and other man-made barriers. The proposed offset strategy will result in the delivery of three separate offset sites, taken in isolation this would not be a preferred strategy due to the limited ability that this would have to address fragmentation. However, in the context described above, and that will be delivered by Sojitz, the selection and formalisation of the protection of these areas will consolidate and expand the ecological connectivity in this region and provide long-term habitat connectivity within the mining operations to other contiguous areas of habitat, particularly to the north and south of the mine – ultimately helping to restore and maintain this critical movement corridor associated with Crinum Creek.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

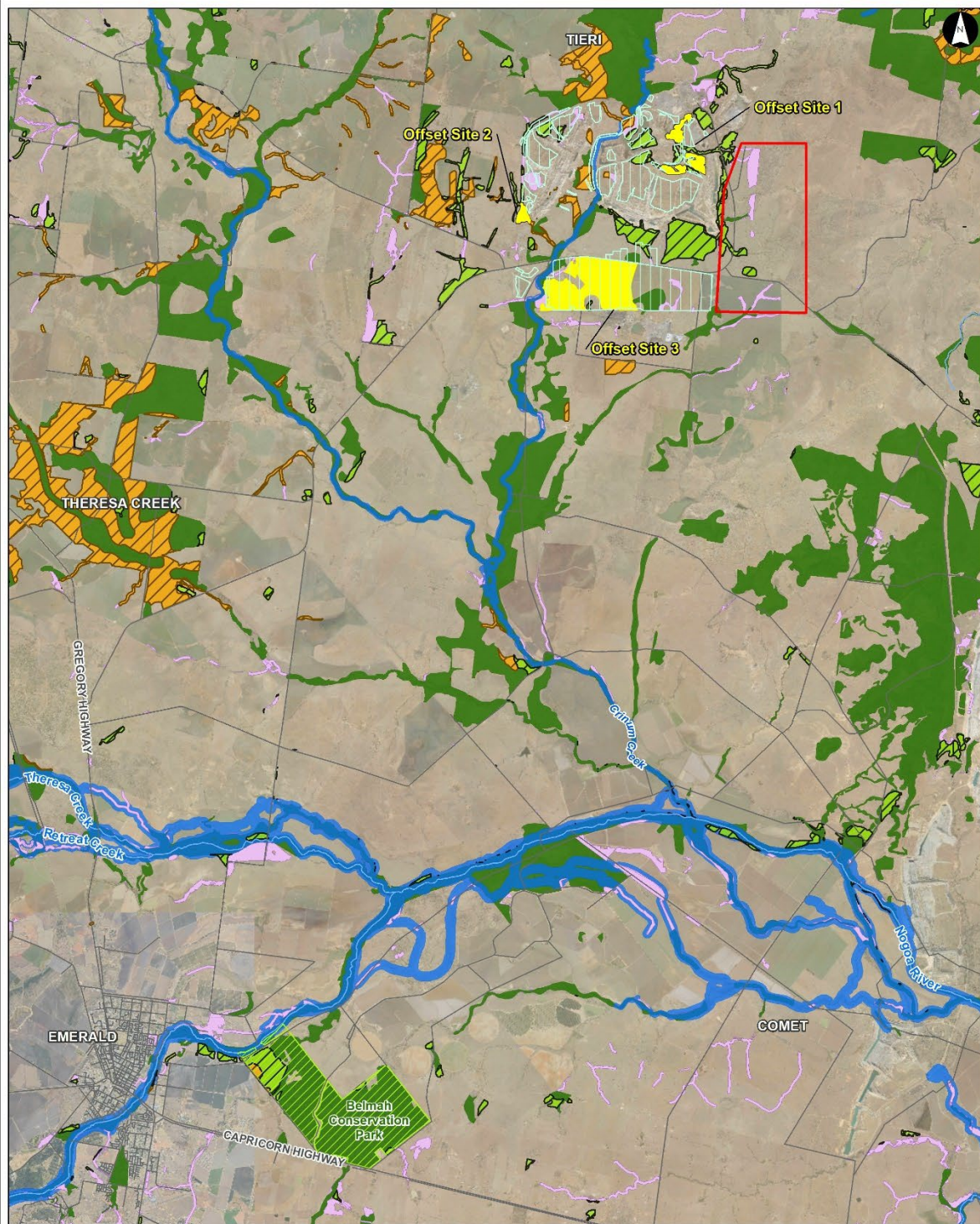
Details of Impact Areas and Offset Sites

The connecting habitats, biodiversity corridors and current progressive rehabilitation in relation to the Offset Sites are shown in **Figure 6**.

2.6 LEGAL ENTITLEMENT TO OFFSET SITE

It is understood that, within 12 months of commencing the Action, Sojitz will legally secure the chosen offset sites. It is expected that this will be in the form of a statutory environmental covenant. The environmental covenant is a legally binding written agreement entered into between a Covenantor (Sojitz) and the Covenantee (Government body). A covenant is registered against the title and survey plan of a property and administered under the *Land Titles Act 1994* (Qld). This will provide ongoing and enduring protection for the offset areas against development incompatible with conservation.





Offset Areas Context Page 1 - Overview

Gregory Crinum Mine, QLD

Project Code: 304500119-GS-061
Drawn By: JE, Checked By: AS
Rev: 03
Date: 2023-04-03



Legend

- M-Block Extension Area
- Road
- Major Watercourse
- Offset Site
- Rehabilitation Area
- Protected Area
- Remnant Vegetation
- Regrowth Vegetation
- Potential Squatter Pigeon Habitat
- Potential King Bluegrass Habitat
- Potential Brigalow TEC
- Potential Grassland TEC
- Statewide Corridor
- Riparian

Notes:

1. Coordinate System: GDA2020 MGA Zone 55

References:

1. Aerial Imagery (State of Queensland, 2017)
2. Roads and Major Watercourses (DoR)
3. Rehabilitation Area (SGM Rehabilitation Management Plan, 2021)
4. Protected Areas (DES, 2020)
5. Remnant Vegetation (DES, 2021)
6. Regrowth Vegetation (DoR, 2021)
7. Statewide Corridor v1.6 (DES, 2019)

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Kilometres
Scale at A3 1:150,000



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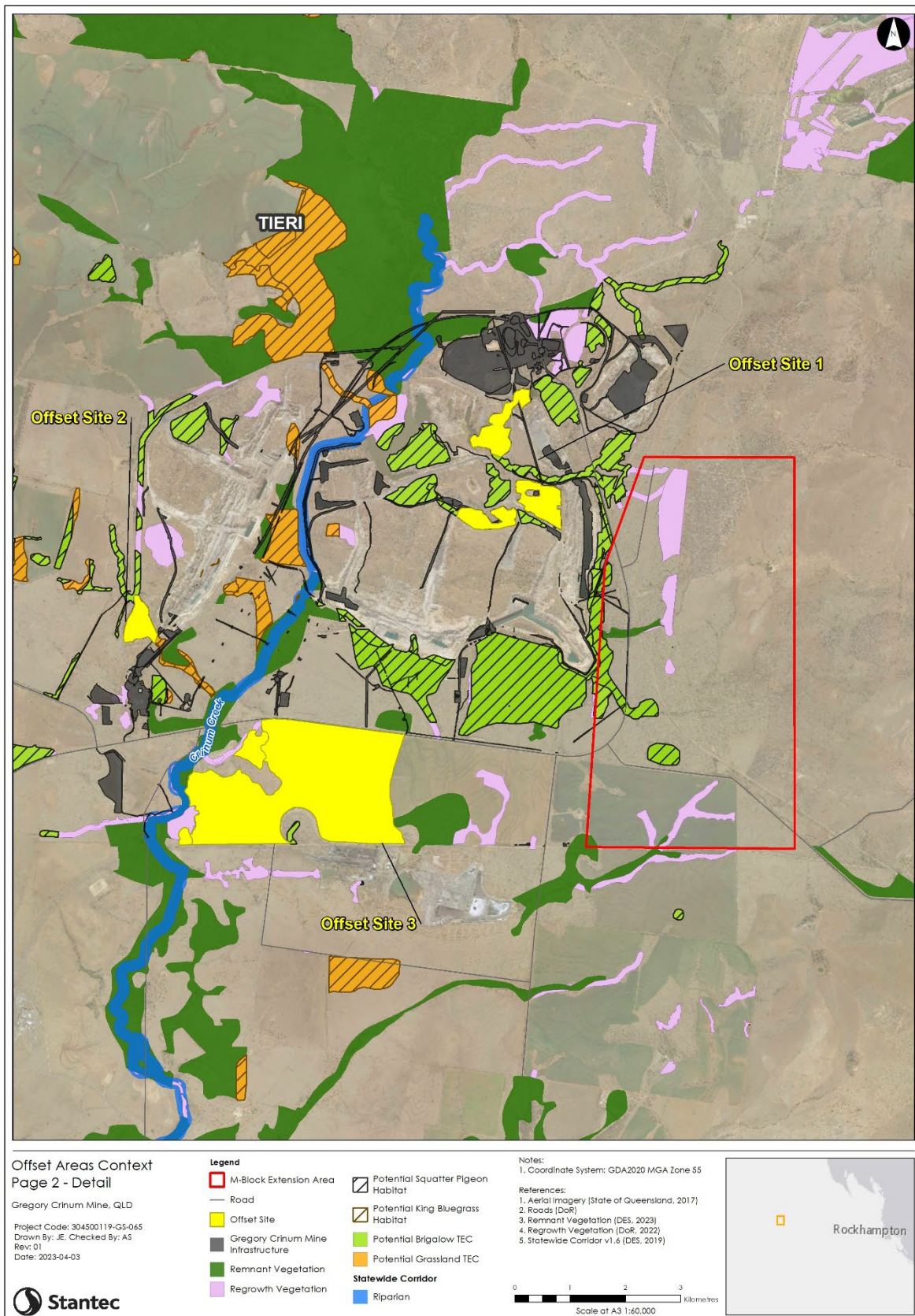


Figure 6: Connecting Habitats, Biodiversity Corridors and Rehabilitation Areas (remapped areas not updated in this figure)



2.7 HOW THE ENVIRONMENTAL OFFSETS MEET THE REQUIREMENTS OF THE DEPARTMENT'S EPBC ACT ENVIRONMENTAL OFFSETS POLICY (2012)

Data from Cardno now Stantec's 2022 BioCondition and habitat quality assessments were used to justify the existing habitat quality inputs in to the *EPBC Act Offsets Assessment Guide* (the Guide). The following calculations will be used to advise Sojitz of the required area (hectares) and habitat quality needed to offset the impacted MNES.

Table 7 provides a reconciliation of the proposed action's offset requirements in order to satisfy the *EPBC Act Environmental Offsets Policy* requirements. A summary of the inputs and justification of inputs for each MNES is provided as **Appendix B**.

Table 7: Offset requirements for each relevant MNES for the proposed M-Block Extension of Gregory Crinum Mine

Matter of National Environmental Significance	M-Block Impact Area (ha)	Habitat quality impact area	Area within Potential Offset Area (ha)	Habitat quality offset area	Future habitat quality with offset	Percentage of Offset Liability Satisfied (%)	Offset Requirement Satisfied?
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) ecological community	58.7	6	165	6	8	102.63%	Yes
Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin ecological community	133.5	6	375	5	7	101.97%	Yes
King Bluegrass (<i>Dichanthium queenslandicum</i>)	174.9	6	495	5	7	102.73%	Yes
Squatter Pigeon (southern) (<i>Geophaps scripta scripta</i>)	58.7	4	95	6	8	105.31%	Yes



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Details of Impact Areas and Offset Sites

2.7.1 Offset Requirements

Suitable offsets are determined by applying the requirements outlined in Section 7 of the *EPBC Act Environmental Offsets Policy*. These requirements and how they have been addressed are detailed below (Table 8).

Table 8: Offset requirements outlined in Section 7 of the *EPBC Act Environmental Offsets Policy* and how each requirement is met

Offset Requirements	Elements of OAMP in which requirement is addressed
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter	The available offset sites have the potential to improve or maintain the viability of each MNES addressed in this report. Each potential offset site was assessed and compared with the proposed impact sites.
Suitable offsets must be built around direct offsets but may include other compensatory measures	The offset requirements for the Project will be satisfied by direct offsets.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	The offset sites would provide for over 100% of the offset liability for each MNES relevant to the proposed action. This has been determined by applying the <i>EPBC Act Offsets Assessment Guide</i> . Once the Project has been approved, Sojitz will legally secure the required offset sites in perpetuity.
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter	The inputs and outputs of the <i>EPBC Assessment Guide</i> are provided in Appendix B . This has provided the required hectares and habitat quality of the chosen offset sites to be of a suitable size and scale proportionate to the residual impacts on the protected matter.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding	Each Offset Area has been assessed according to the <i>BioCondition Assessment Manual</i> (Eyre <i>et al.</i> 2015) to ensure the chosen sites are the most effective and efficient. In the unlikely event that the chosen offset sites are not achieving performance objectives, ongoing and adaptive management actions will be pursued according to this OAMP. Corrective actions will be documented and monitored.
Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	The offset sites will be legally secured in perpetuity. Once secured, the offset sites chosen along with management actions will enhance the ecological condition of the area and protect any MNES present while being protected under environmental planning laws. The offset sites will therefore provide additional conservation outcomes through the management of the habitat values on site and ensure performance objectives are achieved.
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	Each Offset Site has been assessed according to the <i>BioCondition Assessment Manual</i> (Eyre <i>et al.</i> 2015). BioCondition assessments and habitat quality assessments have been undertaken at both the proposed impact site and each Offset Site to determine the quality of habitat impacted by the Project and quality of habitat within each Offset Site.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Offset Area Management Plan

Offset Requirements	Elements of OAMP in which requirement is addressed
	<p>The offset sites chosen will efficiently and effectively compensate for the impacts on the protected matters and help maintain the viability of the protected matters.</p> <p>The proposed management actions such as weed management are known to improve ecological condition.</p>
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	<p>This OAMP outlines the areas of MNES, starting habitat quality and performance objectives.</p> <p>Prescribed timeframes, annual monitoring and reporting and corrective actions where objectives are not being achieved are proposed to ensure management actions are being completed and offset outcomes are being achieved.</p>

3.0 OFFSET AREA MANAGEMENT PLAN

3.1 OBJECTIVES, KEY PERFORMANCE INDICATORS AND OFFSET COMPLETION CRITERIA

This OAMP has been prepared to satisfy the requirements of the PER which is being prepared upon request of the delegate of the Minister to inform the decision on whether or not to approve, under Part 9 of the EPBC Act, the proposed 'M Block' extension of Gregory Crinum Mine.

The *EPBC Act Environmental Offsets Policy* outlines the Australian Government's approach to the use of environmental offsets under the EPBC Act. The OAMP has been prepared to guide management objectives and outcomes, and the actions necessary to fulfill a statutory requirement for the provision of an offset under the *EPBC Act Environmental Offsets Policy* and EPBC Act.

The conservation objective for this OAMP is to protect and enhance the condition and extent of the biodiversity values of the Offset Sites within 20 years. The following sections outline the management actions to achieve these objectives.

The key conservation outcomes from the long term management and protection of the Offset Sites are:

- Increased extent, condition and value of Brigalow TEC and Grassland TEC.
- Increased extent, condition and value of King Bluegrass habitat.
- Improved fauna movement and flora dispersal opportunities within the surrounding disturbed landscape.
- Increased condition and area of refuge for the Squatter Pigeon and other local fauna populations.

Table 9 outlines the key biodiversity values for each offset area, with their corresponding Key Performance Indicators.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Offset Area Management Plan

Table 9: Values within Offset Sites and completion criteria

Offset area	Regional Ecosystem	Nested values	Key performance indicators	Completion criteria
Offset Site One	RE 11.9.1 Regrowth vegetation	Brigalow TEC	<ul style="list-style-type: none"> Interim performance targets outlined in Table 10 are achieved. BioCondition score increases by 2 points in 20 years. 	<ul style="list-style-type: none"> Observed and measured increase to a BioCondition score of 8 in 20 years.
		Squatter Pigeon habitat	<ul style="list-style-type: none"> Interim performance targets outlined in Table 10 are achieved. Squatter Pigeon observed in Offset Area One within first 5 years of site being secured. Habitat quality score increased by 2 points in 20 years 	<ul style="list-style-type: none"> Observed increase in species usage over 20 years. Observed and measured increase to a habitat quality score of 8 in 20 years.
Offset Site Two	RE 11.4.9 Remnant vegetation	Brigalow TEC	<ul style="list-style-type: none"> Interim performance targets outlined in Table 10 are achieved. BioCondition score increases by 2 points in 20 years. 	<ul style="list-style-type: none"> Observed and measured increase to a BioCondition score of 8 in 20 years.
Offset Site Three	RE 11.4.9 Regrowth vegetation	Brigalow TEC	<ul style="list-style-type: none"> Interim performance targets outlined in Table 10 are achieved. BioCondition score increases by 2 points in 20 years. 	<ul style="list-style-type: none"> Observed and measured increase to a BioCondition score of 8 in 20 years.
	RE 11.8.11 Regrowth vegetation	Grassland TEC	<ul style="list-style-type: none"> Interim performance targets outlined in Table 10 are achieved. BioCondition score increases by 2 points in 20 years. 	<ul style="list-style-type: none"> Observed and measured increase to a BioCondition score of 7 in 20 years.

Table 10 outlines the specific completion criteria and interim performance targets needed to reach the final habitat quality goal within the 20 year timeframe.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Offset Area Management Plan

Table 10: Interim performance targets

Offset area	Starting Habitat Quality Score	Interim Performance Targets			Final Habitat Quality (Year 20) Completion Criteria
		Year 5	Year 10	Year 15	
Offset Area One RE 11.9.1 Brigalow TEC	6	6.5	7	7.5	8
Offset Area One RE 11.9.1 Squatter Pigeon habitat	6	6.5	7	7.5	8
Offset Area Two RE 11.4.9 Brigalow TEC	6	6.5	7	7.5	8
Offset Area Three RE 11.4.9 Brigalow TEC	6	6.5	7	7.5	8
Offset Area Three RE 11.8.11 Grassland TEC King Bluegrass habitat	5	5.5	6	6.5	7

3.2 ROLES AND RESPONSIBILITIES

Sojitz will implement the OAMP. Persons implementing management and monitoring activities described in this management plan will have appropriate skills and qualifications and will be authorised by Sojitz to do so. It is recognised that Sojitz has a number of management documents, including a Rehabilitation Management Plan and Erosion and Sediment Control Plan that may have bearing on this OAMP. Roles and responsibilities that relate to water and land management within these documents may supersede those outlined in this OAMP.

Where the identification of a suspected threatened species is not clear, the Queensland Museum for fauna or the Queensland Herbarium for flora will be the first contact for identification confirmation (via photographs and/or detailed description).



4.0 CONSERVATION MANAGEMENT STRATEGIES

Table 11 outlines the key threats to the listed MNES according to each of their conservation advice listed on their Species Profile and Threats Database (SPRAT) profile. These threatening processes will be used to guide management actions within the offset areas.

Table 11: Key threats to MNES

Threatening process	Brigalow TEC	Grassland TEC	Squatter Pigeon	King Bluegrass
Vegetation clearing	✓	✓	✓	✓
Fire	✓			
Weeds and pest animals	✓	✓	✓	✓
Dust emissions	✓	✓		✓
Habitat loss			✓	✓
Trampling of nests			✓	
Changes in hydrological regimes			✓	
Vehicle strike			✓	

4.1 BRIGALOW (ACACIA HARPOPHYLLA DOMINANT AND CO-DOMINANT) ECOLOGICAL COMMUNITY

Brigalow TEC was listed as an Endangered threatened ecological community under the EPBC Act in 2001. In Queensland, the Brigalow ecological community is defined by reference to 16 regional ecosystems (RE), all of which are listed as Endangered under the Queensland *Vegetation Management Act 1999* (TSSC 2001). The Brigalow ecological community occurs over a vast area in semi-arid eastern Australia. In Queensland, this ecological community is found in the Brigalow Belt North, Brigalow Belt South, Mulga Lands, Darling Riverine Plains and Southeast Queensland IBRA (Interim Biogeographic Regionalisation for Australia) bioregions (DCCEEW 2013). In Queensland, Brigalow TEC only includes remnant and regrowth areas that retain the species composition and structural elements of its undisturbed corresponding RE which can be found in the DCCEEW's Approved Conservation Advice (2013).

This ecological community is characterised by the presence of Brigalow (*Acacia harpophylla*) as one of the three most abundant tree species (Butler 2007). Brigalow may be dominant in the canopy layer or co-dominant with other species including Belah (*Casuarina cristata*), Eucalyptus species or other Acacia species within an open forest to open woodland (Butler 2007). In Queensland, the soils within this ecological community are generally cracking clays where Brigalow is dominant (Benson et al. 2006).



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The original extent of the Brigalow ecological community in Queensland has been estimated at over 7.3 million hectares. Approximately 8% remained in 2003 (Butler 2007). Major identified threats include clearing, fire, inappropriate grazing and invasion of exotic plant species and feral animals (Butler 2007).

This OAMP has been developed to align with DCCEEW's Conservation Advice for Brigalow TEC (2013). The conservation strategies outlined in the Conservation Advice which relate to this Project and will therefore be implemented includes:

- The protection and conservation of remnant and regrowth areas of the ecological community within Offset Site One, Offset Site Two and Offset Site Three.
- Weed and feral animal control with a particular focus on high biomass exotic grasses and feral pigs.
- Fire management that considers Brigalow conservation, protection, and ecological heterogeneity.
- Managing stocking rates and grazing practices to avoid damage to woodland understorey and ground cover.
- Increase the area of the Brigalow TEC managed for conservation, such as through the reservation of high quality/large areas of remnant or regrowth and by facilitating conservation agreements with landholders.

It should be noted that as outlined in the Queensland Herbarium's Brigalow: regrowth benefits management guideline (Peeters and Butler, 2014) –

“Grazing may also be helpful in managing fire risks by reducing fine fuels loads. Grazing may also reduce competition from grasses and increase the growth rates of brigalow. Therefore grazing can be compatible with reforestation in brigalow, as long as grazing pressure is held at low to moderate levels, the trampling of litter and woody debris is minimised, and the mortality of mature trees is equal to the recruitment of new trees into the canopy.”

Further details and specific management actions are provided in **Table 12**.

4.2 NATURAL GRASSLANDS OF THE QUEENSLAND CENTRAL HIGHLANDS AND NORTHERN FITZROY BASIN ECOLOGICAL COMMUNITY

The Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin ecological community are native grasslands composed of a mix of perennial native grasses and forbs. This ecological community is listed as Endangered under the EPBC Act. The primary indicators are the native grasses based on their prominence and utility. This ecological community occurs on fine textured soils derived from basalt or fine-grained sedimentary rocks, on flat or undulated rises. Tree canopy is typically absent otherwise no more than 10% of projective crown cover (TSSC 2009). This ecological community is restricted to Queensland extending from Collinsville in the north to Carnarvon National Park in the south (DAWE 2008).



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Species dominance and cover may fluctuate seasonally due to climatic factors (Wilson *et al.* 2002). Bluegrass communities have different climatic requirements to Curly Mitchell Grass and so the abundance can shift depending on which species the climate is favouring (Austin and Williams, 1988). The major identified threats to this ecological community include grazing, cropping and pasture improvement; invasive plants and animals; mining activities; road construction and other infrastructure (DCCEEW 2008).

This OAMP has been developed to align with DCCEEW's Conservation Advice for Grassland TEC (2008). The conservation strategies outlined in the Conservation Advice which relate to this Project and will therefore be implemented includes:

- The protection and conservation of regrowth areas of the ecological community within Offset Site Three.
- Weed and feral animal control with a particular focus on controlling high biomass exotic grasses and invasive weeds like parthenium (*Parthenium hysterophorus*) and parkinsonia (*Parkinsonia aculeata*) to reduce the chance of a woody shrub layer forming.
- Managing stocking rates and grazing practices to avoid degradation to grassland.
- Increase the area of the Grassland TEC managed for conservation, such as through the reservation of high quality/large areas of remnant or regrowth and by facilitating conservation agreements with landholders.

Further details and specific management actions are provided in **Table 12**.

4.3 KING BLUEGRASS (*DICHANTHIUM QUEENSLANDICUM*)

King Bluegrass (*Dichanthium queenslandicum*) is a perennial grass from the Poaceae family, growing to 80 cm tall. Inflorescences are single racemes of paired spikelets to 10 cm long. It is listed as Endangered under the EPBC Act and listed as Vulnerable under the Queensland *Nature Conservation (Plants) Regulation 2020*. King Bluegrass occurs on black cracking clay in tussock grasslands generally associated with other Bluegrass species (*Dichanthium* spp. and *Bothriochloa* spp.) (TSSC 2013). Flowers have been recorded year-round particularly from March and after heavy rain.

King Bluegrass is endemic to central and southern Queensland where it occurs in three distinct populations: Hughenden district (one record); from Nebo to Monto and west to Clermont and Rolleston; and Dalby district, Darling Downs. Recently, a specimen was recorded in 2018, 110km north of Charter Towers (Queensland Herbarium, 2021).

Currently, there is no specific recovery plan for King Bluegrass. A draft recovery plan has been developed for 'Bluegrass (*Dichanthium* spp.) dominant grassland of the Brigalow Belt Bioregions (north and south)' endangered ecological community (Butler 2007). There is also a draft recovery plan for the Natural Grassland of the Queensland Central Highlands and the Northern Fitzroy Basin TEC and it outlines additional key priority actions that should be considered for management of natural grasslands. Additional key priority actions that should be considered for the management of King Bluegrass are outlined in the approved conservation advice. Due to the similarities between recovery plans and conservation advice,



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the management actions outlined in this OAMP for King Bluegrass have been combined with those for Grassland TEC as they occur on the same Offset Area.

This OAMP has been developed to align with DCCEEW's Conservation Advice for King Bluegrass (2013). The conservation strategies outlined in the Conservation Advice which relate to this Project and will therefore be implemented includes:

- The protection and conservation of King Bluegrass habitat which includes the regrowth areas of Grasslands TEC within Offset Site Three.
- Weed and feral animal control with a particular focus on controlling high biomass exotic grasses and invasive weeds like parthenium (*Parthenium hysterophorus*) and parkinsonia (*Parkinsonia aculeata*) to reduce the chance of a woody shrub layer forming.
- Managing stocking rates and grazing practices to avoid degradation to grassland.
- Increase the area of King Bluegrass habitat managed for conservation, such as through the reservation of high quality/large areas of remnant or regrowth and by facilitating conservation agreements with landholders.

Further details and specific management actions are provided in **Table 12**.

4.4 SQUATTER PIGEON

The Squatter Pigeon (southern) (*Geophaps scripta scripta*) is a medium-sized, ground-dwelling pigeon that is listed as Vulnerable under the EPBC Act. The known distribution of the Squatter Pigeon extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern New South Wales, and from the east coast to Hughenden, Longreach and Charleville, Queensland (TSSC 2015).

The Squatter Pigeon (southern) feeds on seeds in the grassy understorey of open eucalypt woodland and is nearly always found in close proximity to permanent water bodies including waterholes and rivers. They nest on the ground and lay a clutch of two eggs under or amongst vegetation (Garnett and Dutson 2011). The population declined rapidly in the late 19th and early 20th centuries, with the near disappearance of the subspecies in New South Wales being attributed to overgrazing and vegetation clearing (Garnett and Crowley 2000).

This OAMP has been developed to align with DCCEEW's Conservation Advice for Squatter Pigeon (2015). The conservation strategies outlined in the Conservation Advice which relate to this Project and will therefore be implemented includes:

- The protection and conservation of Squatter Pigeon habitat which includes the regrowth areas of Brigalow TEC within Offset Site One.
- Weed and feral animal control with a particular focus on feral pigs, cats and foxes.
- Managing stocking rates and grazing practices to avoid degradation to Squatter Pigeon habitat.



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- Increase the area of Squatter Pigeon habitat managed for conservation, such as through the reservation of high quality/large areas of remnant or regrowth and by facilitating conservation agreements with landholders.

Further details and specific management actions are provided in **Table 12**.

4.5 SPECIFIC MANAGEMENT ACTIONS

The objectives of each completion criteria will be achieved through the implementation of a range of specific management actions to be performed by the Landholder. This OAMP is written for the management of clearly defined Offset Sites however the outcome and general contextual improvement will be achieved through the management of the broader property as a whole. The continued progressive rehabilitation throughout the broader property as outlined in Sojitz's Rehabilitation Management Plan and the implementation of actions outlined in this OAMP will help improve the overall outcome and will reduce the likelihood of edge effects, weed invasion and enhances habitat connectivity.

With improved and active management of the Offset Sites, it is anticipated that an improvement in the condition of the Offset Sites and the completion criteria can be achieved within 20 years, with 5-yearly interim milestones to help ensure the active management actions are having the desired effect. The specific management actions consist of a range of on-ground management regimes designed to be consistent with the national recovery plan or conservation advice for that species or community. **Table 12** outlines the management actions and monitoring methods for each Offset Area generally as well as specific actions for each MNES.



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Table 12 Management and monitoring actions for Offset Sites

Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
All Offset Sites				
Minimise habitat or vegetation loss through unplanned land clearing	<ul style="list-style-type: none"> No unapproved and/or intentional clearing of vegetation within the offset area, except for clearing that is required for fencing, access, firebreaks or public safety. Signs and fences will be maintained to prevent unauthorised access, to minimise incursions by feral herbivores and to control stock presence. New fences may be erected within three months of the offset being legally secured if necessary. Fences may be used where there are pre-existing grazing arrangements or where grazing pressure is a problem. Fences should not be erected if there will be impact to general fauna movement. 	<ul style="list-style-type: none"> Detection of damaged fences associated with vehicle access roads/tracks. Detection of prohibited forestry operations, native timber harvesting or clearing outside of established access tracks, fire control lines and fence lines (existing infrastructure). 	<ul style="list-style-type: none"> Monitoring and inspections will monitor and document if there is evidence of timber harvesting activities or illegal clearing. Monitoring will also document vegetation clearing that has occurred for fire break, access road or fence line maintenance. The annual compliance report will document any illegal/ unauthorised land clearing. 	<ul style="list-style-type: none"> Notify the Department within 10 business days of clearing. Upon being notified or becoming aware of prohibited native timber harvesting or clearing outside of existing infrastructure, the landholder is to assess how unauthorised persons accessed the site. Corrective actions will be implemented immediately and if appropriate the OAMP will be revised and updated if required. Any changes to the OAMP will be reported to the Minister for approval prior to changes in management.



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Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
Control invasive weed species to reduce impacts from an overdominance of non-native floristic abundance in the understorey	<ul style="list-style-type: none"> An initial weed spraying program will occur within the first 6 months of offset establishment. Thereafter the Landowner will undertake regular assessments for weed development. Should any weeds become established then additional weed control will be undertaken as early as practicable considering climatic conditions. Access to the offset site will be restricted to authorised persons only. Weed management and weed hygiene restrictions will be implemented across the offset site to reduce the extent of existing weeds and to control the potential introduction of other exotic weed species. Weed hygiene and management will be undertaken in consultation with the Landowner. 	<ul style="list-style-type: none"> An increase in the average percent (%) cover score of weed species from baseline and/or previous monitoring events. Outbreak of infestations of weed species not previously recorded in the Offset Area during baseline and/or previous monitoring events. An increase in the presence of weeds (relative abundance and/or area of occurrence) as determined from photo monitoring results. An interim performance target is not attained, or a completion criterion is not attained and/or maintained. 	<ul style="list-style-type: none"> Monitoring of weeds and non-native plants will be undertaken during the BioCondition and habitat quality assessment surveys using the same methodology used for the baseline habitat quality as outlined in the <i>Guide to Determining Terrestrial Habitat Quality</i>, as well as incidental observations as part of routine management. The annual compliance report will document the presence of weeds, weed control measures and extent of weed cover during the reporting period, and the relevant responsive actions. 	<ul style="list-style-type: none"> Review adherence to current weed hygiene procedures to ensure compliance and to update restrictions. Review timing and frequency of weed management measures, and implement alternative weed management timeframes. Investigate alternative weed management control actions (e.g. spot spraying and/or injection of herbicides) and implement. Undertake additional weed management measures until weed populations are reduced. Suitably qualified ecologist to review the OAMP within one month and update if required.



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Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	<ul style="list-style-type: none"> Chemical and/or mechanical control of declared weed species will be undertaken in accordance with the control measures outlined in the <i>Biosecurity Queensland Fact Sheets</i> and any relevant Sojitz weed management protocols. Any weed spraying needs to be mindful of organic farms that are in proximity. Avoid spray during windy conditions 			
Strategic cattle grazing to reduce and manage understorey fuel loads and native and non-native flora densities	<ul style="list-style-type: none"> Where required, stock management will be undertaken in consultation with the landowner and as required to achieve the performance objectives and completion criteria. If fencing or similar is required to control unintended grazing by cattle it shall be designed and installed using best management practices and only to the extent necessary to manage 	<ul style="list-style-type: none"> Livestock located in the offset areas outside of strategic grazing events. Damaged fencing is observed. Habitat Quality assessments indicate native grass groundcover is <30% or >55%. 	<ul style="list-style-type: none"> Regular inspections of the offset area will be undertaken during normal land management and farming practices to examine fence lines when stock are grazing in the offset area and/or adjacent to the offset area. Records will be kept of when and how many cattle graze in offset areas. Regular inspections will be undertaken to assess signs of 	<ul style="list-style-type: none"> Amend livestock management practices including amendment of stocking rates, and/or timing, and/or duration and/or frequency of strategic grazing events until native grass cover is >30% and <55%. Repair offset area boundary fencing if damaged within one week of detection. Removing stock when excessive pugging or overgrazing is observed such that



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Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	grazing. The chosen solution is to be of a nature that will not result in negative impacts to the existing movement opportunities of native fauna – notably macropod species known to occur in the locality.		<p>overgrazing and pugging.</p> <ul style="list-style-type: none"> BioCondition and habitat quality assessments will be undertaken in accordance with this OAMP and will include assessment of percentage cover of native perennial grasses. 	<p>native grass cover is <30%.</p> <ul style="list-style-type: none"> Construct additional fencing if required. Should monitoring activities identify triggers for further action, the OAMP will be reviewed by a suitably qualified within three months and updated if required. Any corrective action identified will be implemented within 6 months of the OAMP being updated.
Minimise habitat degradation caused by feral animals including feral pigs and wild dogs	<ul style="list-style-type: none"> Pest animal management will be undertaken in consultation with the landowner and in accordance with general pest management processes. Pest management will include a range of best management practice actions including shooting, trapping, fencing and baiting, and will be undertaken in accordance with Queensland's Department of 	<ul style="list-style-type: none"> Any increase in sightings/signs (tracks) and/or the relative abundance of pest animals above baseline levels and/or previous monitoring event. Observation of, or signs of, a feral animal not identified as occurring within the Offset Area during the baseline surveys. BioCondition and habitat quality scores for interim performance targets are not 	<ul style="list-style-type: none"> Feral animal presence will be monitored as a minimum through visual signs recorded during monitoring and direct observations. Feral animal monitoring results, and associated actions, will be included in annual reporting to the Department. Monitoring of offset value habitat quality and BioCondition scores will be undertaken. The results of monitoring events will be 	<ul style="list-style-type: none"> Review adherence to pest animal management actions. Investigate potential sources or reasons for an increase in pest animal numbers and rectify. Increase the frequency or revise the type of invasive pest animal control efforts in accordance with DAFF guidelines, and in conjunction with neighbouring landowners. Suitably qualified ecologist to review the



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Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	<p>Agriculture, Fisheries and Forestry (DAFF) guidelines and the requirements of the <i>Biosecurity Act 2014</i>.</p> <ul style="list-style-type: none"> If an increase in feral pest species is noted above trigger levels, additional pest management/control measures will be instigated until the increased activity has ceased. 	<p>achieved by year 5, 10, 15 or 20.</p>	<p>compared against baseline scores, interim performance targets and completion criteria to determine the progress of the offset area and recorded as part of reporting.</p>	<p>OAMP within one month and update if required.</p>
<p>Reduce the risk of unplanned fire causing adverse impacts to MNES by strategic fire management</p>	<ul style="list-style-type: none"> Controlled burns will be undertaken in consultation with the landowner and in accordance with the recommended fire management guidelines for Regional Ecosystems and will involve a range of burn strategies including patchwork burns. Fire is to be excluded from the offset area except for planned and strategic burns as required to reduce understorey fuel loads having a detrimental impact on canopy tree recruitment and establishment and to 	<ul style="list-style-type: none"> Unplanned fire within the offset area. Planned fires become out of control or the required burning regime is not achieved. Habitat Quality assessments indicate native grass groundcover is <30% or >55%. 	<ul style="list-style-type: none"> Fire breaks are to be inspected annually in September Visual inspection of signs of fire during routine land management and during the habitat quality assessments. Fuel loads will be monitored through monitoring of ground cover and to inform fire management strategies. 	<ul style="list-style-type: none"> Occurrences of fire are to be recorded during the visual inspections undertaken during routine land management. If an uncontrolled bushfire has impacted the offset area (including if controlled burning becomes out of control), review the grazing management and fire management strategies and adherence to these strategies and exclude cattle for at least three months. All fire breaks will be inspected, maintained, and repaired if required.



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Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	<ul style="list-style-type: none"> maintain existing fire breaks. Create firebreaks around the offset area boundary to minimise unplanned fire from adjacent lands. Firebreaks are to be co-located, where possible, with roads, fence lines and vehicle access tracks. No areas of MNES will be cleared unless necessary for safety management and without consideration to the impacts and Department requirements. 			<ul style="list-style-type: none"> To ensure compliance, with performance criteria, undertake remedial action including amendments to fire management practices as required including fire safety and containment management. Suitably qualified ecologist to review the OAMP within one month and update if required.
Minimise habitat degradation and direct impact to MNES due to unauthorised access to offset site	<ul style="list-style-type: none"> All signs and fences will be erected within three months of the offset being legally secured. Signs will be erected at all entrances and potential access points to the site stating that access to the site is restricted. Existing fences will be maintained to prevent unauthorised access, to minimise incursions by feral herbivores and 	<ul style="list-style-type: none"> Evidence of unauthorised or unplanned access by persons, vehicles, and/or stock is detected during exclusion periods. Evidence of stock is detected at any point during exclusion times. Damage is detected to any fence or sign. 	<ul style="list-style-type: none"> Monitoring of fence lines will be undertaken by the Landholder or suitable qualified person appointed by the approval holder within 3 months of the offset area being legally secured and during quarterly inspections. Inspections will monitor and document damage or loss of signs and evidence of unauthorised access to the offset area. 	<ul style="list-style-type: none"> Upon being notified or becoming aware of prohibited access to the offset area, the approval holder is to reassess access protocols for any lessees etc., signage and general access within one fortnight. Damage to signage and fences will be repaired within one month of noting the damage. If there are areas that have been negatively



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Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	to control stock presence.			<p>impacted by unauthorised access, the regeneration of those areas will be undertaken, and these areas added to the ongoing monitoring sites.</p> <ul style="list-style-type: none"> • Signage will be repaired and maintained as required by the Landholder or suitable qualified person appointed by the approval holder.
Offset achieves the interim performance targets and completion criteria within the anticipated 5, 10, 15 and 20 year time intervals.	<ul style="list-style-type: none"> • All management actions outlined in this OAMP will be implemented to ensure that the interim performance targets and completion criteria are achieved. • The legal securement of each Offset Area by Sojitz will ensure that the landholder remains obliged to undertake active management of the offset until all completion criteria are achieved. • Monitoring will continue for the life of the approval to ensure that completion criteria 	<ul style="list-style-type: none"> • Interim performance targets are not achieved by year 5, 10 or 15. • Completion criteria are not achieved by year 20. 	<ul style="list-style-type: none"> • BioCondition and habitat quality score assessments will be undertaken for each 5-year period, as a minimum. • Monitoring of the offset area will be undertaken in accordance with the methods outlined in this OAMP. • Monitoring results will be compared against the interim performance targets and completion criteria to assess progress of offset area in achieving the requirements of this OAMP. 	<ul style="list-style-type: none"> • Within one month of detection of the trigger, complete an investigation into the reasons why the interim performance targets or the completion criteria were not achieved within the specified timeframes. This investigation must reevaluate the suitability of the relevant management actions and identify appropriate corrective actions. • As soon as practicable, and within six months of detection of the trigger, implement



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Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	have been met and maintained.			<p>revised corrective actions. These may include (but not limited to):</p> <ul style="list-style-type: none"> - Increasing the frequency and intensity of pest animal and weed control measures or revising the type of measures to be implemented. - Modify fire management measures, to better support enhancement of offset values. - If the investigation outlined above requires changes to the management actions, then as soon as possible, and within six months of detection of the trigger, implement a revised OAMP, as approved by the Minister, incorporating those recommended changes.



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Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
				<ul style="list-style-type: none"> Additional offsets will need to be sought by the approval holder, and approved by the Minister, should the above corrective actions not be successful.
Brigalow TEC				
The extent and condition of Brigalow TEC will be maintained or increased between each successive BioCondition assessment.	<ul style="list-style-type: none"> Thinning of Brigalow to manage dense Brigalow regrowth (to promote rapid recovery of stunted Brigalow stands) may occur where canopy is >70% or stem count is >10,000 / ha, and recommended by a qualified ecologist and only where canopy cover and or stem density is preventing or limiting overall improvement in condition Ground disturbance (i.e ploughing) is not permitted. Removal of groundcover and organic litter is not permitted. The use of fertilisers on the property at locations where it 	<ul style="list-style-type: none"> Brigalow canopy is >70% or stem count is >10,000 / ha 	<ul style="list-style-type: none"> Biannual photopoint monitoring for the first 2 years, then annually for the next 5 years, then biennially for remaining duration of offset 5 yearly BioCondition monitoring 	<ul style="list-style-type: none"> Thinning of Brigalow to manage dense Brigalow regrowth recommended by a qualified ecologist.



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Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	could move into the offset area is to be avoided.			
Grazing management	<ul style="list-style-type: none"> Stock are to be carried at similar stocking densities to that historically carried on the property. However the duration of grazing within the Brigalow areas is to be adjusted based on the results of monitoring for grazing pressure. Grazing intensity should be reduced during the wet season. Stock will be excluded from the Brigalow offset area during periods of drought. 	<ul style="list-style-type: none"> Stock in offset area during exclusion periods Increase in stock within offset areas from baseline 	<ul style="list-style-type: none"> Regular inspections of the offset area will be undertaken during normal land management and farming practices to examine fence lines when stock are grazing in the offset area and/or adjacent to the offset area. Records will be kept of when and how many cattle graze in offset areas. Regular inspections will be undertaken to assess signs of overgrazing and pugging. BioCondition and habitat quality assessments will be undertaken in accordance with this OAMP and will include assessment of percentage cover of native perennial grasses. 	<ul style="list-style-type: none"> Amend livestock management practices including amendment of stocking rates, and/or timing, and/or duration and/or frequency of strategic grazing events until native grass cover is >30% and <55%. Repair offset area boundary fencing if damaged within one week of detection. Removing stock when excessive pugging or overgrazing is observed such that native grass cover is <30%. Construct additional fencing if required. Should monitoring activities identify triggers for further action, the OAMP will be reviewed by a suitably qualified within one month and updated if required. Any corrective action identified will be implemented within 1



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Conservation Management Strategies

Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
				month of the OAMP being updated.
Pest animal management	<ul style="list-style-type: none"> Wild pigs pose the greatest risk to the improvement of the Brigalow offset area. Should the presence of pigs be noticed during the quarterly checklist, a pig eradication program shall be implemented within the Offset Area in accordance with the <i>Land Protection (Pest and Stock Route Management) Act 2002</i>. 	<ul style="list-style-type: none"> Any increase in sightings/signs (tracks) and/or the relative abundance of wild pigs 	<ul style="list-style-type: none"> Wild pig presence will be monitored as a minimum through visual signs recorded during monitoring and direct observations. 	<ul style="list-style-type: none"> Review adherence to pest animal management actions. Investigate potential sources or reasons for an increase in pest animal numbers and rectify. Increase the frequency or revise the type of invasive pest animal control efforts in accordance with DAFF guidelines, and in conjunction with neighbouring landowners. Suitably qualified ecologist to review the OAMP within one month and update if required.
Grassland TEC and King Bluegrass				
Control invasive weed species to reduce impacts from an overdominance of non-native floristic abundance in the understorey	<ul style="list-style-type: none"> Conduct weed management as described above. Should the Buffel grass persist, additional targeted herbicide spraying will occur as soon as reasonably practicable until such point as the natural 	<ul style="list-style-type: none"> If the presence of foreign perennial weeds exceeds 5% ground cover 	<ul style="list-style-type: none"> Monitoring to occur according to the general management and monitoring actions 	<ul style="list-style-type: none"> Subsequent herbicide spraying programs will be performed at intervals suited to regrowth of Buffel grass and seasonal timing and conditions pending the findings of the regular inspections



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Conservation Management Strategies

Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	<p>grassland species are able to outcompete the Buffel grass.</p> <ul style="list-style-type: none"> Grazing in accordance with the regime described above will encourage selective consumption of Buffel grass above other grass species. As such grazing should also be used as a tool to manage weeds. 			
Squatter Pigeon				
Observed species usage of offset site.	<ul style="list-style-type: none"> General management actions and Brigalow TEC management actions to improve quality of habitat for the Squatter Pigeon Installation of artificial watering points for Squatter Pigeons will be added throughout Offset Area One to maximise the potential for this species to occur in the offset area and their populations to increase. These will be installed in areas where existing permanent water sources are not available. The final number, method and location of these 	<ul style="list-style-type: none"> No evidence of usage within 5 years of Offset Area being obtained 	<ul style="list-style-type: none"> Biannual surveys to occur within the first two years of the Offset Area being secured including dawn/dusk surveys, camera traps, flushing surveys during breeding season. Annual surveys to continue from year two to year 5, or until species observed on offset site (whichever occurs first) 	<ul style="list-style-type: none"> If there is no evidence of presence within 4 years of securing Offset Site, alternative Offset Sites should be considered. If after 5 years there is no evidence of Squatter Pigeon then additional offsets will need to be sought by the approval holder and approved by the Minister.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Conservation Management Strategies

Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	<p>watering points will be determined by suitably qualified ecologists and the landholder during the year 1 comprehensive survey. In practice, the watering points could be installation of new water bores, new water holding tanks supplied by overland pipes from existing bores or the installation of new dams to collect overland flow.</p> <ul style="list-style-type: none"> • Squatter Pigeon breeding period can vary depending on localised site conditions but generally peaks in the early to mid-dry season (May-July). Grazing will be restricted at least during the peak Squatter Pigeon breeding and egg laying periods in the early to mid-dry season. • Pig management measures as described above as well as implementing recommendations outlined in <i>Threat Abatement Plan for Predation by Feral Cats</i> and the <i>Threat</i> 			



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Conservation Management Strategies

Habitat management objectives	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions
	<i>Abatement Plan for Predation by the European Red Fox.</i>			



5.0 MONITORING, EVALUATION, REPORTING AND ADAPTIVE MANAGEMENT

5.1 MONITORING PROGRAM

As part of the plan to improve the baseline condition of TECs, King Bluegrass and Squatter Pigeon habitat within the Offset Sites, a monitoring plan will be implemented to assess the success of the management activities. Monitoring will be statistically robust and quantify the change in condition of the Offset Sites. This monitoring program will include control sites and periodic ecological surveys to be undertaken by a suitable qualified ecologist.

The monitoring program will include the items detailed below and presented in **Table 12**.

- Quarterly checklist completed by Land Manager
- Photo point monitoring to be conducted at intervals described below
- BioCondition assessments

5.1.1 Quarterly checklist

The quarterly checklist is a basic approach to capturing the observations and general farm management practices that occur but are only limited to the Offset Sites. The types of data that will be sought includes:

- Weather conditions
- Grazing intensity and stock rotation
- Pasture management such as seeding or fertilizing
- Pest and weed occurrence/intensity and management activities
- Erosion issues
- Incidents of fire
- General property management activities such as fencing

5.1.2 Photopoint monitoring

Photopoint monitoring has already commenced on each Offset Area as part of establishing baseline conditions. This type of monitoring will continue to occur biannually for the first 2 years (May and November), then annually (April/May) for the next 5 years and then biennially (April/May) for the remaining duration of the offset. This monitoring will be performed at the Biocondition sites in a North, East, South and West direction by the landholder or land manager at the already established locations (and others if deemed necessary).



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Monitoring, Evaluation, Reporting and Adaptive Management

5.1.3 BioCondition assessments

BioCondition monitoring will be performed by a qualified Ecologist and occur at an interval not exceeding 5 years, although additional monitoring may be carried out if climatic conditions or other events are expected to have had a significant impact. The monitoring will follow the prescriptive methodology outlined in *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2. 2015* by the Queensland Herbarium and occur at the same monitoring locations each time. This methodology must be used for the entire 20 years even if future versions of the manual alter the methodology, this is for consistency and accuracy of scores. An evaluation of the Biocondition data will be made at the time of monitoring to again inform and recommend modification to management regimes if required.

5.1.4 Squatter Pigeon Monitoring

Squatter Pigeon monitoring will occur within Offset Area One. Biannual surveys will occur within the first two years of the Offset Area being secured. Annual surveys to continue from year two to year five, or until species are observed on offset site (whichever occurs first). Opportunistic identification by Environmental personnel on site will occur throughout operations.

Targeted Squatter Pigeon surveys will be conducted according to the Species Profile and Threat Database (SPRAT) survey guidelines. This will involve:

- Surveys being conducted by appropriately qualified ecologists who are competent in recognising Squatter Pigeon and Squatter Pigeon habitat.
- Surveys to be conducted during optimal time of year and day. This is generally mid to late dry season from May to the end of October when the subspecies is most actively foraging for grass seed. Surveys will be conducted from sunrise to 9am and from 3.30pm to sunset, when Squatter Pigeons are most active.
- Driving surveys will also be conducted in the following manner:
 - Along the same route, in the same manner, on consecutive days
 - Adjacent to areas of natural habitat throughout the offset area
 - Along unsealed roads, tracks and other dusty areas
 - Along sealed roads around the perimeter of the offset area

To support these on-ground field assessments, camera traps will be deployed. Previous studies have successfully utilised camera traps to observe ground-dwelling birds, including a study conducted on Lewin's Rail (*Lewinia pectoralis brachipus*) a poorly known, ground-dwelling wetland bird of similar size to the Squatter Pigeon. This study deployed 15 camera traps over 294 days to understand the ecology of this species (Znidarsic, 2017). As our study is only aiming to determine presence, deployment for a shorter amount of time is considered to be sufficient. A minimum of 15 camera traps will be deployed in the following manner:

- Camera traps will be deployed between May and September and will remain in the field for approximately two months.
- Batteries and SD cards will be replenished after a period of approximately 4 weeks.



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Monitoring, Evaluation, Reporting and Adaptive Management

- Camera traps will be collected after a further 4 weeks.

5.1.5 Annual reporting

Annual reports will be provided to DCCEEW within three months of every twelve month anniversary of the commencement of the action following approval. The report will detail the progress towards achieving the management objectives and completion criteria outlined in this OAMP. The report will contain, but may not be limited to:

- name and contact details of the proponent, landholder, and any contractors or consultants who have worked on the offset area. If someone other than the contractor is undertaking management activities (i.e. landholders, lessees, a sub-contractor or consultant) their details will also be provided, including skills and expertise of the responsible entity/ies
- relevant EPBC approval and EA numbers
- lot on plan property description and postal address
- a general description of climatic conditions for the management period
- management measures undertaken within the management period and, where required, describe instances where corrective actions have been implemented
- results of monitoring events undertaken within the management period, including Squatter Pigeon survey results
- a comparison of the monitoring results for the current management period with the monitoring results from the previous management period
- an indication of any risks or potential threats that have become apparent in the management period, and activities to be undertaken to manage these threats and risks including any corrective actions that need to be implemented in the subsequent management period
- evidence of progress towards achieving the management objectives and completion criteria if required, recommendations to be incorporated into the revised OAMP including changes to management and monitoring methodology



5.2 EVALUATION, REPORTING AND ADAPTIVE MANAGEMENT

The evaluation of the quarterly checklist and photopoint monitoring will be performed by the Landowner and occur annually. That evaluation will include an assessment of the condition of the ecosystems in terms of vegetation cover and health and recommendations for modified management practices provided to the Land Manager. Reporting for photopoint monitoring will also form part of the Biocondition monitoring report.

A formal reporting process on the Biocondition monitoring will occur immediately following each Biocondition monitoring event which will not exceed a 5 yearly interval. This reporting process will include an evaluation of all data collected during the preceding 5 years and make a comparison to earlier report findings including baseline conditions. Importantly this reporting process will re-calculate the condition of the offset areas using the *Offset Assessment Guide* and make a determination regarding achievement of the Specific Management Outcomes and any recommendations for adaptive management required. The evaluation will enable a determination of trajectory for the longer term condition of the TECs, and if not on an appropriate trajectory then modifications to management actions can be applied. Should recommended management actions vary drastically from those detailed in this OAMP then the Department will be informed as part of normal reporting processes. The report will be submitted to the administering authority.

6.0 RISK ANALYSIS

A risk assessment was undertaken to assess the risks associated with failing to achieve the objectives outlined in this OAMP for mitigating impacts to MNES. For each identified risk, the potential consequence of the risk (**Table 13**) was assessed against the likelihood of that risk occurring (**Table 14**) to determine an overall risk rating using the matrix in **Table 15**. The consequence and likelihood of each risk occurring was reassessed following the implementation of the management and mitigation measures (i.e. control measures) to provide a residual risk rating (**Table 16**).

Table 13: Consequence Levels

Level	Descriptor	Qualitative Description
1	Insignificant	Low level impact/s to land, biodiversity, ecosystem services, water resources or air
2	Minor	Minor impact/s to land, biodiversity, ecosystem services, water resources or air
3	Moderate	Moderate impact/s to land, biodiversity, ecosystem services, water resources or air
4	Major	Significant impact/s (>20 years) to impact/s to land, biodiversity, ecosystem services, water resources or air.
5	Catastrophic	Permanent, severe impact/s to land, biodiversity, ecosystem services, water resources or air



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Risk Analysis

Table 14 Risk Assessment Criteria Matrix

Level	Descriptor	Qualitative Description
A	Almost certain	The event is expected to occur; event will occur on an annual (or more frequent) basis.
B	Likely	Event could be incurred over a 1-2 year timeframe.
C	Possible	Event could be incurred within a 5 year timeframe.
D	Unlikely	Event could be incurred over a 5-20 year timeframe.
E	Rare	Event may occur less than once in 20 years.

Table 15 Risk Assessment Criteria Matrix

		Consequences				
		1 (Insignificant)	2 (Minor)	3 (Moderate)	4 (Major)	5 (Catastrophic)
Likelihood	A (Almost certain)	Medium	High	High	Extreme	Extreme
	B (Likely)	Low	Medium	High	High	Extreme
	C (Possible)	Low	Medium	Medium	High	Extreme
	D (Unlikely)	Low	Low	Medium	High	High
	E (Rare)	Low	Low	Low	Medium	High

6.1 PROJECT RISK ASSESSMENT

The environmental risk ratings presented in Table 16 are to be interpreted as follows:

- **Low:** Risk can be adequately managed by routine procedures and work practices.
- **Medium:** Control measures other than administrative controls are needed.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Risk Analysis

- **High:** Significant risk control measures need to be implemented before works commence and must be maintained.
- **Severe:** Operations are not to be undertaken without extensive risk control and mitigation measures in place prior to the commencement of works and such measures must be maintained for the duration of the project.



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Risk Analysis

Table 16 Risk Analysis

Risk Event	Risk Description	Unmitigated Risk Ranking	Risk Assessment / Risk Controls	
			Management Measures / Actions	Mitigated Environmental Risk Ranking
Weed invasion and further spread	<ul style="list-style-type: none"> Infestation of previously unidentified weeds within the offset area. Expansion of range and abundance of existing weed species within the offset site. Left unchecked, weed invasion and proliferation could cause significant deterioration of the offset site. 	High (B3)	<ul style="list-style-type: none"> Access to site will be restricted to authorised persons. Weed management and weed hygiene restrictions will be implemented across the offset site to reduce the extent of existing weeds and to control the potential introduction of new exotic weed species. Weed hygiene and management will be undertaken in consultation with the landowner. Chemical and/or mechanical control of all declared weeds in accordance with the control measures outlined in the Biosecurity Queensland Fact Sheets or other sources of information. 	Low (D2)
Inappropriate grazing regimes	<ul style="list-style-type: none"> Inappropriate cattle grazing destroys shrubs and native grass cover and slows or reverses the regeneration of TECs and threatened fauna habitat. Grazing can also lead to the trampling of Squatter Pigeon nests, impairing breeding. 	Medium (C3)	<ul style="list-style-type: none"> Stock will be managed in accordance with Table 12. Should fencing or similar be required to manage grazing pressure or demarcate offset area, ensure solution uses best practice design and construction and will not reduce pre-existing movement opportunities for native fauna.. Squatter Pigeon breeding period can vary depending on localised site conditions but generally peaks in the early to mid-dry season (May-July). Grazing will be restricted at least during the peak Squatter Pigeon breeding and egg laying periods in the early to mid-dry season. 	Low (D3)



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Risk Analysis

Risk Event	Risk Description	Unmitigated Risk Ranking	Risk Assessment / Risk Controls	
			Management Measures / Actions	Mitigated Environmental Risk Ranking
Unplanned fire	<ul style="list-style-type: none"> If unchecked bushfire may degrade some or all of the offset site and increase related risks such as erosion. Fire late in the management period would also reduce the environmental improvement achieved at the offset site. 	High (C4)	<ul style="list-style-type: none"> Controlled burns will be undertaken in consultation with the landowner and in accordance with the recommended fire management guidelines for Regional Ecosystems and will involve a range of burn strategies including patchwork burns. Fire is to be excluded from the offset area except for planned and strategic burns as required to reduce understorey fuel loads having a detrimental impact on canopy tree recruitment and establishment and to maintain existing fire breaks. Create firebreaks around the offset area boundary to minimise unplanned fire from adjacent lands. Firebreaks are to be co-located, where possible, with roads, fence lines and vehicle access tracks. No areas of MNES will be cleared unless necessary for safety management. 	Medium (D3)
Increased population of feral animals in the offset area causing habitat degradation or direct impacts to MNES	<ul style="list-style-type: none"> Pest animals pose threats to the MNES including predation (Wild Dogs, Feral Cats and Foxes) and habitat degradation (Feral Pigs and Rabbits). Feral Pigs and rabbits can impact on habitat including tree species recruitment and understorey vegetation composition. 	Medium (C3)	<ul style="list-style-type: none"> Pest animal management will be undertaken in consultation with the landowner and in accordance with general pest management processes. Pest management will include a range of best management practice actions including shooting, trapping, fencing and baiting, and will be undertaken in accordance with Queensland's Department of Agriculture, Fisheries and Forestry (DAFF) guidelines and the requirements of the <i>Biosecurity Act 2014</i>. If an increase in feral pest species is noted, additional pest management/control measures will be instigated until the increased activity has ceased. 	Low (C1)



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Risk Analysis

Risk Event	Risk Description	Unmitigated Risk Ranking	Risk Assessment / Risk Controls	
			Management Measures / Actions	Mitigated Environmental Risk Ranking
Offset fails to achieve the interim performance targets and completion criteria.	<ul style="list-style-type: none"> Offset Area has not met the requirement of the offset policy or this OAMP, nor achieved the outcomes that were key to the rationale for the approval decision. 	Medium (D3)	<ul style="list-style-type: none"> All management actions outlined in this OAMP will be implemented to enable the interim performance targets and completion criteria to be achieved. The legal securement of each Offset Area by Sojitz will ensure that the landholder remains obliged to undertake active management of the offset until all completion criteria are achieved. Monitoring will continue for the life of the approval to ensure that completion criteria have been met and maintained. 	Low (D2)



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Appendix A SQUATTER PIGEON HABITAT QUALITY INDICATORS



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Appendix A Squatter Pigeon Habitat Quality Indicators

A.1 SQUATTER PIGEON HABITAT QUALITY INDICATORS

Quality and availability of food and habitat required for foraging

The Squatter Pigeon's diet has been estimated to consist of 95% seeds which fall to the ground from low vegetation.

Percentage of vegetation being low to the ground grass, herbs or shrubs that have or are expected to drop seeds:

Score	0	1	2	3	4	5
Description	0%	0-30%	30-50%	50-70%	70-80%	80-100%

The Squatter Pigeon is known to travel to waterbodies daily to drink and so will inhabit vegetation that is within 3km of a suitable, permanent, or seasonal waterbody.

Distance to the closest suitable waterbody. This includes permanent or seasonal rivers, creeks, lakes, ponds, waterholes, artificial dams etc. The water body must have a small patch of bare ground as the Squatter Pigeon drinks from the waters edge.

Score	0	1	2	3	4	5
Description	>5km away	4-5km	3-4km	2-3km	1-2km	0-1km

The Squatter Pigeon prefers to forage on bare ground under an open canopy of trees.

Percentage of vegetated understorey (of grass tussocks, shrubs and forbs) mixed with bare ground area (patchiness)

Score	0	1	2	3	4	5
Description	0-20% ground area	20-30%	30-40%	40-50%	50-60%	>60%

Canopy cover along 100 m transect:

Score	0	1	2	3	4	5
Description	>60%	50-60%	40-50%	30-40%	20-30%	0-20% canopy cover

Quality and availability of habitat required for shelter and breeding

Typical ground cover vegetation is patchy with native grasses or a mix of tussock grasses, shrubs and forbs which rarely exceed 33% of ground area.

Percentage of vegetated understorey (of grass tussocks, shrubs and forbs) mixed with bare ground area (patchiness)



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Appendix A Squatter Pigeon Habitat Quality Indicators

Score	0	1	2	3	4	5
Description	0-20% ground area	20-30%	30-40%	40-50%	50-60%	>60%

Squatter Pigeons nest in shallow depressions in the ground which require well-draining soils. They nest beneath grass tussocks, bushes or fallen trees/logs within 1km of a suitable, permanent waterbody.
Presence of fallen trees/logs (50 x 20m plot)

Score	0	1	2	3	4	5
Description	0 – 10m	10-20m	20-30m	30-40m	40-50m	50-100m

Distance to suitable, permanent waterbody

Score	0	1	2	3	4	5
Description	2.5km+	2km-2.5km	1.5km-2km	1km-1.5km	500m-1km	0m-500m

Quality and availability of habitat required for mobility

Squatter Pigeons are generally sedentary when food and water resources are reliable within their local region. When resources become unreliable or unavailable they may disperse along vegetated corridors to source new water sources.

Habitat connectivity to site

Score	0	1	2	3	4	5
Description	Not connected at all – isolated patch by more than 100 m	Not directly connected but suitable habitat with 100 m of patch	Connected to larger habitat in one direction only.	Connected to larger habitat patches in two directions.	Connected to larger habitat patches in three directions.	Connected to larger habitat patches to the north, south, east and west.

Typical ground cover vegetation is patchy with native grasses or a mix of tussock grasses, shrubs and forbs which rarely exceed 33% of ground area.

Percentage of vegetated understorey (of grass tussocks, shrubs and forbs) mixed with bare ground area (patchiness)

Score	0	1	2	3	4	5
Description	0-20% ground area	20-30%	30-40%	40-50%	50-60%	>60%



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Appendix A Squatter Pigeon Habitat Quality Indicators

The Squatter Pigeon is known to travel to waterbodies daily to drink and so will inhabit vegetation that is within 3km of a suitable, permanent, or seasonal waterbody.

Distance to the closest suitable waterbody. This includes permanent or seasonal rivers, creeks, lakes, ponds, waterholes, artificial dams etc. The water body must have a small patch of bare ground as the Squatter Pigeon drinks from the waters edge.

Score	0	1	2	3	4	5
Description	>5km away	4-5km	3-4km	2-3km	1-2km	0-1km

Absence of threats

Squatter Pigeons are threatened by ongoing vegetation clearance and introduction of weeds.

Percentage of land that has been actively cleared for grazing or cropping within 500 m of site

Score	1	2	3	4	5
Description	60-100%	40-60%	20-40%	10-20%	0-10%

% of ground vegetation that is weeds

Score	1	2	3	4	5
Description	>40%	30-40%	20-30%	10-20%	0-10%

Disappearance of this species in New South Wales has been attributed to overgrazing during times of drought. A similar threat is the trampling of nests by livestock.

Occurrence of foxes, cats or livestock or evidence of use by these species (trampling of nests):

Score	1	2	3	4	5
Description	Frequent	Common	Occasional	Infrequent	Absent



Appendix B OFFSETS ASSESSMENT GUIDE INPUTS



Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	King Bluegrass (Dichanthium)
EPBC Act status	Endangered
Annual probability of extinction <small>Based on IUCN category definitions</small>	1.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
	Ecological communities						
	Area of community	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Threatened species habitat						
	Area of habitat	Yes	King Bluegrass (Dichanthium queenslandicum)	Area	174.9	Hectares	
				Quality	6	Scale 0-10	
				Total quantum of impact	104.94	Adjusted hectares	
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
	Threatened species						
	Birth rate e.g. Change in nest success	No					
	Mortality rate e.g. Change in number of road kills per year	No					
	Number of individuals e.g. Individual plants/animals	No					

Offset calculator																											
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source						
	Ecological Communities																										
	Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset															
								Future area without offset (adjusted hectares)		0.0		Future area with offset (adjusted hectares)										0.0					
						Time until ecological benefit				Start quality (scale of 0-10)												Future quality without offset (scale of 0-10)				Future quality with offset (scale of 0-10)	
	Threatened species habitat																										
	Area of habitat	Yes	104.94	Adjusted hectares		Time over which loss is averted (max. 20 years)		20		Start area (hectares)		495		Risk of loss (%) without offset		2%		Risk of loss (%) with offset		0%							
														8.91		90%		8.02		6.32							
						Time until ecological benefit		20		Start quality (scale of 0-10)		5		Future quality without offset (scale of 0-10)		4		Future quality with offset (scale of 0-10)		7							
	Threatened species																										
	Birth rate e.g. Change in nest success		No																								
	Mortality rate e.g. Change in number of road kills per year		No																								
	Number of individuals e.g. Individual plants/animals		No																								

Summary							
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)	
						Direct offset (\$)	Other compensatory measures (\$)
	Birth rate	0				\$0.00	
	Mortality rate	0				\$0.00	
	Number of individuals	0				\$0.00	
	Number of features	0				\$0.00	
	Condition of habitat	0				\$0.00	
	Area of habitat	104.94	107.81	102.73%	Yes	\$0.00	N/A
	Area of community	0				\$0.00	
						\$0.00	\$0.00

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*

2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Brigalow (Acacia harpophylla)
EPBC Act status	Endangered
Annual probability of extinction <small>Based on IUCN category definitions</small>	1.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	Yes	Brigalow (Acacia harpophylla dominant and co-dominant) ecological community	Area	58.7	Hectares	
				Quality	6	Scale 0-10	
				Total quantum of impact	35.22	Adjusted hectares	
	Threatened species habitat						
	Area of habitat	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
	Threatened species						
	Birth rate e.g. Change in nest success	No					
	Mortality rate e.g. Change in number of road kills per year	No					
	Number of individuals e.g. Individual plants/animals	No					

Offset calculator																						
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
	Ecological Communities																					
	Area of community	Yes	35.22	Adjusted hectares		Risk-related time horizon (max. 20 years)	20	Start area (hectares)	165	Risk of loss (%) without offset	2%	Risk of loss (%) with offset	0%	2.97	90%	2.67	2.11	36.15	102.63%	Yes		
										Future area without offset (adjusted hectares)	162.0	Future area with offset (adjusted hectares)	165.0									
						Time until ecological benefit	20	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	8	3.00	90%	2.70	2.13					
	Threatened species habitat																					
	Area of habitat	No				Time over which loss is averted (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset										
										Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0									
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)										
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
	Number of features e.g. Nest hollows, habitat trees	No																				
	Condition of habitat Change in habitat condition, but no change in extent	No																				
	Threatened species																					
	Birth rate e.g. Change in nest success	No																				
	Mortality rate e.g. Change in number of road kills per year	No																				
	Number of individuals e.g. Individual plants/animals	No																				

Summary							
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)	
						Direct offset (\$)	Other compensatory measures (\$)
	Birth rate	0				\$0.00	
	Mortality rate	0				\$0.00	
	Number of individuals	0				\$0.00	
	Number of features	0				\$0.00	
	Condition of habitat	0				\$0.00	
	Area of habitat	0				\$0.00	
	Area of community	35.22	36.15	102.63%	Yes	\$0.00	N/A
						\$0.00	\$0.00

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012
This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Natural grasslands of the Queensland
EPBC Act status	Endangered
Annual probability of extinction <small>Based on IUCN category definitions</small>	1.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	Yes	Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin ecological community	Area	133.5	Hectares	
				Quality	6	Scale 0-10	
				Total quantum of impact	80.10	Adjusted hectares	
	Threatened species habitat						
	Area of habitat	No		Area			
				Quality			
				Total quantum of impact	0.00		
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
	Threatened species						
	Birth rate e.g. Change in nest success	No					
	Mortality rate e.g. Change in number of road kills per year	No					
	Number of individuals e.g. Individual plants/animals	No					

Offset calculator																					
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
	Ecological Communities																				
	Area of community	Yes	80.10	Adjusted hectares		Risk-related time horizon (max. 20 years)	20	Start area (hectares)	375	Risk of loss (%) without offset	2%	Risk of loss (%) with offset	0%				4.79	81.67	101.97%	Yes	
								Future area without offset (adjusted hectares)	368.3	Future area with offset (adjusted hectares)	375.0		6.75	90%	6.08						
						Time until ecological benefit	20	Start quality (scale of 0-10)	5	Future quality without offset (scale of 0-10)	4	Future quality with offset (scale of 0-10)	7	3.00	90%	2.70	2.13				
	Threatened species habitat																				
	Area of habitat	No				Time over which loss is averted (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset									
								Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0										
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)									
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
	Number of features e.g. Nest hollows, habitat trees	No																			
	Condition of habitat Change in habitat condition, but no change in extent	No																			
	Threatened species																				
	Birth rate e.g. Change in nest success	No																			
	Mortality rate e.g. Change in number of road kills per year	No																			
	Number of individuals e.g. Individual plants/animals	No																			

Summary								
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
						Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	0				\$0.00		\$0.00
	Area of community	80.1	81.67	101.97%	Yes	\$0.00	N/A	\$0.00
							\$0.00	\$0.00

Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Squatter Pigeon (southern)
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator							
Impact calculator	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Ecological communities						
	Area of community	No		Area			
			Quality				
			Total quantum of impact	0.00			
	Threatened species habitat						
	Area of habitat	Yes	Squatter Pigeon (southern) (Geophaps scripta scripta)	Area	58.7	Hectares	
				Quality	4	Scale 0-10	
				Total quantum of impact	23.48	Adjusted hectares	
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
	Number of features e.g. Nest hollows, habitat trees	No					
	Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species							
Birth rate e.g. Change in nest success	No						
Mortality rate e.g. Change in number of road kills per year	No						
Number of individuals e.g. Individual plants/animals	No						

Offset calculator																						
Offset calculator	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source		
	Ecological Communities																					
	Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset		Risk of loss (%) with offset										
										Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0									
						Time until ecological benefit		Start quality (scale of 0-10)		Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)										
	Threatened species habitat																					
	Area of habitat	Yes	23.48	Adjusted hectares		Time over which loss is averted (max. 20 years)	20	Start area (hectares)	95	Risk of loss (%) without offset	2%	Risk of loss (%) with offset	1%	0.76	90%	0.68	0.66		24.73	105.31%	Yes	
							Future area without offset (adjusted hectares)		93.3	Future area with offset (adjusted hectares)	94.1											
						Time until ecological benefit	20	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	8	3.00	90%	2.70	2.59					
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start value		Future value without offset		Future value with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source		
	Number of features e.g. Nest hollows, habitat trees	No																				
	Condition of habitat Change in habitat condition, but no change in extent	No																				
Threatened species																						
Birth rate e.g. Change in nest success	No																					
Mortality rate e.g. Change in number of road kills per year	No																					
Number of individuals e.g. Individual plants/animals	No																					

Summary								
Summary	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)	
	Birth rate	0				\$0.00		\$0.00
	Mortality rate	0				\$0.00		\$0.00
	Number of individuals	0				\$0.00		\$0.00
	Number of features	0				\$0.00		\$0.00
	Condition of habitat	0				\$0.00		\$0.00
	Area of habitat	23.48	24.73	105.31%	Yes	\$0.00	N/A	\$0.00
	Area of community	0				\$0.00		\$0.00
						\$0.00	\$0.00	\$0.00

OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Appendix B Offsets Assessment Guide Inputs

B.1 EPBC ACT OFFSET AREA CALCULATOR ATTRIBUTES

The table below summarises the justification for each offset area calculator attribute. The offset assessment calculation for each MNES is provided in the following pages.

Offset Calculator Input	Comment
Quality of impact area	As required by the PER Guideline, the quality of the impact area and offset area was determined by way of BioCondition assessments and Habitat Quality Assessments. Both techniques have been developed by the Queensland State government and have been accepted at a State and Commonwealth level for use in assisting to calculate the quality of ecological communities and habitat for threatened species.
Quality of offset area (starting)	
Future quality of offset area <u>without</u> offset	<p>A review was undertaken of the known threatening processes for the MNES. It is understood that, in the absence of the legal protection afforded by the offset and the management measures that would be implemented as part of same there are a range of on-going and potential future uses of the land, including further mining operations, that may exacerbate some of the key threatening processes for the MNES.</p> <p>Principal amongst this would be the continued as of right use of all of the land for some level of grazing and cropping and the auxiliary actions associated with this – many of which can be undertaken by landholders in certain circumstances for essential management and construction of necessary infrastructure including fences, roads, tracks, fire management lines and firebreak and the ability to thin native vegetation under certain circumstances.</p>
Future quality of offset area <u>with</u> offset	<p>Providing for both legal protection and the stipulation of long-term management requirements the offset area score is expected to improve by at least 2 points. The completion criteria is provided in Section 3.</p> <p>Specific management measures have been developed for each MNES and property where necessary, however, at a general level, these measures will seek to directly target any of the key threatening processes known or expected to occur on the offset properties that would likely impact the long-term improvement in the MNES quality. Such measures are likely to include:</p> <ul style="list-style-type: none"> ▪ pest management to reduce the number of pest animals, including Feral Pigs and Rabbits which degrade the sites and limit vegetation recruitment. ▪ grazing management to improve the condition of habitat through enhanced recruitment, improvements in ground layer diversity; ▪ weed management to reduce infestation of weeds; and ▪ Strategic fire management to maximise recruitment – this would be completed in accordance with the recommended fire management guidelines for each of the RE that are associated with the MNES being offset.
Confidence in the offset achieving the score	<p>The offset areas will be managed in accordance with this OAMP. The management measures proposed are well accepted 'best-practice' measures that, when implemented correctly, are expected to have a high degree of success at achieving the intended management outcome. The offset areas will be protected by a legally binding statutory environmental covenant or similar. This is an industry wide accepted mechanism to help ensure the long-term protection of an offset area from future incompatible uses.</p> <p>Provided the above actions are implemented there is a high degree of confidence (90%) the offset score will be achieved over the desired time horizon.</p>
Risk of loss (ROL) <u>without</u> offset	Despite the presence of various State and Commonwealth protections on some of the MNES contained within the offset area there are, as noted previously, a number of threatening processes occurring within the offset area a potential future as of right uses that could exacerbate the threatening processes. Overtime these are likely to result in a loss of habitat



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Appendix B Offsets Assessment Guide Inputs

	<p>quality potentially to the extent that the area is no longer consistent with the MNES in question.</p> <p>Further, estimates from the <i>Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act</i> (Maseyk et al, 2017) found the average annual background rate of loss between 2005-2014 for the Central Highlands was 0.09%, so the risk of loss over twenty years equates to 1.81%. Thus, 2% has been inputted into the calculator.</p>
Risk of loss (ROL) <u>with</u> offset	<p>With the offset in place and with the resultant management measures there is expected to be a very low to negligible risk of loss. The proposed risk of loss (ROL) is expected to be limited to stochastic natural events such as bushfire or floods. Utilising advice from the <i>Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act</i> (Maseyk et al, 2017), the following inputs were determined:</p> <p><u>Threatened Species – Squatter Pigeon:</u></p> <p>It was determined that 1% is appropriate for this input. This has been derived from following Pathway C in the decision tree for calculating Risk of Loss <u>with</u> offset, where the proposed offset site is suitable for restoration / habitat improvement but does not contain the listed EPBC Act listed threatened species, the Squatter Pigeon. The tenure status will be changed to secure protection and so the ROL therefore will be '> 0% but < average annual background rate of loss x time horizon'</p> <p>The ROL is considered to be 0.05% to allow for the above mentioned stochastic natural events, multiplied by 20 years. Thus, ROL with offset = 1% over 20 years.</p> <p><u>Threatened Species – King Bluegrass</u></p> <p>It was determined that 0% is appropriate for this input. This has been derived from following Pathway A in the decision tree for calculating Risk of Loss with offset, where the proposed offset site contains the listed EPBC Act listed threatened species, King Bluegrass. The tenure status will be changed to secure protection so therefore development induced clearing of the proposed offset site due to allowable activities will trigger an offset requirement under any legislation.</p> <p>Thus, ROL with offset = 0% over 20 years.</p> <p><u>TECs – Brigalow TEC and Grasslands TEC:</u></p> <p>It was determined that 0% is appropriate for this input. This has been derived from following Pathway A in the decision tree for calculating Risk of Loss <u>with</u> offset, where the proposed offset site contains each listed EPBC Act listed threatened ecological community. The tenure status will be changed to secure protection so therefore development induced clearing of the proposed offset site due to allowable activities will trigger an offset requirement under any legislation.</p> <p>Thus, ROL with offset = 0% over 20 years.</p>
Confidence in the risk of loss predictions	<p>The legally binding covenant will be registered on the land title and will be binding on all current and future landowners to ensure that the habitat is protected in perpetuity.</p> <p>Significant natural events that could result in the loss of some or all of the offset are inherently difficult to predict. However, for an event to be significant enough to result in substantial loss of the offset it is expected to occur in the order of one every 100 years. As such the 2% risk of loss applied here is both precautionary and has a high degree of confidence in being accurate.</p>



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Appendix B Offsets Assessment Guide Inputs

Time over which the risk of loss is averted	The maximum allowable period of time has been adopted (20 years).
Time until ecological benefit.	The proposed offset sites have relatively high starting quality and provided the required management measures are implemented it is expected that a 20 year timeframe will be sufficient to achieve the proposed 2 point increase in habitat quality.



Appendix C IMPACT AND OFFSET AREA BIOCONDITION AND HABITAT QUALITY RESULTS



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Appendix C Impact and Offset Area BioCondition and Habitat Quality Results

C.1 BIOCONDITION SCORES FROM IMPACT SITES

Site condition attribute	Regrowth RE 11.8.11				Regrowth RE 11.9.1		Remnant RE 11.9.1				Regrowth RE 11.8.5
	RG GL 1	RG GL 2	RG GL 3	RG GL 4	RG Brig 1	RG Brig 2	Rem Brig 1	Desired Rem Brig 1	Desired Rem Brig 2	Desired Rem Woodland	Desired RG Woodland
Recruitment of woody perennial species	na	na	na	na	5	3	5	3	5	3	5
Native plant species richness: trees	na	na	na	na	5	5	5	5	5	5	5
Native plant species richness: shrubs	na	na	na	na	2.5	5	2.5	5	2.5	5	2.5
Native plant species richness: grasses	2.5	2.5	2.5	2.5	2.5	2.5	0	2.5	2.5	0	2.5
Native plant species richness: forbs	0	0	0	0	5	2.5	5	5	2.5	5	2.5
Tree canopy height	na	na	na	na	3	5	3	5	5	5	5
Tree canopy cover	na	na	na	na	3.33	3.33	2.33	2.67	3.33	1.33	1.5
Shrub canopy cover	na	na	na	na	5	5	5	5	3	3	5



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Appendix C Impact and Offset Area BioCondition and Habitat Quality Results

Native perennial grass cover	3	5	5	3	1	0	0	0	1	0	1
Organic litter cover	5	5	5	5	5	5	5	5	5	5	5
Large trees	na	na	na	na	10	5	10	5	10	5	0
Coarse woody debris	na	na	na	na	5	5	5	2	2	5	2
Weed cover	10	10	5	5	5	5	5	10	5	10	5
Total site condition attributes	20.5	22.5	17.5	15.5	57.33	51.33	52.83	55.17	51.83	52.33	42
Fragmented – Patch size	7	7	7	7	7	7	10	2	10	10	5
Fragmented – Connectivity	0	0	0	0	0	0	0	0	2	2	0
Fragmented – Context	2	2	2	2	2	2	2	0	4	2	0
Total site context attributes	9	9	9	9	9	9	12	2	16	14	5
Total BioCondition score	0.59	0.63	0.53	0.49	0.66	0.60	0.65	0.57	0.68	0.66	0.47
Average BioCondition score for RE	0.56				0.64			0.64			0.47
BioCondition Class	3				2			2			3



OFFSET AREA MANAGEMENT PLAN – GREGORY CRINUM M-BLOCK EXTENSION

Appendix C Impact and Offset Area BioCondition and Habitat Quality Results

C.2 SQUATTER PIGEON HABITAT QUALITY SCORES FROM IMPACT SITES

Species Habitat Attribute	RG RE 11.8.11				RG RE 11.9.1		REM 11.9.1				RE 11.8.5
	RG GL 1	RG GL 2	RG GL 3	RG GL 4	RG Brig 1	RG Brig 2	Rem Brig 1	Desired Rem Brig 1	Desired Rem Brig 2	Desired Rem Woodland	Desired RG Woodland
Foraging	15	12.5	13.75	16.25	11.25	11.25	13.75	13.75	13.75	13.75	12.5
Shelter & Breeding	21.67	16.67	16.67	8.33	11.67	11.67	15	5	3.33	5	3.33
Mobility	18.33	16.67	16.67	15	10	15	16.67	11.67	11.67	11.67	11.67
Absence of Threats	10	5	10	10	5	10	10	10	10	10	5
Score	65	50.83	57.08	49.58	37.92	47.92	55.42	40.42	38.75	40.42	32.5
Sum of Group Scores	65	51	57	50	38	48	55	40	39	40	33
Habitat Assessment Score	7	5	6	5	4	5	6	4	4	4	3
Average for RE	6				4		4				3
Average for Species	4.37										



C.3 OFFSET SITES BIOCONDITION SCORES



Site condition attribute	REM RE 11.49		RG RE 11.4.9	RG RE 11.9.1		
	AOO Rem Brig 1	AOO Rem Brig 2	AOO RG Brig 4	AOO RG Brig 1	AOO RG Brig 2	AOO RG Brig 3
Recruitment of woody perennial species	5	5	5	5	5	5
Native plant species richness: trees	5	5	5	5	5	5
Native plant species richness: shrubs	5	2.5	2.5	2.5	5	2.5
Native plant species richness: grasses	0	0	5	5	2.5	2.5
Native plant species richness: forbs	2.5	2.5	5	5	5	2.5
Tree canopy height	3	3	3	3	3	3
Tree canopy cover	4	4	3.5	3.33	3.33	2.33
Shrub canopy cover	5	5	3	5	3	3
Native perennial grass cover	0	0	0	3	3	3
Organic litter cover	5	5	5	5	5	5
Large trees	5	5	0	5	5	5
Coarse woody debris	5	5	2	5	2	2
Weed cover	10	10	3	5	5	3
Total site condition attributes	54.5	52	42	56.83	51.83	43.83
Fragmented – Patch size	5	5	2	5	5	5
Fragmented – Connectivity	0	0	0	0	0	0
Fragmented – Context	2	2	0	2	0	0
Total site context attributes	7	7	2	7	5	5
Total BioCondition score	0.62	0.59	0.44	0.64	0.57	0.49
Average BioCondition score for RE	0.60		0.44		0.57	
BioCondition Class	2		3		3	

C.4 OFFSET SITES HABITAT QUALITY



Squatter Pigeon Habitat Assessment Results

Species Habitat Attribute	REM RE 11.49		RG RE 11.4.9	RG RE 11.9.1		
	AOO Rem Brig 1	AOO Rem Brig 2	AOO Brig 4 RG	AOO RG Brig 1	AOO RG Brig 2	AOO RG Brig 3
Foraging	10	10	16.25	16.25	15	17.5
Shelter & Breeding	11.67	15	13.33	20	15	13.33
Mobility	13.33	18.33	16.67	21.67	15	16.67
Absence of Threats	5	10	10	10	10	5
Score	40	53.33333333	56.25	67.91666667	55	52.5
Sum of Group Scores	40	53	56	68	55	53
Habitat Assessment Score	4	5	6	7	6	5
Average for RE	4.5		6	6		