

Vegetation and Fauna Management Plan

M-Block Extension

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Prepared for: Sojitz Blue Pty Ltd

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VEGETATION AND FAUNA MANAGEMENT PLAN – M-BLOCK

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VEGETATION AND FAUNA MANAGEMENT PLAN – M-BLOCK

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Abbreviations

Brigalow TEC	Brigalow (Acacia harpophylla dominant and codominant)
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
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	Nature Conservation Act 1992
PER	Public Environment Report
RE	Regional Ecosystem
RMP	Rehabilitation Management Plan
SPRAT	Species Profile and Threats Database
TEC	Threatened Ecological Communities



VFMP

Vegetation and Fauna Management Plan

Glossary

Impact Area	Areas within M-Block expansion 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 Expansion

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.

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). The PER guidelines were issued on 24 March 2022.

The draft PER was prepared to address the requirements of the PER guidelines. In response to the draft PER, the Department of Climate Change, Energy, the Environment and Water (DCCEEW) requires a Vegetation and Fauna Management Plan (VFMP) to be prepared which outlines the proposed avoidance, safeguards and mitigation measures to deal with the relevant impacts of the proposed action on MNES.

1.1 **PROPOSED WORKS**

Sojitz are proposing to continue mining operations at GCM with the expansion into M-Block. M-Block is located wholly within ML 1923 and immediately east of the existing mining areas. ML 1923 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 GCM, including M-Block, holds a Queensland Environmental Authority (EA) (EPML00945013) and water licence (WL#577145) to enable dewatering of ML 1923.

Mining of M-Block will use conventional open-cut mining methods for the first three years, with underground access to be established from the highwall. The total area of the M-Block footprint is 2,441.3 ha, with the total impact area of 1,710.5 ha. This comprises 296.4 ha of open cut impact area and 1,414.1 ha of underground mining, with a total avoidance footprint of 730.8 ha.The proposed infrastructure impact area is illustrated on **Attachment A.**



Introduction

GCM has substantial established infrastructure that will be used for M-Block mining activity. This includes rail loading facilities, Coal Handling and Processing Plant, tailings dams and workshops. The use of this existing infrastructure will keep the overall surface disturbance at M-Block to a minimum.

1.2 PURPOSE OF VFMP

The purpose of the VFMP is to reduce environmental impacts of the Project on MNES through the development of mitigation and monitoring measures. These measures are to be implemented across various stages of the Project, including pre-construction, during construction, during operations and as part of the decommissioning process.

Objectives of the VFMP include:

- Describe practical measures to mitigate impacts of the Project on the existing environment;
- Describe practical measures to mitigate impacts of the Project on listed species and ecological communities referencing the Species Profile and Threats Database (SPRAT) database and relevant approved conservation advices;
- Describe monitoring measures to assess the effectiveness of mitigation measures and inform adaptive management actions;
- Outline timing, frequency and duration of the measures to be implemented; and
- Provide scaled mapping which will visualise impact areas and mitigation strategies for easier reference during construction.

1.3 EXISTING ENVIRONMENT

GCM is located in the Brigalow Belt Bioregion, one of 13 bio-geographical areas of Queensland. The Brigalow Belt Bioregion extends from the Queensland – New South Wales border to Townsville.

Extensive clearing has occurred in the Brigalow Belt for agriculture and mining purposes. Remnant Brigalow (*Acacia harpophylla*) woodland and open poplar box woodland provide habitat for native flora and fauna species.

Several ecological assessments have been previously undertaken within the current MLs, including the M-Block area. Stantec conducted terrestrial ecology assessments during the Spring and Post-Wet season of 2022 to investigate the nature, extent and condition of MNES within M-Block.

1.3.1 Flora

There are two Threatened Ecological Communities (TECs), under the EPBC Act, recorded within the M-Block expansion area, specifically:

• Brigalow (Acacia harpophylla dominant and codominant), (Brigalow TEC).



Introduction

Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin (Grassland TEC).

Ground-truthing assessments during Cardno now Stantec's previous surveys (2021) found that the boundaries of mapped RE polygons within M-Block are broadly accurate at the scale at which they are mapped. A large portion of the Survey Area is mapped as containing the heterogenous RE 11.8.5 / 11.8.11 (70/30%).

Over the course of the surveys, one threatened flora species was identified, King Bluegrass (*Dichanthium queenslandicum*). This species is listed as endangered under the EPBC Act and Vulnerable under the *Nature Conservation Act 1992* (Qld) (NC Act). It is therefore considered to be an MNES and a matter of state environmental significance (MSES). Large numbers of this species were encountered in numerous locations in M-Block.

1.3.2 Fauna

The dominant habitat types identified during Cardno, now Stantec's 2021 ecological investigations can be broadly described as:

- Woodlands to Open Forest.
- Grasslands native and introduced pasture.
- Natural and man-made watercourses and waterbodies.

Fauna groups including ground-dwelling reptiles and mammals are likely to use these key habitat areas. The Squatter Pigeon (*Geophaps scripta scripta*), which is listed as Vulnerable under the EPBC Act and NC Act, is known to occur within the greater Gregory Crinum Mine area and was observed within the M-Block extension area during Cardno's 2022 ecological assessments and a previous assessment conducted by Austecology in 2009. It has also been observed by mine staff to the north of current mining operations.

In addition to ecological surveys undertaken by Cardno (now Stantec) in 2021, further investigations were undertaken by Stantec in 2022. These investigations were focused on detailed habitat quality assessments, supported by further targeted surveys within M-Block. These assessments did not find any further evidence of additional threatened fauna species occurring within M-Block.



Introduction

1.4 **RESPONSIBILITIES**

Table 1 identifies persons responsible for undertaking the works outlined in this VFMP.

Table 1: Responsibilities under M-Block VFMP

Activity	Person responsible
Clearing works	TBA following awarding of tender for construction works
Construction works	TBA following awarding of tender for construction works
Fauna Spotter Catcher	TBA following awarding of tender for construction works
Wildlife carers *	 WIRES Wildlife Rescue Ph: 1300 094 737 RSPCA Ph: 1300 264 625 Central Highlands Wildlife Carers Ph: 0475 288 301
Veterinarian *	 Maraboon Veterinary Surgery 61 Hospital Road, Emerald Ph: (07) 4987 6800 Gray Street Veterinary Clinic 43 Gray Street, Emerald Ph: (07) 4982 4868
Project ecologist	TBA following awarding of tender for construction works

* - Note: At least one month prior to construction, all Wildlife Carers and Veterinarians listed are to be contacted. As much as practicable, Wildlife Carers are to be equipped with the necessary materials to aid in the care of wildlife injured as a result of construction works.

Impact Management Plan

2.0 IMPACT MANAGEMENT PLAN

2.1 POTENTIAL IMPACTS

Table 2 outlines the potential impacts the Project may have on the existing environment throughout all stages of construction and operation. Throughout this plan, the following stages are defined as:

- Pre-construction: all activities occurring prior to construction including vegetation clearing
- During construction: activities occurring during construction of mining infrastructure
- Operational: all mining activities occurring during the operation of M-Block including ongoing clearing in progression with the mining timeline

Table 2: Potential impacts associated with the construction and operation of M-Block

Impact	Description	Project Phase	
Clearing of vegetation	Destruction of habitat, including impacts to foraging resources	Pre-construction,	
	Destruction or disturbance of the following MNES – Brigalow TEC, Grasslands TEC, King Bluegrass habitat and Squatter Pigeon habitat	Construction and Operation	
	Destruction and/or degradation of breeding places (e.g. trees containing nests or hollows, and breeding places of more cryptic species)		
	Adverse indirect impacts on breeding animals associated with noise, dust and vibration impacts		
	Fragmentation and edge effects to areas of habitat;		
	Degradation of aquatic habitat and water quality through erosion and sedimentation		
	Reduction in connectivity of biodiversity corridors		
Increasing anthropogenic	Impacts to water quality and degradation of aquatic habitat by pollution from human and vehicular traffic (e.g. oil, fuel, and litter);	Pre-construction, Construction and	
activity	Injury to fauna by litter (e.g. by ingestion, entanglement, or indirectly by providing resources for pest species);	Operation	
	Disruptions to fauna behaviour in response to human presence in the form of:		
	 Avoidance behaviour; Habituation; and Disruption of ecological behaviour (e.g. predator prey interactions). 		
Weed and pest species	Establishment of pest fauna species, in areas of intact vegetation through clearing and fragmentation	Pre-construction, Construction and	
	Introduction and/or spread of existing weed species in construction zones through movement and disturbance of soil and attachment of fertile plant material to vehicles, machinery and human vectors	Operation	
	Increased dispersal of pest fauna species, including predatory species (e.g. foxes and cats) into impact area and surround as a result of clearing and human disturbance		



Impact Management Plan

2.2 IMPACT MANAGEMENT

2.2.1 Avoidance

M-Block has been designed to minimise disturbance and avoid impacting MNES as much as practical. **Table 3** outlines the total area of each MNES within M-Block and how much of this area has been avoided by the proposed design. It should be noted that Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin ecological community (Grassland TEC) provides suitable habitat for King Bluegrass (*Dichanthium queenslandicum*) so these areas overlap in most instances. Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community (Brigalow TEC) provides suitable habitat for Squatter Pigeon (southern) (*Geophaps scripta scripta*) and so these areas also overlap in most instances.

Table 3 Total MNES habitat area impacted within M-Block

MNES	Total Area of Habitat (ha)	Direct Impact Area (ha)	Indirect Impact Area (ha)	Total Disturbance Estimate (ha)	Total Area of Habitat Avoided (ha)
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) ecological community	156.4	58.7	0	58.7	97.6
Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin ecological community	819.6	133.5	0	133.5	686.1
King Bluegrass (<i>Dichanthium queenslandicum</i>)	1,029.1	174.9	0	174.9	854.1
Squatter Pigeon (southern) (Geophaps scripta scripta)	164.8	58.7	0	58.7	106.1

Overarching Management Measures

3.0 OVERARCHING MANAGEMENT MEASURES

The following mitigation and management measures are generic and relevant to all species and ecological communities within the Site. Specific mitigation measures relating to the threatened ecological communities and species present within the impact area are addressed in **Section 5.0. Table 4** outlines the generic mitigation and management measures which have been developed to mitigate the potential impacts, discussed above in **Section 2.1**.

Table 4 Overarching management procedures

Project Stage	Management Procedures
Project Stage Pre-construction	 Prepare and deliver an environmental induction to all site employees – this should cover: Actions and requirements to avoid introducing or spreading weed material throughout the construction site and ensuring they do not transfer weeds from outside work areas into new work areas via vehicles, machinery or clothing. The presence of EVNT, migratory and LC colonial breeders and associated habitat within the Project area; The implementation and location of exclusion zones; and Location and importance of erosion and sediment control measures. An information poster for species covered by this plan is prepared and prominently displayed in site offices; Minimise total construction footprint through utilisation of existing cleared or modified areas; Construction laydown areas are to be set back from waterbodies (where practicable); Care is to be taken during the installation of structures within waterways (ephemeral and permanent) to ensure there is no isolation of currently connected pools of water; Install silt curtains around works to limit sedimentation of surrounding waterbody when working near water bodies. The full extent of the clearing footprint is demarcated with 'no-go zones' and high-visibility fencing demarcated through signage. A qualified fauna spotter catcher shall undertake a pre-clearing survey, as detailed in Section 4.0 no more than 3 days prior to commencement of clearing. The purpose of the pre-clearing survey is to identify and locate (marked with flagging tape, paint &/or GPS located) hollow-bearing trees, protected and threatened species and signs of fauna; If practicable within the broader project timeframes conduct clearing outside of core breeding/torpor periods;
	operations using the clearing guide illustrated on Attachment B and described in Section 4.0.

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Overarching Management Measures

Project Stage	Management Procedures
During construction	 During the proposed works (including clearing) a spotter catcher or ecologist independent of the contractor will be present to supervise the works and ensure they are completed in accordance with the requirements of this document, a site-specific Construction Environment Management Plan including an Erosion and Sediment Control Plan. All spotter catchers will preferably be licensed and experienced and hold a current Rehabilitation Permit under the NC Act. All spotter catchers will undertake the handling of native wildlife in accordance with the <i>Code of Practice – Care for Orphaned, Sick or Injured Protected Animals in Queensland</i> prepared by DES. Spotter catcher to control clearing operations and direct machine operator during felling as detailed in Section 4.0 Avoid unnecessary clearing by clearly marking out 'no-go' zones (areas to be strictly avoided); Enforce corrective actions should the outcomes not achieve the adopted objectives; Erosion and sediment control measures including silt curtain and socks, rock check dams are to be monitored and maintained to ensure on-going effective functioning; Where trenches and other excavations are left open overnight, a spotter catcher is to check the excavation in the morning of each day that the excavation remains open and remove wildlife before they are exposed to direct daylight;
Post-construction and Operational	 Upon completion of the proposed works, the Principal Contractor will: Ensure all temporary structures for controlling sediment and erosion are fully removed; and Undertake any necessary stabilisation and revegetation works where required, by using native endemic species. Rehabilitate all temporary disturbed areas according to a Rehabilitation Management Plan Maintain awareness for all staff and contractors about the presence and identification of threatened species and TECs during operations. Implement environmental offsets for impacted MNES. Vehicles will only drive on designated access tracks and adhere to designated speed limits. Temporary stockpile sites for soil and equipment, access routes, laydown yards and other associated infrastructure will be located in cleared areas, where possible. Longer term vegetation clearing is to follow the guidelines provided in Section 4.0.

Pre-Clearing and Clearing Procedures

4.0 PRE-CLEARING AND CLEARING PROCEDURES

The following section describes the procedures to be implemented pre-clearing and during clearing to minimise impacts including:

- Conduct of a pre-clearing survey.
- Sequential clearing undertaken to ensure that fauna have enough time to move out of the clearing site without human intervention.
- Adoption of tree protection measures along the boundary of each clearing stage.

4.1 PRE-CLEARING SURVEY

- No more than 3 days prior to clearing, a suitably qualified fauna spotter catcher will conduct a preclearing survey which involves:
 - Identifying and marking all locations of trees with habitat features (eg. Hollow-bearing, nests)
 - Inspect aquatic habitats and surrounding habitat prior to dewatering (if applicable) for the presence of aquatic fauna
 - Identifying the presence or evidence of the presence of fauna and threatened species
 - Identifying TECs and delineating areas within and adjacent to impact area that are to be retained with marking tape
- The pre-clear survey will be conducted in any areas requiring clearing. The general area has been illustrated in **Attachment A**, however the final area for survey will be confirmed by the fauna spotter catcher.

4.2 SEQUENTIAL CLEARING

- Sequential clearing will be undertaken for this Site. This will help reduce impacts to fauna by inducing a disturbance response allowing them enough time to move out of each clearing phase without human intervention through completion of the following management measures. Clearing phases will be determined in accordance with the preferred direction of clearing and locations of discrete habitat patches.
- Sequential clearing will be undertaken through adoption of the following measures:
 - Conducting clearing in stages.
 - The clearing direction of north to south is proposed to encourage fauna movement toward the intact Brigalow communities located south of the impact area, as shown on **Attachment B**.
 - The final order and direction of clearing is to be confirmed following consultation with faunaspotter catcher and the Principal Contractor; however, indicative clearing directions are shown on **Attachment B.**
 - Each clearing area can be adjusted in consultation with the fauna-spotter catcher and take into consideration the characteristics of the vegetation. For example, for areas that are sparsely treed



Pre-Clearing and Clearing Procedures

or areas with juvenile vegetation that do not support breeding features, the area of clearing may be increased. Any adjustments to discreet clearing blocks will still remain within the stated disturbance footprint. To be clear, this does not allow an increase in the total area of clearance but allows for flexibility of clearing practices within the defined disturbance footprint.

4.3 CLEARING OF NON-HABITAT TREES

- Non-habitat trees (i.e. trees other than those identified as habitat trees) will be cleared and stockpiled.
- Clearing of non-habitat trees will only occur where their removal will not impact on identified habitat trees (e.g. canopies do not interconnect with those of habitat trees).

4.4 HOLLOW INSPECTION AND REMOVAL OF HABITAT TREES

- An elevated work platform or cherry-picker may be used in conjunction with a chainsaw operator and suitably qualified fauna spotter/catcher to inspect and remove hollows as necessary prior to habitat tree felling. This method will involve the fauna spotter/catcher inspecting each of the potential habitat features (usually hollows, dreys and arboreal termite nests) to determine the presence of arboreal fauna.
- Any fauna recovered during hollow removal will, where practicable, be inspected for any signs of physical injury. If the fauna appears to be injured, they will be immediately transported to a suitably qualified veterinary surgeon for appropriate treatment. The details for nearby, suitable wildlife care facilities are detailed in **Section 1.4**.
- The contractor and spotter-catcher are to agree on an approach for clearing trees, prior to commencement, with a focus on controlled lowering of any trees with hollows, stags, large living/dead trees with decorticating bark or other notable habitat features determined by the spotter catcher.

4.4.1 Injured fauna

Injured fauna will be inspected by the Fauna Spotter Catcher to assess the extent of the injury or sickness. Where the injury is considered to be minor (e.g. minor abrasion) and the animal is otherwise alert and active, the animal may be released to reduce the stress on the animal. In the event that an animal is suffering injuries of a more serious nature, it will be transported to the nearest veterinary clinic or licensed wildlife rescue organisation (refer to **Table 1**).

Fauna (other than koalas) encountered during clearing activities that are able to be captured shall be done so in accordance with the *Code of Practice Care of Sick, Injured or Orphaned Protected Animals in Queensland* and the conditions of approval for the fauna Spotter Catcher's Rehabilitation Permit issued under the *Nature Conservation (Administration) Regulation 2017.* Under this permit, it is the Fauna Spotter Catchers responsibility to ensure all reasonable measures are put in place to minimise the likelihood of injury and/or death to protected fauna. The methods outlined within the *Code of Practice Care of Sick, Injured or Orphaned Protected Animals in Queensland* and the conditions of approval for

the fauna spotter-catcher's Rehabilitation Permit shall be adhered to for fauna translocation (other than koalas).

Emergency euthanasia my need to be carried out in the field, in which case, Sections 12 and 13 of the *Code of Practice Care of Sick, Injured or Orphaned Protected Animals in Queensland* apply. Any instances of an animal emergency will be followed up with an incident report completed. If an animal emergency occurs to any EVNT species or Colonial Breeding species, all activities within the affected area will cease and contact will be made with DES. Appropriate advice and actions will then be followed for works to recommence in the affected area.

4.5 DISPOSAL

Vegetation cleared from the Site will be burnt.

4.6 POST-CLEARANCE REPORTING

- A written report is to be provided to Sojitz within two weeks of the completion of clearing that addresses the following:
- I. The length of clearing time.
- II. Animal trapping prior to and during clearing.
- III. Animal relocations.
- IV. Fauna injuries and euthanasia.



Significant Species and Ecological Communities Management Plans

5.0 SIGNIFICANT SPECIES AND ECOLOGICAL COMMUNITIES MANAGEMENT PLANS

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

5.1.1 Known and Potential Habitat within M-Block Extension Area

The location of Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community (Brigalow TEC) was confirmed during Cardno, now Stantec's Spring and Post-Wet Survey Periods in 2021 by field assessment using quaternary points and BioCondition assessments. It was determined that there is 156.4ha of known or potential habitat within the M-Block extension area. The location of this threatened ecological community is illustrated on **Attachment A**.

5.1.2 Ecology and Distribution

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 codominant 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).

5.1.3 Key Threats and Project Impacts

Threatening processes affecting this ecological community which are relevant to the Project include:

• Clearing – the Brigalow ecological community has been extensively cleared historically. Clearing remains a threat to this community as most remnants now occur as fragments within substantially modified landscapes, or on small clay pans or the toe-slopes of jump-ups and escarpments.



Significant Species and Ecological Communities Management Plans

- Fire the low density of herbage in most Brigalow vegetation suggests fire has been historically rare in this community. This makes fire a serious threat to remnant Brigalow where fuel characteristics have been changed (e.g. by the presence of high biomass introduced grass pasture species)
- Weeds pest plant can alter the structure and function of Brigalow ecosystems and affect their suitability as habitat for native species.
- Feral animals feral pigs are the most widespread and problematic pest animal is this community. Goats, cane toads, cats and foxes are also threats.
- Inappropriate grazing trampling and grazing by large herbivores compresses soil, can reduce amount of leaf litter and woody debris, and alters the composition and density of herbs and shrubs in the understory.

These threatening processes have been derived from the Brigalow (*Acacia harpophylla* dominant and codominant) threatened ecological community SPRAT profile and Approved Conservation Advice (DCCEW, 2013). **Table 5** outlines all potential impacts to Brigalow TEC that are relevant to activities associated with the M-Block extension of Gregory Crinum Mine.

Threatening processes	Potential impacts related to the Project	Project Stage
Vegetation	Removal or disturbance of 58.7ha of Brigalow TEC	Construction
clearing	Removal and disturbance of land adjacent to Brigalow TEC, leading to an increase in edge effects and habitat fragmentation and/or degradation	
Fire	Altered vegetation composition, particularly fuel characteristics and ignition sources, could increase fire frequency and intensity impacting retained Brigalow TEC	Construction and Operation
Weeds and pest animals	Introduction and/or dispersal of weeds throughout M-Block by anthropogenic activity (e.g. vehicles and machinery)	All phases
	Increased presence of animal pest species due to higher level of disturbance leading to degradation in TEC condition	
Dust emissions	Photosynthetic abilities of plants within the Brigalow TEC adjacent to Project activities may be impacted due to an increase in dust emissions	Construction and Operation

Table 5: Potential impacts from the Project on Brigalow TEC

Significant Species and Ecological Communities Management Plans

5.1.4 Mitigation and Management Measures

Currently, there is no finalised recovery plan for Brigalow TEC. Key priority actions that should be considered for the management of Brigalow TEC are outlined in the draft recovery plan and conservation advice. These actions have been considered where relevant to the management of Brigalow TEC within the M-Block area.

Table 6 outlines management procedures specific to Brigalow TEC which are consistent with the draft recovery plan and conservation advice. Refer to Section 3.3 for overarching management procedures.

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
Minimise degradation of retained areas of Brigalow TEC adjacent to and within impact areas	Limit disturbance from fire through altered fuel loads and construction activities	 Actions will be outlined in relevant management plans (i.e. CEMP) Parking of vehicles in designated areas Regular maintenance of vegetation within M-Block operational areas during operational phase Firebreaks along fenced boundary areas Best practice grazing procedures will be implemented to prevent overgrazing including exclusion of stock during the wet season. 	Uncontrolled fire in the project area	 Immediately implement actions to suppress the spread of the fire. Incidents will be recorded in a register as per the CEMP. Review adherence to control procedures to ensure compliance. Take remedial action where compliance has not been adhered to. Increase training to ensure breach does not re-occur.
Rehabilitation of temporary disturbance areas to existing condition	 Evidence of Brigalow recruitment within 5 years of rehabilitation commencing Species composition and structural elements are typical of 	 Update the Site Rehabilitation Management Plan (RMP) prior to commencement of rehabilitation activities. Rehabilitation to commence as soon as practical and in 	 No evidence of Brigalow recruitment within 5 years. Species composition and structural elements 	An annual rehabilitation monitoring report will be submitted to DCCEEW, including rehabilitated Brigalow TEC monitoring.

Table 6: Mitigation and management measures for Brigalow TEC

Significant Species and Ecological Communities Management Plans

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
	the original RE within 10 years	accordance with license conditions.	of original RE not attained within 10 years.	Where rehabilitated areas fail to reach target values. Sojitz will implement measures to achieve objectives in the RMP.
Minimise invasion of weed and pest species	Reduce spread of existing pest and weeds and the introduction of new pest and weeds	 Identify any weed species and pest animals prior to commencing clearing works. Implement strict hygiene protocols for the movement of soils and vehicles within M-Block. All vehicles and plant used during construction and operation should be inspected for weed, seed and/or soil that may result in the introduction of weeds / plant pathogens. If required, these should be washed-down prior to leaving M-Block. Provision of appropriate waste collection bins (i.e fully enclosed). Disposal of contaminated material by a suitably licensed contractor to an appropriate waste disposal facility. 	 >10% increase in the population or cover of each weed or pest species present Presence of new weeds or pests 	Increase weed management efforts and implement additional management actions to achieve objective.

Significant Species and Ecological Communities Management Plans

5.1.5 Monitoring

The potential impacts of the Project activities will be monitored according to the monitoring program outlined in **Table 7**. The design of the on-going monitoring program will be determined by a suitably qualified person to ensure sufficient data are collected to quantify likely impacts resulting from the Project. BioCondition monitoring will be used to assess Brigalow TEC condition as well as specific Brigalow TEC condition measures outlined in **Table 7**. The monitoring program will include impact and control sites to monitor the progress of recovery and any potential impacts. Impact sites will be located close to the impact footprint of the Project but will not be directly impacted by the Project. The purpose of monitoring these impact sites will be to track any indirect impacts associated with the Project and to enable comparisons with the control sites. Stantec has undertaken baseline assessments in 2022 and will choose impact and control sites from these previous assessments. It is possible additional baseline monitoring may be required if these sites do not fall within the appropriate distance from the area of impact. Monitoring will occur annually within the spring/summer wet season.

Performance Criteria	Triggers	Monitoring Program	Outcomes
Maintain existing condition of retained areas of Brigalow TEC within and adjacent to M-Block		Baseline BioCondition Assessments were undertaken across M-Block in 2022 by Stantec. A minimum of three impact and three control sites	Baseline condition of Brigalow TEC which has been determined prior to construction will allow effective
Limit disturbance from fire through altered fuel loads	Progressive decline in habitat condition over 5 vears.	will be chosen to monitor impacts on retained areas of Brigalow TEC.	monitoring of the Project impacts.
Limit spread of existing pest and weeds and the introduction of new pest and weeds	, caller	The impact sites will be located in retained Brigalow TEC within 500m of the area of impact. Control plots will be located a film form the impact.	 Soijtz to review monitoring results and report annually. Management actions are to be
Limit disturbance from dust emissions on photosynthetic ability of the community		 Will be located <1km from the impact area. The goal of these assessments is to monitor any impacts to retained Brigalow TEC near the area of impact by comparing to baseline results and control plots. A visual assessment of dust and dust impacts on areas of retained Brigalow TEC adjacent to area of 	revised if any frigger is exceeded.

Table 7: Details of monitoring program for Brigalow TEC

Significant Species and Ecological Communities Management Plans

Performance Criteria	Triggers	Monitoring Program	Outcomes
Evidence of Brigalow recruitment within 5 years of rehabilitation commencing Within 10 years, vegetation is trending towards the expected structural elements and species composition of the original RE.	 No evidence of Brigalow recruitment within 5 years. Within 10 years, vegetation is not trending towards the expected structural elements and species composition of the original RE. 	 impact will occur regularly during construction and operation activities. Annual post disturbance BioCondition Assessments will be undertaken to determine the effectiveness of rehabilitation works. 	

Significant Species and Ecological Communities Management Plans

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

5.2.1 Known and Potential Habitat within M-Block Extension Area

The location Natural Grasslands of the Queensland Central Highlands and Northern Fitzroy Basin Ecological Community (Grasslands TEC) was confirmed during Cardno, now Stantec's Spring and Post-Wet Survey Periods in 2021 by field assessment using grassland plots and grassland assessments. It was determined that there is 819.6ha of known or potential habitat within the M-Block extension area. The location of this threatened ecological community is illustrated on **Attachment A**.

5.2.2 Ecology and Distribution

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).

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 depended 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).

5.2.3 Key Threats

Threatening processes affecting this species that are relevant to the Project include:

- Overgrazing, cropping and pasture improvement grazing is the predominant land use to which remaining patches of grasslands and subject. Persistent heavy grazing can degrade grasslands and increase risk of weed invasion.
- Pest animals pest animals include the rabbit, feral cat, fox and house mouse. These animals have the potential to impact upon this community through predation and competition with native animals, grazing of native plants and soil disturbance through burrowing and diggings.
- Weeds invasive weeds have the potential to alter the vegetation structure through the development of a woody shrub layer



Significant Species and Ecological Communities Management Plans

- Mining activities resulting in the physical destruction of the ecological community.
- Construction of roads and other infrastructure which can directly destroy grasslands or increase likelihood of weed invasion and erosion of sites.

These threatening processes have been derived from the Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin threatened ecological community SPRAT profile and Approved Conservation Advice (DCCEW, 2008).

Table 8 outlines all potential impacts to Grasslands TEC that are relevant to activities associated with the

 M-Block extension of Gregory Crinum Mine.

Threatening processes	Potential impacts related to the Project	Project Stage
Vegetation clearing	Removal or disturbance of 133.5ha of Grasslands TEC	Construction
	Removal and disturbance of land adjacent to Grassland TEC, leading to an increase in edge effects and habitat fragmentation and/or degradation	
Weeds and pest animals	Introduction and/or dispersal of weeds, particularly Parthenium, Parkinsonia and Prickly Acacia throughout M-Block by anthropogenic activity (e.g. vehicles and machinery)	
	Increased presence of animal pest species due to higher level of disturbance leading to degradation in TEC condition	
Dust emissions	Photosynthetic abilities of plants within the Grasslands TEC adjacent to Project activities may be impacted due to an increase in dust emissions	Construction and Operation

Table 8: Potential impacts from the Project on Grasslands TEC

Significant Species and Ecological Communities Management Plans

5.2.4 Mitigation and Management

Currently, there is no finalised recovery plan for Grasslands TEC. Key priority actions that should be considered for the management of Grasslands TEC are outlined in the draft recovery plan and conservation advice. These actions have been considered where relevant to the management of Grasslands TEC within the M-Block.

Table 9 outlines management procedures specific to Grasslands TEC which are consistent with the draft recovery plan and conservation advice. Refer to **Section 3.3** for overarching management procedures.

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
Minimise degradation of retained areas of Grasslands TEC within impact areas Rehabilitation of temporary disturbance areas to existing condition	 Within 10 years of rehabilitation commencing, habitat meets Good Quality condition thresholds as defined in the <i>Commonwealth Listing</i> <i>Advice on Natural</i> <i>Grasslands of the</i> <i>Queensland Central</i> <i>Highlands and the</i> <i>northern Fitzroy Basin</i> (TSSC 2009) Native species richness is >70% of baseline richness 	 Update Site RMP prior to commencement of rehabilitation activities. Rehabilitation to commence as soon as temporary construction areas are no longer required. Best practice grazing procedures will be implemented to prevent overgrazing including exclusion of stock during the wet season. 	• Within 10 years of rehabilitation commencing, habitat does not meet Good Quality condition thresholds as defined in Table 18 and Native species richness is <70% of baseline richness	 An annual rehabilitation monitoring report will be submitted to DCCEEW, including rehabilitated Grasslands TEC monitoring. Where rehabilitated areas fail to reach target values. Sojitz will implement measures to achieve objectives in the RMP.
Minimise invasion of weed and pest species	• Reduce spread of existing pest and weeds and the introduction of new pest and weeds	 Identify any weed species and pest animals prior to commencing clearing works. Implement strict hygiene protocols for the movement of soils and vehicles within M- Block. 	 >10% increase in the population or cover of each weed or pest species present Presence of new weeds or pests 	Increase weed management efforts and implement additional management actions to achieve objective.

Table 9: Mitigation and management measures for Grasslands TEC

Significant Species and Ecological Communities Management Plans

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
		 All vehicles and plant used during construction and operation should be inspected for weed, seed and/or soil that may result in the introduction of weeds / plant pathogens. If required, these should be washed- down prior to leaving M- Block. Provision of appropriate waste collection bins (i.e fully enclosed). Disposal of contaminated material by a suitably licensed contractor to an appropriate waste disposal facility. 		

Significant Species and Ecological Communities Management Plans

5.2.5 Monitoring

The potential impacts of the Project activities will be monitored according to the monitoring program outlined in **Table 10**. The design of the on-going monitoring program will be determined by a suitably qualified person to ensure sufficient data are collected to quantify likely impacts resulting from the Project. BioCondition monitoring will be used to assess Grasslands TEC condition as well as specific Grasslands TEC condition measures outline in **Table 10**. The monitoring program will include impact and control sites to monitor the progress of recovery and any potential impacts. Impact sites will be located close to the impact footprint of the Project but will not be directly impacted by the Project. The purpose of monitoring these impact sites will be to track any indirect impacts associated with the Project and to enable comparisons with the control sites. Stantec has undertaken baseline assessments in 2022 and will choose impact and control sites from these previous assessments. It is possible additional baseline monitoring may be required if these sites do not fall within the appropriate distance from the area of impact. Monitoring will occur annually within the spring/summer wet season.

Triggers **Performance Criteria Monitoring Program** Outcomes **Baseline BioCondition Assessments** Baseline condition of Maintain existing condition of were undertaken across M-Block in Grasslands TEC which has retained areas of Grasslands TEC 2022 by Stantec. A minimum of been determined prior to within and adjacent to M-Block three impact and three control sites construction will allow effective where under Sojitz control will be chosen to monitor impacts on monitoring of the Project retained areas of Grassland TEC. impacts. Progressive decline in ٠ The impact sites will be located in Soijtz to review monitoring habitat condition over 5 retained Grassland TEC within results and report annually. years. Manage disturbance from dust on 300m of the area of impact. Control Management actions are to be photosynthetic ability of the plots will be located <1km from the revised if any trigger is community impact area. exceeded. The goal of these assessments is to monitor any impacts to retained Grassland TEC near the area of impact by comparing to baseline results and control plots. In addition to BioCondition Assessments, a transect of 50 x 20 m plots will also be surveyed at

Table 10: Details of monitoring program for Grasslands TEC

Significant Species and Ecological Communities Management Plans

Performance Criteria	Triggers	Monitoring Program	Outcomes
Within 10 years of rehabilitation commencing, habitat meets Good Quality condition threshold as defined in the Listing Advice (TSSC 2015) and Native species richness is >70% of baseline richness	 After 3 years native species richness and/or native grass tussock abundance are <25% of baseline records and/or no indicator perennial grass species are present. After 6 years native species richness and/native grass tussock abundance are <50% of baseline records and/or <2 indicator perennial grass species are present. 	 each monitoring site to determine the number of indicator perennial grass species present as well as the number of native grass tussocks. A visual assessment of dust and dust impacts on areas of retained Brigalow TEC adjacent to area of impact will occur regularly during construction and operation activities. Annual post disturbance BioCondition Assessments will be undertaken to determine the effectiveness of rehabilitation works. A transect of 50 x 20 m plots will also be surveyed at each monitoring site to determine the number of indicator perennial grass species present as well as the number of native grass tussocks per 0.1ha. 	

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Significant Species and Ecological Communities Management Plans

5.3 KING BLUEGRASS (DICHANTHIUM QUEENSLANDICUM)

5.3.1 Known and Potential Habitat within M-Block Extension Area

5.3.2 Ecology and Population Dynamics

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).

5.3.3 Key Threats

Threatening processes affecting this species that are relevant to the Project include:

- Habitat loss, disturbance and modification through agricultural and mining activities, road construction
 and other infrastructure developments
- Invasive weeds including Parthenium (*Parthenium hysterophorus*) and Buffel Grass (*Cenchrus ciliaris*)
- Trampling, browsing and overgrazing

These threatening processes have been derived from the '*Dichanthium queenslandicum* — King Bluegrass' SPRAT profile and Approved Conservation Advice (DCCEW, 2013).

Table 11 outlines all potential impacts to King Bluegrass habitat that are relevant to activities associated with the M-Block extension of Gregory Crinum Mine.



Significant Species and Ecological Communities Management Plans

Threatening processes	Potential impacts related to the Project	Project Stage
Vegetation clearing	Removal or disturbance of 174.9ha of King Bluegrass habitat.	Construction
	Removal and disturbance of land adjacent to King Bluegrass habitat, leading to an increase in edge effects and habitat fragmentation and/or degradation	
Weeds	Introduction and/or dispersal of weeds throughout M-Block by anthropogenic activity (e.g. vehicles and machinery).	All phases
Dust emissions	Photosynthetic abilities of King Bluegrass adjacent to Project activities may be impacted due to an increase in dust emissions	Construction and Operation

Table 11: Potential impacts from the Project on King Bluegrass habitat

Significant Species and Ecological Communities Management Plans

5.3.4 Mitigation and Management

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. These actions have been considered where relevant to the management of King Bluegrass habitat within M-Block. Cardno, now Stantec identified King Bluegrass habitat within M-Block in 2021/2022, the results from these assessments will be used as baseline surveys.

Table 12 outlines management procedures specific to King Bluegrass habitat which are consistent with the above mentioned draft recovery plan and conservation advice. Refer to **Section 3.3** for overarching management procedures.

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
Rehabilitation of temporary disturbance areas to existing condition	Where King Bluegrass was identified in the habitat during baseline surveys, the species must occur at 80% of its baseline abundance within 10 years of rehabilitation commencing.	 Develop a Rehabilitation Management Plan (RMP) prior to commencement of rehabilitation activities. Rehabilitation to commence as soon as temporary construction areas are no longer required. 	Occurrence of King Bluegrass is <80% of baseline abundance within 10 years of rehabilitation commencing.	 An annual rehabilitation monitoring report will be submitted to DCCEEW, including rehabilitated King Bluegrass habitat monitoring. Where rehabilitated areas fail to reach target values. Sojitz will implement measures to achieve objectives in the RMP.

Table 12: Mitigation and management measures for King Bluegrass habitat

Monitoring

6.0 MONITORING

The potential impacts of the Project activities will be monitored according to the monitoring program outlined in **Table 13**. The design of the on-going monitoring program will be determined by a suitably qualified person to ensure sufficient data are collected to quantify likely impacts resulting from the Project. BioCondition monitoring will be used to assess Grasslands TEC condition as well as specific Grasslands TEC condition measures outlined in **Table 13**. The monitoring program will include impact and control sites to monitor the progress of recovery and any potential impacts. Impact sites will be located close to the impact footprint of the Project but will not be directly impacted by the Project. The purpose of monitoring these impact sites will be to track any indirect impacts associated with the Project and to enable comparisons with the control sites. Stantec has undertaken baseline assessments in 2022 and will choose impact and control sites from these previous assessments. It is possible additional baseline monitoring may be required if these sites do not fall within the appropriate distance from the area of impact. Monitoring will occur annually, immediately after the first good rains in summer when a seed head is present.

Performance Criteria	Triggers	Monitoring Program	Outcomes
Maintain existing condition of retained areas of King Bluegrass habitat within and adjacent to M- Block	 Progressive decline in habitat condition over 2-3 years. 	 As per Grassland TEC monitoring program. In addition to these assessments, targeted searches for King Bluegrass will be undertaken within potential habitat after suitable rainfall (November – January). If this species is recorded, an additional 	 Baseline condition of King Bluegrass habitat which has been determined prior to construction will allow effective monitoring of the Project impacts. Soijtz to review monitoring results and report appually.
Manage disturbance from dust on photosynthetic ability of King Bluegrass		five 1 m x 1 m plots will be assessed along the assessment transect to determine the abundance of the	 Management actions are to be revised if any trigger is exceeded.
Where King Bluegrass was identified in the habitat during baseline surveys, the species must occur at 80% of its baseline	 After 3 years native species richness is <25% of baseline richness and/or King Bluegrass 	species.	

Table 13: Details of monitoring program for King Bluegrass

Performance Criteria	Triggers	Monitoring Program	Outcomes
abundance within 10 years of rehabilitation commencing.	 abundance is <10% of its baseline abundance. After 6 years native species richness is <50% of baseline richness and/or King Bluegrass abundance is <40% of its baseline abundance tussock abundance are <50% of baseline records and/or <2 indicator perennial grass species are present. 		

Monitoring

6.1 SQUATTER PIGEON (SOUTHERN) (GEOPHAPS SCRIPTA SCRIPTA)

6.1.1 Known and Potential Habitat within M-Block Extension Area

The Squatter Pigeon is known to occur within the greater Gregory Crinum Mine area and was observed within the M-Block extension area during Cardno, now Stantec's 2022 ecological assessments and a previous assessment conducted by Austecology 2009. Cardno, now Stantec's assessments in 2021 have confirmed that there will be impacts to habitat that is likely to be used for foraging, breeding and movement. For the purpose of this impact assessment, the habitat requirements as outlined within the Threatened Species Scientific Committee's Species Profile and Threats Database has been adopted, 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.

In the context of the Survey Area, this approximates with the areas of regrowth and remnant woodland and Brigalow.

6.1.2 Ecology and Population Dynamics

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).

6.1.3 Key Threats

Threatening processes affecting this species that are relevant to the Project include:

- Loss and fragmentation of habitat due to clearing for agricultural purposes
- Degradation of habitat by overgrazing by domesticated herbivores, especially the sheep and the cow
- Degradation of habitat by invasive weeds
- Predation by invasive species including the feral cat and European foxes



Monitoring

These threatening processes have been derived from the '*Geophaps scripta scripta*— Squatter Pigeon' SPRAT profile and Approved Conservation Advice (DCCEW, 2015).

Table 14 outlines all potential impacts to Squatter Pigeon habitat that are relevant to activities associated with the M-Block extension of Gregory Crinum Mine.

Threatening processes	Potential impacts related to the Project	Project Stage
Vegetation clearing/Habitat loss	Removal or disturbance of 58.7ha of Squatter Pigeon habitat and disturbance to breeding.	Pre-construction, Construction
Predation by invasive animals	Loss of individuals to predation by feral cats or dogs which are known to inhabit the area	Construction, Operation
Trampling of nests	Destruction of nests by vehicles, machinery and people	Construction, Operation
Weeds	Introduction and/or dispersal of weeds throughout M-Block by anthropogenic activity (e.g. vehicles and machinery).	Construction, Operation
Changes in hydrological regimes	Siltation of critical water resources due to construction activities at waterway crossings	Construction
Vehicle strike	Mortality and injury from vehicle strike.	Construction, Operation

Table 14: Potential impacts from the Project on Squatter Pigeon habitat

Monitoring

6.1.4 Mitigation and Management

Table 15 outlines the mitigation and management measures for the Squatter Pigeon that are consistent with the conservation advice (TSSC 2015) for this species. There is no recovery plan for the Squatter Pigeon as the approved conservation advice for the subspecies provides sufficient direction to implement priority actions and mitigate against key threats (DCCEEW 2015). All appropriate management measures will be implemented during construction in habitats known or likely to support Squatter Pigeons. Any additional sightings of Squatter Pigeons outside of known or likely habitat within the M-Block impact area during construction and operation will be reported and confirmed by a suitably qualified person for verification. Where additional populations are identified, the Department of Science will be notified of locations and appropriate management actions will be implemented.

Refer to Section 3.3 for overarching management procedures.

Objective Performanc Criteria		Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
	Minimise loss of habitat	Rehabilitation of disturbed areas that are no longer required for operations	Progressive rehabilitation of disturbed areas will be undertaken as soon as possible after the completion of construction activities according to the Rehabilitation Management Plan. Vegetation rehabilitation will use seeds for native grasses, herbs and woody plants.	Rehabilitated areas fail to reach 70% of baseline and control scores within 15 years	 An annual rehabilitation monitoring report will be sent to DES and DCCEEW. Revise and implement an updated Rehabilitation Management Plan if targets are not achieved within 15 years.
	Minimise predation by invasive animals Reduce weed competition	Reduce spread of existing pest and weeds and the introduction of new pest and weeds	 Identify any weed species and pest animals prior to commencing clearing works. Implement strict hygiene protocols for the movement of soils and vehicles within M-Block. 	 >10% increase in the population or cover of each weed or pest species present Presence of new weeds or pests 	Increase weed management efforts and implement additional management actions to achieve objective.

Table 15 Mitigation and management measured for the Squatter Pigeon

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
		 Do not mulch cleared vegetation that contains weed species. All vehicles and plant used during construction and operation should be inspected for weed, seed and/or soil that may result in the introduction of weeds / plant pathogens. If required, these should be washed-down prior to leaving M-Block. Provision of appropriate waste collection bins (i.e fully enclosed). Disposal of contaminated material by a suitably licensed contractor to an appropriate waste disposal facility. 		
Eliminate trampling of nests	No nests trampled	 All suitable breeding areas will be surveyed by a suitably qualified person prior to vegetation clearing. Any nests observed in or adjacent to the impact area will be marked and mapped, appropriately fenced and monitored throughout construction activities. Stock are to be excluded from Squatter Pigeon habitat during the nesting season (late winter to summer). Buffer areas around nests are to be demarcated using high visibility tape and communicated as no-go zones until eggs have hatched and juveniles have dispersed into adjacent, suitable, undisturbed habitat. 	Trampling of nest	Complete an incident report and notify DCCEEW and DES. Review adherence to control procedures to ensure compliance. Take remedial action where compliance has not been adhered to. Increase training to ensure breach does not re-occur.

Objective	pjective Performance Mitigation and Management Criteria Measures		Contingency trigger	Contingency actions
		 Any identification of additional nesting sites will be verified by a suitably qualified person. 		
Minimise loss of permanent water sources	No net loss of suitable permanent water sources unless approved	Permanent water sources in suitable Squatter Pigeon habitat will not be drained during construction, unless suitable alternative water supplies (permanent water with gently sloping, bare ground at the edge) are available within a 1 km radius. This includes permanent water sources at waterway crossings.	Draining of suitable permanent water source without a offset water source provided	 Implement remedial actions to provide supplementary water sources, where possible.
Minimise siltation of water resources during construction		Erosion and sediment control measures will be designed and managed to prevent sedimentation run-off into permanent water sources during construction.	Siltation of a suitable permanent water source in Squatter Pigeon habitat	 Investigate source of siltation, implement appropriate corrective measures and report as per environmental approval conditions and CEMP requirements, if required.
Minimise the risk of light vehicle and machinery strike	No death or injury due to light vehicle or machinery strike during construction and operations	 Prior to clearing or earthworks occurring in suitable Squatter Pigeon habitat, pre-clearing surveys will be conducted by a fauna spotter catcher to flush and relocate any Squatter Pigeons within and adjacent to areas where works will occur. Vegetation clearing will occur sequentially to allow individuals to disperse from work areas ahead of machinery. 	Light vehicle or machinery strike during other activities	 Complete an incident report and notify DES and DCCEEW. Depending on the extent of injuries, any injured Squatter Pigeons will be either taken to the nearest qualified veterinary practitioner or wildlife carer, or humanely euthanised on site by a

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
		 All relevant site personnel, including contractors, will be made aware of the locations of Squatter Pigeon habitat and the tendency of this species to feed on dusty roads. Identification posters for the Squatter Pigeon will be installed in prominent positions at each work site. Vehicles and plant will drive on pre-determined roads only, and adhere to all speed limits, which will be clearly signposted. 		suitably qualified person (see Section 3.5.1).

Monitoring

6.1.5 Monitoring

Pre-clearance surveys will be undertaken at suitable times to detect the species and identify and map suitable water bodies and nesting opportunities in the development area, prior to any clearing or associated works occurring. The surveys will target suitable habitat for this species within and directly adjacent to the impact area.

Design of the on-going monitoring program, including the location and extent of sites, will be determined by a suitably qualified person to ensure that sufficient data are collected to quantify likely impacts resulting from the action, and to determine appropriate habitat management goals. The monitoring program will include both impact and control sites to monitor the progress of recovery, including effectiveness of management actions, and adapt if necessary. Annual monitoring will occur for the duration of operations.

The potential impacts of the Project activities will be monitored according to the monitoring program outlined in Table 16.

Table 16 Details of monitoring program for Squatter Pigeon

Performance Criteria	Monitoring Program	Trigger for Corrective Action	Outcomes
Monitoring within and immediately adjacent to the impact area	• Pre-clearance targeted surveys for Squatter Pigeon targeting suitable habitat for this species within and directly adjacent to the impact area. Surveys to be undertaken at any time of the year; however surveys will be most effective during dry seasons, when suitable water bodies can be targeted.	N/A	• Record and map Squatter Pigeon locations in the vicinity of the impact area, to ensure appropriate mitigating management measures are implemented.
No trampling of nests	Breaches reported to DES and	Trampling of a nest	Compliance with VFMP
No death or injury due to light vehicle or machinery strike during construction and operations	DCCEEW.	Light vehicle or machinery strike	

Performance Criteria		Monitoring Program		Trigger for Corrective Action		Outcomes
No net loss of suitable permanent water sources	•	Annual monitoring (including photo monitoring) of water source availability, in the driest season.	•	Draining of suitable permanent water source without offset watercourse provided. Siltation of a suitable permanent water source in Squatter Pigeon habitat.	•	Compliance with VFMP.

Monitoring

6.2 GROUND-DWELLING REPTILES AND MAMMALS

6.2.1 Known and Potential Habitat within M-Block Extension Area

M-Block provides necessary habitat resources to potentially support other ground-dwelling fauna. In particular it was noted that the Brigalow woodland and open forest, particularly to the west of the impact area supports an overarching vegetation community that is known to be used by ground-dwelling reptiles and mammals. Suitable micro-habitat also exists including the presence of soil cracks, piles of woody debris and a matrix of ground habitat comprising grass, bare earth and leaf litter or other coarse litter.

6.2.2 Key Threats

Table 17 outlines all potential impacts to ground-dwelling reptiles and mammals that are relevant to activities associated with the M-Block extension of Gregory Crinum Mine.

Threatening processes	Potential impacts related to the Project	Project Stage
Habitat loss and fragmentation	Removal or disturbance of 58.7ha of suitable Brigalow habitat	Construction, Operation
Habitat degradation	 Reduced habitat quality and function Reduced resilience of populations to adverse environmental change 	Construction, Operation
Invasion of weeds, animal pests or predatory species	 Introduction and/or dispersal of weeds throughout M-Block by anthropogenic activity (e.g. vehicles and machinery). Increased mortality due to degraded habitat or predation 	Construction, Operation
Mortality	Mortality and injury from vehicle strike.	Construction, Operation

Table 1	7: Potential	impacts fron	n the Project	on ground-dv	welling reptiles	and mammals

Monitoring

6.2.3 Mitigation and Management

Table 18 outlines the mitigation and management measures for ground-dwelling reptiles and mammals.

Refer to **Section 3.3** for overarching management procedures.

Table to miligation and management measured for ground-dwenning reputes and mann

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
Minimise loss of habitat	 Rehabilitation of disturbed Brigalow areas that are no longer required for operations 	 Progressive rehabilitation of disturbed Brigalow areas will be undertaken as soon as practical after the completion of construction activities according to the Rehabilitation Management Plan. Vegetation rehabilitation will use seeds for native grasses, herbs and woody plants. 	 Rehabilitated areas fail to reach 70% of baseline and control scores within 15 years 	 An annual rehabilitation monitoring report will be sent to DES and DCCEEW. Revise and implement an updated Rehabilitation Management Plan if targets are not achieved within 15 years.
Minimise predation by invasive animals Reduce weed competition	Reduce spread of existing pest and weeds and the introduction of new pest and weeds	 Identify any weed species and pest animals prior to commencing clearing works. Implement strict hygiene protocols for the movement of soils and vehicles within M-Block. All vehicles and plant used during construction and operation should be inspected for weed, seed and/or soil that may result in the introduction of weeds / plant pathogens. If required, these should be 	 >10% increase in the population or cover of each weed or pest species present Presence of new weeds or pests 	Increase weed management efforts and implement additional management actions to achieve objective.

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
		 washed-down prior to leaving M-Block. Provision of appropriate waste collection bins (i.e fully enclosed). Disposal of contaminated material by a suitably licensed contractor to an appropriate waste disposal facility. 		
Minimise the risk of light vehicle and machinery strike and mortality via anthropogenic activities	 No death or injury due to light vehicle or machinery strike during construction and operations No death or injury due to entrapment 	 Prior to clearing or earthworks occurring in Brigalow TEC, preclearing surveys will be conducted by a fauna spotter catcher. Pre-clear surveys will include searching of appropriate microhabitats including carefully turning woody debris and rocks, raking soil surface or leaf litter beneath trees and looking beneath peeling bark. Vegetation clearing will occur sequentially to allow individuals to disperse from work areas ahead of machinery. Vehicles and plant will drive on pre-determined roads only, and adhere to all speed limits, which will be clearly signposted. Wherever possible, all excavations should have ramped edges/ends no greater than 45 degrees. Fauna ramps (e.g. wooden 	 Light vehicle or machinery strike during other activities Death or injury due to entrapment 	 Fauna Spotter Catcher will keep record all injured fauna. Depending on the extent of injuries, any injured fauna will be either taken to the nearest qualified veterinary practitioner or wildlife carer, or humanely euthanised on site by a suitably qualified person (see Section 3.2.5).

Monitoring

Objective	Performance Criteria	Mitigation and Management Measures	Contingency trigger	Contingency actions
		 installed in all cavities deeper than 20cm to provide a means for trapped fauna to escape. These ramps will be clearly marked and all staff will be informed of their purpose. Adequately check trenches and excavations for trapped fauna daily including immediately prior to these cavities being filled in 		

6.2.4 Monitoring

The potential impacts of the Project activities will be monitored according to the monitoring program outlined in Table 19.

Table 19 Details of monitoring program for ground-dwelling reptiles and mammals

Performance Criteria	Monitoring Program	Trigger for Corrective Action	Outcomes
Monitoring within and immediately adjacent to impacted Brigalow TEC.	 Pre-clearance targeted surveys for ground-dwelling fauna targeting areas of impacted Brigalow. 	N/A	Record of all fauna trapped, re-located and observed.
Minimise potential for death or injury due to light vehicle or machinery strike during construction and operations or entrapment within anthropogenic structures.	Breaches reported to DES and DCCEEW.	Death or injury from entrapment within anthropogenic structures	Compliance with VFMP

References

7.0 REFERENCES

- Austecology (2009). Rare and Threatened Fauna and Flora Surveys and Fauna Biodiversity Inventory of M Block, BMA Gregory Crinum. An unpublished report for BMA Gregory Crinum.
- Austin MP and Williams OB (1988). Influence of climate and community composition on the population demography of pasture species in semi-arid Australia. Vegetatio 77, 43–9.
- Benson JS, Allen CB, Togher C and Lemmon J (2006). New South Wales Vegetation Classification and Assessment: Part 1 Plant communities of the NSW Western Plains. Cunninghamia 9: 383–450.
- Butler DW (2007). Recovery plan for the "Brigalow (*Acacia harpophylla* dominant and codominant" endangered ecological community (draft of 1 May 2007). Report to the Department of the Environment and Water Resources, Canberra. Qld National Parks and Wildlife Service, Brisbane.

Cardno, now Stantec (2021) Ecological Assessment Report – Gregory Crinum Mine Expansion

- Department of Climate Change, Energy, the Environment and Water (2013). Approved Conservation Advice for the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community. Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/028-conservationadvice.pdf. In effect under the EPBC Act from 17-Dec-2013.
- Department of Environment and Science (2020) Code of Practice Care of Sick, Injured or Orphaned Protected Animals in Queensland, Wildlife and Threatened Species Operations Branch.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) (2013). Approved Conservation Advice for *Dichanthium queenslandicum* (king blue-grass). Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/5481-conservationadvice.pdf. In effect under the EPBC Act from 26-Feb-2013.
- Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for Natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin. Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/99-conservationadvice.pdf. In effect under the EPBC Act from 07-Jan-2009.
- Garnett ST and Crowley GM (2000). The Action Plan for Australian Birds 2000. Environment Australia, Canberra.
- Queensland Herbarium (2021). Specimen label information. Queensland Herbarium. Accessed 27/04/2022.



References

Stantec (2022) Biodiversity Offset Strategy - Gregory Crinum Mine Extension

Stantec (2022) Supplementary Ecology Assessment – Gregory Crinum Mine Extension.

- Threatened Species Scientific Committee (2009). Commonwealth Listing Advice on Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin. Department of the Environment, Water, Heritage and the Arts. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/99-listing-advice.pdf. In effect under the EPBC Act from 07-Jan-2009.
- Threatened Species Scientific Committee (2015). Conservation Advice *Geophaps scripta scripta* Squatter Pigeon (southern). Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/64440-conservation-advice-31102015.pdf. In effect under the EPBC Act from 27-Oct-2015.
- Threatened Species Scientific Committee (TSSC) (2001). Commonwealth Listing Advice on Brigalow (*Acacia harpophylla* dominant and co-dominant). Available from: http://www.environment.gov.au/biodiversity/threatened/communities/brigalow.html. In effect under the EPBC Act from 04-Apr-2001.
- Threatened Species Scientific Committee (TSSC) (2013). Commonwealth Listing Advice on *Dichanthium queenslandicum* (king blue-grass). Department of Sustainability, Environment, Water, Population and Communities. Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities. Available from:

http://www.environment.gov.au/biodiversity/threatened/species/pubs/5481-listing-advice.pdf. In effect under the EPBC Act from 26-Feb-2013.

Wilson BA, Neldner V.J. and Accad A.(2002). The extent and status of remnant vegetation in Queensland and its implications for statewide vegetation management and legislation. Rangelands Journal 24 (1), 6–35.



Appendix A Impacted Vegetation and Pre-Clear Assessment

Appendix A IMPACTED VEGETATION AND PRE-CLEAR ASSESSMENT







This document has been prepared based on information provided by others as cited in the data sources. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Appendix B VFMP Clearing guide

Appendix B VFMP CLEARING GUIDE









Project Code: 304500119-GS-055 Drawn By: JE, Checked By: SM Rev: 02 Date: 2023-02-14

Stantec







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Infrastructure & Impact
Area
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Sequential Clearing Area



1. Coordinate System: GDA2020 MGA Zone 55

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References: 1. Aerial Imagery (State of Queensland, 2017) 2. Roads and Major Watercourses (DoR)

200 400 600 800 1,000

Scale at A3 1:27,500

Metres



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