Biodiversity AUSTRALIA

SUSTAINABLE PARTNERSHIPS
DEDICATED TO ACHIEVING
ECOLOGICAL AND ECONOMICAL BALANCE

LEADING THE WAY
IN ENVIRONMENTAL
MANAGEMENT

OFFSET AREA MANAGEMENT PLAN

METSERVE PTY LTD

October 2024

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Abbreviations

Table 1: List of abbreviations used within the report

AU	Assessment Unit
BC Act	Biodiversity Conservation Act
Bio. Aus.	Biodiversity Australia
DCP	Development Control Plan
DEC	Department of Environment and Conservation
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EEC	Endangered Ecological Community
EPBC Act	Environment Protection and Biodiversity Conservation Act
EOP	Environmental Offsets Policy
HBT	Hollow-bearing Tree
KFT	Koala Food Tree
LGA	Local Government Area
OAMP	Offset Area Management Plan
MNES	Matter of National Environmental Significance
RE	Regional Ecosystem
TEC	Threatened Ecological Community
VDec	Voluntary Declaration
VSCM	Vulcan South Coal Mine

Executive Summary

METServe a subsidiary of MEC Mining has been engaged by Vitrinite Pty. Ltd., owner of Qld Coal Aust No.1 Pty. Ltd. and Queensland Coking Coal Pty. Ltd. (Vitrinite) to manage the environmental approval process for Vulcan South (the Project). The Project will target hard coking coal which has been identified through previous exploration activities and is located north of Dysart and approximately 45 km south of Moranbah in Queensland's Bowen Basin on ML700073 (Figure 1).

The Project is located immediately to the south of Vitrinite's initial mining project, the Vulcan Coal Mine (VCM), located on ML700060. The Project will result in significant residual impacts to threatened species that are considered Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999* namely:

- Koala (*Phascolarctos cinereus*) (endangered)
- Squatter Pigeon (*Geophaps scripta scripta*) (vulnerable)
- Central Greater Glider (*Petauroides armillatus*) (endangered)

In addition, the following EPBC listed Threatened Ecological Communities (TEC's) will be impacted:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) (endangered)
- Polar Box on alluvial sand plains (endangered)

The project will also result in two matters of State Environmental Significance (MNES) impacted by the proposed action, namely:

- 5.22 ha of Eucalyptus populnea woodland on alluvial plains (RE 11.3.2, Of Concern) (Figure 6). will be removed with a BioCondition derived score of 6.6/10
- Removal of 38.1 ha of Glossy Black-Cockatoo foraging habitat (Figure 7).

Due diligence surveys also assessed the suitable habitat for the Ornamental Snake (*Denisonia maculata*)

The impacts of potential feeding habitat for the Glossy Black Cockatoo are considered marginal as this species has limited record of occurrence within the area, and the minor patches of habitat are considered to provide occasional grazing habitat only.

To counter the above impacts, Vitrinite proposes to deliver 7415 hectares of suitable offset, located on Lot 3 of Plan SP314273 via 100% direct offset. The proposed offset site is located approximately 3 km west of Dysart, Queensland and approximately 6 km southwest of the impact site. Vitrinite proposes to ensure the habitat quality gains (1/10 gain over 20 years) are achieved by reducing the threats of clearing, management of feral predators and weeds, reduction of fire risk and removal of barbed wire and by improving the habitat condition via active management measures such as, providing water points, active grazing management and potentially installation of artificial hollows. For all matters, the starting habitat quality in the candidate offset site exceeded, or with active management will exceed the quality of the habitat disturbed at the impact site, a requirement of the EPBC Act Environmental Offsets Policy. Overall, this offset site will satisfy the requirements of the EPBC Act Environmental Offsets Policy (as determined using the Offsets Assessment Guide).

This Offset Area Management Plan (OAMP) has been prepared to demonstrate how the Tay-Glen offset area addresses the *EPBC Act Environmental Offsets Policy* (EOP) (DSEWPaC, 2012). The plan utilises the findings of the ecological assessments from both the impact site and offset area to outline how the offset obligations and requirements, under the OAMP, will be addressed. This OAMP also details the management of offsets and how monitoring and reporting are to take place. Once approved by the Australian Government, the offset area is to be managed in accordance with this OAMP.

1. Introduction

Biodiversity Australia was engaged by MEC Mining to develop an Offset Area Management Plan (OAMP) for the Tay-Glen Offset Property purchased by Vitrinite Pty Ltd as part of the approval process for the extension of Vulcan South (the Project).

1.1 Project Description

The Vulcan South Coal Mine (VSCM) is an open-cut and highwall coal-mining operation developed by Vitrinite Pty Ltd (Vitrinite) between Dysart and Moranbah, in the Bowen Basin of Queensland. The mine is located on lot 59 SP235297, 2 SP296877 and mining lease ML700073 (Figure 1). The VSCM lies within the Isaac Regional Council area and falls within the Northern Bowen Basin subregion (less than 1 km from its boundary with the Isaac-Comet Downs subregion) of the Brigalow Belt Bioregion.

Ecological assessments undertaken as part of the VSCM approval process (METServe, 2022) identified six Matters of National Environmental Significance (MNES) that will potentially experience significant residual impacts from the proposed activity, namely:

- Koala (*Phascolarctos cinereus*) (endangered) –removal of 1166.9 hectares of koala habitat (Figure 2) with habitat quality score of 5.4/10 consisting of:
    - 938.6 ha foraging, shelter and dispersal habitat,
    - 45.5 ha for shelter and dispersal habitat, and
    - 182.8 ha for dispersal habitat;
- Squatter Pigeon (*Geophaps scripta scripta*) (vulnerable) – removal of 1056.8 hectares of habitat (Figure 3) consisting of:
    - 372.489 ha of breeding and foraging habitat (8.0/10 habitat quality score),
    - 78.948 of foraging habitat (8.1/10 habitat quality score) and
    - 767.63 ha of dispersal habitat (6.8/10 habitat score).
- Greater Glider (*Petauroides volans*) (endangered) – reduction in the area of occupancy by 1056.8 ha with a habitat (Figure 4) quality score of 5.5/10 consisting of:
    - 750 ha likely/current denning habitat,
    - 234.6 ha of future denning habitat,
    - 19.3 ha of foraging habitat and
    - 52.9 ha of dispersal habitat
- 71.17 ha of Brigalow (*Acacia harpophylla* dominant and co-dominant) Threatened Ecological Community (TEC) (REs 11.4.8 and 11.4.9) will be removed with a BioCondition derived score of 6.4/10 (Figure 5).

Two matters of State Environmental Significance (MNES) will also be impacted by the proposed action, namely:

- 5.22 ha of Eucalyptus populnea woodland on alluvial plains (RE 11.3.2, Of Concern) (Figure 6). will be removed with a BioCondition derived score of 6.6/10
- Removal of 38.1 ha of Glossy Black-Cockatoo foraging habitat (Figure 7).

The 5.22 ha of Eucalyptus populnea woodland on alluvial plains (RE 11.3.2, Of Concern) impacted by the Project does not EBPC quality criteria to be considered a TEC. Regardless, the offset of this habitat has

been based on conservation advice and MNES offset requirements as the aim is to improve the Offset Area to a suitable condition to be considered TEC.

Although habitat was not considered conducive to supporting viable populations of the Ornamental Snake *(Denisonia maculata)*, this species was considered in due diligence in the possibility of its habitat being considered viable following departmental review. This OMP has not considered management of the species habitat as part of this document.

The Project will operate for approximately seven years, including primary rehabilitation works, following a two-year construction period and will extract approximately 13.5 Mt of Run of Mine (ROM) coal. Habitat values for the MNES have been incorporated into the rehabilitation completion criteria within the Project's Progressive Rehabilitation and Closure Plan, such that impacts to these matters are anticipated to last up to 20 years from the project's commencement.

Due to these impacts, the VSCM was referred to the *Department of Climate Change, Energy, the Environment and Water* (DCCEEW) for assessment under the EPBC Act. The proposed works associated with the VSCM are highly likely to be considered a controlled action by DCCEEW and therefore environmental offsets will be required to ensure the project does not result in a net loss to any MNES and MSES.

To achieve these environmental offsets, Vitrinite proposes to procure, protect and restore areas of land that support MNES impacted by the VSCM. This OAMP has been prepared to demonstrate how the selected offset areas on the Tay-Glen property address the EPBC Act *Environmental Offsets Policy 2012* (EOP) (DSEWPaC, 2012). This OAMP utilises the findings of the ecological assessments from both the impact site and offset site to outline how the offset obligations and requirements under the EOP are addressed. This OAMP describes the monitoring and reporting required to fulfil the requirements of the EOP.

1.2 Purpose

The purpose of this OAMP is to fulfil the requirements of a self management offset program as outlined in the EPBC Act EOP. The OAMP has been prepared by a suitably qualified ecologist to meet the information requirements in accordance with the government's *Environmental Management Plan Guidelines* (Department of the Environment, 2014).

The OAMP has the following principal objectives:

- Describe the baseline conditions at the offset area.
- Describe the management of the offset area.
- Describe the expected gains that will be achieved at the offset area for the listed MNES and MSES.
- Consider the potential risks of failing to achieve the above gains.
- Demonstrate how the environmental offset compensates for residual significant impacts of the project on relevant listed threatened species; and
- Describe the monitoring program and completion criteria that determine whether the offset has been successful.

1.3 Plan Structure

The OAMP will outline the following information to ensure that the EPBC Act EOP is satisfied by the purchase of the Tay-Glen property and the subsequent management, including:

- Introduction to the Project and the purpose of the plan.
- How the offsets address the EOP, conservation advice and threat abatement plans.

- An overview of the proposed offset property.
- Description of the Impact area.
- Offset property information, including the landscape values.
- Offset area description and habitat quality scores.
- Risk analysis.
- Offset management measures.
- Completion criteria and performance targets.
- Monitoring and reporting.

Figure Name: Project Location	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 1: Location of the Tay-Glen offset property (QGIS, 2024)

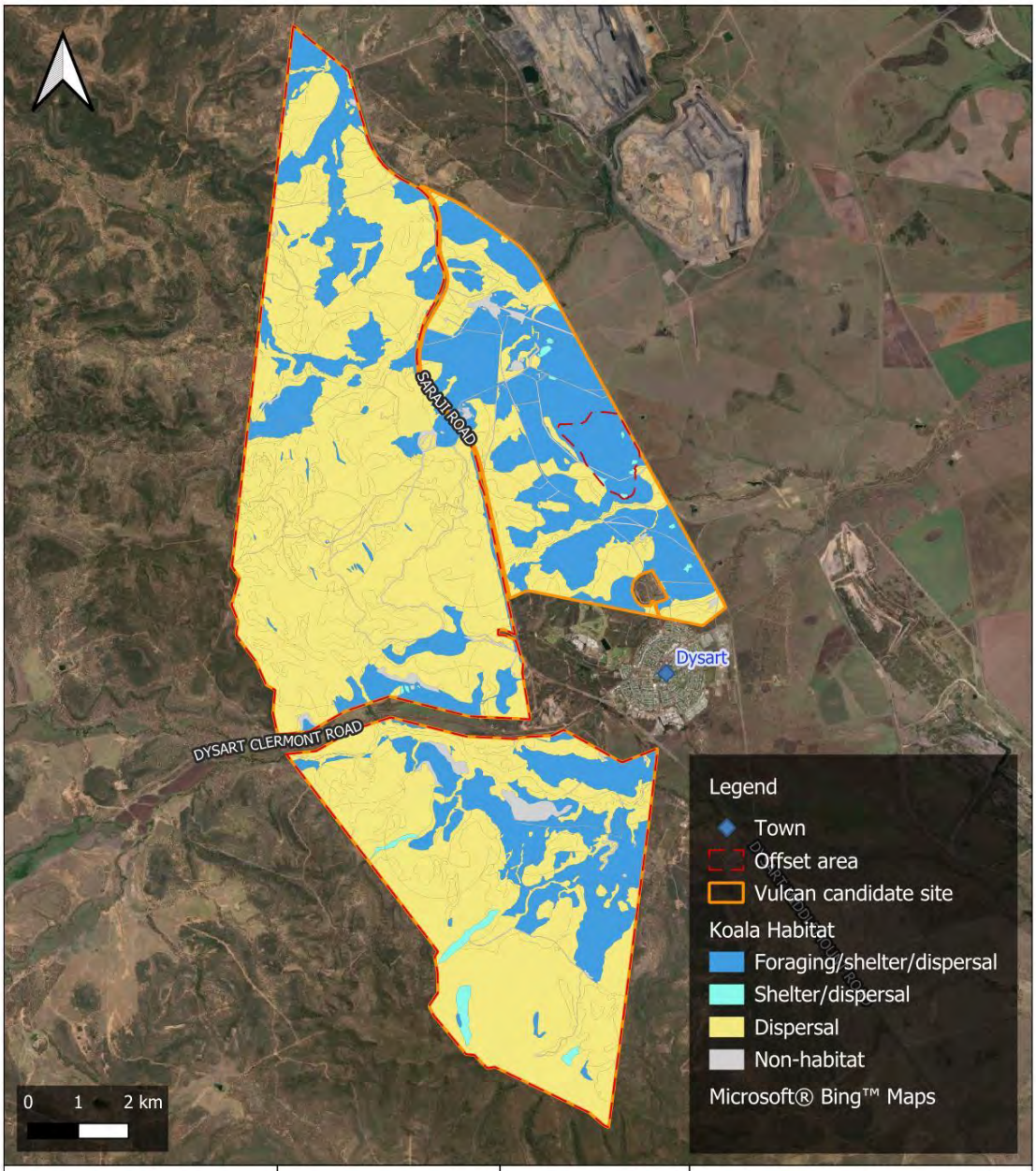

Figure Name: Matter areas for Koala	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 2: Matter area for Koala

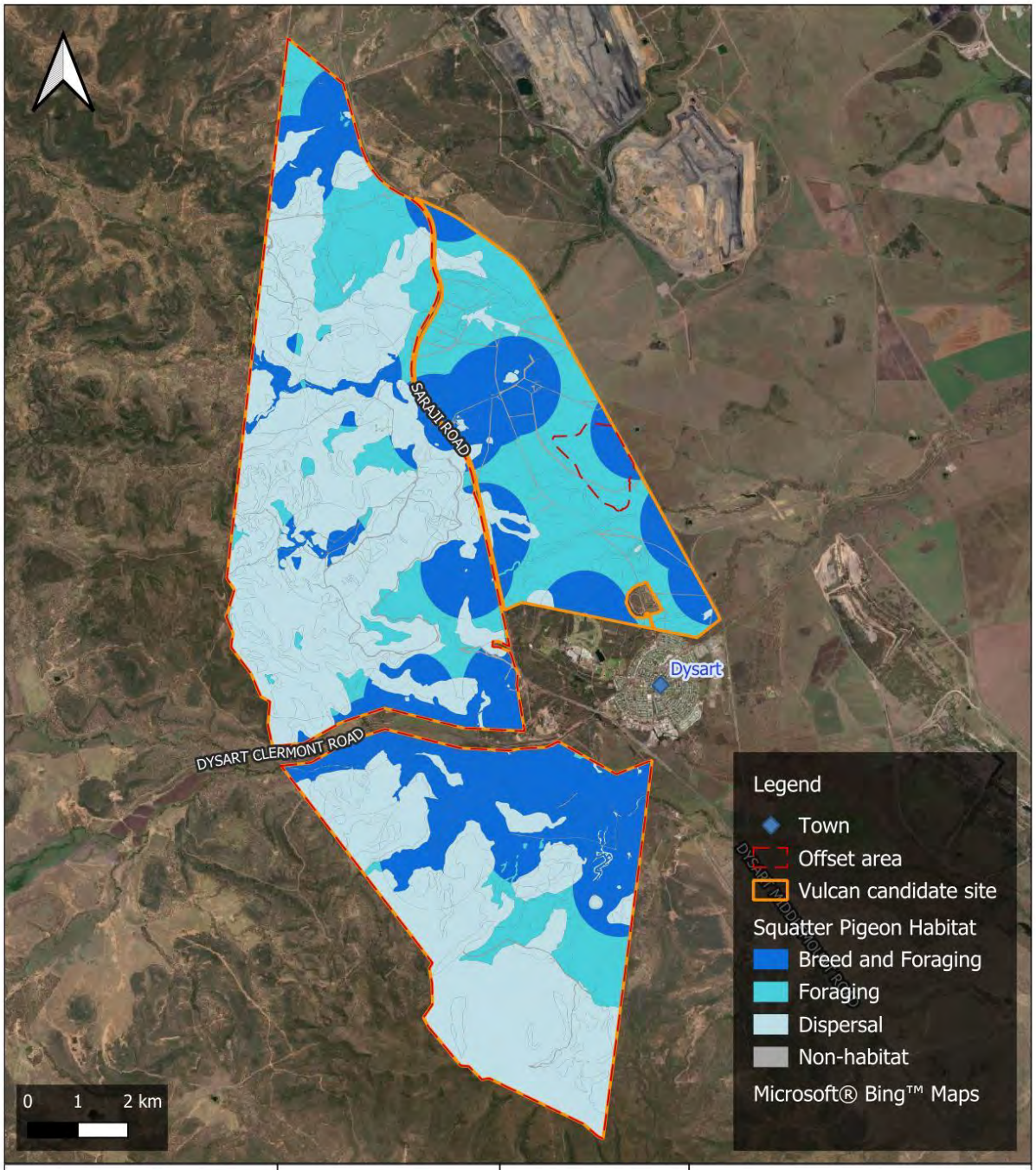

Figure Name: Matter areas for Squatter Pigeon	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 3: Matter area for Squatter Pigeon

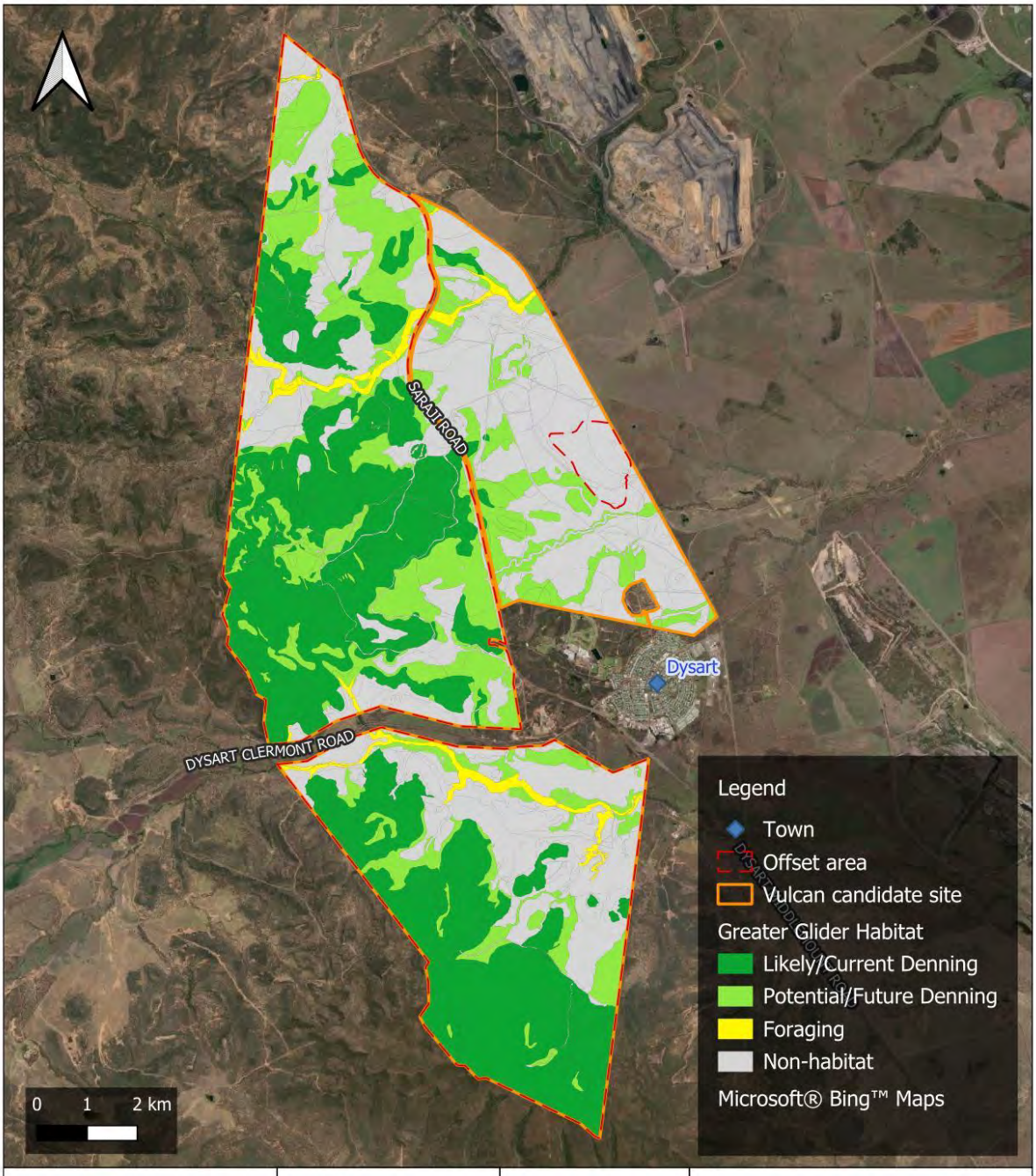

Figure Name: Matter areas for Greater Glider	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 4: Matter area for Greater Glider

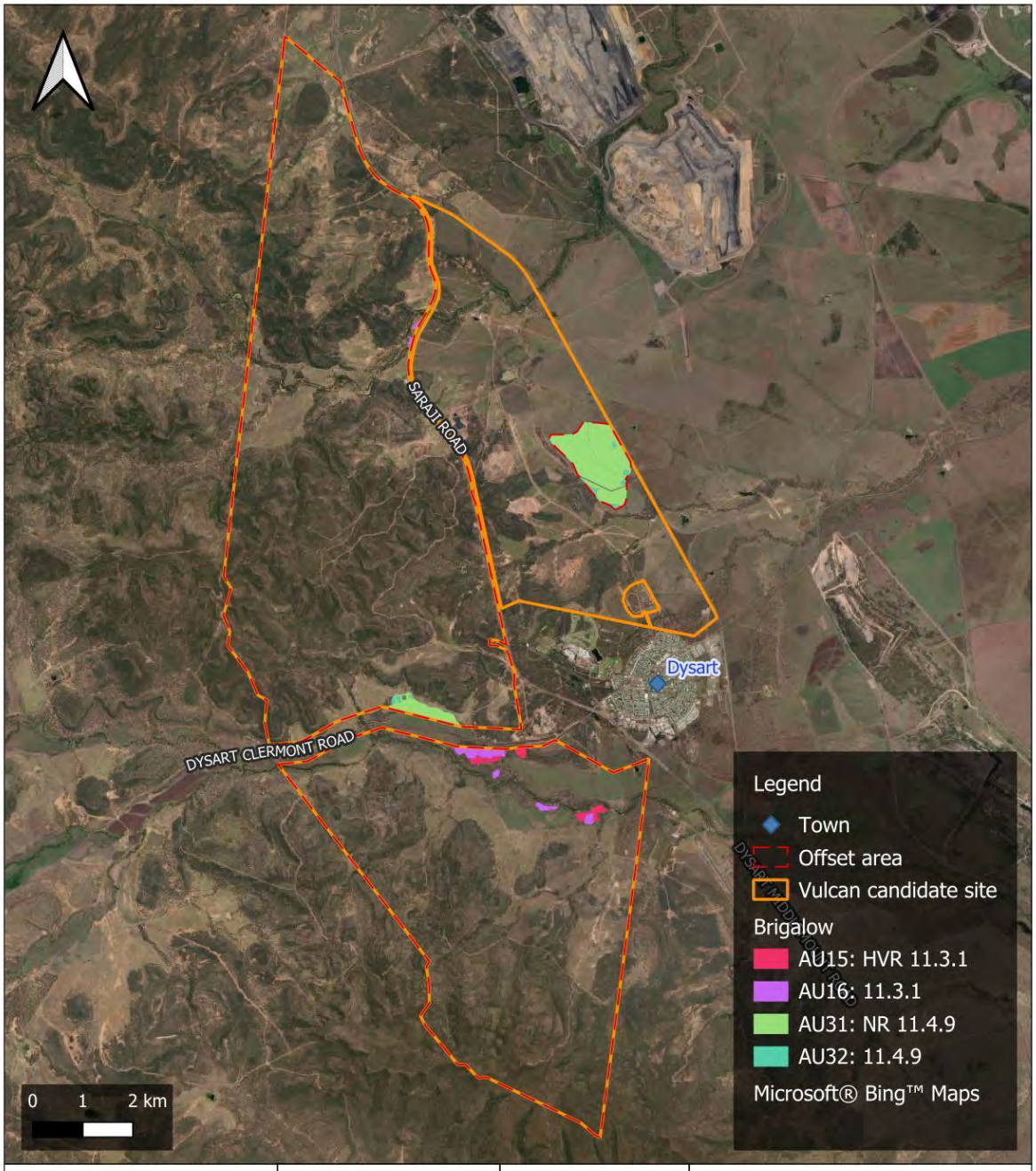

Figure Name: Matter areas for Brigalow	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 5: Matter area for Brigalow

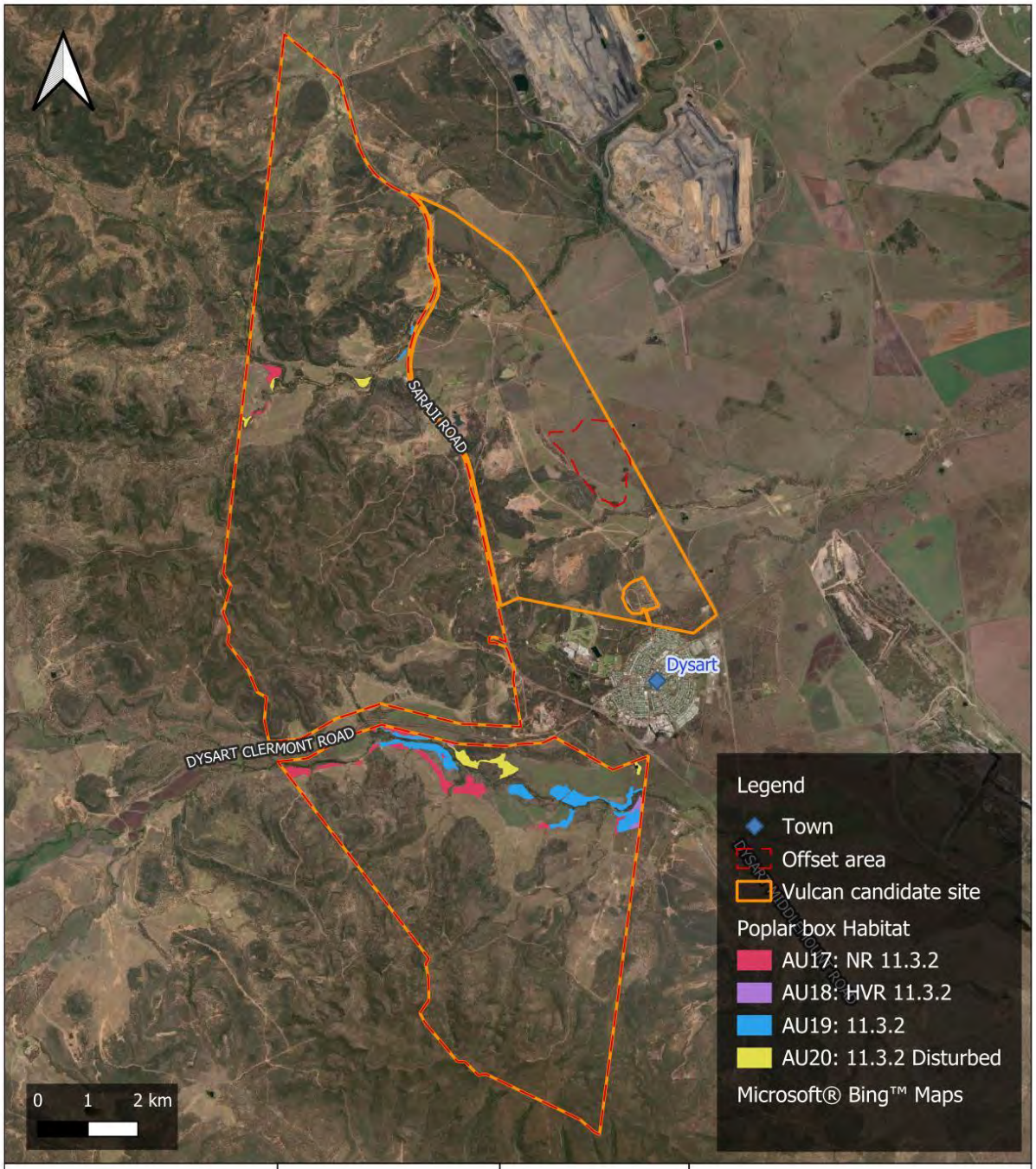

Figure Name: Matter areas for Poplar box	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 6: Matter area for Eucalyptus populnea woodland on alluvial plains

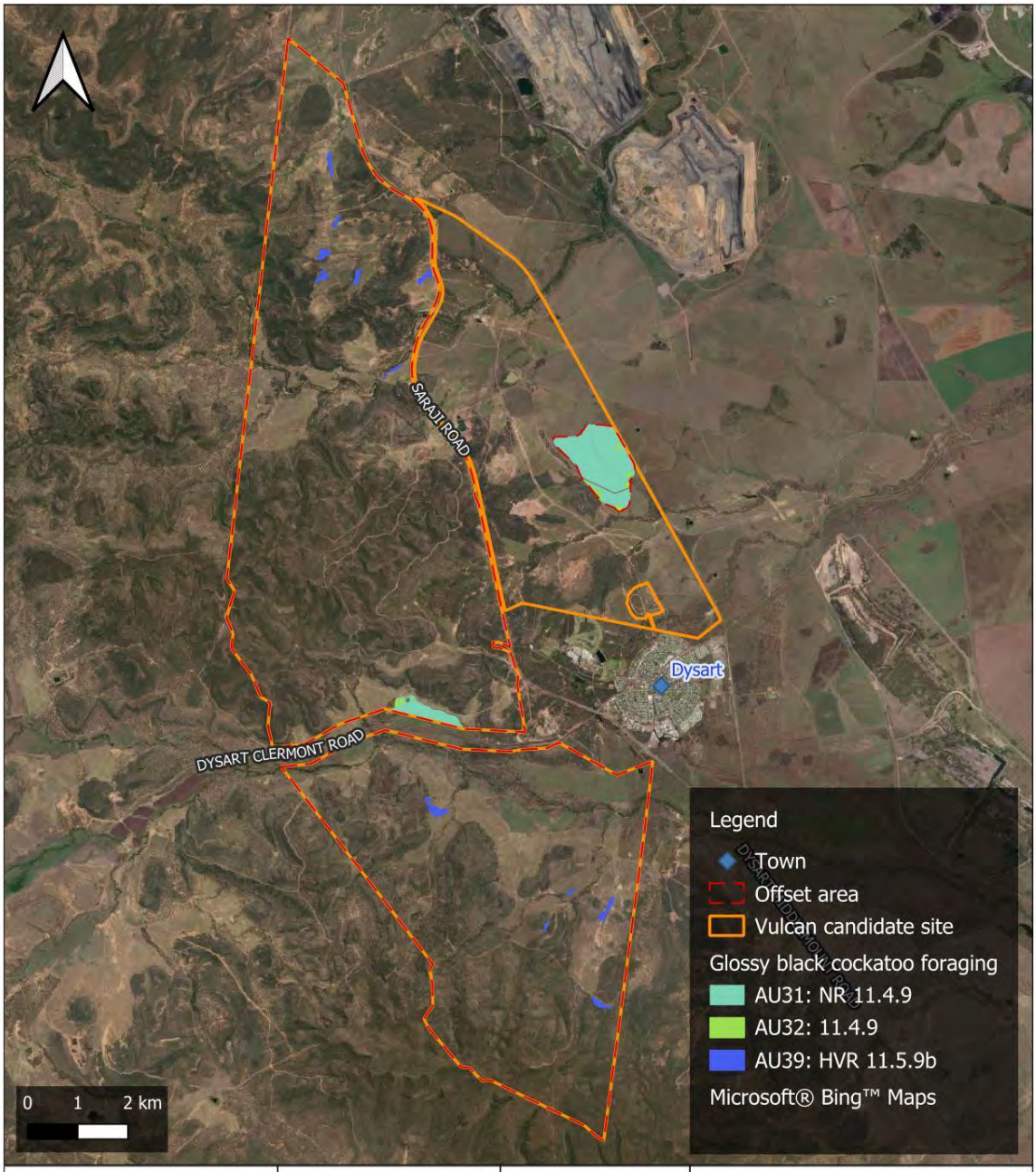

Figure Name: Matter areas for Glossy black cockatoo	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 7: Matter area for Glossy Black Cockatoo

2. EPBC Act Environmental Offsets Policy and Framework

The proposed offset is required to meet the stipulations of the guidelines outlined in the EPBC Act Environmental Offset Policy (October 2012), plans and guidelines.

2.1 Policy Principles

The EOP sets out eight key overarching principles to determine the suitability of offsets. The following table outlines each of the policy principles and how it has been considered in the OAMP, with a reference to the relevant OAMP section (Table 2).

Table 2: Accordance with the EPBC Act Environmental Offsets Policy

Policy principle	Management actions
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matters.	By proposing an offset area and management strategy that, when assessed using the *Offset Assessment Guide*, indicates No Net Loss or a Net Gain for the listed MNES. By achieving a positive conservation outcome for the same protected matters as being impacted and the same attributes (i.e., both foraging and breeding habitat for the Squatter Pigeon are assessed separately). By providing evidence that the listed MNES are in the offset area. By implementing the offset for the duration of the impact (anticipated 20 years), not just the action itself (4 years). By restoring native vegetation communities and ecosystems, rather than non-native ones; and By committing to a future habitat quality that is equal to, or greater than, the quality of the impact site, and which is to be attained by the nominated time until ecological benefit and then maintained for the duration of the approval.
Suitable offsets must be built around direct offsets but may include other compensatory measures.	By having 100% of the Project's MNES offset obligations delivered through direct land-based offsets.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.	By considering the level of statutory protection (for example: Vulnerable or Endangered) for the MNES when applying the Offset Assessment Guide.
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	By using the attributes of the protected matters being impacted, the quality and importance of those attributes, the nature of the impact (e.g., permanent or temporary), the level of threat applicable to the offset area, the time it will take to achieve a conservation gain for the protected matter, and risk of the conservation gain not being realised when informing the inputs into the Offset Assessment Guide; and By ensuring that offsets calculations are as accurate as possible and implementing the Precautionary Principle where there is scientific uncertainty.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding.	By using direct offsets instead of other compensatory measures. By including a risk analysis within Section 6 of this OAMP, which considers factors that could affect the success of the offset (i.e. attain the completion criteria by the nominated time until ecological benefit and maintain this for the duration of the approval); By proposing measures within the OAMP for if the offset fails (Section 7).

Policy principle	Management actions
	By detailing within the OAMP how and when the Precautionary Principle has been applied; and By including uncertainty in the Offset Assessment Guide.
Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs.	By providing conservation gains that are in addition to the duty of care or environmental planning laws. By calculating the risk of loss based on existing environmental planning laws (e.g., Vegetation Management Act 1999) that apply to the offset area (Section 3.3 of this OAMP); and By delivering conservation gains that have not been paid for, or achieved, while participating in other schemes (e.g., carbon offset scheme).
Suitable offsets must be efficient, timely, transparent, scientifically robust and reasonable	By implementing offsets prior to the commencement of the VSCM's actions. By having a habitat quality scoring system that is based on scientifically robust and verifiable information, including published peer-reviewed studies, the Australian Government's Species Profile and Threats Database, expert opinion, and field-collected data from the local area (see the Vulcan South Environmental Offsets Strategy for a detailed justification of this scoring system). By implementing the Precautionary Principle if there is not scientific certainty. By using scientifically robust and peer-reviewed methods for monitoring the progress of offsets; and By having realistic offset commitments and completion criteria that are likely to be achieved despite any reasonable threats or risks.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	By detailing responsibilities for the offset area within Section 7 of this OAMP. By committing to measure and monitor the performance of the offset and reporting every five years to the Department (Section 10). By delivering the offset through contractual arrangements with a third party (a local landholder); and By ensuring that offset commitments are measurable and specific so that they can be audited and enforced.

2.2 Relevance to EPBC Plans and Advice

The EOP states that an offset should address key priority actions for the impacted MNES in any approved recovery plans, threat abatement plans, conservation advice, ecological character description or approved Commonwealth Management Plan. Table 3 below outlines how this plan addresses the relevant conservation advice and threat abatement plans.

Table 3 Conservation advice and threat abatement plans addressed in the OAMP

Document	Priority actions	Implementation
***Approved Conservation Advice for* Phascolarctos cinereus *(Koala)* (DCCEEW, 2022b)**	Threat abatement actions identified by the advice include: Development plans should explicitly address ways to mitigate risk of vehicle strike when development occurs adjacent to, or within, Koala habitat. Develop and implement a management plan to control the adverse impacts of predation on Koalas by dogs in urban, peri-urban and rural environments. Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them, if necessary. Develop and implement options of vegetation recovery and re-connection in regions containing fragmented Koala populations. Investigate formal conservation arrangement, management agreements and covenants on private land. Engage with private landholders, local indigenous groups and land managers responsible for the land on which populations occur and encourage these stakeholders to contribute to the implementation of conservation management actions; and Improve the condition of existing koala habitat on both private and public land through altered land management practices, including management of vegetation, fire, weed, and introduced species. Ensure habitat restoration plans, based on up-to-date mapping and spatial analysis that considers potential carrying capacity and landscape-scale processes such as climate change, fire and drought, and koala movement patterns. Consider spatially and temporally strategic areas of high priority for the koala, related to climate and fire refugia, environmental corridors	The offset includes management measures specifically aimed to control dogs and improve vegetation recovery and connectivity. Public access to the offset area will be prohibited, limiting vehicular traffic to the site. Monitoring will investigate the effectiveness of the management measures implemented every five years. The offset will occur on private land, which will be subject to a voluntary declaration to protect vegetation from future clearing. Private landholders owning the land will be responsible for the implementation of conservation management measures. The offset location was chosen strategically as it follows an environmental corridor of regional significance and will assist in the connectivity of local koala populations.
National Koala Conservation and Management Strategy (DCCEEW, 2009)	Key objectives of the strategy are that:	The offset site is located within the local government area adjacent to the impact site. The status of the species within

Document	Priority actions	Implementation
	The Koala remains nationally abundant and widespread and is not nationally threatened. The threatened statuses of the Koala at state and regional levels are reduced. Koalas in identified priority areas are stabilised or increasing. Increased consideration of Koala habitat is demonstrated in development planning. Productive and integrated partnerships that foster the conservation and welfare of Koalas. Greater areas of high-quality Koala habitat are conserved and effectively managed through legislation, covenants, or agreements. Greater activity by land and resource managers to effectively protect and manage Koala populations is facilitated by state and local governments. Community capacity to drive Koala conservation and care is increased. Overabundant Koala groups are stabilised or reducing wherever they occur or arise.	the local region is not expected to change as a result of the project. By entering into an agreement with a local landholder, the total extent and connectivity of high-quality Koala habitat will be increased. This partnership with a local landholder to deliver the offsets also improves community participation in Koala conservation.
National Recovery Plan for the Koala Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory (DAWE, 2022)	This recovery plan identifies the following as priority actions: To build and share knowledge through identifying nationally important populations and habitat, identifying priority areas for restoration, prioritising the implementation of actions and research, establishing a national Koala monitoring program, reviewing and coordinating mapping across jurisdictions, standardizing monitoring methods, and sharing knowledge and data about Koala conservation. To encourage strong community engagement with Koala conservation and monitoring. To strengthen cross-cultural knowledge exchange between indigenous and non-indigenous communities. To develop a user-friendly single-site portal for the public to report Koala sightings. To develop national guidelines for veterinary standards of care. To increase the overall area of protected Koala habitat within the state protected areas. To expand existing targeted private land incentive mechanisms for habitat protection. To improve the condition of existing Koala habitat on both private and public land through altered land management practices,	The OAMP aligns with the recovery plan's priority actions by: Engaging local landholders to deliver the offset management. Increasing the level of protection of Koala habitat within the offset area. Improving the condition of Koala habitat on private land through the management of fire, grazing, weeds and pest animals. Locating the offset area in a strategic corridor containing regionally significant connectivity values and other offset areas for other projects. Implementing on-ground restoration practices based on published, peer-reviewed data; and managing grazing intensity and fuel loads to lessen the risk of intense, large-scale fires.

Document	Priority actions	Implementation
	including management of vegetation, fire, weed and introduced species. To review and update referral guidelines, statutory planning instruments and policies to minimise impacts to the Koala. To ensure identification and implementation of any offset decisions are strategic, coordinated, tracked in governments' databases, and informed by the recovery plan. To incorporate impacts of climate change into strategic Koala planning and actions. To develop and implement best-practice revegetation and restoration guidelines appropriate to local conditions. To implement on-ground revegetation or restoration programs. To develop and implement fire management that effectively secures and promotes long-term, strategic, and effective protection of populations. To undertake active metapopulation management through consideration of genetics, disease and connectivity when translocating or releasing individuals.	
Approved Conservation Advice for Geophaps scripta scripta (Squatter Pigeon southern) (TSSC 2015)	The advice recommends the following conservation and management actions for the Squatter Pigeon: Identify sub-populations of high conservation priority, especially in the southern part of the Squatter Pigeon's range. Protect and rehabilitate areas of vegetation that support important sub-populations. Protect sub-populations of the listed subspecies through the development of covenants, conservation agreements or inclusion in reserve tenure. Develop and implement a stock management plan for key sites. Develop and implement a management plan, or nominate an existing plan to be implemented, for the control and eradication of feral herbivores in areas inhabited by the squatter pigeon (southern). Raise awareness of the squatter pigeon (southern) within the local community, particularly among land managers.	The offset is not within the southern part of the Squatter Pigeon's range, however the offset area will be afforded extra protection through a voluntary declaration. The offset also involves managing grazing intensity to maintain grass cover in a favourable range for the Squatter Pigeon to feed and breed, as well as increasing access to water. Stock management and pest animal management are incorporated into this OAMP. The offset will be implemented by local landholders, raising local awareness about the species.
Threat Abatement Plan for predation by the European red fox	The following are the objectives of the threat abatement plan: To prevent foxes occupying new areas in Australia and eradicate foxes from high-conservation-value islands. To promote the maintenance and recovery of native species and ecological communities that are affected by fox predation.	Feral predator management is incorporated into the OAMP. The offset area is near the northern edge of the fox's current range in Australia. Monitoring and control of feral predators' forms part of this OAMP and aligns with the threat abatement plan's recommendation to monitor fox's distribution at the edge of their extent.

Document	Priority actions	Implementation
	To improve knowledge and understanding of fox impacts and interactions with other species and other ecological processes. To improve the effectiveness, target specificity, integration and humaneness of control options for foxes; and To increase awareness of all stakeholders of the objectives and actions of the plan and of the need to control and manage foxes.	Coordination of feral predator management over multiple adjoining offset areas minimises reinvasion. Feral predator management will utilise the- best-practice control methods
Threat Abatement Plan for predation by feral cats	The following are the objectives of the threat abatement plan: To effectively control feral cats in different landscapes by timing control to coincide with periods of highest predation risk and utilising methods most suitable for the local landscape. To improve effectiveness of existing control options for feral cats, by providing incentives to landholders to control cats, and by ensuring that areas prioritised for cat control maximize benefits to biodiversity. To develop or maintain alternative strategies for threatened species recovery, such as the introduction of the species to offshore islands or fenced reserves free of cats; and To increase public support for feral cat management and promote responsible cat ownership.	Feral predator management is incorporated into the OAMP. The techniques used for control consider local landscapes and potential for collateral impacts to non-target native species. As the offset area supports multiple MNES, the benefits to biodiversity of feral predator control are high. Suitable habitat for Squatter Pigeons is not known to occur on predator-free islands or in currently fenced reserves.
Threat Abatement plan for competition and land degradation by rabbits **(Department of Environment and Energy, 2016)**	The following are the objectives of the threat abatement plan: To strategically manage rabbits at the landscape scale and suppress rabbit populations to densities below threshold levels (i.e., 0.5 rabbits per ha) in identified priority areas. To improve knowledge and understanding of the impact of rabbits and their interactions with other species and ecological processes. To improve the effectiveness of rabbit control programs; and To increase engagement of, and awareness by, the community of the impacts caused by rabbits, and the need for integrated control.	Whilst monitoring and management of pest species is a component of this OAMP, rabbits generally occur in low densities in the northern Brigalow Belt, where heavy summer rainfall floods burrows, mosquito-borne disease is prevalent and high night-time temperatures are near the species' physiological limits. In the unlikely event that rabbit densities increase above threshold levels, pest monitoring and control will include assessment of presence and density of rabbits. Impact on vegetation health is expected from increased rabbit population
Conservation Advice for Petauroides volans (Greater Glider (southern and central))	The advice recommends the following conservation and management actions for the Central Greater Glider: Implement and enforce measures to reduce direct mortality and loss of hollow-bearing trees during site preparation and execution of prescribed burns. Ensure that the impacts of disturbance (including fire) are managed to prevent them transitioning to less nutritious, hotter, and/or more fire-prone plant communities, and to	The OAMP aligns with the conservation advice for Central Greater Gliders through: The construction of artificial hollows to improve Greater Glider habitat. Locating the offset area in a strategic corridor containing regionally significant connectivity values and other offset areas for other projects.

Document	Priority actions	Implementation
	ensure that food tree species preferred by the Central Greater Glider continue to be the dominant canopy trees. Protect and maintain sufficient areas of suitable habitat, including denning and foraging resources and habitat connectivity, to sustain viable subpopulations throughout the species' range. Protect hollow-bearing trees on private property, roadside reserves, and along the edges of roads/tracks. Prior to removing trees identified to be a 'hazard', undertake a risk assessment by a suitably qualified person to determine whether their removal is necessary, including a consideration of the potential impacts of tree removal on the Greater Glider. Incorporate measures to ensure ongoing recruitment of hollow-bearing trees into planning processes. Avoid fragmentation and loss of habitat due to development of new transport corridors. Include consideration of the species in planning processes, and where possible re-locate recreational activities and roads away from habitat. Establish, maintain and enforce effective prescriptions in production forests to support populations of the Greater Glider. As a last resort, where hollows are limiting, consider the use of nest boxes and artificial hollows that are suitable for the species. Monitor use of these structures to ensure they are being utilised, and revise designs or placement as required. Restore habitat and connectivity: Revise mitigation and offset guidelines for development and linear infrastructure (e.g., pipelines, transport corridors) to reflect the limited effectiveness of artificial structures (nest boxes, glide poles) as mitigation actions for loss, degradation or fragmentation of Greater Glider habitat. Avoid the use of barbed wire and replace the top strands of existing barbed wire with single-strand wire in habitat known to be occupied by Greater Gliders. Where threats from introduced predators (including the European red fox and feral cat) are locally significant: Implement appropriate control measures, particularly in areas burnt by bushfires. Develop and implement longer-term strategies to control predation by the European red fox and feral cat, as detailed in the relevant Threat Abatement Plans Seek stakeholder input into assessment and planning, including developing and implementing a communication strategy,	Engaging local landholders to deliver the offset management goals. Utilising best-practice feral predator control methods. Improving the condition of Central Greater Glider habitat on private land through the management of fire, grazing, weeds and pest animals. Managing grazing intensity and fuel loads to lessen the risk of intense, large-scale fires. Minimises the presence of barbed wire fences by removing the top barb wire of internal fences except for the perimeter fence.

Document	Priority actions	Implementation
	supporting and engaging private landholders, traditional owners and conservation groups	
Approved Conservation Advice for the Brigalow (Acacia harpophylla dominant and co-dominant) ecological community	The approved conservation advice for Brigalow includes the following priority conservation actions: Establish condition benchmarks across the range of the Brigalow ecological community for each of the component vegetation communities. Survey and continue to monitor a representative set of sites in Qld and NSW to assess condition and to identify relevant threats. Identify, prioritise and map important areas for Brigalow conservation in Qld and NSW. Investigate methods to assist advanced regrowth to attain the structural and floristic characteristics of remnant Brigalow. Undertake monitoring to ensure and encourage compliance with legislation that protects the Brigalow ecological community. Protect and conserve remnant and regrowth areas of the ecological community. Prevent clearance of this endangered ecological community and of nearby native vegetation including buffer zones and connecting corridors. Where further clearance is unavoidable; mitigate the severity of impacts (e.g. avoid higher quality areas, avoid dissection of patches, act to minimise hydrological disruption and the spread of weeds); and offsetting should consider the location and emulate qualities of affected patches. Manage areas of the Brigalow ecological community to reduce threats, including through: fire management that considers Brigalow conservation, protection, and ecological heterogeneity; and targeted weed and feral animal control with a particular focus on high biomass exotic grasses (Buffel Grass, Rhodes Grass, Green Panic Grass) and feral pigs. Manage all weeds appropriately within and close to the Brigalow ecological community, e.g.: spot application of herbicides, rather than aerial spraying; avoid fertiliser application; minimise tree thinning and soil disturbance. Manage foxes and cats (as well as feral pigs) using a coordinated approach, preferably among groups of neighbours and across regions. Help woodland birds to avoid aggression from Noisy Miners by: encouraging and protecting shrubby understorey; managing grazing pressure so that it does not degrade native	The OMP aligns with the conservation advice for Brigalow including protecting, enhancing and monitoring areas of Brigalow within the offset via: Establishment of a volunteer declaration to protect vegetation. Regular monitoring of the condition of Brigalow within the offset. Undertaking management actions to improve the condition of Brigalow. Engaging local landholders to deliver the offset management goals. Utilising best-practice feral predator control methods. Minimising threats through the management of fire, grazing, weeds and pest animals. Managing grazing intensity and fuel loads to lessen the risk of intense, large-scale fires. Undertaking targeted grazing to control target exotic grasses including Buffel, Rhodes and Green Panic Grass. Protection of understory and improvement of shrub diversity via grazing minimisation to allow natural recruitment. Management actions include targeted regeneration and revegetation actions in areas of non-remnant and degraded areas of Brigalow to ensure ecological targets are met.

Document	Priority actions	Implementation
	vegetation; and retaining dense stands of trees and regrowth. Encourage landholders to balance primary production and the conservation of native flora and fauna within and close to the ecological community. Examples of this are: managing stocking rates, paddock numbers/sizes, grazing practices and livestock camp sites to avoid damage to woodland understorey and ground cover, this may include adopting rotational or cell grazing regimes; or, excluding grazing entirely from intact stands of brigalow where appropriate (e.g. unless managing fuel loads through grazing); leaving trees, or clumps of regrowth, in paddocks to maintain connections between patches of native flora and fauna habitat; connecting shade-lines to one another and keeping them as wide as possible (ideally more than 100 m); avoiding the application of fertiliser, or the aerial / broad scale spraying of herbicides; and, leaving dead trees standing and allowing dead timber and leaf litter to rot where it falls on the ground. Undertake regeneration of high value regrowth sites and revegetation of degraded sites. Increase the area of the Brigalow ecological community managed for conservation, such as through the reservation of high quality/large areas of remnant or regrowth and by facilitating conservation agreements with landholders. Establish adequate buffer zones to protect remnants. Devise and implement water management, sediment erosion and pollution control and monitoring plans. Undertake management actions that help to increase the diversity of species and their abundance; this requires thinking about habitat use at multiple scales. General management actions that benefit many fauna species include: retaining fallen timber and leaf litter for small mammals and reptiles; retaining standing dead trees or old trees with hollow limbs for nesting sites for birds, mammals and reptiles; re-introducing microhabitat features (e.g. rocks, logs and other woody debris) to sites disturbed during proposed works;	

Document	Priority actions	Implementation
	discouraging species like Noisy Miners and introduced predators by maintaining large patches of woodland with complex structure; and, avoiding clearing remnant vegetation; and retaining areas of Brigalow regrowth. Encourage woodland regeneration close to areas of existing woodland. In consultation with land managers, local and state authorities and Indigenous groups develop and propagate environmentally sustainable management guidelines and technical material to assist land managers, including measure to address inappropriate fire regimes, plant pathogens, invasive animal management, weed management and health and maintenance of the ecological community. develop or support appropriate existing education programs, information products and signage to help the public recognise the presence and importance of the ecological community and encourage compliance with their responsibilities under state and local regulations and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).	
Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains RE11.3.2	The Approved Conservation Advice for this ecological community outlines the following priority conservation and research actions: Prevent further clearance, fragmentation or detrimental modification of remnants of the ecological community and of surrounding native vegetation for example, through land use zoning and during land development, raw materials extraction, and associated infrastructure development. High conservation value, unmodified and older growth areas (e.g. stands of more mature trees) are particularly important for retention and management (refer to condition thresholds in section 3.2.2 for guidance). Identify high quality remnants in advance of zoning and development planning decisions and avoid clearing or damaging them. Recognise the landscape position of remnants of the ecological community and ensure that planning supports increased resilience within the landscape (for example, by retaining appropriate connectivity between remnants of all naturally occurring ecological communities). Prevent impacts to native vegetation, native fauna, hydrology or soil structure from any developments and activities adjacent to or near patches of the ecological community by planning for and appropriately avoiding or mitigating off-site effects.	The OMP aligns with the conservation advice for Poplar Box on Grassy Woodland on Alluvial Plains including protecting, enhancing and monitoring areas of the TEC within the offset via: Establishment of a volunteer declaration to protect vegetation. Preserving and improving the quality of existing mature stands. Protecting the community and immediate surrounding vegetation as part of the larger offset to ensure connectivity throughout the landscape. Protecting and enhancing the Poplar vegetation within the Stated Connectivity Buffer along Philips creek. Access to the offset will be restricted. The Offset design Increases the size and condition of patches and promotes regeneration via minimising grazing and undertaking weed control which improving natural recruitment, promoting regeneration of a diversity of understorey species. Within a State identified wildlife corridors.

Document	Priority actions	Implementation
	For instance, apply recommended buffers of at least 30 m (native vegetation buffers are preferred) around patches of the ecological community and avoid activities that could cause significant hydrological change. Wider buffers may be required where there is larger scale landscape change, for example hydrological modifications. Protect mature trees, particularly with hollows, even if they are dead. Large and old trees may have numerous fissures that provide shelter; support diverse insects and their predators; and act as 'stepping stones' for fauna moving between remnants in an otherwise cleared landscape. Minimise further conversion of moderate, good or highest condition remnants of the ecological community to cropping, improved pasture or mines/wells where possible. Ensure that any further mineral and energy extraction and exploration activities minimises direct impacts to the ecological community or indirect effects on its ecological functionality. Ensure that any further development of river and ground water infrastructure and water storage minimises impacts on the ecological function of the ecological community. Avoid significant changes to water table levels and /or run-off, salinity, pollution and water flow patterns arising from developments, such as through mineral and gas extraction. Prevent impacts from any developments and activities adjacent to or near patches that might result in further degradation, by planning for and appropriately mitigating off-site effects (for example, by avoiding disturbances to native vegetation, fauna, hydrology or soil structure, and applying recommended buffer zones around the ecological community). Retain other native vegetation remnants and mature isolated trees near patches of the ecological community where they are important for connectivity or as buffers. Manage access to remnants to prevent, for example, disturbance and spread of weeds and plant pathogens. Ensure that areas that form important landscape connections, such as wildlife corridors or other patches of particularly high quality or regional importance are considered for inclusion in formal reserve tenure or other conservation related land tenure, such as conservation covenants, for protection and management in perpetuity. Liaise with local councils and State authorities to ensure that cumulative impacts, from activities undertaken as part of	Targeted grazing and mobile water stations minimise sever and prolonged impact of cattle in the one area, minimising soil disturbance and weed invasion. Engaging local landholders to deliver the offset management goals. Utilising best-practice feral monitoring and predator control methods. Minimising threats through the management of fire, grazing, weeds and pest animals. Managing grazing intensity and fuel loads to lessen the risk of intense, large-scale fires.

Document	Priority actions	Implementation
	broader or related projects (e.g. road works, developments), are reduced when planning individual activities. Protect the native soil seed bank by minimising soil disturbance and removal. Retain habitat features for fauna, noting species requirements (e.g. fallen timber) or particular vegetation structure. For example, for many bird species the quality of native vegetation as habitat can be improved by leaving fallen logs and leaf litter in situ (shrubs may be important at some sites), controlling weed species, taking care of the canopy by controlling dieback and controlling wildfires by public awareness and vigilance. Prior to removal of any trees, or use of heavy machinery that may also damage the understorey, ensure comprehensive flora and fauna surveys have identified threatened species on site and their potential shelter and nesting sites, for example hollows, burrows and tree crevices, as well as visible nests. Damage to these should be avoided altogether, but if approved for removal, care should be taken to appropriately relocate fauna. Increase the size and condition of patches by promoting regeneration of and replanting canopy trees and a diversity of understorey species. As part of this create or restore appropriate wildlife corridors and linkages, including stepping stones. Prevent weed invasion by minimising soil disturbance. Following disturbances implement a weed control program that responds to weed establishment, particularly in the following 1–2 years after disturbance. It typically requires less resources to control weeds at this time. Do not plant (or spread) known, or potential, environmental weeds within or near the ecological community: Prevent activities such as planting potentially invasive species near the ecological community; or dumping garden waste in or near patches of the ecological community. Review the planting schedule for new developments to ensure that potential weeds or other inappropriate plants (e.g. likely to contaminate the local gene pool) are not included. Use plants from accredited nurseries (e.g. see the Nursery Industry Accreditation Scheme: Nursery and Garden Industry Australia, undated). Implement effective control and management techniques for invasive grasses, such as *Cenchrus ciliaris* (Buffel Grass).	

Document	Priority actions	Implementation
	Control runoff to prevent movement of weed material into natural areas. Avoid the use of fertilisers and cultivation, which can favour invasive species, in subcatchments. Detect and control weeds early. Small infestations should be a priority for removal. For example, weeds have invaded to varying extents along access tracks and such areas should be considered a priority for weed control. Prevent further introduction of feral animals and contain domestic animals within new development areas. Target management of existing weed problems to sites of high diversity or where threatened or regionally significant species are known to occur. Monitor for signs of new disease such as myrtle rust or incursions by new weeds (for example, African Boxthorn or Blackberry), or pest animals, (for example goats, rabbits and deer) and manage early for local eradication. Ensure stock do not carry weeds into patches of the ecological community (for example, hold stock in weed management paddocks for an appropriate time prior to introduction). Use appropriate hygiene to minimise the introduction or spread of weeds and diseases at susceptible sites. For example, keep vehicles and machinery to dedicated roads and out of remnants wherever possible. If vehicles must be taken into remnants ensure vehicles are washed first to remove soil, potential fungal pathogens and weed seeds. Implement strategic responses to rural tree dieback, in particular, implement preventative measures. Use a landscape-scale approach and available knowledge on fire histories and age of stands, to identify priority conservation sites that need fire for biodiversity conservation. Fires must be managed to ensure that where possible, prevailing fire regimes do not disrupt the life cycles of the component species of the ecological community, that they support rather than degrade the habitat necessary to the ecological community, that they don't promote invasion of exotic species, and that they do not increase impacts of other disturbances such as grazing or predation by feral predators. Faunal populations in isolated patches may be vulnerable to local extinction following intense fires. Implement appropriate fire management regimes for the ecological community that take into account results from research. Appropriate actions relating to burning may include:	

Document	Priority actions	Implementation
	clearing fuel away from the base of old trees prior to burning; minimising high intensity fires and extinguishing tree bases after the fire front has passed to retain old and /or hollow trees and roost sites; when burning to control annual weeds, where they dominate, take into consideration the requirements of any threatened species or characteristic flora, and fauna species; do not burn during peak reproductive seasons, e.g. flowering and fruiting seasons, for threatened, functionally important or characteristic native flora and fauna species within the ecological community; do not burn if soil moisture is very low, or dry conditions are predicted for the coming season, because native grass recovery will be slow and erosion may occur, or weeds may become established or recover quicker than native species while the groundcover is reduced; within large patches burn different parts in rotation, rather than the whole area in any one season; avoid native vegetation removal as part of fire management or creation of new tracks or use of machinery through bushland. Slashing to maintain low native understorey as a fire break is preferred over a mineral earth fire break; consider fire regimes appropriate for nearby ecological communities and threatened species when planning burning (for example, where wetlands are adjacent). Integrate appropriate grazing management regimes with fire management requirements, persistent grazing can negatively affect understorey species composition and impact diversity. Provide alternative shelter and watering areas for stock, for example, by planting shade trees, particularly Poplar Box, in nearby cleared or non-native areas. Where feral herbivores (e.g. rabbits) are present or there is an overabundance of native herbivores (e.g. kangaroos) install temporary or permanent fencing to protect regrowth, revegetation areas, or sites with threatened, regionally important or diverse understorey species. Manage populations of feral grazing animals that damage native vegetation. Ensure that livestock grazing, if it occurs in the area, uses an appropriate management regime and stocking rate that does not detrimentally affect the ecological community:	

Document	Priority actions	Implementation
	occasional grazing may be beneficial for reducing grass cover, encouraging herb growth and minimising shrub regeneration; however, if stock could carry noxious weeds into the remnant, then it would be preferable to exclude stock altogether or admit them only at times when weeds are not producing seed; wherever possible avoid grazing during peak native plant flowering and seeding times (spring and summer); and avoid long term grazing at high stocking densities. Enhance the resilience of the ecological community to the impacts of climate change by relieving other pressures, in particular by implementing actions in this advice regarding vegetation clearance, invasive species and fire. Implement optimal restoration strategies (including regeneration, revegetation) for the ecological community, across the landscape. In general, use locally collected seed where available to create an appropriate canopy, including *Eucalyptus populnea*, and diverse understorey. However, choosing sources of seed closer to the margins of their range may increase resilience to climate change. Ensure restoration is site specific, as this is important to the success of restoration efforts. Restore wildlife corridors and linkages (e.g. travelling stock routes/reserves) and ensure that these areas or other patches of particularly high quality or regional importance are considered for inclusion in formal reserve tenure or other conservation related tenure in perpetuity. Create habitat linkages (where appropriate) between remnants for the ecological community and other areas of native vegetation (e.g. other listed threatened ecological communities (TEC) such as Brigalow (*Acacia harpophylla* dominant and co-dominant), or reconstructed habitat to reduce fragmentation and isolation. Increase the size and condition of patches by promoting regeneration of and replanting canopy trees and a diversity of understorey species. Consider particularly the needs of species of conservation concern or known to be of functional importance for the ecological community. Survey and monitor recovery, through estimates of extent and condition assessments for the ecological community. Allow juvenile Poplar Box trees to naturally thin out and grow to maturity.	

Document	Priority actions	Implementation
	Where appropriate, fence significant remnants in or adjacent to agricultural and development areas and limit access for vehicles, in consultation with local and state authorities. If necessary, supplement, (but do not replace) fauna habitat by placing artificial hollows (e.g. various sized nest boxes) in, or near to, the ecological community. Maintain the boxes, including controlling invasive species such as bees and monitor outcomes. Encourage appropriate use of local native species in developments and revegetation projects through local government and industry initiatives. It is important to use seeds and plants that will be resilient to future changes in climate. Implement effective adaptive management regimes using information from relevant research. Map weed occurrence and prioritise management of weeds in highest quality patches or where threatened or regionally significant species are known to occur. Implement effective control and management techniques for weeds currently affecting the ecological community integrating this with alternative habitat provision and predator control. • Control introduced pest animals through consolidated landscape-scale programs. Manage weeds before and after fires, and during revegetation works to maximise success of restoration. Manage weeds at the sides of new roads and housing and industrial developments near to the ecological community by regular monitoring, and control by targeted herbicide spraying or manual removal for several years after the works are complete. Ensure actions to control invasive or other pest species avoid impacts on non-target species and do not have any long-term adverse impacts upon the ecological community: ensure workers are appropriately trained in the use of relevant herbicides and pesticides, best methodologies (e.g. spot-spraying, stem injection) and what to target; avoid chemical spray drift and off-target damage within or near to the ecological community, having regard to minimum buffer zones; control run-off to prevent dispersal of weeds and plant diseases.	

Document	Priority actions	Implementation
	Support the development of a Recovery Team, with broad community involvement. Develop a communication strategy, education programs, information products and signage to help local communities and managers recognise: when the ecological community is present and why it is important to protect it; how to appropriately manage patches of the ecological community; and responsibilities under state and local regulations and the *EPBC Act.* Promote knowledge about local weeds, means to control these and appropriate local native species to plant. Develop education programs to discourage damaging activities such as the removal of dead timber, the dumping of rubbish (particularly garden waste), creation of informal paths and the use of off-road vehicles in patches of the ecological community. Encourage local participation in recovery efforts, removing threats and actively protecting and restoring existing patches, as well as facilitating these. This may be achieved by setting up a recovery team(s) with appropriate expert and local participants; adoption of patches by local conservation groups; or encouraging short term involvement through field days and planting projects, with appropriate follow-up. Ensure planners and participants are aware of appropriate species to plant and which species to avoid in woodland revegetation projects across the range of the ecological community (taking into account local sub-communities), the best opportunities to restore landscape connectivity and encourage natural regeneration and the best-known techniques for the site conditions and species being planted. Ensure land managers are given information about managing fire for the benefit of threatened species and ecological communities. Ensure commitment to follow-up after planting, such as care of newly planted vegetation by watering, mulching, weeding and removal of tree guards. Promote awareness and protection of the ecological community by relevant agencies and industries. For example with: state and local government planning authorities, to ensure that planning around towns takes the protection of	

Document	Priority actions	Implementation
	remnants into account, with due regard to principles for long-term conservation; land developers, mining and construction industries, to minimise threats associated with land development; local councils and state authorities, to ensure road widening and maintenance activities (or other infrastructure or development activities) involving substrate or vegetation disturbance do not adversely impact the ecological community. This includes avoiding the introduction or spread of weeds and avoiding planning new roads or paths through patches of the ecological community; the use of signage to identify key sites of the ecological community that occur along road verges and other public lands such as travelling stock reserves; and natural resource management groups, consultant agronomists and livestock industry. In new developments include measures to limit additional impacts from domestic animals and invasive plants. These may include: public education, including the use of signs to both identify good examples of the ecological community and explain beneficial and detrimental activities; cat exclusion areas; requirements for registering and sterilising cats; requirements for dogs to remain on leash in natural areas; lists of suitable species for gardens to provide habitat and complement natural areas; lists of invasive plant species to avoid planting in gardens. Liaise with local fire management authorities and agencies and engage their support in fire management of the ecological community. Request these agencies to use suitable maps and install field markers to avoid damage to the ecological community. Support opportunities for traditional owners or other members of the Indigenous community to manage the ecological community. Implement formal conservation agreements (for example, covenants) for sites on private tenure that contain the ecological community. Develop coordinated incentive projects to encourage conservation and stewardship on private land, and link with other programmes and activities, especially those managed	

Document	Priority actions	Implementation
	by regional catchment groups, local natural resource management authorities or Local Land Services. Review data: consolidate information over entire extent of the ecological community and improve and update maps of the ecological community across its range: Support field survey and interpretation of other data such as aerial photographs and satellite images to more accurately document current extent, condition, threats, function, presence and use by regionally significant or threatened species. Support and enhance existing programs to: model the pre-1750 extent across the entire range of the ecological community to inform restoration; identify the most intact, high conservation value remnants and to gain a better understanding of variation across the ecological community. Reassess the conservation status of the ecological community. Undertake dieback mapping and risk assessment of dieback susceptible areas. Undertake or support ongoing research aimed at managing major weeds and feral animals. Research the effects of fire on floristics and structure of vegetation, native fauna and invasive species in patches and across the broader landscape: Keep precise records of fire history; Monitor the response of the ecological community to fire, using an appropriate measure (structure, species composition, population of key species, habitat features etc) with a monitoring design that aims to improve understanding of the response to fire of the ecological community; • Identify and publish appropriate fire management regimes to conserve key species and the broader ecological community. For example, address the effects of fire intervals and timing on seedbank accumulation and seedling recruitment to inform the identification of fire regimes that maintain or recover floristic diversity and an open grassy structure; and Monitor and manage how the outcomes of fire interacts with the management of other threats, for instance ongoing weed management and management of feral predators. Develop a weed management strategy that includes integrated weed management over large areas. Undertake research aimed at managing feral animals and major weeds, such as African boxthorn (*Lycium ferocissimum*), African Lovegrass (*Eragrostis curvula*), Buffel Grass (*Cenchrus*	

Document	Priority actions	Implementation
	ciliaris), Coolatai Grass (*Hyparrhenia hirta*), Lippia (*Phyla canescens*), Mother-of-millions (*Bryophyllum delagoense*), Parthenium Weed (*Parthenium hysterophorus*), Perennial Veldt Grass (*Ehrharta calycina*), Rhodes Grass (*Chloris gayana*) and Prickly Pear (*Opuntia spp.* and related genera). Conduct research leading to the development of effective landscape-scale rehabilitation and maintenance of vegetation condition for the ecological community. Investigate the interactions between threats (e.g. fire and grazing regimes, climate change, dieback, hydrological changes) to determine how an integrated approach to threat management can be implemented. Research the effects of alternative grazing regimes, identify optimal and sustainable grazing regimes, and determine appropriate management prescriptions to maintain plant diversity and/or faunal habitat quality. Investigate key ecological interactions, such as the role of fauna in pollination, seed dispersal and nutrient cycling. Also investigate the mechanisms of mammal decline and understanding the ecological role of mycophagous mammals; and decline of other fauna, e.g. pollinators. Investigate the most cost-effective options for restoring landscape function, including: re-vegetation or assisted regeneration of priority areas, potentially buffering, connecting and protecting existing remnants; weed, and predator control options such as trapping and baiting, urban containment, exclusion fencing; re-introduction of key fauna; Determine optimal management regimes and best practice management standards including for integrated fire, grazing and invasive species best practice for each region within its broad range (e.g. Brigalow Belt North and NSW Southwestern Slopes IBRA Bioregions, Central West Local Land Services Condamine, Alliance Natural Resource Management organisation). Undertake analysis of the hydrological needs of the ecological community including groundwater, surface water flow, impacts from dryland salinity, the legacy effects of water table decline and possible management responses. Further assess the vulnerability of the ecological community to climate change and investigate ways to improve resilience through other threat abatement and management actions. enable options to avoid the need to offset; retain remaining patches rather than offset;	

Document	Priority actions	Implementation
	Ensure that offsets are consistent with the wording and intent of the EPBC Act Environmental Offsets Policy (Commonwealth of Australia 2012), including: 'like-for-like' principles based on meeting the overall definition of the ecological community and considering the particular species composition, maturity of trees, vegetation structure and other habitat and landscape features at a particular site (e.g. do not use offsets distant from the site of impact, as there is local variation of the ecological community); how proposed offsets will address key priority actions outlined in this Conservation Advice and any other relevant recovery plans, threat abatement plans and any other Commonwealth management plans. demonstrate that offsets are feasible (i.e. by reference to successful applications elsewhere) with outcomes expected within reasonable time frames to offset development impacts; match any offsets to the same ecological community, as it is not appropriate to offset losses of one ecological community with another ecological community; avoid offsetting a particular component of the national ecological community with a different component, e.g. loss of a certain Queensland regional ecosystem should be offset with patches that are the same regional ecosystem, where possible; do not use offsets too distant from the site of impact, given the broad distribution and inherent variation within the ecological community; maintain (or increase) the overall area, quality and ecological function of the remaining extent of the ecological community and improve the formal protection of high quality areas through a combination of the following measures: protecting and managing offset sites in perpetuity in areas dedicated under legislation for conservation purposes; that is, do not allow reduction in their size, condition and ecological function in the future through ongoing threat abatement measures and adaptive management based on monitoring; and/or increase the area and improve ecological function of the woodlands, for example by enhancing landscape connectivity (e.g. protecting and linking smaller remnants), habitat diversity and condition; and/or-restoring patches to improve their condition, particularly	

Document	Priority actions	Implementation
	to ensure that any offset sites add additional value to the remaining extent.	

3. Offset Area

3.1 Tay-Glen

The candidate offset property, Tay-Glen, occupies 10,832 ha within Lot 3 on SP314273 adjacent to the town of Dysart, Queensland. A subset of this property (7415 ha) has been chosen as the offset area (Figure 1). This property, located within the Bowen Basin subregion of the Brigalow Belt Bioregion is close to the VSCM. This property was selected for the following reasons:

- Its proximity to the impact site,
- its proximity to state and regional biodiversity corridors,
- field verified biodiversity values (Sections 3.7), and
- the potential to locate further offsets on the same property for other projects, thus creating larger areas of biodiversity offsets and achieving improved environmental outcomes.

The predominant use of the offset property is cattle grazing with a small amount of cropping. Within the eastern and central portion of the property there are large areas of remnant vegetation and areas of High-value Regrowth (HVR) are spread throughout the site. The survival of this vegetation is presumably due to the difficult terrain and low fertility of the soils. Two waterways dissect the north (Philips Creek), and south (Stephens Creek), of the property from west to east. The waterways form a degraded connectivity corridor.

3.2 Connectivity

Riparian corridors classed as local and state under QLD Waterway Mapping dissect the offset area along the two waterways. (Figure 8)

The Tay-Glen offset area is within 2.5 km of a biodiversity corridor of state significance, located to the south and west that connects the Carborough and Cherwell Ranges, and the Dawson and Boomer Ranges. Enhancing the habitat quality adjacent to the State Significant corridors and minor local corridors will increase the size and function of the corridors.

The site is also located within 3 km of other proposed offset sites for the project, clustering of offsets further enhances the ecological values and connectivity of the area. This is further enhanced as large areas of habitat are being appropriately managed for weeds, feral animals and fire, creating culminative benefits, which are difficult to achieve on a single offset site.

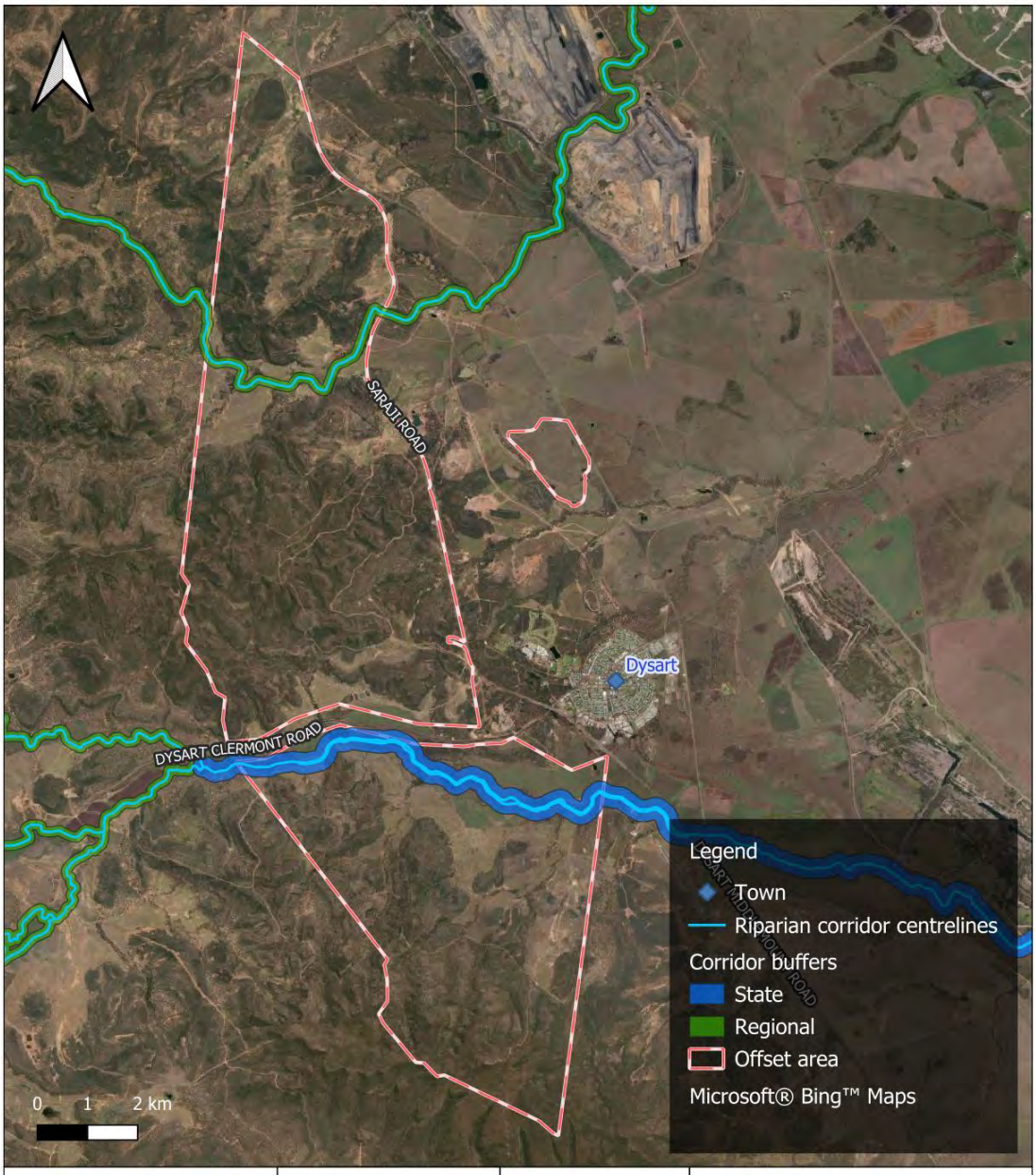

Figure Name: State Biodiversity corridors	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 8: State Biodiversity Corridors

3.3 Existing protection

The existing level of protection is an important consideration for potential offset areas. An offset has maximum benefit if it delivers a high level of protection to areas that otherwise had a high risk of loss. Offsets are only suitable for areas of land that are not fully protected from clearing by other laws or legal instruments.

Vegetation in Queensland is protected on various levels under the *Vegetation Management Act 1999* (VM Act), summarised as follows:

- Category A: Compliance areas. Environmental offset areas, declared areas
- Category B: Remnant vegetation
- Category C: High value regrowth
- Category R: Areas within 50 m of a watercourse or drainage within all Great Barrier Reef catchments.
- Category X: Exempt

The Regulated Vegetation Map is presented in Figure 3 (Below) and identifies The Tay-Glen property contains the following classifications of vegetation under the VM Act according to Queensland Globe, with:

- Category B remnant vegetation,
- Category X containing non-remnant vegetation.

Despite the fact that remnant vegetation is protected in Queensland as category B, a small amount of clearing occurs annually through exempt works and illegal activities. In cattle grazing property, such exempt works include clearing for fodder harvesting, ensuring public safety, building a residence, reducing hazardous fuel loads, harvesting timber to repair infrastructure, managing thickened vegetation, and establishing fences, tracks and firebreaks. Additionally, grazing within these habitats, if not managed appropriately, will cause significant loss of biodiversity and ecological functions of these mapped areas. While the vegetation will not be “cleared”, the ecological function of the community can be “lost”.

The Australian Government’s Offset Assessment Guide requires an estimate of risk of loss with and without offsets over the 20-year offset period. To calculate the background risk, historical clearing patterns were examined using data published for the Statewide Landcover and Trees Study (SLAT). By overlaying data gathered between 2014 and 2019 with regional ecosystem mapping, the proportion of each land zone and vegetation management protection class that was cleared over the five-year period was calculated.

In The University of Queensland’s (2017) *Guidance for Deriving ‘Risk of Loss’ Estimates When Evaluating Biodiversity Offset Proposals under the EPBC Act*, they recommend that ‘risk of loss’ estimates be based on recent background clearing patterns in the region of interest. This report also presents background clearing rates for each local government area in Australia. While useful as a guide, these clearing rates do not take into account more recent data published since 2014. Furthermore, these clearing rates do not consider the differing risk of loss experienced by vegetation growing on different land zones (plains and more fertile clay soils are under greatest pressure for agriculture), tenure types, and with varying levels of protection under the VM Act.

Only freehold land was considered, to reflect this risk at the offset site. The results of this analysis are presented for Tay-Glen in Table 4. As expected, vegetation with higher protection status (Category A and B regulated vegetation) has a lower risk of loss than unprotected, non-remnant vegetation (Category X vegetation). The weighted average risk of loss for the entire offset site is 11.9%. This suggests that important conservation gains can be made by increasing the level of protection of this habitat through a Voluntary Declaration (VDec) under the VM Act where areas of HVR occur but is designated as Category X vegetation, which will elevate nominated areas to Category A.

The offset areas are described below in terms of the vegetation categories currently contained within them.

Table 4 Existing status of vegetation within the Tay-Glen offset area and the current risk of clearing

Land Zone	Category of regulated vegetation	Woody vegetation present in 2014*	Loss between 2014 and 2019*	Percentage loss over 5 years	Percentage loss over 20 years
3	B	1,354,296.6 ha	19,146.0 ha	1.41%	5.65%
5	B	890,237.2 ha	16,069.6 ha	1.81%	7.22%
5	X	1,721,556.3 ha	139,823.1 ha	8.12%	32.49%
Total		3,966,090.10 ha	175,038.70 ha	**Weighted average loss†**	11.9%

*Calculations are based on the entire Brigalow Belt bioregion.

†Average loss is weighted by the relative proportions of the different land zones and regulated vegetation classes within the offset area.

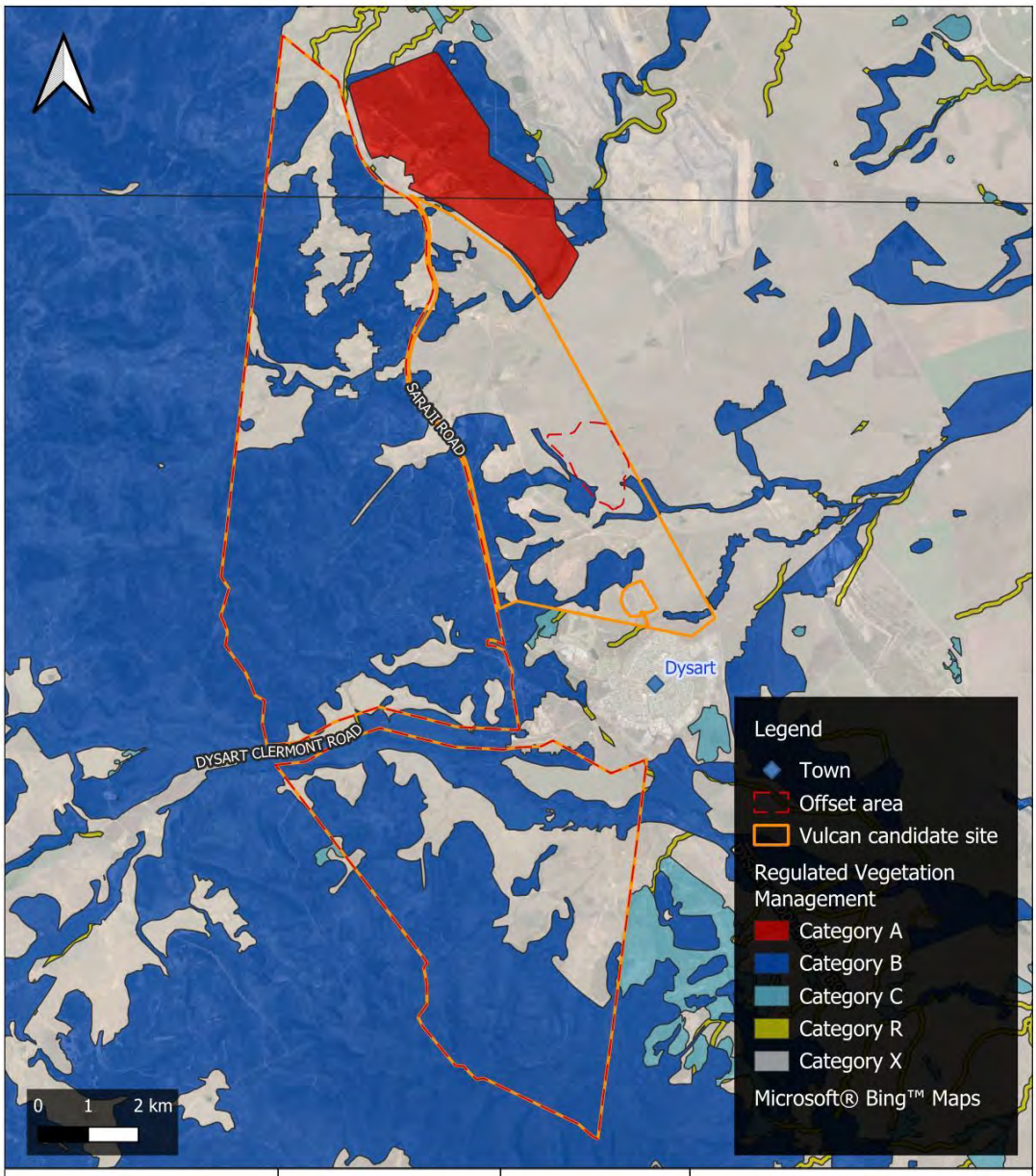

Figure Name: Regulated Vegetation Management Map	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 9: Regulated Vegetation Mapping

3.4 Landscape

The offset property contains a variety of habitat types and topography. The topography ranges from 450 m above sea level to 190 m above sea level. This variation in topography has led to a variety of land zones within the offset property including the following:

- land zone 3: Cainozoic alluvial plains and piedmont fans,
- land zone 4: Cainozoic clay deposits, gently undulating plains,
- land zone 5: Cainozoic sand deposits, extensive flat or gently undulating plains,
- land zone 8: Cainozoic igneous rocks, flooded basalts forming extensive plains and occasional low scarps, and
- land zone 10: Cainozoic/Proterozoic consolidated medium to coarse grained sediments.

The offsite property contains several dams, water tanks and ephemeral to permanent waterways occurring within its boundary providing viable year-round water sources for native fauna. The offset property contains several first and second order streams including Downs Creek to the east of the offset property and Stephens Creek within the southern section of the of the offset property. A majority of Stephens Creek contained water and while it is unlikely to be a permanent source of water, it is expected to contain water for extended periods.

The Queensland Government's *Guide to Determining Terrestrial Habitat Quality version 1.3* specifies that the landscape-scale components of BioCondition are not considered as part of habitat quality for offsets. They are nevertheless to be reported, as position in the landscape must be appropriate for delivering an offset that achieves a conservation outcome. A "moderate" landscape score is necessary for an offset to be suitable, although the minimum acceptable landscape-scale attribute score is "determined by the administering agency on a case-by-case basis".

The offset site had a landscape score of 16/20, which is slightly higher than the impact site's score of 14/20 (Table 5). The high landscape score of the offset site is likely to be suitable for delivering offset gains for the MNES.

Table 5 Landscape-scale BioCondition scores

Landscape Attribute	Impact Site	Tay-Glen offset area
Size of patch	10/10	10/10
Connectivity	0/5	2/5
Context	4/5	4/5
Total score	14/20	16/20

3.5 Vegetation

The regional ecosystem map published by the Queensland Herbarium shows multiple vegetation units within the offset site. The boundaries of these units were refined based on satellite imagery, and their identities were ground-truthed during field surveys. These field surveys revealed that the published mapping was largely correct.

Benchmarks are specific to each regional ecosystem (R.E) or vegetation community in Queensland. However, some R.Es are still missing benchmarks on the Regional Ecosystem Description Database (REDD) maintained by the Queensland Herbarium, Department of Environment, Science and Innovation (DESI).) BioCondition Benchmark Database. Version 3.4 (April 2023). The AU 14 on the offset site, for example, (R.E 11.10.8 - *Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary rocks*) has no benchmarks described by the Queensland Herbarium (2023) BioCondition Benchmark Database. In this

case, the benchmark used for the offset site was 11.9.4a - *Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary rocks*), suggested to be the closest vegetation similarities for R.E 11.10.8.

The field-verified mapping found 43 distinct vegetation units contained within the offset area. These are detailed in Table 6 with Figures 10 to 13 presenting the location.

All REs within the offset property could be classified as Category B, Category C or Category X (Table 6). In areas where the vegetation is mapped as remnant, there was evidence of extensive historic clearing, timber harvesting, thinning and grazing.

Non-remnant areas varied from open paddocks of agricultural feed to containing extensive regrowth shown by the presence of saplings and seedlings. A number of these areas also appeared to have been chemically treated, indicating while the area may contain minimal current vegetation, significant seed source is still present. Areas of high value regrowth seemed to have experienced significant disturbance including aerial herbicide spraying. Without spraying the natural progression of plant communities suggest that in certain sections natural regeneration without the need for planting is likely.

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Table 6 Vegetation units contained within the offset sites

Assessment unit	Regional ecosystem	Descriptions	VM Act category	MNES habitat	Area (ha)
AU01	11.10.1	*Corymbia citriodora* woodland on coarse-grained sedimentary rocks	B	Squatter Pigeon (dispersal), Greater Glider (current & likely denning), Koala (foraging, shelter and dispersal)	57.37
AU02	11.10.12	*Eucalyptus populnea* woodland on medium to coarse-grained sedimentary rocks	X	Squatter Pigeon (dispersal), Koala (dispersal)	77.91
AU03	11.10.12	*Eucalyptus populnea* woodland on medium to coarse-grained sedimentary rocks	C	Squatter Pigeon (dispersal), Koala (dispersal)	3.08
AU04	11.10.1x1	Variation of *Corymbia citriodora* woodland on coarse-grained sedimentary rocks. This variation includes *Eucalyptus crebra, Corymbia clarksoniana, Eucalyptus melanophloia* and *Acacia burdekensis* in varying proportions in the emergent and/or canopy layers.	X	Squatter Pigeon (dispersal), Koala (foraging, shelter and dispersal)	31.29
AU06	11.10.1x1	Variation of Corymbia citriodora woodland on coarse-grained sedimentary rocks. This variation includes Eucalyptus crebra, Corymbia clarksoniana, Eucalyptus melanophloia and Acacia burdekensis in varying proportions in the emergent and/or canopy layers.	B	Squatter Pigeon (dispersal), Greater Glider (current & likely denning), Koala (foraging, shelter and dispersal)	2705.07
AU07	11.10.3	*Acacia shirleyi* or *A. catenulata* open forest on coarse-grained sedimentary rocks. Crests and scarps	X	Squatter Pigeon (dispersal), (Koala (foraging, shelter and dispersal)	46.89
AU08	11.10.3	*Acacia shirleyi* or *A. catenulata* open forest on coarse-grained sedimentary rocks. Crests and scarps	C	Squatter Pigeon (dispersal), Koala (foraging, shelter and dispersal)	28.51
AU09	11.10.3	*Acacia shirleyi* or *A. catenulata* open forest on coarse-grained sedimentary rocks. Crests and scarps.	B	Squatter Pigeon (dispersal), Greater Glider (current & likely denning), Koala (foraging, shelter and dispersal)	1229.72
AU10	11.10.7	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	X	Squatter Pigeon (dispersal), Koala (foraging, shelter and dispersal)	259.65
AU11	11.10.7	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	C	Squatter Pigeon (dispersal), Koala (foraging, shelter and dispersal), Greater Glider (potential future denning)	9.77

Assessment unit	Regional ecosystem	Descriptions	VM Act category	MNES habitat	Area (ha)
AU12	11.10.7	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	B	Squatter Pigeon (dispersal), Koala (foraging, shelter and dispersal), Greater Glider (potential future denning)	567.59
AU13	Disturbed 11.10.7	*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	B	Squatter Pigeon (dispersal), Koala (dispersal), Greater Glider (foraging)	12.80
AU14	11.9.4a	Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary	B	Squatter Pigeon (dispersal), Koala (dispersal), Greater Glider (potential future denning)	33.38
AU15	11.3.1	*Acacia harpophyl*la and/or *Casuarina cristata* open forest on alluvial plains	C	Squatter Pigeon (breeding & foraging), Koala (dispersal)	19.01
AU16	11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	B	Squatter Pigeon (foraging), Koala (dispersal)	28.10
AU17	11.3.2	*Eucalyptus populnea* woodland on alluvial plains.	X	Squatter Pigeon (breeding & foraging), Koala (foraging, shelter and dispersal)	212.56
AU18	11.3.2	*Eucalyptus populnea* woodland on alluvial plains.	C	Squatter Pigeon (breeding & foraging), Koala (foraging, shelter and dispersal)	7.47
AU19	11.3.2	*Eucalyptus populnea* woodland on alluvial plains.	B	Squatter Pigeon (foraging), Koala (foraging, shelter and dispersal), Greater Glider (potential future denning)	92.03
AU20	Disturbed 11.3.2	*Eucalyptus populnea* woodland on alluvial plains.	B	Squatter Pigeon (breeding & foraging), Koala (foraging, shelter and dispersal), Greater Glider (potential future denning)	30.57
AU23	11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	B	Squatter Pigeon (breeding & foraging), Koala (foraging, shelter and dispersal), Greater Glider (foraging)	205.13
AU24	Disturbed 11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	B	Squatter Pigeon (breeding & foraging), Koala (foraging, shelter and dispersal)	6.36

Assessment unit	Regional ecosystem	Descriptions	VM Act category	MNES habitat	Area (ha)
AU25	11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	X	Squatter Pigeon (breeding & foraging), Koala (foraging, shelter and dispersal)	47.44
AU26	11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	B	Squatter Pigeon (breeding & foraging), Koala (dispersal)	61.06
AU27	Disturbed 11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	B	Squatter Pigeon (breeding & foraging), Koala (dispersal)	15.33
AU29	11.3.39	*Eucalyptus melanophloia +/- E. chloroclada* open woodland on undulating plains and valleys with sandy soils	B	Squatter Pigeon (foraging), Koala (dispersal)	0.34
AU30	Disturbed 11.3.39	*Eucalyptus melanophloia +/- E. chloroclada* open woodland on undulating plains and valleys with sandy soils	B	Squatter Pigeon (foraging), Koala (dispersal)	0.30
AU31	11.4.9	*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	X	Squatter Pigeon (foraging), Koala (shelter and dispersal), ornamental snake	185.64
AU32	11.4.9	*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	B	Squatter Pigeon (breeding & foraging), Koala (shelter and dispersal), glossy black cockatoo	8.55
AU33	Disturbed 11.4.9	*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	B	Squatter Pigeon (breeding & foraging), Koala (shelter and dispersal), glossy black cockatoo	401.22
AU34	11.5.3	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	X	Squatter Pigeon (foraging), Koala (foraging, shelter and dispersal)	9.98
AU35	11.5.3	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	C	Squatter Pigeon (foraging), (Koala (foraging, shelter and dispersal)	22.76
AU36	11.5.3	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	B	Squatter Pigeon (foraging), Koala (foraging, shelter and dispersal)	0.68
AU38	11.5.9b	*Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius +/- Corymbia* spp. woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges.	X	Squatter Pigeon (foraging), Koala (foraging, shelter and dispersal)	785.52
AU39	11.5.9b	*Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius +/- Corymbia* spp. woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges.	C	Squatter Pigeon (foraging), Koala (foraging, shelter and dispersal)	31.52

Assessment unit	Regional ecosystem	Descriptions	VM Act category	MNES habitat	Area (ha)
AU40	11.5.9b	*Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius +/- Corymbia* spp. woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges.	B	Squatter Pigeon (foraging), Koala (foraging, shelter and dispersal), Greater Glider (potential future denning)	1081.93
AU41	Disturbed 11.5.9b	*Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius +/- Corymbia* spp. woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges.	B	Squatter Pigeon (breeding & foraging), Koala (foraging, shelter and dispersal), Greater Glider (potential future denning)	13.10
AU42	11.5.12a	*Corymbia clarksoniana* woodland and other *Corymbia* spp. and *Eucalyptus* spp. on Cainozoic sand plains and/or remnant surfaces	B	Squatter Pigeon (foraging), Koala (dispersal)	110.17
AU43	Disturbed 11.10.12	*Eucalyptus populnea* woodland on medium to coarse-grained sedimentary rocks	B	Squatter Pigeon (dispersal), Koala (foraging, shelter and dispersal)	2.75

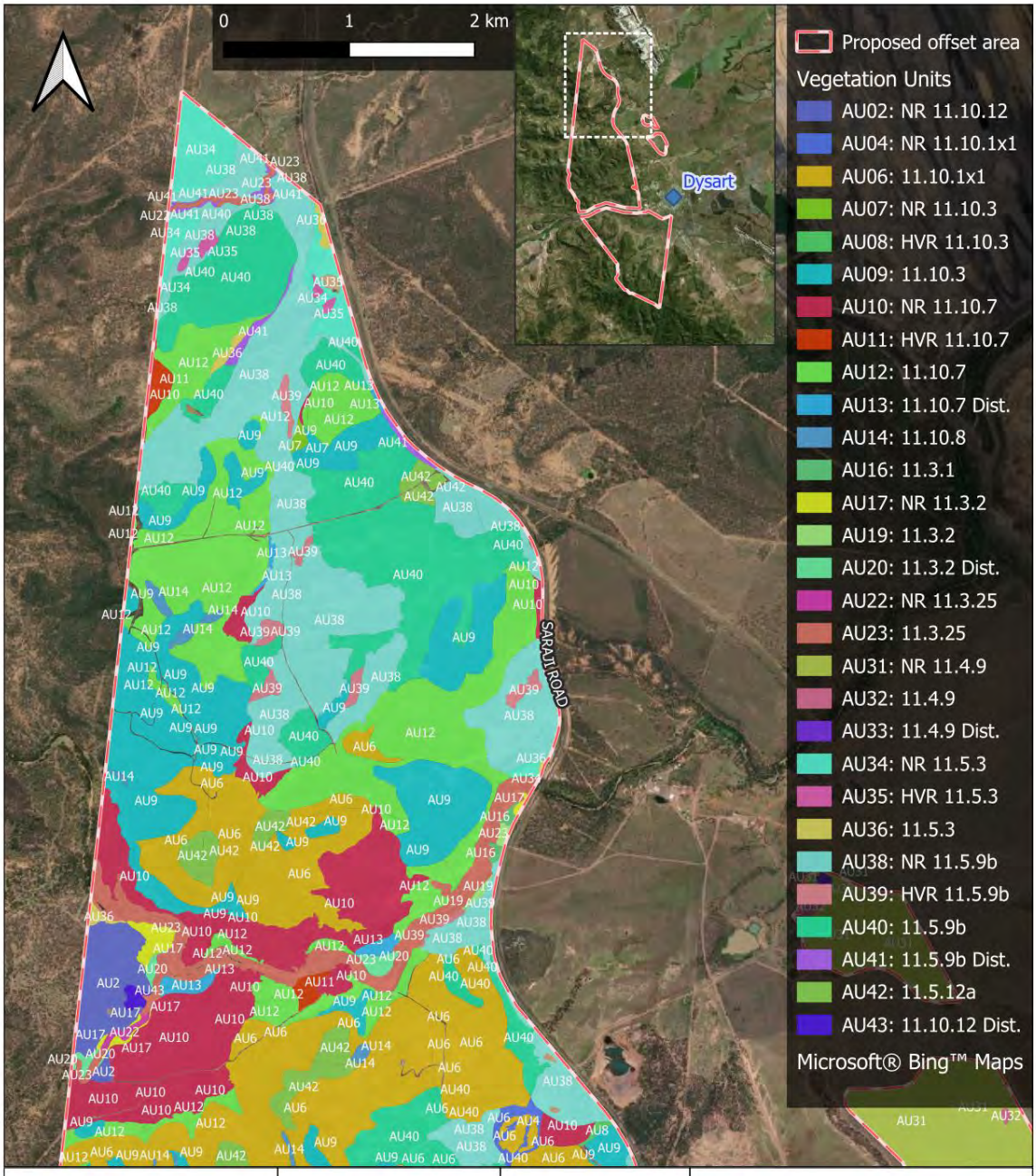

Figure Name: Vegetation units within offset site (North)	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
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		Scale: 1:40000	Spatial Reference: GDA2020 / MGA zone 55

Figure 10: Vegetation units within the offset site (north region)

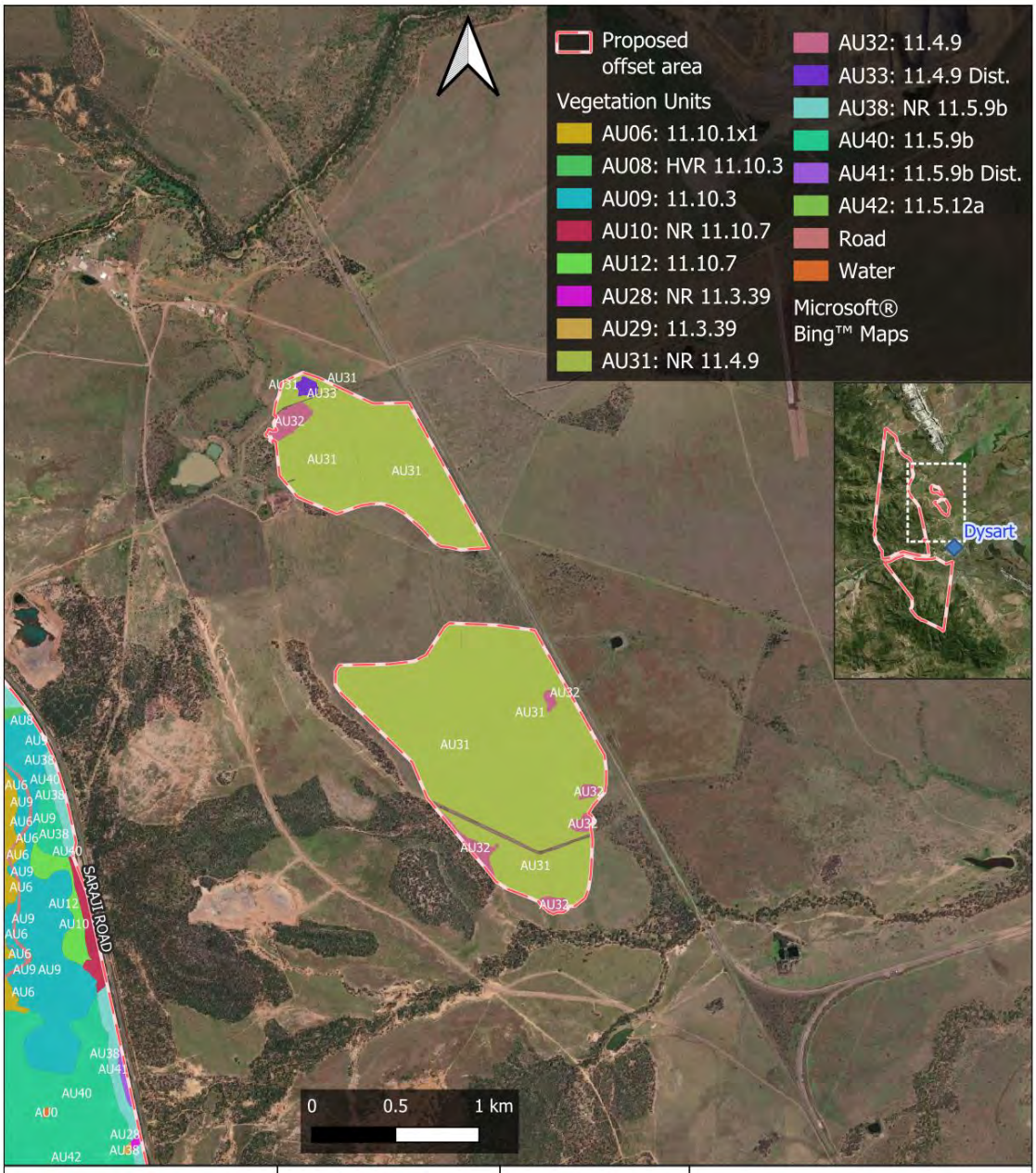

Figure Name: Vegetation units within offset site (Central East)	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
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		Scale: 1:30000	Spatial Reference: GDA2020 / MGA zone 55

Figure 11: Vegetation units within the offset site (central east region)

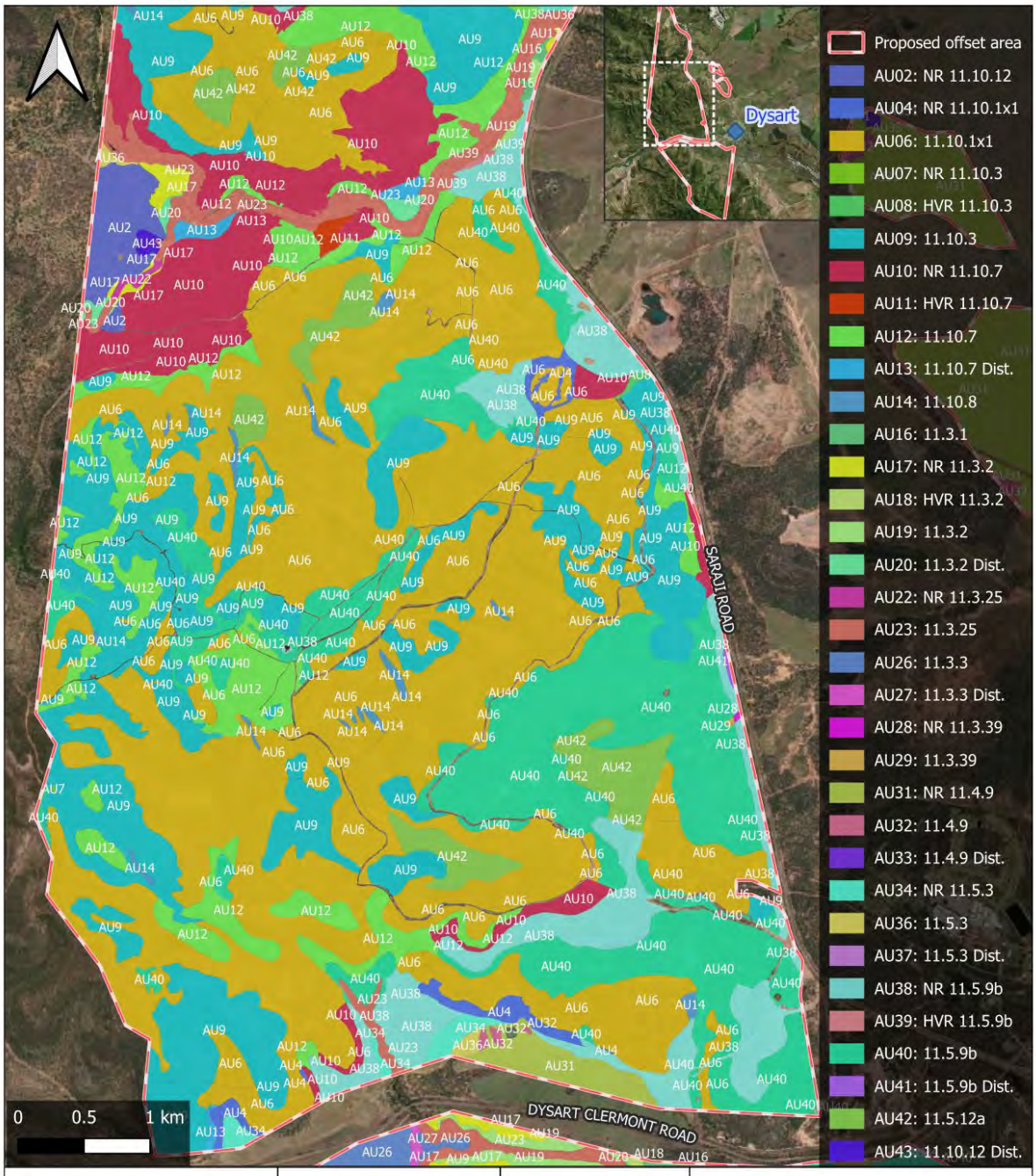


Figure Name: Vegetation units within offset site (Central West)	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:38000	Spatial Reference: GDA2020 / MGA zone 55

Figure 12: Vegetation units within the offset site (central west region)

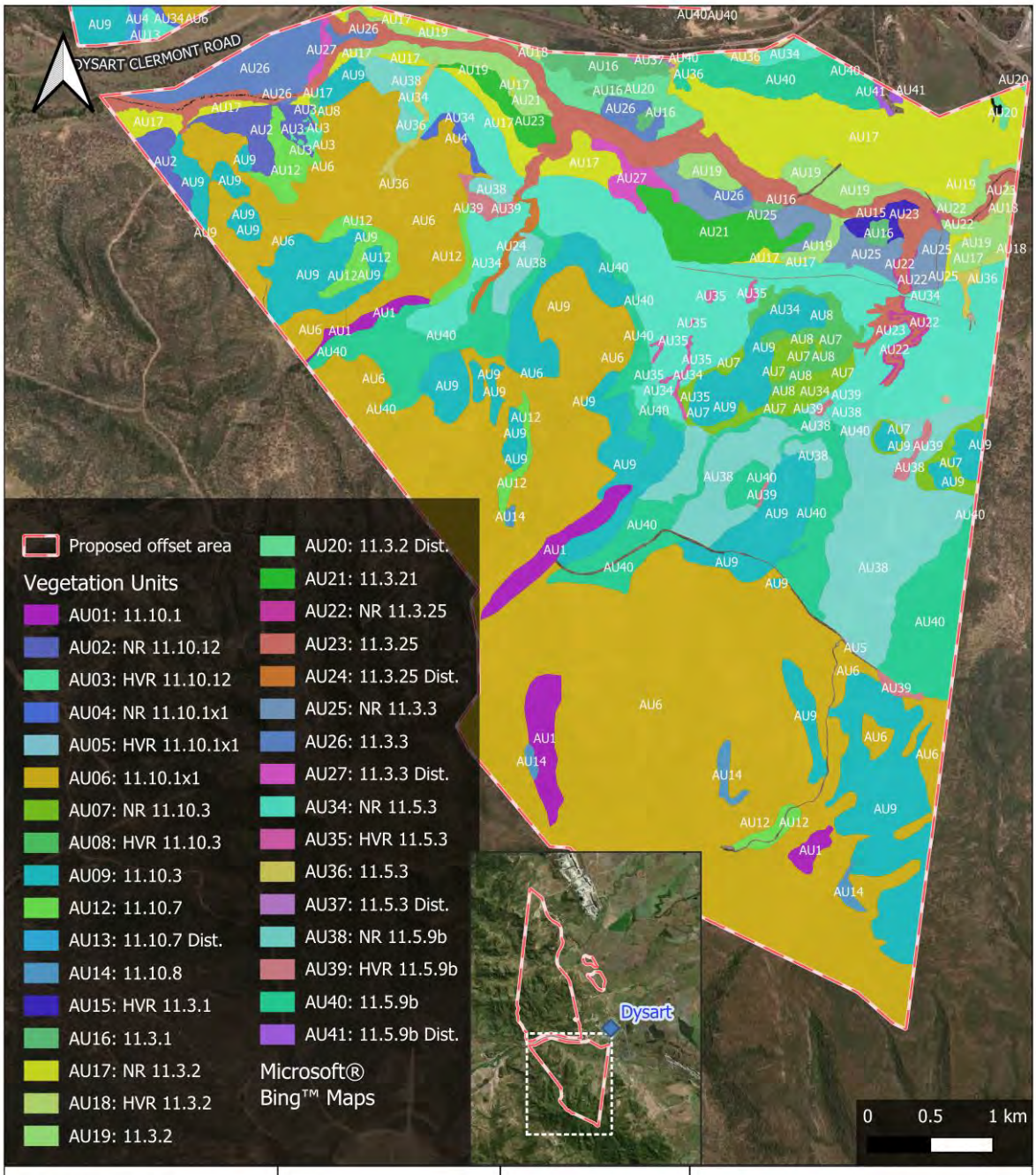


Figure Name: Vegetation units within offset site (South)	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:40000	Spatial Reference: GDA2020 / MGA zone 55

Figure 13: Vegetation units within the offset site (south region)

3.6 Presence of matters of interest

Incidental observations for Koalas, Greater Gliders, and Squatter Pigeons were undertaken within the offset area in July 2024 during the Habitat Quality Assessment field survey. The survey results and assessments of suitable habitats for the species. are presented in Appendix A-1 along with an assessment of likelihood that the offset area supports the four MNES. The assessment is summarised in Table 7.

Table 7 Presence of MNES

MNES	Likelihood of occurrence	BA Assessment
Koala	Known to occur	A single koala individual was observed during habitat quality surveys (July 2024)
Squatter pigeon	Known to occur	Several individuals (>10) were observed during habitat quality surveys (July 2024)
Greater Glider	Likely	Suitable habitat for the Greater Glider was observed throughout the offset area. Biodiversity Australia ecologists have recorded high numbers of individuals within 28 km of the offset property on previous ecological surveys
Glossy Black Cockatoo	Potential	Suitable foraging habitat were observed on site in small patches.
Brigalow TEC	Known to occur	RE's associated with Brigalow TEC (RE 11.3.1 & 11.4.9) were directly observes in the July 2024 surveys. The offset site has the potential, through effective management to achieve TEC status.
Poplar box grassy woodland on alluvial plains TEC	Known to occur	RE's associated with Poplar Box TEC (RE 11.3.1) were directly observed in the July 2024 survey. The offset site has the potential, through effective management to achieve TEC status.

The offset site is a low risk option for the Koala and Squatter Pigeon however it is a moderate to high risk option for the Greater Glider due to a lack of confirmed local populations and limited high value habitat within the offset property. These risks were accounted for when inputting confidence values within the Offset Assessment Guide calculator.

3.7 Starting Habitat Quality Scores

Habitat quality was assessed using BioCondition and Habitat quality assessments spanning 43 vegetation units surveyed from May to July 2024. Further information of the assessment methods and results can be found in Appendix A-1 and summarised in Table 8.

Table 8 Summary of initial habitat quality within the offset property

MNES	MNES area (ha)	Starting habitat quality score	EPBC Calculator score
Koala (foraging shelter and dispersal	7360.16	52.49	6
Koala (shelter & dispersal)	185.64	53.00	6
Koala (dispersal	360.85	35.25	4
Squatter Pigeon (breeding, foraging, & dispersal)	3365.48	65.93	7
Squatter Pigeon (foraging & dispersal)	2283.40	54.54	7
Squatter Pigeon (dispersal)	5065.76	67.85	7
Greater Glider existing / likely denning	3992.15	48.00	5
Greater Glider potential future denning	1828.36	48.34	5
Greater Glider foraging	217.92	71.12	8
Brigalow	241.31	32.76	4
Poplar Box grassy woodland on alluvial plains	122.59	56.25	6

4. Offset completion criteria and performance targets

If an offset is to successfully achieve its objective of compensating for the project's impacts on MNES the following must be achieved:

- the Offset Assessment Guide must demonstrate that the scale of the offset and the projected gains adequately compensate for the impact,
- the projected habitat quality gains used for the Offset Assessment Guide must be achieved on site, and
- the projected habitat quality gains must be achieved in the time frame used in the Offset Assessment Guide.

The first condition is assessed and confirmed in Appendix A-1. Based on the projected gains predicted in Appendix A, the completion criteria are outlined in Table 9.

These completion criteria accord with SMART principles, being specific, measurable, achievable, relevant and time specific. They also allow a degree of flexibility in how the habitat quality gains are being achieved. For example, if grazing management does not deliver a forecast gain, additional weed control could be employed to achieve this. Furthermore, less-than-expected improvements in one assessment unit can be compensated for by greater-than-expected improvements in another assessment unit of comparable size and matter area.

To monitor the progress of the offset towards its completion criteria, five-yearly interim targets have been developed. These targets are to be assessed during the rounds of monitoring proposed in 2029, 2034, 2039 and 2044. Interim targets have been developed by assigning habitat attributes into two categories:

- attributes that will result in initial improvements within the first five-year period, then no subsequent changes (e.g., exposure to feral predators, grazing impacts on grass cover), and
- attributes that improve linearly throughout the duration of the offset (e.g., basal area of Koala and Greater Glider food trees, understorey species richness, number of large trees).

A summary of the proposed interim targets and completion criteria are provided in Table 9 below

Table 9 Interim targets and completion criteria

MNES	Offset area (ha)	Habitat quality score / 10				
		Initial	Year 5	Year 10	Year 15	Year 20
Koala (foraging shelter and dispersal)	7360.16	5.2	5.5/10	5.8/10	6.1/10	6.4/10
Koala (shelter)	185.64	5.00	5.3/10	5.6/10	5.9/10	6.2/10
Koala (dispersal	360.85	3.5	3.7/10	3.9/10	4.2/10	4.5/10
Squatter Pigeon (breeding, foraging, & dispersal)	3365.48	6.5	6.7/10	6.9/10	7.1/10	7.5/10
Squatter Pigeon (foraging)	2283.40	5.4	6.0/10	6.6/10	7.2/10	7.8/10
Squatter Pigeon (dispersal)	5065.76	6.7	7.0/10	7.3/10	7.6/10	8/10
Greater Glider existing / likely denning	3992.15	4.8	5.0/10	5.2/10	5.5/10	5.8/10
Greater Glider potential future denning	1828.36	4.8	5.0/10	5.3/10	5.5/10	5.8/10
Greater Glider foraging	217.92	7.1	7.4/10	7.6/10	7.8/10	8.1/10
Brigalow (remnant)	36.66	6.2	6.2/10	6.5/10	6.7/10	7.0/10
Brigalow (non-remnant)	185.4	3.6	4.6/10	5.6/10	6.6/10	7.6/10
Poplar Box grassy woodland on alluvial plains	122	5.6	5.9/10	6.1/10	6.4/10	6.6/10

5. Management objectives

The objectives of the OAMP include:

- Enhance protection of the offset site from the threat of clearing for the duration of the impact;
- Improve BioCondition derived scores for Brigalow TEC and Poplar Box grassy woodland on alluvial plains TEC within the offset areas; and;
- Improve the habitat quality scores for the Koala, Squatter Pigeon, Ornamental Snake and Greater Glider by 1/10 over 20 years within the offset site

If the above objectives are successfully achieved, the offset will lead to no net loss for the Koala, Greater Glider, Squatter Pigeon, and Brigalow TEC as a result of the project, as measured using the Offset Assessment Guide.

6. Risks of failure to achieve offset completion criteria

Each risk has been assessed against the risk matrix (Table 10) that was supplied by the DCCEEW. Potential risks preventing the achievement of the management objectives are considered in Table 12. The risk matrix has been used to assess the risk that the plan's objectives will not be met and identify the sources of those risks and strategies for managing them.
The risk assessment:

- identifies events that will, may, or are likely to impact the attainment of the completion criteria.
- assesses the likelihood and consequences of those events, and characterises residual risk levels, taking into consideration the mitigation of the risk by implementing the management actions; and
- identifies the level of uncertainty in mitigating the risk with the management actions and trigger criteria and corrective actions until the risk is reduced to an acceptable level.

Table 10 Risk matrix (DCCEEW)

Qualitative measure of likelihood (how likely is it that this event/circumstance will occur after management activities are implemented)	
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances
Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Minor	Minor incident of environmental damage that can be reversed (e.g. short-term delays to achieving plan objectives, implementing low-cost, well-characterised corrective actions)
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts (e.g. short-term delays to achieving plan objectives, implementing well-characterised, high-cost/effort corrective actions)
High	Substantial instances of environmental damage that could be reversed with intensive efforts (e.g. medium-long term delays to achieving objectives, implementing uncertain, high-cost/effort corrective actions)

Qualitative measure of likelihood (how likely is it that this event/circumstance will occur after management activities are implemented)	
Major	Major loss of environmental amenity and real danger of continuing (e.g. plan objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies)
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage (*e.g. plan objectives are unable to be achieved, with no evidenced mitigation strategies*)

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

Table 11 Management objectives

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
Force Majeure Events								
Mining of the offset site	No production permits currently cover the proposed offset site. Exploration permits for coal and petroleum do not cover any proportion of the Tay-Glen offset property. If mining were to take place within the offset site, this may result in the removal of habitat.	Rare	Critical	High	The offset site has been positioned outside areas covered by existing production permits. The legal security over the site makes it known that the area is an offset. No available legal mechanism would render mining impossible within the offset site. However, a legally secured offset area is a prescribed matter under Queensland's Environmental Offsets Regulation 2014 and any disturbance to one would require offsetting. If the landowner's consent is needed for mining to occur, that consent will not be given. The Department is to be informed within 10 days of the landowner/approval holder becoming aware, or reasonably suspecting, that any of the following will or may occur: Consultation process for issuing a new exploration license, mining lease, or mining approval, Actual decision on issuing a new exploration license, mining lease, or mining approval, or Any exploration or mining activities occurring on the land, or sufficiently close to the land to create a non-trivial risk of impacts on the land If any of the actions above occur, the landowner/approval holder will notify the license/lease/approval winner of the offset site and that any impacts to it run a real risk of	Rare	Critical	High

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
					being significant, which would trigger a requirement to refer the proposal to the department.			
Drought	Short dry periods coinciding with monitoring events can lead to misleadingly low habitat quality scores associated with grass cover and understory species richness. Prolonged droughts may result in slower tree growth rates than anticipated over a 20-year period, resulting in smaller habitat quality improvements than anticipated. Extreme droughts may result in large-scale tree death, resulting in severe decreases in habitat quality score.	Likely	Moderate	Medium	Grazing will be closely managed within offset areas during times of drought to maintain a minimum cover of ground vegetation. Recent weather conditions are to be considered when assessing the results of monitoring against milestone criteria. No practical measures can be implemented to mitigate the effects of drought on tree growth and recruitment; however, habitat quality improvements resulting from tree growth and development constitute a minority of the total improvements anticipated and most improvements will occur even in the event of extended droughts. In the event of large-scale tree death due to extreme drought, the approval holder and the Department will work together to determine an appropriate response.	Likely	Moderate	Medium
Cyclones/ severe tropical lows/ flooding	Severe cyclones can cause large-scale tree-felling, although such wind speeds are highly unlikely to occur away from the coast, such as where the offset site is located. Moderate damage (fallen limbs and reduced canopy cover) could occur but is not expected to have lasting impacts. The most likely impact from tropical cyclones or tropical lows in subcoastal	Likely	Moderate	Medium	No practical measures can be implemented to mitigate the risk of cyclones. The offset site is in the upper catchment, where the risk of prolonged or severe flooding is minimal. Flooding is not expected to be of sufficient duration, and winds are not expected to be sufficiently severe, to cause substantial long-term harm to the site. Additionally, increased soil moisture following extreme storm events is expected to increase growth rates, likely assisting natural repair of any potential damage.	Likely	Minor	Low

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
	locations is heavy rain, leading to flash-flooding and erosion.				The risk of erosion will be managed by maintaining ground cover with <50% bare ground with native species.			
Failure to Reduce Threat of Clearing								
Unauthorised access	Unauthorised access to the offset area may result in the illegal harvesting of timber. It may also cause damage to vegetation through illegal camping and vehicles leaving tracks.	Unlikely	Moderate	Low	The offset area is located on a remote, private property where incursions by the public are infrequent. Signage will be installed at all vehicle entry points, identifying the area as an environmental offset, within 12 months of the approval of this OAMP. The installation of any new planned fences will be completed within twelve months of the approval of this OAMP. Gates providing access from main roads will be locked. Field monitoring will report on any evidence of timber harvesting.	Rare	Moderate	Low
Herbicide drift from aerial spraying on neighboring properties	Tree death can occur through herbicide drift in areas close to those where herbicide is applied. This risk is highest in areas used for cropping, where herbicide use is high, or in grazing areas where herbicides are used to control woody regrowth.	Unlikely	Major	High	The offset area is far from land used for cropping. It is also surrounded on most sides by vegetation that is protected under the Vegetation Management Act 1999 as endangered regional ecosystems. It therefore has a low risk of broadscale herbicide application.	Rare	Major	Medium

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
Inadvertent clearing by landowner due to misunderstanding about offset area boundaries or obligations	A failure to adequately communicate this OAMP with the landowner could lead to clearing of parts or all of the offset area. This risk is highest if a change in land ownership takes place during the offset.	Possible	Major	High	Within 12 months of the approval of this OAMP, a Voluntary Declaration will be registered over the offset area. This OAMP will be linked to the Voluntary Declaration so that any future landowner can access it. The offset area will be mapped as category A regulated vegetation on Queensland Government mapping, which is the primary tool used by landowners to infer a right to clear. Signage is to be installed at all vehicle entry points, identifying the area as an environmental offset.	Rare	Major	Medium
Loss of Koala or Greater Glider habitat trees during thinning	A failure to adequately communicate this OAMP with the landowner could lead to excessive thinning beyond that prescribed by the plan, resulting in long-term reductions in habitat quality scores for the Koala and Greater Glider. Inadequate training of thinning operators can lead to misidentification of woody tree species and accidental clearing of habitat trees.	Possible	Major	High	Any persons engaged in thinning activities are to read and acknowledge the commitments in this OAMP. Any persons engaged in thinning activities must be able to accurately identify the following tree species: *Eucalyptus tereticornis, Eucalyptus camaldulensis, Eucalyptus populnea, Eucalyptus crebra* and *Corymbia tessellaris*, OR all trees to be removed during thinning are to be clearly marked by a qualified person prior to any thinning activities.	Unlikely	Moderate	Low
Loss of Brigalow and/or Poplar box quality due to incorrect thinning methods	Incorrect thinning of Brigalow will likely trigger a proliferation of "suckers" which will set back any rehabilitation efforts. Inadequate training of thinning operators can lead to misidentification of woody tree species and accidental clearing of habitat trees.	Possible	Major	High	Any persons engaged in thinning activities are to have read and acknowledged the commitments in this OAMP. Thinning of Brigalow is to be undertaken first by ringbarking to avoid triggering of extensive "suckering" of horizontal roots. Once dead, ringbarked trees may be felled. Persons involved in thinning activities must be able to at minimum accurately identify the following tree species: *Acacia harpophylla* and *Eucalyptus populnea*. OR all trees	Unlikely	Moderate	Low

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
					to be removed during thinning are to be clearly marked by a qualified person prior to any thinning activities.			
Failure to Reduce Threat from Feral Predators								
Control measures are insufficient to reduce invasive feral predator numbers	Invasive predators may become trap-shy and/or bait-shy and therefore not be susceptible to the control measures in place, resulting in an increase in numbers. Failure to maintain low feral predator densities will lead to 0.5/10 less-than-forecast improvement in habitat quality for the Koala and 0.4/10 less-than-forecast improvement in habitat quality for the Squatter Pigeon. These failures are unlikely to prevent the achievement of completion criteria for the Squatter Pigeon but may prevent this for the Koala.	Possible	Moderate	Medium	Investigate potential sources or reasons for an increase in pest animal numbers and rectify. Usage of a diverse range of control measures reduces the risk of failure due to any one method. Current control of pigs and wild dogs is undertaken via a baiting program on the Tay-Glen property. This is augmented with shooting and trapping of wild pigs if numbers increase. Additionally, the Pastoral Manager, during quarterly inspections of the offset area may remove any wild cats, pigs or wild dogs that are seen. If an increase in pig or dog activity is recorded, an additional trapping, baiting and/or control program is to be instigated until the increased activity has ceased.	Unlikely	Moderate	Low
Rapid recolonisation of predators from neighboring areas	Removal of predators within small areas connected to other predator populations results in rapid recolonisation. Failure to reduce feral predator densities will lead to 0.5/10 less-than-forecast improvement in habitat quality for the Koala and 0.4/10 less-than-forecast improvement in habitat quality for the Squatter Pigeon. These failures are unlikely to prevent the achievement of	Likely	Moderate	Medium	Feral predator control over larger spatial scales is more likely to be effective than control over small scales, where recolonisation is rapid. If monitoring reveals no effect of active pest management, the intensity and/or frequency of control measures will be increased to counter recolonisation.	Possible	Moderate	Medium

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
	completion criteria for the Squatter Pigeon but may prevent this for the Koala.							
Dog control leads to increased rabbit density	Rabbit densities are currently low in the Isaac-Comet Downs subregion of the Brigalow Belt but may increase if relieved of predation pressure by cats and dogs. This may be balanced by predation by avian predators such as eagles. The overall risk is low, as populations of rabbits in central Queensland are likely limited by climate and other factors unrelated to predation (DPIF, 2008). High rabbit densities damage the habitat used by Squatter Pigeons and can lead to soil erosion.	Unlikely	High	Medium	If five-yearly monitoring indicates that rabbit densities are reducing habitat quality attributes, a rabbit control program will be implemented. Otherwise, controls are expected to be unnecessary.	Rare	High	Low
Increased Threat from Fire								
Unplanned or non-controlled fire in offset area.	The impact of uncontrolled fire would be a reduction in dry matter yields and overall ground cover, thinning of the canopy, destruction of regrowth and emerging saplings and an overall slowing of the offset site achieving the completion criteria.	Likely	Moderate	Medium	The offset sites are comprised of remnant eucalypt species circa 10-32 m in height. These communities are adapted to fire and the risk of a 100% loss is low due to lower dry matter yields (fuel load) within the communities that are further managed with grazing. Controlled burns will be undertaken as a mosaic throughout the slopes within the offset site to minimise fuel loads and the risk of high intensity fires	Possible	Minor	Low

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
Unplanned or non-controlled fire in Brigalow offset area.	Fire is likely to severely damage Brigalow to the point that all gains would be lost, effectively resetting the values to lower than starting scores.	Likely	High	High	Fires in Brigalow are lower risk if the habitat is of good quality, particularly with a low density of weeds – in particular Buffel Grass (*Cenchrus ciliaris*). Areas with high weed or shrub loads are highly susceptible to damage caused by fire. The site overall has a relatively low risk of fire with only 2 areas identified as High Risk of fire, development of fire trails, targeted grazing and controlled burns of these areas along the slopes will reduce the risk of fire within areas of Brigalow Managing fuel by controlled burning within Brigalow is high risk and should be avoided. Overall risk can be lowered by selective grazing to reduce Buffel Grass, and/or careful burning in habitats adjacent to Brigalow to reduce the chances of unintended fires reaching Brigalow	Possible	Moderate	Medium
Increased fire risk due to high fuel loads	During periods when a low-level grazing regime has occurred alongside an average or above average wet season, there is an opportunity for fuel loads to accumulate to unacceptable levels. When this occurs and the high levels of fuel are present prior to summer, the risk of wild and/or high-intensity fires is exacerbated.	Possible	High	Medium	Rotational grazing will be implemented to maintain an appropriate level of grass cover for the Squatter Pigeon (10-50% bare ground and 20-33% ground vegetation cover). This is appropriately sparse to limit the risk of hot, uncontrolled fires. Biomass monitoring will be undertaken to ensure grazing only occurs in areas and times where suitable feed is available. In the event that pasture density cannot be reduced to appropriate levels by grazing alone, controlled burns will be implemented. If required, such burns would involve cold fires lit during the months of June, July, August and September when wind speeds are less than 5 km/h.	Unlikely	Minor	Low

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
Increased Threat from Weeds								
New infestations of restricted invasive weeds in the offset area.	Infestation of previously unidentified invasive weeds within the offset area. If a weed infestation is unchecked, it may cause a significant deterioration in the offset site.	Possible	High	Medium	In the event new species are identified onsite an Investigation for potential sources, vectors or reasons for new infestation(s) will be undertaken with identified causes rectified. The offset area is has only remote access and access to the offset area will be limited, to reduce/prevent pathogen/propagule transmission vectors. If a new weed infestation is identified, weed management measures will occur as per Table 12. Weed monitoring will target potential weed vectors such as access tracks, waterways, property entries.	Unlikely	Minor	Low
Expansion of existing infestations of weed species in the offset area	Increasing weed densities reduce habitat quality scores for the Squatter Pigeon directly and indirectly through reducing cover and richness of native understory species. Increasing density of Rubber Vine may kill habitat trees for the Koala and Greater Glider, reducing habitat quality for these species. Parthenium *(Parthenium hysterophorus)* is has the potential to severely impact Brigalow .	Likely	High	High	Investigate potential sources or reasons for an expansion of existing infestation(s) and rectify. Access to the offset area will be restricted. Chemical and/or mechanical control of restricted invasive plants in accordance with the control measures outlined in the Biosecurity Queensland Fact Sheets or other sources of information.	Unlikely	Moderate	Low

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
Failure of natural regeneration on Non-remnant and Disturbed areas								
Lack of the development of the overstorey tree recruitment and woody understory species	The regeneration of woodlands is widely considered to be 'woody weeds' by landholders and regrowth vegetation management has traditionally focused on methods for controlling the development and spread of regrowth.	Likely	Hight	High	Identifification and map the location of good candidate areas for restoration, with consideration of important regrowth locations that require repair and protection. Allow regrowth / prevent further clearing of Brigalow, Poplar Box, and other vegetation types respecting pre-cleared veg type. Avoid control action that may impact natural regrowth in disturbed remnant and non-remnant areas. Identify the causes of the current state of species and communities. Engage a certified ecological professional to identify native species recruitment within non-remnant and disturbed areas of Poplar Box and Brigalow, and then apply control measures on invasive species and revegetation actions if necessary.	Unlikely	Moderate	Low
Inappropriate Grazing Management								
Insufficient levels of grazing	Vegetation communities present in the offset area naturally have a sparse grass cover with many patches of bare ground, which facilitate foraging by Squatter Pigeons. Low grazing pressure can lead to a high ratio of grass cover to bare ground that impedes foraging by Squatter Pigeons. Understory vegetation that exceeds 33% ground cover is associated with reduced habitat quality scores. Dense herbage and grass cover that cures during the dry season is also associated with	Likely	High	Medium	The offset area is fenced to contain/exclude cattle but allow movement of Koalas, Greater Gliders and Squatter Pigeons, and fences will be maintained in working order for the duration of the offset. Grazing of the offset area will be managed to maintain grass cover between 1200 kg per hectare and 2500 kg per hectare of feed. With cattle exclusion to be undertaken when feed is below 1200 kg per hectare and not reintroduced until 2500 kg per hectare of feed is present. This allows grasses and forbs to produce large crops of fallen seed (food for the Squatter Pigeon). The	Possible	Moderate	Medium

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
	increased fire risk, which is a threat to Koalas and Greater Gliders. However over grazing significantly reduces native recruitment, impacting floral diversity. Grazing will be restricted to targeted activities in areas that are above a pasture dry matter yield of approximately 2,500 kg/ha available at the end of the dry season.				introduction of cattle will thin dense grass swards and provide a favorable ratio of grass to bare ground, to provide an optimal foraging habitat for the Squatter Pigeon. Vegetative groundcover is to be maintained between 20% (Approx 1200 kg per hectare of feed) and 33% (2500 kg per hectare of feed), the optimal range for Squatter Pigeons The exact timing of cattle introduction and removal will be determined with consideration of pasture cover in conjunction with hectare of feed. Ground cover maintained in this range is likely to support a low-intensity fire, but unlikely to produce high-intensity fires fatal to Koalas and Greater Gliders.			
Excessive levels of grazing	High intensity grazing over extended periods inhibits shrub and native perennial grass cover and slows the regeneration of habitat. Low vegetative groundcover increases surface run-off of rainwater and encourages soil erosion. Insufficient groundcover vegetation causes reduced habitat quality scores for the Squatter Pigeon.	Likely	High	Medium	Fences are in working order and allow for the exclusion of cattle when needed. All water sources will be fenced and exclude cattle including, dams, creek lines and installed dams to improve Squatter Pigeon breeding habitat. Cattle are to be removed from the offset area when vegetative groundcover reaches a minimum of 20% (equivalent to a pasture dry matter yield of approximately 1,500 kg/ha), and no further rain is forecast. This will maintain ample protective cover to the soil from erosion and to Squatter Pigeons from predators.	Possible	Moderate	Medium
Thickening of woody vegetation	Prolonged grazing can promote regeneration of unpalatable trees through reduced competition with grass and reduced fire frequency. This can lead to dense stands of small-stemmed trees that compete with each other for resources and limit growth rates of individual trees.	Possible	High	Medium	Ecological burns will be undertaken, as required, to reduce the stem density of the eucalypt vegetation when there is a density of >750 immature trees/ha (DNRME, 2020). This is done to reduce competition for soil resources and therefore promote larger trees becoming established. Prescribed burns will produce low-intensity	Unlikely	Minor	Low

Risk	Threats	Initial risk ranking*			Management measures/actions	Residual risk ranking*		
		L	C	R		L	C	R
	Inhibited growth as a result of high competition results in reduced habitat quality gains associated with increased basal area of Koala and Greater Glider food trees and increased number of large trees.				fires through being undertaken in winter, to ensure no damage to mature trees.			
Failure to Achieve Performance Targets								
Cumulative risks	Minor consequences of multiple risks can combine to cause a failure to achieve and maintain interim performance targets and offset completion criteria.	Possible	High	Medium	The projected habitat quality gains used in the Offset Assessment Guide are considered conservative, as these are based on published scientific studies and the precautionary principle. Risk has also been incorporated into the Offset Assessment Guide outputs used for determining total offset area size. This means that the performance targets listed in Section 5 can be lower than the gains actually expected and still achieve no net loss of the protected matters. Additionally, offset habitat for the Koala and Squatter Pigeon exceed the targeted 100% offset by 3 or 4 times due to the overlap of these species habitat with the Greater Glider. The Poplar Box offset will be approximately 200% due to the overlap with the above three species. Yearly monitoring of pest, biomass and weed within the site ensure ongoing targets are met. Bi-annual monitoring of non-remnant vegetation to ensure suitable recruitment. Ecological (Bio-condition, habitat quality and targeted species survey) monitoring performance every five years allows for the early detection of potential problems, and the opportunity to enact alternate measures to achieve later rounds of performance targets.	Unlikely	High	Medium

*The risk ranking codes relate to the risk matrix as follows: L = Likelihood, C = Consequence, R = Risk

7. Offset management

The management of the offset aims to abate threats to the following MNES:

- Koala,
- Greater Glider,
- Squatter Pigeon, and
- Brigalow TEC.

Additionally the management aims to improve the amount or quality of habitat present within the offset site for MSES:

- Poplar Box grassy woodland on alluvial plains (RE 11.3.2), and
- Glossy Black Cockatoo.

The management actions include:

- Limiting vegetation clearing to only those areas required for, thinning excess where prescribed, and fire control lines.
- Prohibiting alternate land use and activities during the period of approval (e.g. timber harvesting, cropping);
- Restricting unauthorised access and disturbance to the Koala, Greater Glider and Squatter Pigeon.
- Managing domestic livestock within the offset area to reduce fuel loads in dry periods and enable biomass reduction of Buffel Grass as well as improving groundcover diversity;
- Controlling feral animals.
- Managing fire.
- Controlling weeds.
- Establishment of suitable watering points for Squatter Pigeons to convert foraging habitat into breading and foraging habitat
- Undertaking enhancement planting in non-remnant areas of Brigalow if natural recruitment is insufficient after 2 years and
- Removal of top barbed wire from fencing in Greater Glider habitat

The potential for these actions to improve habitat quality scores for the impacted MNES were assessed in Appendix A-1. Management measures will be implemented for the duration of EPBC Act approval in accordance with the management schedule presented in Table 12.

Table 12 Management actions, triggers and corrective actions

Management Measure	Timing	Responsibility	Performance Monitoring	Performance Trigger	Corrective Actions
Vegetation within the offset area is to be protected through a voluntary declaration under Section 19E and 19F of the VM Act.	The declaration is to be registered within 12 months of the approval of this OAMP and is to remain in effect for the period of the EPBC Act approval, or until otherwise advised by the Minister in writing.	Vitrinite's Chief Operating Officer	The land manager is to undertake monthly inspections of the offset site to identify signs of unauthorised access and clearing.	The declaration fails to be registered within 12 months of the approval of this OAMP. Any activities in contravention of the Voluntary Declaration.	A failure to register the offset area within 12 months is to be immediately reported to the Australian Government. Upon being notified or becoming aware of prohibited forestry operations, native timber harvesting or clearing: 1. The land manager is to investigate the cause of the trigger (e.g., unauthorised access). 2. The land manager is to assess how unauthorised persons accessed the site, review existing access restrictions, and inspect signage and offset area fencing within one week of detection of the clearing. 3. The Approval Holder is to report the breach within 5 business days of being aware of the incident to the Australian Government consistent with any and all EPBC Act approval(s); and 4. All actions required to prevent recurrence of the prohibited clearing (e.g., additional fencing, signage and/or security) will be completed within two months of detection of the clearing.

Management Measure	Timing	Responsibility	Performance Monitoring	Performance Trigger	Corrective Actions
Assess non remnant areas of regrowth brigalow that are suitable for ripping to increase suckering and ground seed source set **Allow regrowth / prevent further clearing of Brigalow, and other vegetation types**	As required, throughout the duration of the offset.	Land manager	Annually monitoring inspections and reports. Monitoring of large tree native recruitment is to be undertaken within the first 2 years and then every 5 years.	Areas of poor Brigalow recruitment	Undertake ripping of area that are identified as requiring ripping
Cattle-proof fencing is to be maintained surrounding the offset area and within feed paddocks.	When required, throughout the duration of offsets.	Land manager	Monthly inspections of fences and for signs that cattle are intruding into, or escaping from, fenced paddocks.	Fences not cattle-proof.	Fences are to undergo repairs within 10 days of a trigger, and escaping cattle returned to their appropriate paddock. Incidents involving breaches of the perimeter fence by cattle are to be recorded in annual reports.
Signage is to be installed at each vehicular entry point into the offset area and kept in good repair throughout the life of the EPBC Act approval. These signs inform visitors that the site is an offset area and unauthorised entry is prohibited. Authorised persons are those required to undertake actions described in this OAMP, including the landholder, and approval holder and their contractors.	Within 12 months of the approval of this OAMP.	Vitrinite's Chief Operating Officer; land manager	Quarterly inspections of signage and entry tracks for signs of unauthorised access.	Signage is absent or illegible. Evidence of unauthorised access.	Regenerating shrubbery that obscures the sign is to be manually removed. Damaged and illegible signs are to be replaced within one month of damage being detected. Sign maintenance is to be undertaken by the Pastoral Manager, Landholder or suitable qualified person appointed by the approval holder. Evidence of unauthorised entry will trigger increased surveillance, fencing or signage, depending on the likely route of entry.
Water infrastructure (dams and/or troughs) are to be maintained and established as a permanent water supply for Squatter Pigeon and Koala (Figure 15).	As required, throughout the duration of the offset.	Land manager	Levels of water in dams and/or troughs are to be checked by the land manager during monthly inspections.	Dam or trough dries out.	Temporary supplementary water infrastructures (portable tank and trough) are to be installed as soon as practicable and within one month after each trigger occurs.

Management Measure	Timing	Responsibility	Performance Monitoring	Performance Trigger	Corrective Actions
Watering points including waterways and infrastructure (dams) are to be fenced to exclude use by cattle as watering points within the offset area.	Initial fencing is to be completed within 2 years for the entire property. Areas of non-remnant Brigalow and Poplar Box must be completed within 12 months.	Land manager	Cattle are excluded from all non-mobile watering points	Cattle watering at non-mobile sites	Repair fencing and or construct cattle exclusion fencing (non-barbed top wire) around watering points.
Cattle watering points must be mobile and be relocated regularly (monthly) to ensure overgrazing does not occur.	As required, throughout the duration of the offset.	Land manager	Cattle are only watering at designated cattle watering points and overgrazing is not occurring. Grass coverage is not below 30%.	Grass cover below 30% surrounding watering point. Excessive bare ground and surface erosion caused by ungulates.	Mobile watering point to be relocated to suitable target grazing area. Over grazing of areas reduces the quality of habitat for Squatter Pigeons but also significantly reduces native recruitment, which causes a loss of diversity and can cause dense thickets of shrubs and trees which cattle avoid resulting in the requirement for thinning.
The top wire of all fences within Greater Glider habitat (excluding boundary fence) must be replaced with a smooth top wire.	Initial treatment is to be completed within the first two years of the offset.	Land manager	Monitoring within the first 2 years to confirm barbed fencing only occurs on perimeter fence.	Barbed fence present	Any non boundary fences identified with a barbed top fence are to be replaced with a smooth top wire.
Rubber Vine is to be actively controlled in accordance with the Department of Agriculture and Fisheries' (2023) *Rubber vine* factsheet. Where practicable, cut-stump method should be employed to limit collateral damage to neighbouring vegetation through herbicide application. Large infestations are to be foliar sprayed or managed with fire.	Initial treatment is to be completed within the first five years of the offset, with further treatment as required throughout the duration of the offset.	Land manager	Five-yearly monitoring is to include mapping of existing Rubber Vine infestations.	Rubber Vine present in clumps exceeding 5 m diameter. Individual Rubber Vine plants extend higher than 3 m into trees.	If threshold infestations of Rubber Vine are detected during five-yearly monitoring, the land manager is to implement weed control measures within six months of the monitoring. Weed control measures are to be in accordance with the Department of Agriculture and Fisheries' (2023) *Rubber vine* factsheet. The cut-stump or foliar spray methods are likely to be most effective for scattered infestations.

Management Measure	Timing	Responsibility	Performance Monitoring	Performance Trigger	Corrective Actions
					Treatments are to be recorded in annual reports.
Active weed control is to be implemented whenever a new restricted invasive plant listed under the *Biosecurity Act 2014* (Qld) is detected within the offset area or when existing weeds occur in infestations that cover >10% of the offset area's ground surface.	When required, throughout the duration of offsets.	Land manager	Novel infestations of restricted invasive weeds are to be searched for along tracks during quarterly inspections of the offset area by the land manager. Total weed cover is measured at permanent monitoring locations every five years.	Restricted invasive plant cover >10% of the offset area's ground surface. A new restricted invasive plant listed under the *Biosecurity Act 2014* (Qld) is identified within the offset area	Upon being notified or becoming aware of new restricted invasive plant listed under the *Biosecurity Act 2014* (Qld) or restricted invasive plants occupying greater than 10% of the offset area, the land manager is to implement pest control measures within one month. These measures may include, and are not limited to: foliar spraying basal bark spraying stem injection cut stump cut and swab stem scraper wick applicators. Treatments are to be recorded in annual reports. Follow-up retreatment is to take place until further corrective actions are no longer triggered (the novel weed infestation has been eradicated or weed cover returns to <10%).

Management Measure	Timing	Responsibility	Performance Monitoring	Performance Trigger	Corrective Actions
Grazing is to be managed to ensure vegetative groundcover is not to be reduced below 20% (approximately 1,200 kg/ha), to provide a favourable foraging substrate for Squatter Pigeons. Once vegetative groundcover is reduced to 20% and no rain is forecast in the coming week, cattle are to be removed from the offset area and not returned until groundcover is above 30% (approximately 2,500 kg/ha). Stocking rates should be calculated and enacted to maintain feed above 1,200Kg, unless targeted buffel grass reduction is being undertaken for a short period.	Throughout the duration of the offset.	Land manager	Land manager is to keep records of the stocking rate and stocking period each year. Yearly Biomass Assessments are to be conducted on proposed targeted grazing areas. The Land manager is to estimate vegetative groundcover during regular inspections while cattle are present. The five-yearly monitoring includes measures of "perennial grass cover" and 'Squatter Pigeon foraging habitat score", which directly measure whether grazing intensity has been optimal for the Squatter Pigeon. Other habitat attributes measured during five-yearly monitoring (e.g., "species richness of grass and forbs" and "weed cover", should also improve or be maintained with appropriate grazing intensity. Monitoring of large tree native recruitment is to be undertaken.	Habitat quality score for the Squatter Pigeon does not achieve interim performance targets. Native recruitment of canopy trees is below 75%.	A failure to achieve interim performance targets will trigger the following response: 1. Consult the annual reports to determine compliance with the OAMP. 2. If failures occurred despite full compliance, the rotation program is to be amended according to the direction of the failure; longer periods of grazing and/or higher stocking rates are recommended in instances where grass cover is excessive for Squatter Pigeons, while shorter periods of grazing and/or lower stocking rates are recommended in instances of insufficient grass cover.
A pest monitoring and control program is to be implemented, which targets rabbits dogs, cats and pigs using a range of techniques including baiting, shooting and trapping. Participate fully in, and cooperate with, any and all regional pest control programs, except those that contravene a part of this OAMP.	Throughout the duration of the offset.	Land manager	A baseline survey must be undertaken as part of a pest management plan development. Additionally, quarterly surveys by the land manager involving 4 daylight hours + 4 nighttime hours during a single 24-hour period will be undertaken to determine the number of pest animals detected per survey. .	Observed increase in the number of pest animals recorded per 8-hour survey above baseline levels and/or previous monitoring event (whichever is lower).	Observations of a large number of feral animals will trigger an increase in control effort expended until a resulting decline in feral animal numbers is observed and maintained. If triggers continue, the Pastoral Manager or Landholder is to approach neighboring landowners to reach an agreement regarding the implementation of a larger-scale integrated pest control program, to slow recolonisation of the offset area.

Management Measure	Timing	Responsibility	Performance Monitoring	Performance Trigger	Corrective Actions
Fire breaks are to be maintained around all external boundaries of the offset area. Fire control lines must be inspected quarterly. Maintenance must be undertaken as required and at least once every two years. **Targeted grazing is to occur in areas identified as high and very high fire risk to minimise ground cover.** **If one or more bushfires are current in the region and considered potentially threatening to the site, coordinate with all relevant fire authorities to determine the appropriate method of protecting the site (if the relevant fire authorities advise against protecting the site from a specific fire, the approval holder may comply with that advice without needing approval or agreement from DCCEEW).**	Throughout the duration of the offset.	Land manager	Occurrence of unplanned and uncontrolled fires within the offset area is to be monitored by the land manager quarterly.	Occurrence of an unplanned and uncontrolled fire within the offset area.	An uncontrolled fire will trigger the following response once controlled: 1. Identify the source of the fire, and which fire breaks failed to contain it. 2. Repair any damage to fencing and/or water trough infrastructure. 3. Exclude cattle until the end of the following wet season to allow recovery and regeneration of vegetation. 4. Report the fire within the annual report; and 5. Based on the damage to habitat quality attributes resulting from the fire, reassess the fuel load reduction practices and the width of fire breaks at the offset site.
Mosaic prescribed, controlled burns are to be undertaken in regularly to: - **Reduce fuel loads** - **Control buffel grass** - **Reduce overly dense regrowth of small trees and shrubs ,** - **Assist in buffel grass control or to control Rubber Vine infestations.** **If required, such burns would involve cool fires lit during the months of June, July, August and September when wind speeds are less than 5km/h.**	As required, but primarily within the first ten years of the offset.	Land manager	The timing of prescribed burns is to be recorded by the land manager, along with a map of each fire scar. The impact of fire on habitat quality attributes will be assessed as part of the five-yearly monitoring of the offset area.	>25% of the offset area burnt in any 12-month period. Scorch height of fires >5 m. Non-juvenile Koala food trees (>4 m tall) killed by fire.	A fire that is hotter or more extensive than planned will trigger: A review of the controlled burning practices (timing and wind conditions permissible); and An assessment of whether prolonged cattle exclusion (longer than one wet season) is required to facilitate tree regeneration.

Management Measure	Timing	Responsibility	Performance Monitoring	Performance Trigger	Corrective Actions
Planned and controlled ecological burns are to be restricted to <25% of the offset area in any 12-month period. **Cattle are to be removed prior to the fire and not returned until after the following wet season.**					
In instances where controlled burns fail to thin dense regrowth of juvenile trees, thinning of Koala non-food tree saplings may be undertaken using chemical or mechanical means. **Prior to any ecological thinning taking place, an ecologist with >15 years' experience in Central Queensland is to be consulted.** **The ecologist is to assess the pre-thinning habitat quality scores for the target area and determine limits on the number, species and size of trees to be removed in order that thinning does not cause long-term declines in habitat quality scores.** **Thinning can only be undertaken with the prior written agreement of DCCEEW.** **Any persons engaged in thinning activities are to have read and acknowledged the commitments in this OAMP.** **Any persons engaged in thinning activities must be able to accurately identify the following tree species: *Eucalyptus tereticornis, Eucalyptus populnea, Eucalyptus crebra* and *Corymbia tessellaris,* OR all trees to be removed during thinning are to be cleared marked by a qualified**	As required, within the first five years of offsets.	Land manager	Five-yearly monitoring of habitat quality will track the improvements in tree growth rates achieved by thinning, as well as collateral impacts on other habitat attributes such as canopy cover.	Unapproved thinning. Thinning that results in a decline in habitat quality score that is likely to persist for longer than 10 years.	Unapproved thinning constitutes an incident reportable to the Australian Government consistent with any and all EPBC Act approvals. Approved thinning that results in a decline in habitat quality score within a trial area will trigger either the abandonment of the practice at larger scales within the offset area or further trials involving substantially revised practices. Any further trials are only to be undertaken with the prior written agreement of DCCEEW.

Management Measure	Timing	Responsibility	Performance Monitoring	Performance Trigger	Corrective Actions
person prior to any thinning activities.					
Removal of regrowth within access tracks and fire management lines associated with fences. Construction and maintenance of access tracks, fencing and fire lines will be undertaken in accordance with the requirements of the VM Act. Any vegetation clearing required for fencing, access or fire lines must be undertaken in accordance with best practice management methods and any applicable legislative requirements (e.g., be less than 10 m wide).	When required, throughout the duration of offsets.	Land manager	Annual reports are to contain a description of all clearing activities undertaken within the offset area, and how this clearing accorded with this OAMP and the VM Act.	Clearing wider than 10 m for tracks, fences and fire management lines.	Unauthorised clearing (clearing not in accordance with this OAMP) constitutes an incident reportable to the Australian Government consistent with any and all EPBC Act approvals.
Implement monitoring and reporting program described in Section 10	See Section 10	See Section 0	See Section 10	See Section 10	See Section 10

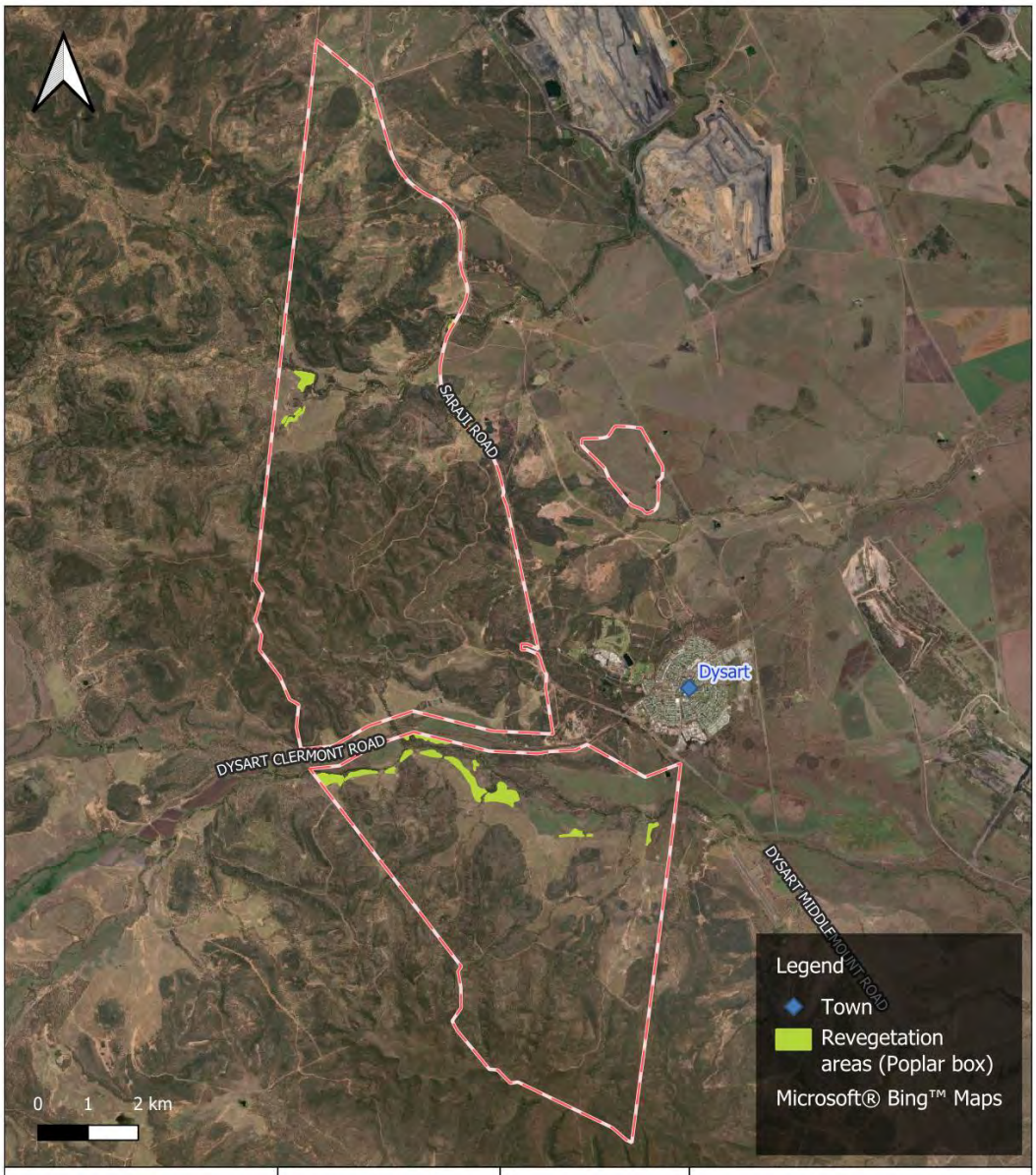


Figure Name: Poplar box non-remnant revegetation areas	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 14: Non remnant revegetation areas – Poplar box.

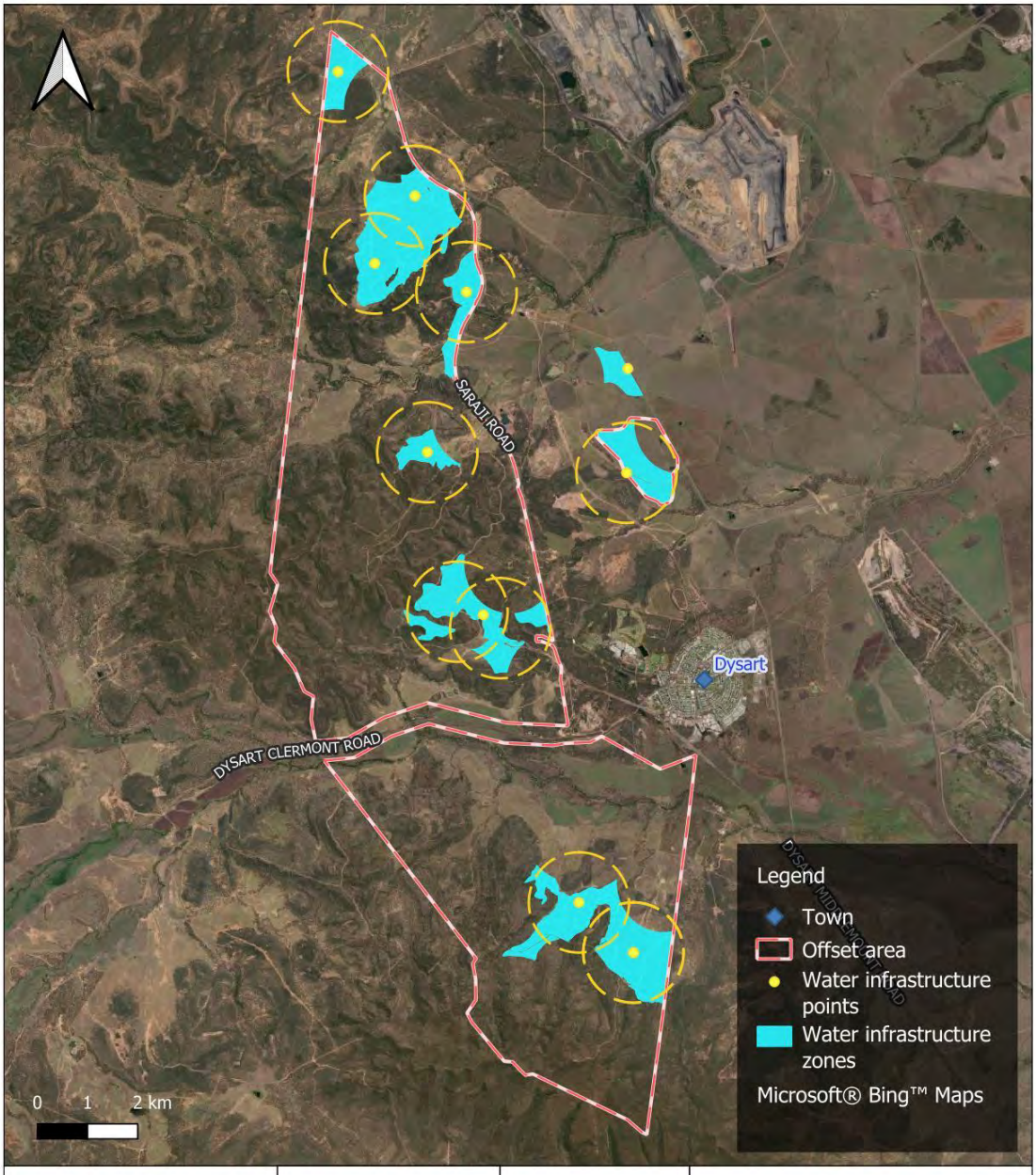


Figure Name: Water infrastructure zones	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 15: Water Infrastructure Zones

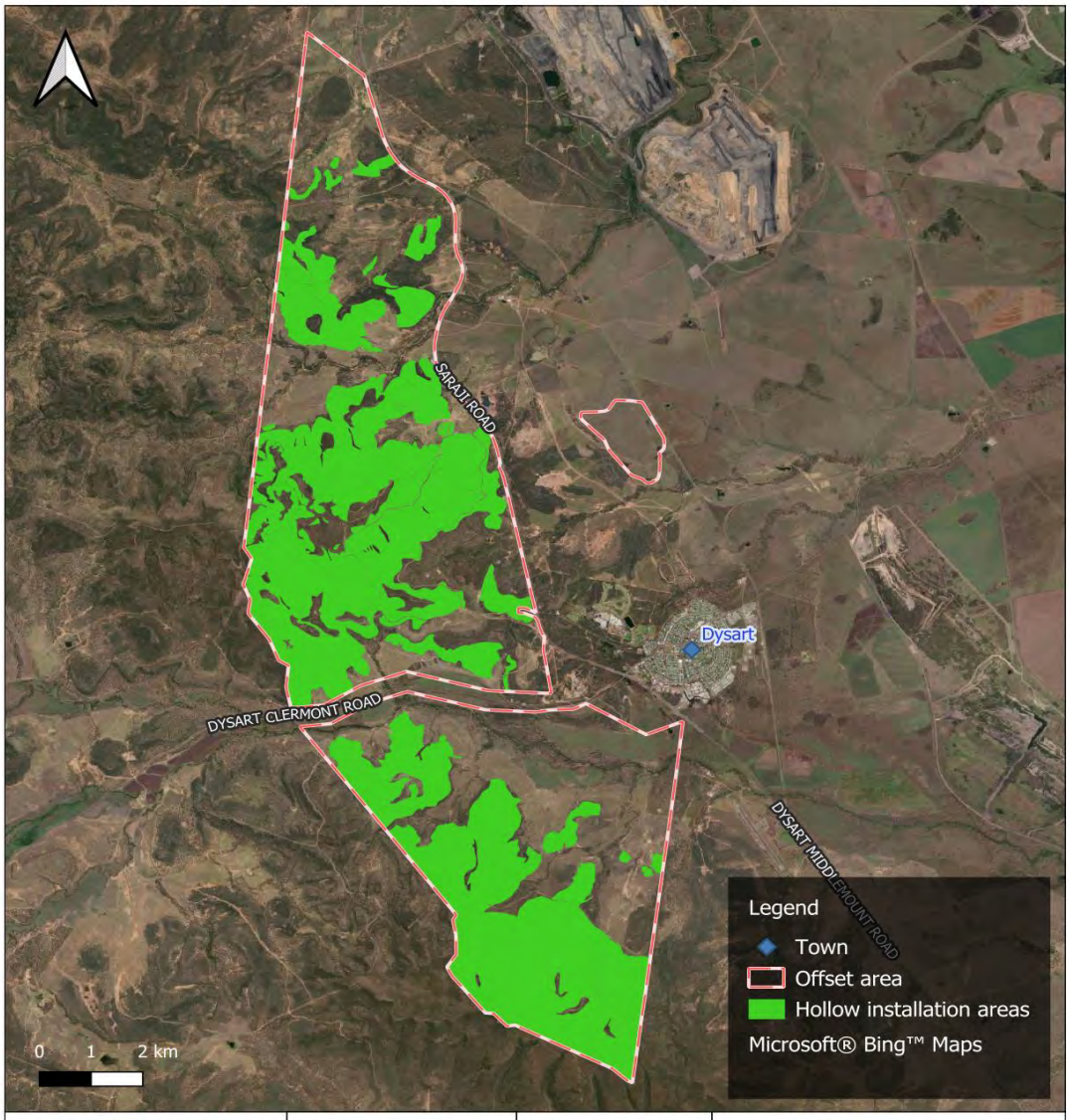


Figure Name: Hollow installation management areas	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 16: Hollow Installation Management Areas

7.1 Roles and responsibilities

The persons responsible for undertaking the tasks described in this OAMP are listed in Table 13.

Table 13 Roles and responsibilities

Person/position	Duties
Offset land manager	Oversee compliance with the voluntary declaration under the VM Act. Maintain fences, access tracks and fire breaks. Manage rotation of cattle grazing. Install, inspect and maintain dams, bores and troughs. Maintain entry signage. Undertake quarterly weed and pest animal monitoring and management. Undertake control burns and/or thinning in accordance with this OAMP. Undertake regular site inspections and make available all data gathered during these inspections to Vitrinite's Chief Operating Officer for annual reporting. Undertake Biomass assessment for strategic grazing Contact Vitrinite's Chief Operating Officer in the event of becoming aware of a reportable incident.
Vitrinite's Chief Operating Officer	Register the offset area with a voluntary declaration under the VM Act. Arrange for signage to be prepared and installed. Engage arborists and ecologists to undertake work. Prepare and submit the Annual Offset Area Report to the Australian Government; and inform the Australian Government of reportable incidents.
Qualified arborist	Construct chainsaw-carved hollows for Greater Gliders
Qualified ecological consultant	Undertake initial and 5 year pest, weed and biomass survey to develop suitable pest management plan and grazing management plan Undertake 12 month and 2 year monitoring of recruitment in non-remnant Brigalow and Poplar box to ensure natural recruitment is occurring at a suitable density Undertake five-yearly monitoring of habitat quality within the offset area.

7.2 Emergency contact procedure

A list of corrective actions and processes to be undertaken to address various management triggers are outlined in Table 12. In the event of a reportable incident, Vitrinite's Chief Operating Officer must contact DCCEEW within 5 business days of becoming aware of the incident. The following are considered reportable incidents:

- A failure to register the offset within 12 months of approval of this OAMP.
- A force majeure event.
- Unapproved clearing within the offset area.
- A failure to achieve interim performance targets.
- A failure to submit an Annual Offset Report and/or an Offset Performance Report by the due date; and
- A failure to adhere to any other conditions of this OAMP or the EPBC Act approval.

8. Legal obligations without offsets

Securing the offset area will increase protection for biodiversity values from clearing and provide management of grazing, fire, weeds and pest animals that are additional to current legal obligations.

The offset area is not protected from timber harvesting or the sowing of exotic pasture species by either the VM Act or the EPBC Act due to exemptions within the legislative frameworks for the continuing use of the land. Areas of remnant vegetation are protected from broad scale clearing under the VM Act. However, clearing of areas mapped as Category X on the regulated vegetation map is permitted. Likewise, clearing of remnant vegetation for the purposes of timber harvesting, reducing hazardous fuel loads, or for maintaining/constructing fences and tracks is permitted under the VM Act. For an assessment of risk of loss without offsets, refer to Appendix A-1.

There are no pre-existing legislative requirements pertaining to fire management or grazing practices in the offset area, other than it being illegal to light fires during a local fire ban declared under the *Fire and Emergencies Act 1990* (Qld).

Since 1 December 2021, graziers within the Fitzroy River catchment will be subject to minimum practice agricultural standards, including the need to take action to improve land condition and ground cover on areas of grazing land with less than 50% ground cover (cover of plants, litter, twigs and woody debris measured at 30 September each year). This OAMP goes above and beyond requiring a maximum of 50% bare ground by also prescribing optimal minimum amounts of bare ground and optimal cover of living plants that align with the habitat preferences of Squatter Pigeons.

There are minimal pre-existing obligations for weed and pest management under the *Biosecurity Act 2014* (Qld) and these relate only to species that are listed as prohibited or restricted under this act. All those who should reasonably and practically know have a general biosecurity obligation under section 23 of the *Biosecurity Act 2014* to take all reasonable and practical measures to prevent or minimise the biosecurity risk. This obligation extends to preventing or minimising adverse effects of a declared weed or pest animal. Land holders must not do or omit to do something if the person knows or ought reasonably to know that doing or omitting to do the thing may exacerbate the adverse effects of a declared pest animal or weed.

In addition to these general biosecurity obligations, specific legal obligations pertain to certain restricted matters, depending on their classification under the *Biosecurity Act 2014* (Table 14). Rubber Vine and Parthenium are both category 3 restricted matters, which must not be intentionally spread, but landholders are under no legal obligation to control existing infestations.

Parthenium and Rubber Vine are both listed as Weeds of National Significance (WONS), though this listing does not incur any additional obligations.

Table 14 Obligations under the *Biosecurity Act 2014*

Category	What is required	Examples
1	Must report presence	Plant and animal diseases, feral ants
2	Must report presence	Noxious fish, certain weeds
3	Must not distribute, be traded or released into the environment	Most invasive weeds, pest animals, noxious fish
4	Must not move	All pest animals and noxious fish, certain weeds
5	Must not possess or keep	Wild dogs, rabbits, foxes, rabbits, certain noxious fish, certain weeds
6	Must not feed (except if undertaking a control program)	All pest animals, certain noxious fish
7	Must be killed and disposed of	Certain noxious fish

The obligations under this OAMP for suppressing weed and pest animal numbers below densities prescribed in Table 12 are additional to the above obligations under the *Biosecurity Act 2014*.

The Isaac Regional Council identifies the Tay-Glen offset area as Rural Agricultural Land Class C in its planning scheme and offers no protection from the current ongoing land use. The Isaac Regional Council's Biosecurity Plan 2024-27 outlines landholder responsibilities including requirements to discharge their general biosecurity obligations in line with their obligations under the *Biosecurity Act 2014*, and to exercise due diligence by taking all practical steps towards best practice management of pest species as defined under the *Biosecurity Act 2014* and Isaac Regional Council local laws.

9. Legally binding mechanism

This offset will be secured via a voluntary declaration (VDec) as an area of high conservation value under the VM Act. Once this has been registered on the title, the offset area will be mapped as Category A regulated vegetation on the property map of assessable vegetation. An area mapped as Cat A on a PMAV is described as an "area subject to compliance notices, offsets and voluntary declarations".

The approved OAMP must be attached to the legal mechanism used to legally secure the environmental offset. The approval holder will notify the Department within 5 business days of the mechanism to legally secure the environmental offset having been executed.

The VDec will remain in place as the legally securing mechanism for the offset area. The VDec and approved OAMP will ensure the offset completion criteria are attained, and then maintained for the period of the EPBC Act approval, or until otherwise advised by the Minister in writing. Statutory protection of the offset area is maintained under the VM Act, *Nature Conservation Act 1992* (Qld) and EPBC Act (or subsequent legislation).

10. Monitoring and reporting

The monitoring program described in this section has two purposes:

- to assess performance of the offset against interim performance targets and completion criteria; and
- as a quality assurance/quality control that management measures are being undertaken in accordance with this OAMP.

The former identifies whether the offset is successful, while the latter helps identify potential causes of any failure.

10.1 Monitoring methodology

The monitoring to be undertaken of the offset area is summarised in Table 15 and described in further detail in the following subsections.

Table 15 Monitoring schedule

Attributes monitored	Timing	Method	Responsibility
Pasture cover (biomass), condition of water points.	Weekly	Site inspections (Section 10.1.4)	Land manager
Signage, condition of tracks, fences and fire breaks	Monthly	Site inspections (as per Section 10.1.1).	Land manager
Non remnant Brigalow and Poplar Box rehabilitation areas	Annually for the first 2 years	As per Section 10.1.1	Land manager
Weed, pest and biomass monitoring	At establishment and every 5 years.	As per Section 10.1.2	Ecologists contracted by Vitrinite

Feral animals, weeds (general)	Quarterly	As per Section 10.1.1	Land manager
Habitat quality scores / BioCondition (as required) for the MNES outlined in this OAMP.	Mar-May in 2029, 2034, 2039 and 2044.	As per Section 10.1.3	Ecologists contracted by Vitrinite

10.1.1 Regular site inspections

The land manager is to undertake regular inspections of the offset area, which involve driving along the major tracks and fence lines. The following are to be checked and noted during these inspections:

- condition of entrance signs,
- any indications of unauthorised access (damaged locks, tyre tracks, used camp sites),
- direct observations or indirect signs (e.g., hoof prints around muddy dam edges) that cattle have intruded into the offset area during periods when they were to be excluded,
- signs of recent fire,
- condition of fire breaks,
- condition of and presence of water within all troughs and dams; and,
- condition of pasture (estimation of percentage cover of vegetation under 1 m tall, litter, rock and bare ground), as assessed against the Brigalow Belt pasture photo standards (https://futurebeef.com.au/knowledge-centre/brigalow-belt-pasture-photo-standards).

Inspections are to be undertaken at least monthly; however, during certain periods (e.g., when pasture condition indicates that cattle are soon to be removed, or when water levels in dams are low), more regular inspections (weekly) may be necessary.

Pest animals are to be monitored quarterly, by spending four daylight hours and four night-time hours searching for feral animals within the offset area. The numbers of each species observed are to be recorded for each round of monitoring, as a record of relative population size over time. Weeds are to be monitored concurrently for signs of any infestations of restricted weeds not previously known to occur within the offset area.

Records are to be kept after each inspection, and all records are to be used to prepare an Annual Offset Area Report (Section 10.2.1).

10.1.2 Baseline Weed Surveys and Biomass Surveys

A baseline weed survey defining weed diversity and density for each AU and targeting key vectors (waterways, access tracks, cattle holding yard) is to be completed. The aim of this survey is to identify key weed populations that require management, and provide data to allow assessment of control success and allow for identification of new weeds introduced to the site.

10.1.3 Non-remnant Brigalow and Poplar Box Monitoring

The annual monitoring of disturbed and non-remnant vegetation of Poplar Box (AU 17 and 18) and Brigalow (AU31) is to be conducted for two years to ensure natural recruitment is occurring. Recruitment will be surveyed by the placement of a 100 m by 1 m transect and counting all woody plant species, detailed in the regional ecosystem description, overlapping (i.e. a portion of the individual is within) the transect. The transects will be undertaken a rate of 1 transect per 5 hectares AU.

The results should meet at one individual per $2m^2$ for Brigalow and one individual per $8m^2$ for Poplar box. Non-remnant areas of Poplar and Brigalow are to be restored through natural regeneration. If recruitment is not naturally occurring within two years revegetation enhancement planting will be required by the development of an Revegetation Management Plan.

10.1.4 Biomass monitoring

Fuel loads and strategic grazing will be managed by an assessment of Biomass. No grazing is to occur within Brigalow vegetation or within areas regenerating from natural recruitment (Poplar and Brigalow habitat). The Biomass assessment will be undertaken by:

- determine the current amount of feed present (kg/ha) using appropriate photo standards available on the Future Beef website (https://futurebeef.com.au/resources/pasture-photo-standards.
- identify the amount of feed desired (kg/ha) at the end of the grazing event (minimum of 1,500 kg/ha)
- calculate the total useable feed (kg/ha) by subtracting the feed desired from the feed present.
- determine utilisation (i.e. the proportion of useable feed that livestock can use).
- determine the feed available for the grazing animal (kg/ha) by multiplying the total useable feed by
- the utilisation rate.
- calculate the safe stocking rate by:
- determining the feed consumption per day (kg/day)
- determining the number of days feed is required (days)
- calculating the feed requirement per head (kg/ha) by multiplying the feed consumption per day by
- the number of days
- calculating the stocking rate (kg/ha) by dividing the feed requirement per head by feed available
- calculating the number of stock (head) by dividing the area of the paddock by the stocking rate

10.1.5 Five yearly monitoring habitat quality

Detailed reassessments of habitat quality within the offset area are to be conducted every five years. These are the principal means of assessing the offset against the interim performance targets and completion criteria listed in Section 5.

It is important that habitat quality is assessed using identical methodology throughout the duration of the offset, and it is equally important that this methodology aligns with that used to assess habitat quality at the impact site.

Habitat quality is to be monitored in the period March-May every five years after the approval of this OAMP. Monitoring is to be undertaken by qualified ecologists or botanists with experience in ecosystems of the Brigalow Belt. Monitoring is to be undertaken at the same 88 Tay-Glen sites used for the initial offset area assessment (Table 16).

In accordance with the *Guide to determining terrestrial habitat quality version 1.3* (DES, 2020), two approaches for assessing site-based attributes are to be adopted:

- BioCondition scores; and
- tailored, species-specific, fauna habitat quality scores.

Both approaches are used to assess different aspects of habitat quality for listed species. These approaches are described in the following subsections.

Table 16 Location of permanent monitoring points

Assessment Unit	Description	Size within offset area (ha)	Site No.	Location of Transect Start Point		
				Latitude	Longitude	Bearing
Habitat Quality Sites - Tay-Glen						
AU01	Rem 11.10.1	57.34	HQ_BA02	-22.656028	148.330828	00
	Rem 11.10.1		HQ_BA03	-22.618128	148.297033	00
	Rem 11.10.1		HQ_BA04	-22.630462	148.317304	00
AU02	NR 11.10.12	77.87	HQ_BA24	-22.60585	148.28178	12
	NR 11.10.12		HQ_BA25	-22.605386	148.289315	85
	NR 11.10.12		Site034	-22.531713	148.27101	90
AU03	HVR 11.10.12	3.08	HQ_BA38	-22.60495	148.29363	215
AU04	NR 11.10.1x1	31.27	HQ_BA59	-22.54415	148.30366	245
	NR 11.10.1x1		HQ_BA60	-22.588325	148.301277	00
AU06	Rem11.10.1x1	2705.99	HQ_BA67	-22.611797	148.303065	00
	Rem11.10.1x1		HQ_BA68	-22.652408	148.3323	00
	Rem11.10.1x1		HQ_BA12	-22.568715	148.290397	00
	Rem11.10.1x1		Site009	-22.5206442	148.2778803	270
	Rem11.10.1x1		Site023	-22.5409976	148.2944682	180
	Rem11.10.1x1		Site030	-22.544554	148.300669	90
AU07	NR 11.10.3	48.87	HQ_BA69	-22.629	148.34109	190
	NR 11.10.3		HQ_BA70	-22.620318	148.330463	00
AU08	HVR 11.10.3	28.5	HQ_BA71	-22.620443	148.334693	00
	HVR 11.10.3		HQ_BA72	-22.616372	148.328782	00
AU09	Rem 11.10.3	1263.87	HQ_BA73	-22.614945	148.294983	00
	Rem 11.10.3		Site004	-22.5245165	148.2961633	180
	Rem 11.10.3		HQ_BA74	-22.646355	148.339298	00
	Rem 11.10.3		Site010	-22.5201511	148.2957958	00
	Rem 11.10.3		Site017	-22.514261	148.276621	315
	Rem 11.10.3		Site027	-22.558104	148.275822	90
AU10	NR 11.10.7	259.55	HQ_BA05	-22.579993	148.306757	00
	NR 11.10.7		HQ_BA06	-22.54224	148.27498	00
	NR 11.10.7		HQ_BA07	-22.52827	148.29477	340
	NR 11.10.7		HQ_BA08	-22.519903	148.282048	00
AU11	HVR 11.10.7	9.76	Site011	-22.4929447	148.2749166	112.5
	HVR 11.10.7		Site012	-22.4915602	148.2749962	90
AU12	Rem 11.10.7	631	Site002	-22.51869	148.298868	270
	Rem 11.10.7		Site007	-22.5060988	148.2735522	45
	Rem 11.10.7		Site008	-22.5085357	148.2744246	90
	Rem 11.10.7		Site020	-22.502464	148.282128	00
	Rem 11.10.7		Site028	-22.5563502	148.2676348	00

Assessment Unit	Description	Size within offset area (ha)	Site No.	Location of Transect Start Point		
				Latitude	Longitude	Bearing
	Rem 11.10.7		Site021	-22.5224852	148.293113	180
	Rem 11.10.7		Site031	-22.564384	148.282463	225
AU13	Dist. 11.10.7	12.79	HQ_BA10	-22.535018	148.279319	00
	Dist. 11.10.7		HQ_BA09	-22.532818	148.291763	00
AU14	Rem 11.10.8	33.36	HQ_BA11	-22.507787	148.27558	00
AU15	HVR 11.3.1	7.45	HQ_BA13	-22.60984	148.33919	260
	HVR 11.3.1		HQ_BA14	-22.6119	148.3358	330
AU16	Rem 11.3.1	28.43	HQ_BA15	-22.59936	148.31434	180
	Rem 11.3.1		Site022	-22.5251098	148.3018568	180
AU17	NR 11.3.2		HQ_BA16	-22.60341	148.32536	345
	NR 11.3.2		HQ_BA17	-22.607687	148.342488	00
	NR 11.3.2		HQ_BA18	-22.60426	148.281	260
	NR 11.3.2		HQ_BA19	-22.60773	148.313178	00
AU18	HVR 11.3.2	7.46	HQ_BA20	-22.608693	148.347242	00
	HVR 11.3.2		HQ_BA21	-22.612855	148.346802	00
AU19	Rem 11.3.2	91.99	HQ_BA22	-22.607475	148.3239	00
	Rem 11.3.2		HQ_BA23	-22.60857	148.335	345
AU20	Dist. 11.3.2	35.19	HQ_BA26	-22.60054	148.32025	170
	Dist. 11.3.2		HQ_BA27	-22.60189	148.31246	5
AU23	Rem 11.3.25	246.64	HQ_BA28	-22.60843	148.32836	90
	Rem 11.3.25		Site003	-22.52884	148.29875	247.5
	Rem 11.3.25		Site035	-22.5300975	148.2723313	90
	Rem 11.3.25		Site040	-22.5935261	148.2927553	00
AU24	Dist. 11.3.25	6.35	HQ_BA29	-22.61278	148.308722	00
AU25	NR 11.3.3	47.67	HQ_BA30	-22.614195	148.340612	00
	NR 11.3.3		HQ_BA31	-22.61083	148.33104	45
AU26	Rem 11.3.3	61.46	HQ_BA32	-22.60253	148.31746	180
	Rem 11.3.3		HQ_BA33	-22.599966	148.292282	185
	Rem 11.3.3		HQ_BA34	-22.599882	148.286358	00
AU27	Dist. 11.3.3	15.32	HQ_BA35	-22.60916	148.317723	00
AU29	Rem 11.3.39	20.98	HQ_BA36	-22.55736	148.34851	270
	Rem 11.3.39		HQ_BA37	-22.558672	148.339198	00
AU30	Dist. 11.3.39	11.2	HQ_BA39	-22.56617	148.32271	320
	Dist. 11.3.39		HQ_BA40	-22.56217	148.33138	50
AU31	NR 11.4.9	337.73	HQ_BA41	-22.54998	148.33971	165
	NR 11.4.9		HQ_BA42	-22.528393	148.330602	00
	NR 11.4.9		HQ_BA43	-22.569985	148.356025	00
	NR 11.4.9		Site039	-22.591667	148.301407	135
AU32	Rem 11.4.9	16.09	HQ_BA44	-22.528935	148.326265	00
	Rem 11.4.9		Site038	-22.590551	148.299995	00

Assessment Unit	Description	Size within offset area (ha)	Site No.	Location of Transect Start Point		
				Latitude	Longitude	Bearing
AU33	Dist. 11.4.9	1.93	HQ_BA45	-22.527343	148.327108	0
AU34	NR 11.5.3	428.44	HQ_BA46	-22.518972	148.318017	0
	NR 11.5.3		HQ_BA47	-22.61944	148.34255	185
	NR 11.5.3		HQ_BA48	-22.61127	148.31801	175
	NR 11.5.3		Site018	-22.4845177	148.2863699	180
	NR 11.5.3		Site041	-22.487619	148.289651	270
AU35	HVR 11.5.3	28.15	HQ_BA49	-22.517946	148.319307	00
	HVR 11.5.3		HQ_BA50	-22.521242	148.319892	00
AU36	Rem 11.5.3	68.29	HQ_BA01	-22.480698	148.287744	00
	Rem 11.5.3		HQ_BA51	-22.5402	148.31605	10
	Rem 11.5.3		HQ_BA52	-22.524545	148.305292	0
A0U38	NR 11.5.9b	1951.46	HQ_BA53	-22.54464	148.32658	335
	NR 11.5.9b		HQ_BA54	-22.62887	148.32514	15
	NR 11.5.9b		HQ_BA55	-22.63174	148.33895	190
	NR 11.5.9b		Site005	-22.5185909	148.3031427	180
	NR 11.5.9b		Site006	-22.4974319	148.2745272	90
	NR 11.5.9b		Site032	-22.528814	148.300845	180
AU39	HVR 11.5.9b	71.68	HQ_BA56	-22.513645	148.304202	00
	HVR 11.5.9b		HQ_BA57	-22.551518	148.34664	00
	HVR 11.5.9b		HQ_BA58	-22.577272	148.354837	00
AU40	Rem 11.5.9b	1465.76	Site013	-22.4876673	148.2760713	135
	Rem 11.5.9b		Site015	-22.4815213	148.2848786	270
	Rem 11.5.9b		Site016	-22.5169654	148.2881458	180
	Rem 11.5.9b		Site024	-22.5442136	148.2979784	00
	Rem 11.5.9b		Site025	-22.5463711	148.2973225	90
	Rem 11.5.9b		Site026	-22.562488	148.279491	00
	Rem 11.5.9b		Site029	-22.560484	148.267422	90
	Rem 11.5.9b		Site036	-22.5655928	148.3037166	157.5
	Rem 11.5.9b		Site037	-22.5751646	148.3006593	270
AU41	Dist. 11.5.9b	109.2	Site014	-22.4786676	148.2831044	45
	Dist. 11.5.9b		HQ_BA61	-22.53017	148.31861	180
	Dist. 11.5.9b		HQ_BA62	-22.56499	148.31964	250
	Dist. 11.5.9b		Site019	-22.4899562	148.281279	180
AU42	Rem 11.5.12a	153.86	HQ_BA63	-22.56914	148.339753	00
	Rem 11.5.12a		HQ_BA64	-22.572578	148.309663	00
	Rem 11.5.12a		HQ_BA65	-22.578528	148.298233	00
	Rem 11.5.12a		Site001	-22.499585	148.295286	135

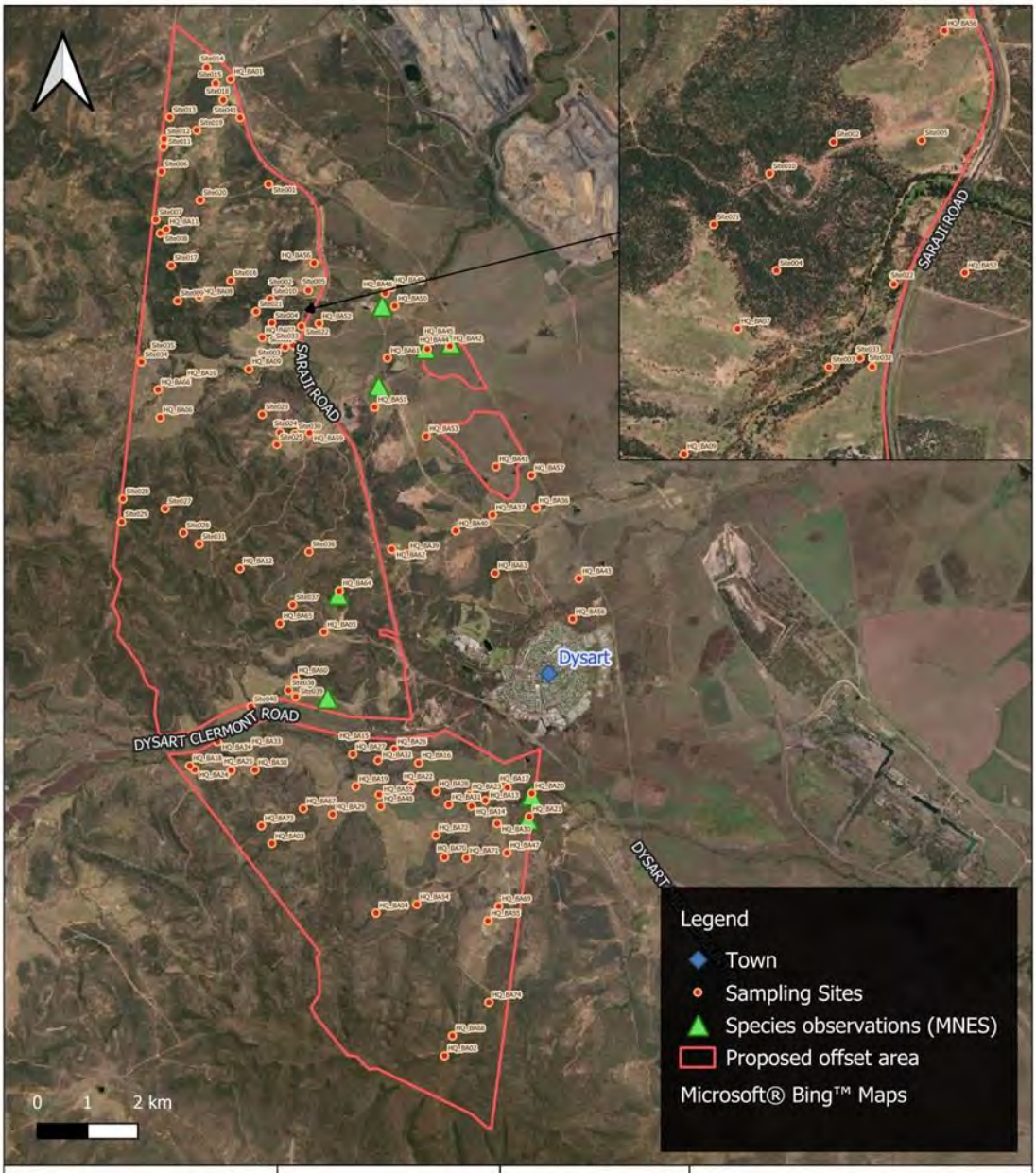


Figure Name: Sampling locations within offset site	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:99778	Spatial Reference: GDA2020 / MGA zone 55

Figure 17: Sampling Locations

10.1.5.1 BioCondition monitoring

BioCondition is assessed following the methodology prescribed by the *BioCondition Assessment Manual version 2.2* (DSITIA, 2015). It is expected that later versions of this manual will be published in the course of the offset; however, to maintain consistency it is important that the methodology of version 2.2 is adopted throughout the period of the offset.

BioCondition uses quadrat sampling to generate measurements of native plant richness, recruitment, shrub and tree cover, native perennial grass cover, litter cover, amount of coarse woody debris, non-native plant cover, tree height and number of large trees. These measurements are compared to benchmarks published by the Queensland Herbarium (Queensland Herbarium, 2022), which are compiled from data from reference sites. The benchmarks used in the initial assessment that informed the starting quality at the offset site should be applied throughout the duration of the offset, regardless of whether these are updated by the Queensland Herbarium as additional data is gathered over the 20-year offset period. These benchmarks are listed in Table 17.

The scoring system prescribed by the *BioCondition Assessment Manual version 2.2* (DSITIA, 2015) results in a score out of 80 for site-specific attributes, while the *Guide to determining terrestrial habitat quality version 1.3* (DES, 2020) requires that this score is out of 100. To achieve this conversion, the original score is multiplied by 1.25.

BioCondition forms 1/3 of the habitat quality score for the Squatter Pigeon but is not relevant for the Koala or Greater Glider. The remaining scores are generated using species habitat attributes described in section 10.1.5.2.

Table 17 BioCondition benchmarks (as published by the Queensland Herbarium 2022) to be used to assess monitoring sites

Regional Ecosystem	Recruitment (%)	Non-native plant cover (%)	Tree species richness	Shrub species richness	Grass species richness	Forb species richness	Tree canopy height (m)	Tree subcanopy height (m)	Tree canopy cover (%)	Tree subcanopy cover (%)	Large tree threshold diameter (cm)		Number of large trees per ha		Shrub canopy cover (%)	Native perennial grass cover (%)	Litter ground cover (%)	Woody debris length (m/ha)
											Eucalypts	Non-eucalypts	Eucalypts	Non-eucalypts				
11.10.1	100	0	4	4	9	17	24	13	30	15	46	30	11	3	13	16	50	388
11.10.12	100	0	4	6	15	15	16	7	23	2	43	na	18	na	13	34	17	200
11.10.3	100	0	3	4	7	9	15	na	41	na	41	26	6	36	3	23	32	498
11.10.7	100	0	6	6	7	9	18	7	40	17	44	25	15	8	8	20	53	387
11..9.4a (11.10.8)	100	0	19	17	3	13	13	7	30	33	na	25	na	146	24	3	60	1035
11.3.1	100	0	4	4	6	10	15	7	35	15	na	30	na	53	15	33	30	1520
11.3.2	100	0	2	2	9	15	18	9	37	7	44	na	18	na	4	26	35	281
11.3.25	100	0	4	4	8	13	23	11	34	12	53	26	19	13	7	35	21	473
11.3.3	100	0	3	5	12	15	18	10	28	5	45	na	10	na	4	45	30	285
11.3.39	100	0	3	3	10	16	19	12	35	11	43	24	15	6	1	49	23	247
11.4.9	100	0	2	5	5	10	10	6	25	11	na	28	na	47	5	16	45	980
11.5.3	100	0	6	6	6	10	16	na	20	na	44	34	9	1	3	19	20	314
11.5.9b	100	0	6	6	9	14	18	10	25	10	43	23	11	2	9	41	35	263
11.5.12a	100	0	6	4	6	8	16	7	30	20	40	25	8	14	5	21	32	533

10.1.5.2 Species Habitat Quality

In addition to BioCondition, which assesses the overall quality of the vegetation within the impact and offset sites, species-specific habitat attributes are also assessed at each sampling location. As prescribed by the *Guide to determining terrestrial habitat quality version 1.3* (DES, 2020), habitat attributes must include indicators for food availability, suitability for breeding and shelter, suitability for mobility and level of ongoing threats. These four habitat attributes are to have equal weighting when generating overall scores for habitat quality for any one species.

Based on a detailed literature reviewed undertaken within the VSCM amendment Environmental Offsets Strategy, a project-specific set of indicators and a scoring system were devised in order to assess habitat quality for the MNES (Table 19). Some of the species-specific habitat attributes may overlap with the BioCondition assessment (e.g., number of large trees for the Koala and Central Greater Glider, woody debris for the Ornamental Snake and understorey richness for the Squatter Pigeon). The following attributes are additional assessments undertaken at monitoring locations:

- basal area per hectare of Koala food trees (*Eucalyptus camaldulensis, Eucalyptus populnea* and *Eucalyptus crebra)* and Central Greater Glider food trees (all *Eucalyptus* and *Corymbia* species) will be assessed via 360° sweeps with a Bitterlich gauge at the 0 m, 50 m and 100 m marks of the transect used to assess canopy cover for BioCondition. The mean of the three estimates will be used to represent the amount of food available at the site for Koalas and Central Greater Gliders,
- canopy cover (based on the vertical projection of crowns) of trees taller than 4 m (the minimum height likely to be used by Koalas) will be assessed as for total canopy cover for BioCondition, except only trees taller than 4 m are included in the estimate. This reflects the density of trees tall enough for Koalas to climb to escape predators,
  - the presence/absence of at least one dense shade tree (at least 6 m tall with >75% foliage projective cover within the crown) within the 100 m X 50 m quadrat used for BioCondition will be recorded. This indicates whether favourable shelter trees are available to Koalas at the site,
  - the proportion of trees that are within gliding distance of other trees (i.e., with spacing & tree height) will be estimated in each 100 m X 50 m quadrat used for BioCondition,
  - elevated fine fuel hazard will be estimated based on the methodology and hazard classes described in the *Overall fuel hazard assessment guide* (Francis, Tolhurst, Wilson, & McCarthy, 2010). A summary of the classification system is provided in Table 18. The elevated fine fuel hazard largely determines if a fire will spread to the forest canopy or be maintained at ground level, where it is of little threat to Koalas and Central Greater Gliders. Elevated fine fuel hazards that are high, very high or extreme have the potential to cause canopy fires.
  - the percentage cover of Buffel Grass will be estimated by dividing the 50 m x 10 m quadrat used for BioCondition into 1/8ths, visually estimating the percentage cover of Buffel Grass in each 1/8, then calculating the mean of the eight estimates. This reflects the threat posed by the weed on foraging habitat for the Squatter Pigeon,
  - the percentage of bare ground will be estimated at five 1 m x 1 m quadrats used for BioCondition, and the mean of the five estimates is calculated. Bare ground is an important feature of foraging habitat for the Squatter Pigeon.

Table 18 Elevated fine fuel hazard classes

Key attributes					Fuel hazard rating	Effect on fire behaviours (at FFDI 25)
Plant cover	% dead	Vertical continuity	Vegetation density	Thickness of fuel pieces		
<20% or low flammability species	<20	-	Easy to walk in any direction without needing to choose a path between shrubs.	-	Low	Little or no effect.
20-30%	<20	Most of the fine fuel is at the top of the layer	Easy to choose a path through but brush against vegetation occasionally.	-	Moderate	Does not sustain flames readily.
30-50%	<20	Most of the fine fuel is at the top of the layer	Moderately easy to choose a path through, but brush against vegetation most of the time.	-	High	Causes some patchy increases in the flame height and/or rate of spread of fire.
50-80%	20-30	Continuous fine fuel from the bottom to the top layer	Need to carefully select a path through.	Mostly less than 1-2 mm thick.	Very high	Elevated fuels mostly dictate flame height and rate of spread of a fire.
>70%	>30	Continuous fine fuel from the bottom to the top layer	Very difficult to select a path through. Need to push through vegetation.	Large amounts of fuel <2mm thick.	Extreme	Elevated fuels almost entirely determine the flame height and rate of spread of a fire.

In addition to these field-measured attributes, the following suite of spatial attributes are to be measured using GIS tools:

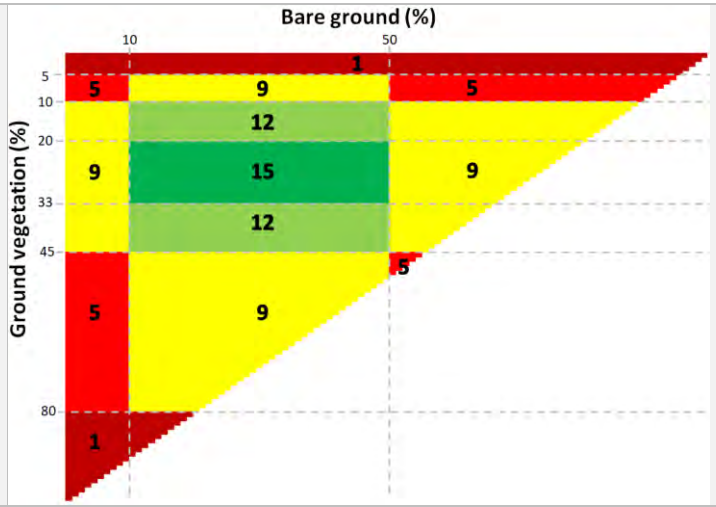
- distance from the assessment unit boundary to the nearest watercourse (refuge from drought for koalas and central Greater Glider) and road (vehicle threat to koalas),
- proportion of the assessment unit that overlaps with groundwater-dependent ecosystems (GDEs) mapped in the National GDE Atlas (BoM, 2022) (drought refuge for the central Greater Glider),
- maximum altitude (based on the Australian Height Datum) of the assessment unit. Temperature decreases linearly with altitude (6.5°C for every 1,000 m), so assessment units higher than 450 m are buffered from an increase in global temperatures of 3°C (such sites are forecast to have the same temperatures as nearby sites at sea level currently have),
- size of the habitat patch connected to the assessment unit, and distance to large habitat patches will be used to assess habitats for all three species,
- the percentage of the assessment unit that comprises one-hectare cells with an NDVI > 0.125, when assessed in the dry season (a measure of the extent of woody vegetation cover for Squatter Pigeons).

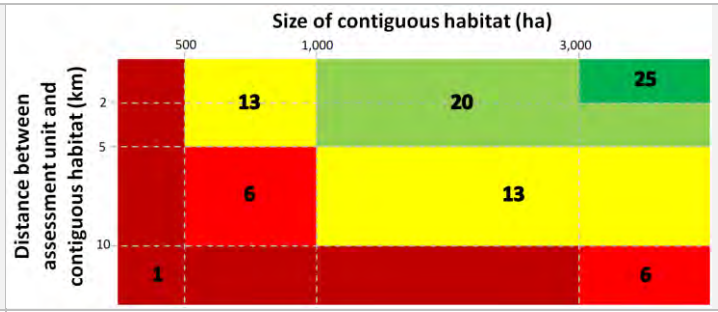
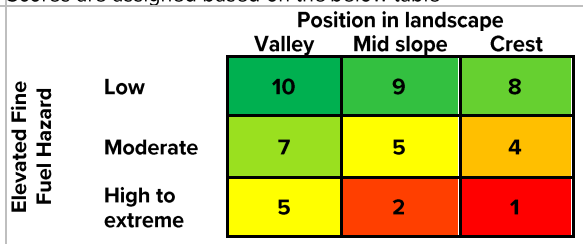
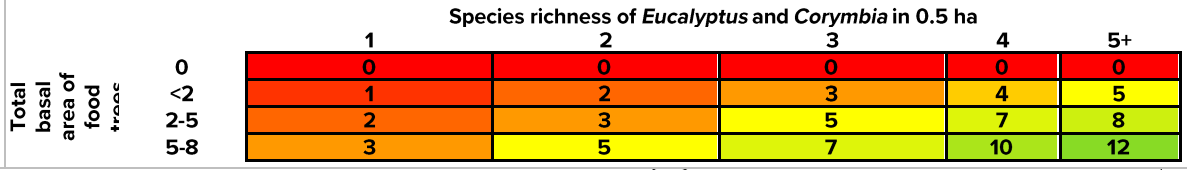
The habitat quality score for the koala and greater glider is to be determined by the species-specific habitat quality scoring system described in Table 19**.** The habitat quality score of the Squatter Pigeon is a weighted average of the offset area's BioCondition score, and the species-specific habitat quality score described in Table 19 (with a weighting of 1:2).

Table 19 Species specific habitat quality scoring system for the impact site and offset area

Koala	**1 Threats to species**	**Score**	0	3	6	8	
		Risk of road-based mortality	High: Assessment unit borders a public road with 100 kph speed limit.	Moderate: Assessment unit is within 1 km of a public road with 100 kph speed limit OR borders a public road with 60-100 kph speed limit.	Low: Assessment unit lies 1-2 km from public roads, AND any private tracks through or near the unit are used infrequently at night (less than once per week) and at low speeds (less than 50 kph).	Nil: Assessment unit lies >2 km from a public road, AND any private tracks through or near the unit are used infrequently at night (less than once per week) and at low speeds (less than 50 kph).	
		Score	0	5	8		
		Risk of dog attack	High: Assessment unit is within 18 km of a town, dump or other source of supplementary food for dogs, and no control programs are in place.	Moderate: Assessment unit is within 18 km of a town, dump or other source of supplementary food for dogs, but active control measures (baiting, trapping or shooting) occur within the assessment unit and effectively reduce dog densities (as shown by monitoring).	Low: Assessment unit is further than 18 km from a town, dump or other source of supplementary food for dogs.		
		Score	0	5	9		
		Importance as a drought refuge	**Low:** The assessment unit is further than 2 km from a watercourse or source of surface water, OR is 1-2 km from a watercourse, but no vegetation occurs along the watercourse.	**Medium:** The assessment unit is 1-2 km from a watercourse or source of surface water and is connected to vegetation along the watercourse.	**High:** The assessment unit is within 1 km of a watercourse or source of surface water.		
	2 Quantity and quality of food	**Score**	Scores are assigned based on combination of basal area and proportion of primary food trees, as shown in the below table				
		Density and quality of food trees	**Combined basal area of all food trees (m^2/ha)**	**Percentage of total food tree basal area that comprises primary food trees (*E. camaldulensis* or *E. tereticornis*)**			
				0	**<10**	**10-40**	**40-70**	**70-100**
			0	0	0	0	0	0
			<2	1	2	3	4	5
			2-5	2	3	5	7	8
			5-8	3	5	7	10	12
			8-10	4	7	10	13	16
			>10	5	8	12	16	20
		Score	1	2	3	4	5
		Number of large food trees	**None:** No large food trees	**Poor:** 1 or 2 large food trees per 0.5 ha	**Moderate:** 3 to 6 large food trees per 0.5 ha	**High:** 7 to 10 large food trees per 0.5 ha	**Very high:** >10 large food trees
		Score	0	2	4	7	10

	3 Quality and availability of shelter	Canopy cover of trees taller than 4 m.	**None:** No trees taller than 4 m.	**Poor:** <10% cover.	**Moderate:** 10-30% cover.	**High:** 30-60% cover.	**Very high:** >60% cover.
		Score	0	2	4	7	10
		Number of large non-food trees	0	1	2-4	5-10	>10
		Score	0	5			
		Presence of dense shade trees	Trees taller than 6 m and with a crown that has >75% cover are absent	Trees taller than 6 m and with a crown that has >75% cover are present			
	4 Species mobility capacity	**Score**	1	5	10	17	25
		Extent of contiguous habitat.	**Very poor:** Assessment unit is further than 5 km from contiguous habitat larger than 200 ha.	**Poor:** Assessment unit is 2-5 km from contiguous habitat larger than 200 ha	**Moderate:** Assessment unit is connected to, or within 2 km of, a contiguous landscape that is 200-500 ha.	**Good:** Assessment unit is within 2 km of a contiguous landscape that is 500-1,000 ha.	**Very good:** Assessment unit is connected to or within 2 km of a contiguous landscape that is >1,000 ha.
Squatter Pigeon	**1 Threats to species**	**Score**	1	6	11	16	
		Invasion by Buffel Grass	**High:** Buffel Grass has a ground cover >40%	**Moderate:** Buffel Grass has a ground cover of 10-40%.	**Low:** Buffel Grass has a ground cover of 0.1-9.9%.	**None:** Buffel Grass is absent.	
		Score	0	3	7	9	
		Predation by feral predators	**Very High:** Assessment unit is within 5 km of a town, dump or other source of supplementary food for dogs and cats, and no control programs are in place.	**High:** Assessment unit is within 18 km of a town, dump or other source of supplementary food for dogs, and no control programs are in place.	**Moderate:** Assessment unit is within 18 km of a town, dump or other source of supplementary food for dogs and cats, but active control measures (baiting, trapping or shooting) occur within the assessment unit and effectively reduce cat and dog densities (as shown by monitoring).	**Low:** Assessment unit is further than 18 km from a town, dump or other source of supplementary food for dogs and cats.	
	2 Quality and availability of food and foraging habitat	**Score**	0	1	*Unlike for other habitat attributes and species, the score for distance to water is multiplied by the sum of the other foraging scores to generate an overall foraging habitat score for Squatter Pigeons.		
		Distance to water*	**High:** Assessment unit is >3 km from water.	**Low:** Assessment unit is within 3 km of water.			
		Score	Scores (1-15) are assigned based on the percentage of ground covered by low vegetation (<1 m) and bare ground, as shown in the below table				

		Ground cover					
		Score	**1**	**3**	**5**	**8**	**10**
		Understorey richness	**Very low:** <5 species of grasses and forbs.	**Low:** 5-14 species of grasses and forbs.	**Moderate:** 15-24 species of grasses and forbs.	**High:** 25-29 species of grasses and forbs.	**Very high:** >30 species of grasses and forbs.
	3 Quality and availability of habitat for shelter and breeding	**Score**	0	1	*Unlike for most other habitat attributes and species, the score for distance to water is multiplied by the other breeding habitat score below to generate an overall breeding habitat score for Squatter Pigeons.		
		Distance to water*	**High:** Assessment unit is >1 km from permanent water	**Low:** Assessment unit is within 1 km of permanent water.			
		Score	**1**	**4**	**11**	**18**	**25**
		Normalised Difference Vegetation Index (NDVI)	**Very poor:** the assessment unit does not contain any 1-ha cells with a mean NDVI > 0.125.	**Poor:** <30% of the assessment unit has NDVI > 0.125.	**Moderate:** 30-60% of the assessment unit has NDVI > 0.125.	**Good:** 60-80% of the assessment unit has NDVI > 0.125.	**Very good**: >80% of the assessment unit has NDVI > 0.125.
		Score	Scores are assigned based on the below table				

<table>
<tr><td></td><td>4 Species mobility capacity</td><td>Extent of, and distance to, large patches of contiguous habitat</td><td colspan="4"> 
</td></tr>
<tr><td rowspan="8">Central Greater Glider</td><td rowspan="6">1 Threats to species</td><td>Score</td><td colspan="4">Scores are assigned based on the below table</td></tr>
<tr><td>Threat of intense canopy fires</td><td colspan="4"> 
</td></tr>
<tr><td>Score</td><td>0</td><td>3</td><td>5</td><td>7</td><td>10</td></tr>
<tr><td>Importance as a climate change refuge</td><td>None: Assessment unit is further than 1 km from a drought refuge OR occurs within 1 km of a drought refuge but there is a vegetation gap > 0.5 km between the unit and the drought refuge.</td><td>Low: Assessment unit is <1 km from a permanent watercourse or an area mapped as a ‘moderate’ or ‘high’ potential groundwater-dependent ecosystem in the National GDE Atlas AND is connected to these drought refuges by woody vegetation.</td><td>Moderate: Assessment unit is within 100 m of a farm dam or other water impoundment OR overlaps with a ‘low’ potential groundwater-dependent ecosystem in the National GDE Atlas.</td><td>High: Assessment unit is adjacent to a permanent watercourse or overlaps with a ‘moderate’ or ‘high’ potential groundwater-dependent ecosystem in the National GDE Atlas.</td><td>Very high: Assessment unit is above 450 m in altitude.</td></tr>
<tr><td>Score</td><td>0</td><td>5</td><td></td><td></td><td></td></tr>
<tr><td>Threat of barbed wire fences</td><td>High: Assessment unit is crossed by one or more fences with barbed top wire.</td><td>Low: Assessment unit is not crossed by any fences with a barbed top wire</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">2 Quality and availability of food</td><td>Score</td><td colspan="4">Scores are assigned based on combination of basal area and proportion of primary food trees, as shown in the below table</td></tr>
<tr><td>Density and quality of food trees</td><td colspan="4"> 
</td></tr>
</table>

			8-10	4	7	10	13	16
			>10	5	8	12	16	20
		Score	1	2	3	4	**5**	
		Number of large food trees (>30 cm DBH)	**None:** No large food trees	**Poor:** 1 or 2 large food trees per 0.5 ha	**Moderate:** 3 to 6 large food trees per 0.5 ha	**High:** 7 to 10 large food trees per 0.5 ha	**Very high:** >10 large food trees	
	3 Quality and availability of shelter	**Score**	0	5	12	18	**25**	
		Number of large shelter trees (>50 cm DBH).	**None:** No eucalypt trees with >50cm DBH.	**Poor:** 1 or 2 eucalypt trees with >50cm DBH.	**Moderate:** 3 to 5 eucalypt trees with >50cm DBH.	**High:** 6 to 8 eucalypt trees with >50cm DBH.	**Very high:** > 8 eucalypt trees with >50 cm DBH	
	4 Species mobility capacity	**Score**	Scores are assigned based on a combination of size of the habitat patch and connectivity to other patches, as shown in the below table.					
		Size and connectivity of habitat patch		**Connectivity to nearest patch**				
				Patches <1 km apart and connected by woody vegetation*	**Patches 1-8 km apart and connected by woody vegetation***	**Patches >8 km apart and connected by woody vegetation***	**Patches <0.5 km apart and separated by open areas***	**Patches 0.5-3 km apart and separated by open areas***	**Patches >3 km apart and separated by open areas***
			Size of habitat patch† **>300 ha**	25	23	21	20	18	15
			100-300 ha	24	20	17	15	12	10
			50-100 ha	23	17	10	8	6	4
			<50 ha	22	14	8	6	3	1
			*Distinction between open areas versus wooded vegetation is defined by the gliding distance of Greater Gliders (i.e., average spaces between trees should not exceed the height of trees in wooded vegetation). †Habitat patch size classes are based on ability of the patch to support a viable population of 100 Greater Gliders, assuming a mean home range size of 3 ha.					
Ornamental snake	**Threats to species**	**Score**	0	4	8		11	13
		Road-based mortality	Assessment unit borders a public road	Assessment unit is within 200 m of a public road OR borders a track likely to be used at night	Assessment unit is within 500 m of a road or track likely to be used at night		Assessment unit is within 800 m of a public road or a track likely to be used at night	Assessment unit is more than 1 km from a road or track likely to be used at night
		Score	1	2	4	6	10	12
		Cane Toads	Assessment unit is within 50 m of permanent water or a mapped waterway	Assessment unit is within 50-500 m of permanent water or a mapped waterway	Assessment unit is within 500 m to 1km of permanent water or a mapped waterway	Assessment unit is within 1-2 km of permanent water or a mapped waterway	Assessment unit is 2 to 3 km of permanent water or a mapped waterway	Assessment unit is 3 km or more from mapped waterways or permanent water
		Score	1	4	3		2	1

	Quality and availability of food and foraging habitat	Total surface area of all gilgais in assessment unit	0-20%			20-40%	40-60%		60-80%		80-100%	
		Score	**See table below**									
		Total surface area of frog-suitable gilgais in assessment unit				Total coverage of assessment unit (%)						
						0-1%	1-5%	5-15%	15-50%	50-80%	80-100%	
						0	2	3	4	3	2	
			Depth (mm)	>136	0	0	0	0	0	0	0	
				136-170	1	0	2	3	5	3	2	
				170-272	2	0	4	6	8	5	4	
				272-408	3	0	6	9	12	9	6	
				408-544	4	0	8	12	16	12	8	
				544+	5	0	10	15	20	15	10	
		Score	Likely to be invaded by fish **0.5**							Unlikely to be invaded by fish **1**		
		Connectivity to permanent water by flooding that will allow invasion of fish	Multiply the values in the total surface area of frog-suitable gilgais in the assessment unit to adjust the final "Total surface area of frog-suitable gilgais in assessment unit" score.									
	Quality and availability of habitat for shelter and breeding	***Score***	***See formula below***									
		Abundance of measured coarse woody debris against mean benchmark of 1053 m/ha	Where: **B** = mean benchmark for coarse woody debris for SPRAT listed REs (1053 m/ha) **C** = measured coarse woody debris as total metres per hectare of debris over 10 cm diameter **25** = maximum habitat quality score Use the formula: **(25/(B x 2)) x C** Round the result up to the nearest whole number to a maximum of **25**									
	Species' mobility capacity	***Score***	***See table below***									
		Percentage of habitat within 1 km	**0**	**3**	**4**	**7**	**9**	**12**	**14**	**17**	**19**	**22**	**25**
			0	1-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100

10.2 Reporting

10.2.1 Annual offset area report

An Annual Offset Area Report is to be prepared and submitted every 12 months from the date of the approval of this OAMP. The purpose of this Annual Offset Area Report is to describe the management actions undertaken during the year, and to document compliance with the EPBC Act approval. The Annual Offset Area Reports will provide transparency regarding how the site management actions are being implemented, and where relevant, identify any force majeure events impacting the offset site, and any non-compliance with the OAMP. To achieve this, all Annual Offset Area Reports must include the following contents:

- the dates that cattle were introduced to, and removed from, the offset area, and the number of head involved,
- a description of any prescribed or uncontrolled fires that occurred within the offset area during the previous 12 months, including details about the date, location of the burn scar boundary, source of the fire, scorch height of the fire, and whether any trees taller than 4 m were killed as a result,
- the results of quarterly weed inspections and pest animal surveys,
- the results of water point inspections and ground cover assessments,
- a description of all actions pertaining to weed control within the offset area during the previous 12 months, including the methods used, weeds targeted, and the timing, location and outcome of actions,
- a description of all actions pertaining to feral animal control within the offset area during the previous 12 months, including the methods used, pests targeted, and the timing, location and outcome of actions (e.g., number of animals killed),
- a description of any authorised and unauthorised clearing that took place within the offset area in the previous 12 months,
- a list of instances during the previous 12 months of cattle breaching the fencing surrounding the offset area, including those escaping from and intruding into the site, including the dates that fence repairs were undertaken; and
- a list of any reportable incidents that occurred during the previous 12 months.

In addition to the above, the first Annual Offset Area Report (to be submitted at the end of the first year) is to contain the following contents:

- the date that the offset area was registered with a voluntary declaration under the VM Act,
- the date that entrance signs were installed; and
- the baseline pest animal survey data.

Every five years, the years in which interim performance criteria are monitored, the Annual Offset Area Report is to be accompanied by an Offset Performance Report (Section 10.2.2). For the year in which hollow-carving takes place (within the first five years), the Annual Offset Area Report is to be accompanied by an Arborist Report (see below for details).

The Annual Offset Area Report is to be prepared by the land manager; alternatively, this can be prepared by the approval holder, or someone assigned by them, once provided with all relevant data and information from the land manager. The Annual Offset Area Report is to be submitted by the approval holder to the Australian Government.

10.2.2 Offset performance report

The results of the five-yearly monitoring of habitat quality of the offset site are to be reported in an Offset Performance Report, which will accompany the Annual Offset Area Report for the year in which monitoring is undertaken.

Each Offset Performance Report is to contain the following:

- a description of the methodology used to assess habitat quality, and how these accords with the methodology prescribed in this OAMP,
- a description of the timing of surveys and of recent weather conditions affecting plant growth,
- all raw data gathered at each monitoring site,
- a calculation of habitat quality scores for the Koala, Greater Glider and Squatter Pigeon across the offset area,
- an assessment of how the habitat quality scores accord with the interim performance targets listed in Section 5 of this OAMP,
- an assessment of the size and location of Rubber Vine infestations within the offset area,
- an indication of whether any additional risks/threats over and above those outlined in the final approved OAMP are apparent and management actions to be employed to manage those risks,
- if any triggers were detected and, if so, the corrective actions that were implemented and their outcomes; and
- recommendations for improving/updating the OAMP in accordance with adaptive management.

The final Offset Performance Report, due 20 years after the approval of this OAMP, is to assess whether the entire offset has fully achieved and maintained all offset completion criteria listed in **Section 5** of this OAMP.

Offset Performance Reports are to be prepared by suitably qualified ecologists.

10.2.3 Reporting schedule

The reporting schedule is listed in Table 20. This assumes an approval date of 30 November 2024.

Table 20 Reporting Schedule

Report to DCCEEW	Reporting period	Submission due date
Annual Offset Area Report	1 November to 31 October each year	30 November each year
Offset Performance Report (an appendix to the Annual Offset Area Report)	1 March to 31 May in 2029, 2034, 2039 and 2043	30 November in 2029, 2034, 2039 and 2043

10.3 Failure to achieve performance triggers

In the event that an Offset Performance Report reveals a failure of the offset to achieve the relevant interim performance triggers and completion criteria listed in Section 4, the following response is triggered:

Step 1: Investigate cause of failure:

- within one month after detecting the failure, complete an investigation into the reasons why the interim performance targets or the completion criteria were not achieved in the specified timeframes. Specifically, compare the improvements/deteriorations in raw data for each habitat attribute with the changes projected by the literature review in the Environmental Offsets Strategy.
- within two months after detecting the failure, complete a re-evaluation of the suitability of relevant management measures in the OAMP. This re-evaluation must identify appropriate corrective actions. Corrective actions may include, but are not limited to:
  - a third-party review of the OAMP to provide input into the effectiveness of the management actions,
  - increasing the frequency, intensity or methods used for pest animal and weed control; or,
  - modifying the grazing schedule or control burns to modify understorey structural attributes.

Step 2: Revise this OAMP to incorporate changes to management measures identified under Step 1 and submit this revised plan to DCCEEW for approval.

Step 3: Implementation of corrective action(s):

- the appropriate corrective actions identified under Step 1 will be implemented as soon as practicable, and in any case within six months after detection of the trigger.

11. Revision of this OAMP

This OAMP is to be revised in the following situations:

- In the event of any failures to achieve interim performance triggers.
- Following force majeure events.
- In the event that offset habitat scores far exceed interim performance triggers to the extent that some management measures are superfluous to the objective of meeting interim performance triggers and offset completion criteria.

Revisions are to be undertaken in consultation with the Australian Government, and the revised OAMP is to be approved by the Australian Government prior to implementation.

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13. Appendices

13.1 A-1: Habitat Quality Assessment

Biodiversity AUSTRALIA

SUSTAINABLE PARTNERSHIPS
DEDICATED TO ACHIEVING
ECOLOGICAL AND ECONOMICAL BALANCE

LEADING THE WAY
IN ENVIRONMENTAL
MANAGEMENT

METESERVE TAYGLEN OFFSET HABITAT QUALITY ASSESSMENT REPORT

METESERVE TAYGLEN

October 2024

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Document Control Page

Version Control

Version	Purpose	Author	Reviewed / approved by	Date
Rev 0.1	Draft Report	Samir Khader	Daniel Joyce	12/8/2024
Rev 1.0	Client Draft Report	Simone Ludlow	Daniel Joyce	21/8/2024
Rev 2.0	Report	Jessica Hobart	Daniel Joyce	21/8/2024
Rev 3.0	Report	Jessica Hobart	Daniel Joyce	04/10/2024
Rev 4.0	Report	Jessica Hobart	Daniel Joyce	18/10/2024

Distribution Control

Copy	Purpose	Method	Issued to:	Name	Date
1	File Copy	Electronic/Email	Biodiversity Australia	Chantal Linares	18/10/2024
2	Client Review	Electronic/Email	MEC mining	Laura Morgan	18/10/2024

Project Number: ESQ6676

Our Document Reference: ESQ6676-Offset Habitat Quality Report-rev4.0

Abbreviations

BC Act	*Biodiversity Conservation Act*
AU	Assessment unit
Bio. Aus.	Biodiversity Australia
DA	Development Application
DCP	Development Control Plan
DESI	Department of Environment and Sciences and Innovation
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EPBC Act	*Environment Protection and Biodiversity Conservation Act*
HBT	Hollow-bearing Tree
HVR	High-value Regrowth
KFT	Koala Food Tree
KTP	Key Threatening Process
LEP	Local Environment Plan
LGA	Local Government Area
MNES	Matter of National Environmental Significance
OEH	Office of Environment and Heritage
RE	Regional Ecosystem
TEC	Threatened Ecological Community

Executive Summary

METServe, a subsidiary of Mining and Energy Technical Services Pty Ltd (MEC mining) has been engaged by Vitrinite Pty. Ltd., owner of Qld Coal Aust No.1 Pty. Ltd. and Queensland Coking Coal Pty. Ltd. (Vitrinite) to manage the environmental approval process for Vulcan South (the Project).

The Project targets hard coking coal which has been identified through previous exploration activities and is located north of Dysart and approximately 45 km south of Moranbah in Queensland's Bowen Basin on ML700073

The proposed activity will result in significant residual impacts under the Environmental Protection and Biodiversity Act (1999) EPBC) on six matters of National Significance (MNES) namely:

- Koala (*Phascolarctos cinereus*),
- Squatter Pigeon (*Geophaps scripta scripta*)
- Greater Glider (*Petauroides armillatus*)
- Glossy Black-cockatoos (*Calyptorhynchus lathami lathami*)
- Brigalow (*Acacia harpophylla* dominant and co-dominant) (Threatened Ecological Community)
- Poplar Box on Alluvial Plains

The Ornamental Snake (*Denisonia maculata*) was also assessed during due diligence in the unlikely situation that this species will be significantly impacted by this project by DCCEEW

To counter these ecological impacts to MNES and MSES, METServe proposes to deliver offsets that directly benefit each affected protected matter. A candidate offset location has been identified on Lot 3 of Plan SP314273, within three km south of the Impact area. This report assesses whether the offset site meets the requirements of the *EPBC Act Environmental Offsets Policy* and has the potential to achieve conservation gains.

Habitat quality assessments were undertaken at the candidate offset sites in July 2024. The methodology used for the assessments are described in the BioCondition Assessment Manual *Version 2.2* (2015) and the *Vulcan Coal Mine Amendment Environmental Offsets Strategy*, and closely followed the Queensland *Guide to Determining Terrestrial Habitat Quality version 1.3.* The field survey confirmed the presence of Brigalow, Poplar Box woodland on alluvial plains (RE 11.3.2), Squatter Pigeons and Koalas.

Field-based assessments between June and August 2023 revealed that the habitat quality at the impact site was 54.0/100, 55.4/100, 81.3/100, 80.5/100, 68.8/100 for the Koala, Greater Glider and Squatter Pigeon respectively. Brigalow TEC quality was 64.9/100 and RE 11.3.2 was 60.6/100. Ornamental Snake habitat was low quality at 15.7/100.

The July 2024 field-based habitat quality assessment at the candidate offset site presents 55.8/100, 57.62 /1, and 55.31/100 for the Koala, Greater Glider and Squatter Pigeon respectively. Brigalow TEC was 32.26/100, and RE 11.3.2 was 37.14/100. The Assessments Unit 35 is a potential habitat for Ornamental Snake while, the AU 32 and 33 are potential foraging habitat for Glossy Black Cockatoo (*Calyptorhynchus lathami lathami*).

The candidate offset site is suitable for meeting the offset needs for Koala, Squatter Pigeon (Breeding & Foraging), Greater Glider, Brigalow and Poplar Box (RE 11.3.2) TECs.

It is therefore likely that a subset of this candidate area will ultimately be selected as the eventual offset for Vulcan South.

A careful examination of each component of habitat quality for each species was undertaken to determine the potential for improving habitat quality within the offset site through management. This revealed that, for all matters, habitat quality is likely to improve by at least 1/10 over a 20-year management period. This can be achieved through implementing a weed and pest animal control program, along with judicious thinning of the shrub and midstory layer where in excess, which also manages fire and to create a more natural vegetation structure and improve the growth rates of retained trees. The installation of water sources will be valuable to the Squatter Pigeon (Breeding & Foraging) and many other species not accounted for in this report. The removal of general cattle grazing from the property will increase native recruitment with targeted grazing to only occur to manage buffel grass. The potential installation of nest boxes to increase breeding locations will also be beneficial for Gliders.

Considering the habitat quality at the impact and offset sites, the projected gains in habitat quality at the offset site, the averted risk of loss, and the confidence in these estimates, the candidate offset site compensates for the impacts of the Vulcan South Coal Mine for the matters:

- Squatter Pigeon (Dispersal, Breeding & Foraging).
- Regional Ecosystem 11.3.2 (Poplar box on alluvial plains)
- Koala (Shelter, Foraging and Dispersal)
- Central Greater Glider (Denning, Future Denning and Foraging)
- Brigalow TEC
- Glossy Black (Foraging)

1. Introduction

The Vulcan South Coal Mine (VSCM) is an open-cut mine located in the Bowen Basin operated by Vitrinite Pty Ltd (Vitrinite). METServe was engaged by Vitrinite to investigate whether the candidate offset site is likely to be suitable for delivering ecological gains for the offset matters under the *EPBC Act Environmental Offsets Policy* (The Policy). The offset matters are identified as:

- Koala (*Phascolarctos cinereus*) (endangered),
- Squatter Pigeon (*Geophaps scripta scripta*) (vulnerable)
- Greater Glider (*Petauroides armillatus*) (endangered)
- Foraging habitat for Glossy Black-cockatoos (*Calyptorhynchus lathami lathami*) (vulnerable)
- Brigalow (*Acacia harpophylla* dominant and co-dominant) (endangered)
- Polar Box on alluvial sand plains (endangered)

As part of this process, Biodiversity Australia Pty Ltd (Bio Aus) was engaged by METServe to investigate Lot 3 of Plan SP314273 (Tay-Glen) consisting of 8,283.25 hectares (Candidate Offset Site) as a suitable Offset area for the Project under the *EPBC Act Environmental Offsets Policy.* This report details the findings of this investigation and contains the following information:

- Habitat quality scores for the impact site (as provided by METServe) and candidate offset site for each offset matter.
- Results of field survey investigating the potential occurrence of each species and TECs.
- Discussion about how the offset site may be managed to improve habitat quality for each and methodologies for the field survey.

Ecological assessments (METServe 2023) identified that the Project is likely to cause significant residual impacts on the following six matters of national environmental significance (MNES):

- Removal of 71.17 ha of Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC
- Removal of 5.2 hectares of Polar Box on alluvial sand plains MSES Threatened RE
- Removal of 1,166.9 ha Koala habitat, comprised of:
    - 938.6 ha of habitat suitable for foraging/shelter/dispersal
    - 45.5 ha of habitat suitable for shelter/dispersal
    - 182.8 ha of habitat suitable for dispersal
- Reduction of the area of occupancy for the Greater Glider by 1,056.8 ha, comprised of:
    - 750 ha of likely/current denning habitat
    - 234.6 ha of future denning habitat

  - 19.3 ha of foraging habitat
  - 52.9 ha of dispersal habitat
- Removal of 1056.8 ha of Squatter Pigeon habitat consisting of
  - 372.489 ha of breeding and foraging habitat,
  - 78.948 ha of foraging habitat
  - 767.63 ha of dispersal habitat for the Squatter Pigeon.
- Removal of 38.1 ha of Glossy Black-Cockatoo foraging habitat

To counter the above impacts, Vitrinite proposes to deliver offsets that directly benefit each of the affected protected matters. A candidate offset location has been identified on Lot 3 of Plan SP314273 consisting of 8,283.25 hectares approximately 3 km west of Dysart, Queensland and approximately 6 km southwest of the impact site.

The impact site investigations identified an additional 38.1 ha of Glossy Black-Cockatoo foraging habitat that was being used by a pair of individuals, despite a lack of desktop evidence for the species occurring in the region, and limited food resources available. The impact assessment determined that the habitat was likely only intermittently used by transient individuals rather than a locally resident breeding population (detailed in full in the Terrestrial Ecological Assessment). The proposed offset site provided little existing habitat for the species, with approximately only 33 hectares of remnant or high value regrowth containing food trees. The proposed offset includes the establishment of 250 hectares of Brigalow by regeneration of non-remnant vegetation that will contain food trees for the Glossy Black cockatoo.

A seventh matter, the Ornamental Snake (*Denisonia maculata*) was given a due diligence assessment if DCCEEW determines it to be significantly impacted by this project.

This report presents the findings of the Habitat Quality Assessment of the candidate Offset Site and assesses the level of offset relative to the Impact with a robust assessment of habitat quality within the Impact and Offset sites necessary for confirming the appropriateness of offsets for three reasons:

1. The Commonwealth Government requires evidence-based quality scores for the impact and offset sites to assess the offset proposal.
2. Improvement in habitat quality over time is one of two means by which conservation gains can be achieved via offsets (the other is via increased levels of habitat protection), and the assessment of baseline habitat quality and improvements over time are important for monitoring the success of offsets.
3. Following section 7.1 of the *EPBC Act Environmental Offsets Policy*, an offset site must possess, as a minimum, the quality of the habitat at the impact site, or be managed and resourced over a defined period so that its habitat quality is improved to meet the quality of habitat originally impacted.

2. Methodology

The accepted methodology for assessing habitat quality at the impact site and the candidate offset site was described in the *Vulcan Coal Mine Amendment Environmental Offsets Strategy*. This methodology is based on the Queensland *Guide to Determining*

Terrestrial Habitat Quality version 1.3, which specifies a combination of BioCondition assessments, and tailored, species-specific habitat quality scores based on the suitability of the site for foraging, breeding, sheltering, dispersal and protection from threats as detailed in Section 2.2.

The offset site and Impact site were sampled during the dry season, to ensure comparability in seasonal state. Field surveys of the impact site were undertaken from 1st June to 31st August 2023 and field surveys of the candidate offset site from 15th to 22nd July 2024.

2.1 Sampling Design

The impact and offset sites were assessed using identical methodologies and sampling designs. The sampling design framework was as described by the *Guide to Determining Terrestrial Habitat Quality version 1.3* (DESI 2020). This framework defines a 'matter area' for each prescribed environmental matter requiring offsets as the area that contains or represents the extent of an individual prescribed environmental matter. The matter areas for the impact site were described by the Vulcan South Coal Mine Amendment Environmental Offset Strategy. For the candidate offset site, the matter areas were defined as follows:

- A majority of the offset site were contained within the matter areas for Koala and Squatter Pigeon as food trees for the former are found throughout and the foraging substrate for the latter is suitable throughout.
- The matter area for the Greater Glider is largely confined to riparian environments locally, and Eucalyptus dominated areas growing away from creeks.

Matter areas were then divided into Assessment Units (AU). An AU is a defined area or group of areas of at least 1 ha in total size within the matter area that is relatively homogenous generally containing only one Regional Ecosystem (RE) type that is of a reasonably consistent broad condition state (i.e., remnant, non-remnant, high-value regrowth (HVR) and disturbed).

The AU's assigned to the impact and offset sites were based upon field-verified RE mapping undertaken as part of the Terrestrial Ecological Assessment (METServe 2023 and 2024). Vegetation mapping was assessed following the methodology described by Neldner et al. (2020).

The candidate offset site and associated sampling locations are shown in Figure 1. The number of sampling locations was based on the sizes of each AU's, as shown in Table 2.

For the BioCondition and Habitat Quality assessment, a total of 115 plots were distributed in 43 AU's within the candidate offset site based on their RE and their level of disturbance. The AU's for the Impact Site (Table 1) are numbered differently to the AU's for the Offset site (Table 2).

Benchmarks are specific to each regional ecosystem (RE) or vegetation community in Queensland. However, some RE's are still missing benchmarks on the Queensland Herbarium (2023) BioCondition Benchmark Database. Version 3.4 (April 2023). The AU 14 on the offset site, for example, (RE 11.10.8 - *Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary rocks*) has no benchmarks described by the Queensland Herbarium (2023) BioCondition Benchmark Database. In this case, the benchmark used for the offset site was 11.9.4a - *Semi-evergreen vine*

thicket in sheltered habitats on medium to coarse-grained sedimentary rocks), suggested to be the closest vegetation similarities for RE 11.10.8.

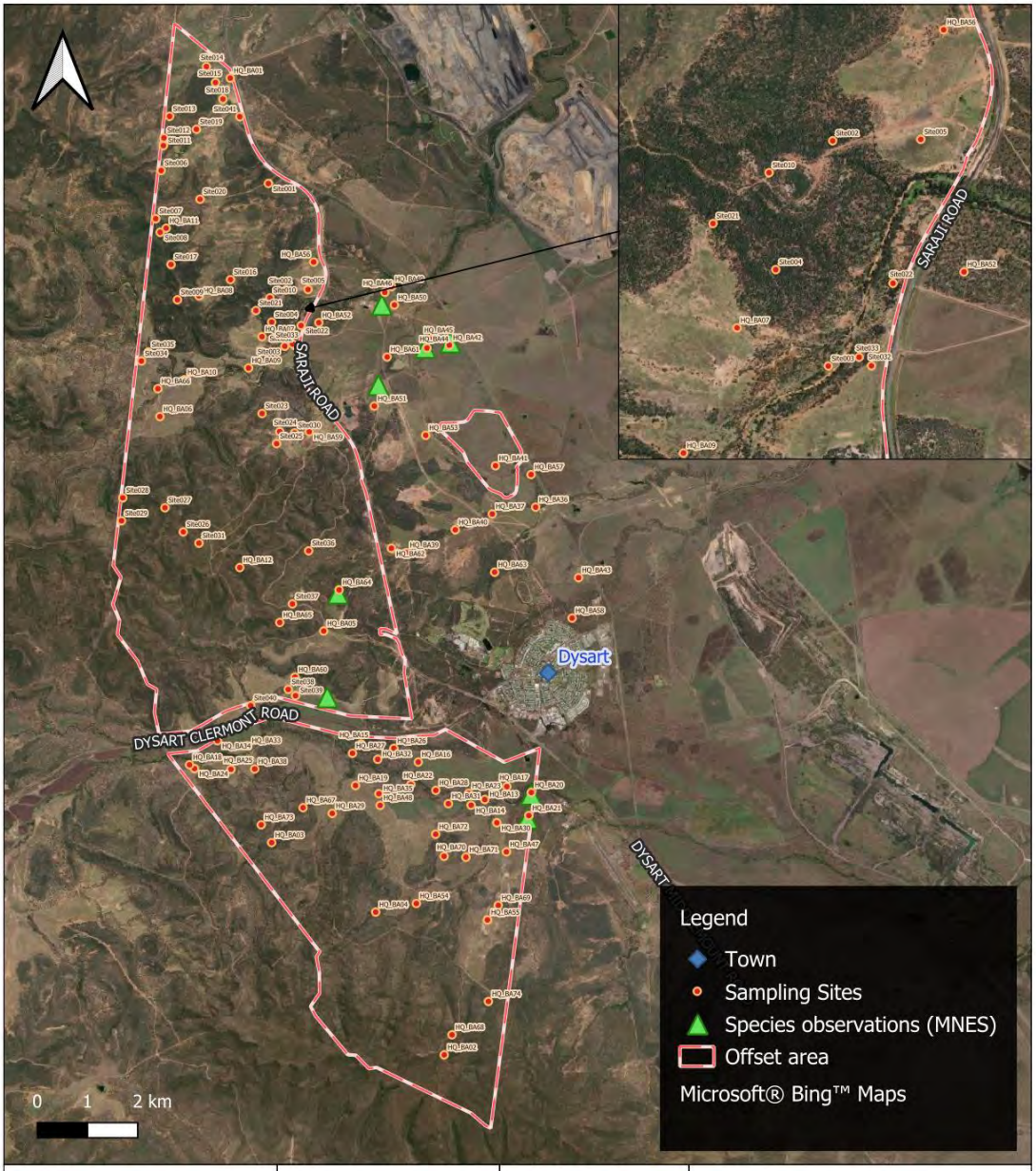


Figure Name: Sampling locations within offset site	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:99778	Spatial Reference: GDA2020 / MGA zone 55

Figure 1: Site Location

Table 1 AU's within the impact Site

Assessment Unit	Description	Area (ha)	Number of sampling locations
AU01	Remnant 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains	5.22	2
AU02	Remnant 11.3.7 – *Corymbia spp.* open woodland on alluvial plains	3.83	2
AU03	Remnant 11.3.25 – *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	7.56	2
AU04	Remnant 11.4.8 – *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	66.94	4
AU05	Remnant 11.4.9 – *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	0.22	1
AU06	Remnant 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	7.08	2
AU07	Remnant 11.5.9 – *Eucalyptus crebra* and other *Eucalyptus spp.* and *Corymbia spp.* woodland on Cainozoic sand plains and/or remnant surfaces	211.97	5
AU08	Remnant 11.9.2 – *Eucalyptus melanophloia* +/- *E. orgadophila* woodland to open woodland on fine-grained sedimentary rocks	163.98	4
AU09	Remnant 11.10.1 – *Corymbia citriodora* woodland on coarse-grained sedimentary rocks	41.42	2
AU10	Remnant 11.10.1x1 – Variation of *Corymbia citriodora* woodland on coarse-grained sedimentary rocks. This variation includes *Eucalyptus crebra*, *Corymbia clarksoniana*, *Eucalyptus melanophloia* and *Acacia burdekensis* in varying proportions in the emergent and/or canopy layers.	69.27	3
AU11	Remnant 11.10.3 – *Acacia shirleyi* or *A. catenulata* open forest on coarse-grained sedimentary rocks. Crests and scarps	163.74	4
AU12	Remnant 11.10.7 - *Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	28.23	2
AU13	Non-Remnant 11.10.3 – *Acacia shirleyi* or *A. catenulata* open forest on coarse-grained sedimentary rocks. Crests and scarps	36.87	2
AU14	Non-Remnant 11.10.7 – *Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	8.00	2
AU15	Non-Remnant 11.4.8 – *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	102.42	1
AU16	Non-Remnant 11.5.3 – *Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	284.38	2
AU17	Non-Remnant 11.5.9 – *Eucalyptus crebra* and other *Eucalyptus spp.* and *Corymbia spp.* woodland on Cainozoic sand plains and/or remnant surfaces	44.28	1
AU18	Non-Remnant 11.3.6 – *Eucalyptus melanophloia* woodland on alluvial plains	6.44	0
AU19	Non-Remnant 11.3.7 – *Corymbia spp.* open woodland on alluvial plains	0.29	1
AU20	Non-Remnant 11.3.25 – *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	1.49	0
AU21	Non-Remnant 11.5.9a – *Eucalyptus melanophloia* woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges. Soils are generally deep red earths. Not a Wetland.	0.91	0

Assessment Unit	Description	Area (ha)	Number of sampling locations
AU22	Non-Remnant 11.9.2 – *Eucalyptus melanophloia* +/- *E. orgadophila* woodland to open woodland on fine-grained sedimentary rocks	194.61	2
AU23	Non-Remnant 11.4.9 – *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	14.43	0
AU24	Non-Remnant 11.3.2 – *Eucalyptus populnea* woodland on alluvial plains	12.87	0
	Total	**1476.4**	

Table 2 AU's within the Offset site

Assessment Unit	Description	Area (ha)	Number of sampling locations	Assessors
AU01	Remnant 11.10.1 – *Corymbia citriodora* woodland on coarse-grained sedimentary rocks	57.37	3	BA
AU02	Non-Remnant 11.10.12 – *Eucalyptus populnea* woodland on medium to coarse-grained sedimentary rocks	77.91	3	BA
AU03	High-value Regrowth 11.10.12 – *Eucalyptus populnea* woodland on medium to coarse-grained sedimentary rocks	3.08	1	BA
AU04	Non-Remnant 11.10.1x1 – Variation of *Corymbia citriodora* woodland on coarse-grained sedimentary rocks. This variation includes *Eucalyptus crebra, Corymbia clarksoniana, Eucalyptus melanophloia* and *Acacia burdekensis* in varying proportions in the emergent and/or canopy layers.	31.29	2	BA
AU06	Remnant 11.10.1x1 – Variation of *Corymbia citriodora* woodland on coarse-grained sedimentary rocks. This variation includes *Eucalyptus crebra, Corymbia clarksoniana, Eucalyptus melanophloia* and *Acacia burdekensis* in varying proportions in the emergent and/or canopy layers.	2705.08	6	BA, METServe
AU07	Non-Remnant 11.10.3 – *Acacia shirleyi* or *A. catenulata* open forest on coarse-grained sedimentary rocks. Crests and scarps	46.89	2	BA
AU08	High Value Regrowth 11.10.3 - *Acacia shirleyi* or *A. catenulata* open forest on coarse-grained sedimentary rocks. Crests and scarps	28.51	2	BA
AU09	Remnant 11.10.3 - *Acacia shirleyi* or *A. catenulata* open forest on coarse-grained sedimentary rocks. Crests and scarps.	1229.72	6	BA, METServe
AU10	Non-remnant 11.10.7 - *Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	259.65	4	BA
AU11	High-value Regrowth 11.10.7 - *Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	9.77	2	METServe
AU12	Remnant 11.10.7 - *Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	567.59	7	METServe
AU13	Disturbed 11.10.7 - *Eucalyptus crebra* woodland on coarse-grained sedimentary rocks	12.8	2	BA

Assessment Unit	Description	Area (ha)	Number of sampling locations	Assessors
AU14	Remnant 11.10.8 - Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary rocks (Benchmark used for the offset site 11.9.4a) - Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary rocks	33.38	1	BA
AU15	High-value Regrowth 11.3.1 - *Acacia harpophyl*la and/or *Casuarina cristata* open forest on alluvial plains	7.46	2	BA
AU16	Remnant 11.3.1 - *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	28.01	1	BA, METServe
AU17	Non-remnant 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains.	212.56	4	BA
AU18	High-value Regrowth 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains.	7.47	2	BA
AU19	Remnant 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains.	92.03	2	BA
AU20	Disturbed 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains.	35.2	2	BA
AU23	Remnant 11.3.25 - *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	207.69	4	BA, METServe
AU24	Disturbed 11.3.25 - *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	6.36	1	BA
AU25	Non-remnant 11.3.3 - *Eucalyptus coolabah* woodland on alluvial plains	47.69	2	BA
AU26	Remnant 11.3.3 - *Eucalyptus coolabah* woodland on alluvial plains	61.49	3	BA
AU27	Disturbed 11.3.3 - *Eucalyptus coolabah* woodland on alluvial plains	15.33	1	BA
AU31	Non-Remnant 11.4.9 – *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	34.05	1	BA
AU32	Remnant 11.4.9 - *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	2.26	1	BA
AU34	Non-Remnant 11.5.3 – *Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	401.22	4	BA, METServe
AU35	High-value Regrowth 11.5.3 - *Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	9.98	1	BA
AU36	Remnant 11.5.3 - *Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	22.76	1	BA
AU38	Non-remnant 11.5.9b - *Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius +/- Corymbia* spp. woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges.	785.52	5	BA, METServe
AU39	High-value Regrowth 11.5.9b - *Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius +/- Corymbia* spp. woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges.	31.52	1	BA

Assessment Unit	Description	Area (ha)	Number of sampling locations	Assessors
AU40	Remnant 11.5.9b - *Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius +/- Corymbia* spp. woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges.	1085.59	9	METServe
AU41	Disturbed 11.5.9b - *Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius +/- Corymbia* spp. woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges.	13.1	2	BA, METServe
AU42	Remnant 11.5.12a *Corymbia clarksoniana* woodland and other *Corymbia* spp. and *Eucalyptus* spp. on Cainozoic sand plains and/or remnant surfaces	110.17	2	BA, METServe
AU43	Disturbed 11.10.12 - *Eucalyptus populnea* woodland on medium to coarse-grained sedimentary rocks	2.75	1	BA
Total		**8283.25**		

2.2 Habitat Quality Assessment

Habitat quality assessments were conducted at each sampling location of the impact site and candidate offset site following the methodology presented in the Vulcan South Coal Mine Amendment Environmental Offsets Strategy. Refer to this strategy for a detailed description of the methodology and the scoring systems (Table 3) used to calculate habitat scores based on the suitability of the site for foraging, breeding, sheltering, dispersal and protection from threats for Koala, Squatter Pigeon and Greater Glider.

In summary, a 100 m × 50 m assessment area was installed at each sampling location to assess floristic and structural attributes. Riparian vegetation units (e.g., RE 11.3.25) were an exception; due to the narrow, linear nature of these habitats. On riparian vegetation sites, where the standard 100 m x 50 m, assessment area was not able to be placed without extending outside the AU, the assessment area was modified to a 200 m x 25 m area if possible or in more difficult cases either a 100 m x 25 m area or a 50 m x 25 m area; with the largest dimensions possible preferentially selected. The attributes of each location were then used to calculate separate habitat quality scores for each protected matter for which the AU forms part of its matter area. A weighted average habitat quality score was then calculated for the entire matter area within the offset site, by weighting the mean scores for each AU by the size of each unit. The raw data and the habitat quality scores are presented in Section 5, to provide baseline data against which future improvements can be assessed.

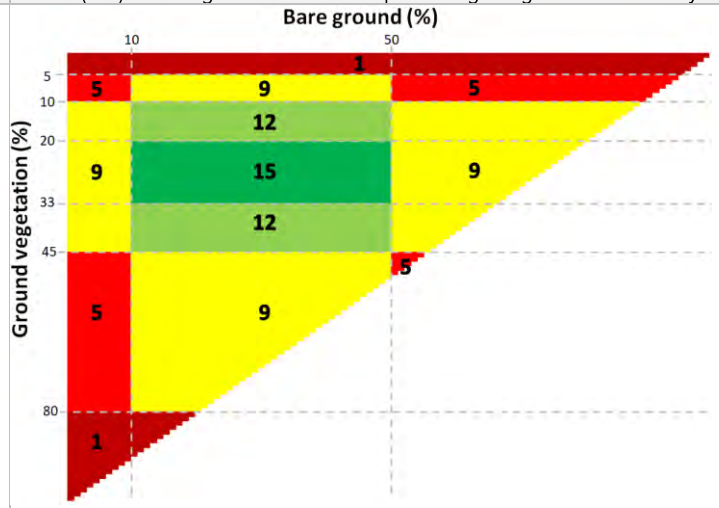
The habitat scoring system is described in Table 3 below.

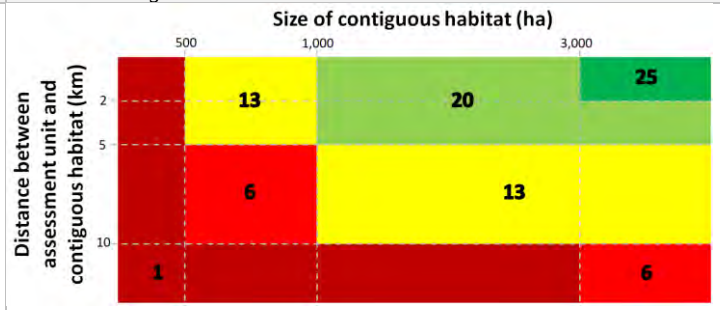
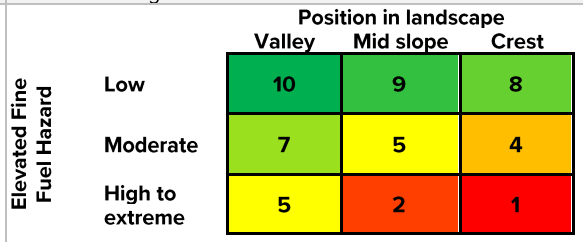
Table 3 Habitat scoring methodology

Koala	**1 Threats to species**	**Score**	0	3	6	8	
		Risk of road-based mortality	High: Assessment unit borders a public road with 100 kph speed limit.	Moderate: Assessment unit is within 1 km of a public road with 100 kph speed limit OR borders a public road with 60-100 kph speed limit.	Low: Assessment unit lies 1-2 km from public roads, AND any private tracks through or near the unit are used infrequently at night (less than once per week) and at low speeds (less than 50 kph).	Nil: Assessment unit lies >2 km from a public road, AND any private tracks through or near the unit are used infrequently at night (less than once per week) and at low speeds (less than 50 kph).	
		Score	0	5	8		
		Risk of dog attack	High: Assessment unit is within 18 km of a town, dump or other source of supplementary food for dogs, and no control programs are in place.	Moderate: Assessment unit is within 18 km of a town, dump or other source of supplementary food for dogs, but active control measures (baiting, trapping or shooting) occur within the assessment unit and effectively reduce dog densities (as shown by monitoring).	Low: Assessment unit is further than 18 km from a town, dump or other source of supplementary food for dogs. 56.9		
		Score	0	5	9		
		Importance as a drought refuge	**Low:** The assessment unit is further than 2 km from a watercourse or source of surface water, OR is 1-2 km from a watercourse, but no vegetation occurs along the watercourse.	**Medium:** The assessment unit is 1-2 km from a watercourse or source of surface water and is connected to vegetation along the watercourse.	**High:** The assessment unit is within 1 km of a watercourse or source of surface water.		
	2 Quantity and quality of food	**Score**	Scores are assigned based on combination of basal area and proportion of primary food trees, as shown in the below table				
		Density and quality of food trees					
		Score	1	2	3	4	5
		Number of large food trees	**None:** No large food trees	**Poor:** 1 or 2 large food trees per 0.5 ha	**Moderate:** 3 to 6 large food trees per 0.5 ha	**High:** 7 to 10 large food trees per 0.5 ha	**Very high:** >10 large food trees

Combined basal area of all food trees (m^2/ha)	Percentage of total food tree basal area that comprises primary food trees (*E. camaldulensis* or *E. tereticornis*)				
	0	**<10**	**10-40**	**40-70**	**70-100**
0	0	0	0	0	0
<2	1	2	3	4	5
2-5	2	3	5	7	8
5-8	3	5	7	10	12
8-10	4	7	10	13	16
>10	5	8	12	16	20

	3 Quality and availability of shelter	**Score**	1	2	4	7	10
		Canopy cover of trees taller than 4 m.	**None:** No trees taller than 4 m.	**Poor:** <10% cover.	**Moderate:** 10-30% cover.	**High:** 30-60% cover.	**Very high:** >60% cover.
		Score	0	2	4	7	10
		Number of large non-food trees	0	1	2-4	5-10	>10
		Score	0	5			
		Presence of dense shade trees	Trees taller than 6 m and with a crown that has >75% cover are absent	Trees taller than 6 m and with a crown that has >75% cover are present			
	4 Species mobility capacity	**Score**	1	5	10	17	25
		Extent of contiguous habitat.	**Very poor:** Assessment unit is further than 5 km from contiguous habitat larger than 200 ha.	**Poor:** Assessment unit is 2-5 km from contiguous habitat larger than 200 ha	**Moderate:** Assessment unit is connected to, or within 2 km of, a contiguous landscape that is 200-500 ha.	**Good:** Assessment unit is within 2 km of a contiguous landscape that is 500-1,000 ha.	**Very good:** Assessment unit is connected to or within 2 km of a contiguous landscape that is >1,000 ha.
Squatter Pigeon	**1 Threats to species**	**Score**	1	6	11	16	
		Invasion by Buffel Grass	**High:** Buffel Grass has a ground cover >40%	**Moderate:** buffel Grass has a ground cover of 10-40%.	**Low:** Buffel Grass has a ground cover of 0.1-9.9%.	**None:** Buffel Grass is absent.	
		Score	0	3	7	9	
		Predation by feral predators	**Very High:** Assessment unit is within 5 km of a town, dump or other source of supplementary food for dogs and cats, and no control programs are in place.	**High:** Assessment unit is within 18 km of a town, dump or other source of supplementary food for dogs, and no control programs are in place.	**Moderate:** Assessment unit is within 18 km of a town, dump or other source of supplementary food for dogs and cats, but active control measures (baiting, trapping or shooting) occur within the assessment unit and effectively reduce cat and dog densities (as shown by monitoring).	**Low:** Assessment unit is further than 18 km from a town, dump or other source of supplementary food for dogs and cats.	
	2 Quality and availability of food and foraging habitat	**Score**	0	1	*Unlike for other habitat attributes and species, the score for distance to water is multiplied by the sum of the other foraging scores to generate an overall foraging habitat score for Squatter Pigeons.		
		Distance to water*	**High:** Assessment unit is >3 km from water.	**Low:** Assessment unit is within 3 km of water.			

		Score	Scores (1-15) are assigned based on the percentage of ground covered by low vegetation (<1 m) and bare ground, as shown in the below table				
		Ground cover					
		Score	**1**	**3**	**5**	**8**	**10**
		Understorey richness	**Very low:** <5 species of grasses and forbs.	**Low:** 5-14 species of grasses and forbs.	**Moderate:** 15-24 species of grasses and forbs.	**High:** 25-29 species of grasses and forbs.	**Very high:** >30 species of grasses and forbs.
	3 Quality and availability of habitat for shelter and breeding	**Score**	0	1	*Unlike for most other habitat attributes and species, the score for distance to water is multiplied by the other breeding habitat score below to generate an overall breeding habitat score for Squatter Pigeons.		
		Distance to water*	**High:** Assessment unit is >1 km from permanent water	**Low:** Assessment unit is within 1 km of permanent water.			
		Score	**1**	**4**	**11**	**18**	**25**
		Normalised Difference Vegetation Index (NDVI)	**Very poor:** the assessment unit does not contain any 1-ha cells with a mean NDVI > 0.125.	**Poor:** <30% of the assessment unit has NDVI > 0.125.	**Moderate:** 30-60% of the assessment unit has NDVI > 0.125.	**Good:** 60-80% of the assessment unit has NDVI > 0.125.	**Very good**: >80% of the assessment unit has NDVI > 0.125.

	4 Species mobility capacity	**Score**	Scores are assigned based on the below table				
		Extent of, and distance to, large patches of contiguous habitat					
Central Greater Glider	**1 Threats to species**	**Score**	Scores are assigned based on the below table				
		Threat of intense canopy fires					
		Score	0	3	5	7	10
		Importance as a climate change refuge	**None:** Assessment unit is further than 1 km from a drought refuge OR occurs within 1 km of a drought refuge but there is a vegetation gap > 0.5 km between the unit and the drought refuge.	**Low:** Assessment unit is <1 km from a permanent watercourse or an area mapped as a 'moderate' or 'high' potential groundwater-dependent ecosystem in the National GDE Atlas AND is connected to these drought refuges by woody vegetation.	**Moderate:** Assessment unit is within 100 m of a farm dam or other water impoundment OR overlaps with a 'low' potential groundwater-dependent ecosystem in the National GDE Atlas.	**High:** Assessment unit is adjacent to a permanent watercourse or overlaps with a 'moderate' or 'high' potential groundwater-dependent ecosystem in the National GDE Atlas.	**Very high:** Assessment unit is above 450 m in altitude.
		Score	0	5			
		Threat of barbed wire fence	**High:** assessment unit is crossed by a barbed top wire	**Low:** Assessment Unit is not crossed by a barbed top wire.			

2 Quality and availability of food

Score — Scores are assigned based on combination of basal area and proportion of primary food trees, as shown in the below table

Density and quality of food trees

Total basal area of food trees (m^2/ha)	Species richness of *Eucalyptus* and *Corymbia* in 0.5 ha: 1	2	3	4	5+
0	0	0	0	0	0
<2	1	2	3	4	5
2-5	2	3	5	7	8
5-8	3	5	7	10	12
8-10	4	7	10	13	16
>10	5	8	12	16	20

Score	1	2	3	4	5
Number of large food trees (>30 cm DBH)	**None:** No large food trees	**Poor:** 1 or 2 large food trees per 0.5 ha	**Moderate:** 3 to 6 large food trees per 0.5 ha	**High:** 7 to 10 large food trees per 0.5 ha	**Very high:** >10 large food trees

3 Quality and availability of shelter

Score	0	4	6	10	15
Number of large shelter trees >RE threshold for DBH) per 0.5 ha transect).	**None:** No eucalypt trees >RE threshold for DBH	**Poor:** 1 to 2 eucalypt trees >RE threshold for DBH.	**Moderate:** 3 to 5 eucalypt trees >RE threshold for DBH	**High:** 6 to 9 eucalypt trees >RE threshold for DBH.	**Very high:** > 10 eucalypt trees >RE threshold for DBH.

Score	0	3	6	10	
Availability of hollows of a suitable size (over 8 cm entrance diameter) per hectare (double the number recorded per half hectare BioCondition transect)	**None:** No hollows observed, trees unlikely to be able to support hollows (	**Moderate:** 4 or 6 suitable hollows	**High:** 8 or 10 suitable hollows	**Very high:** More than 10 suitable hollows	

4 Species mobility capacity

Score — Scores are assigned based on a combination of size of the habitat patch and connectivity to other patches, as shown in the below table.

Size and connectivity of habitat patch

Size of habitat patch[1]	Connectivity to nearest patch: Patches <1 km apart and connected by woody vegetation*	Patches 1-8 km apart and connected by woody vegetation*	Patches >8 km apart and connected by woody vegetation*	Patches <0.5 km apart and separated by open areas*	Patches 0.5-3 km apart and separated by open areas*	Patches >3 km apart and separated by open areas*
>300 ha	25	23	21	20	18	15
100-300 ha	24	20	17	15	12	10
50-100 ha	23	17	10	8	6	4
<50 ha	22	14	8	6	3	1

*Distinction between open areas versus wooded vegetation is defined by the gliding distance of Greater Gliders (i.e., average spaces between trees should not exceed the height of trees in wooded vegetation).

[1]Habitat patch size classes are based on ability of the patch to support a viable population of 100 Greater Gliders, assuming a mean home range size of 3 ha.

2.3 Presence of Target Species

The evidence of Koalas, Squatter Pigeons and Greater Gliders was investigated within the candidate offset site during the habitat quality assessment July 2024 survey.

Koalas may be detected at any time of day, and all large trees were inspected for sleeping Koalas while transiting between sampling locations. In addition, indirect signs of Koala presence (scratch marks and scats) were opportunistically searched for at all sampling locations. (Section 7.2)

Squatter Pigeons are typically highly detectable, as they forage on tracks and roadsides in the morning and afternoon. The species was detected while transiting between locations sampled for habitat quality, along tracks and near waterbodies. (Section 7.1)

The Greater Glider shelters in Eucalyptus hollow trees during the day and is best detected by spotlighting at night. Spotlighting for a total of 18 hours was undertaken in the impact sites. The species records within the surrounding areas the number of large trees with suitably sized hollows were recorded for the offset site.

Species records for each of the fauna matters are shown in Figure 2.

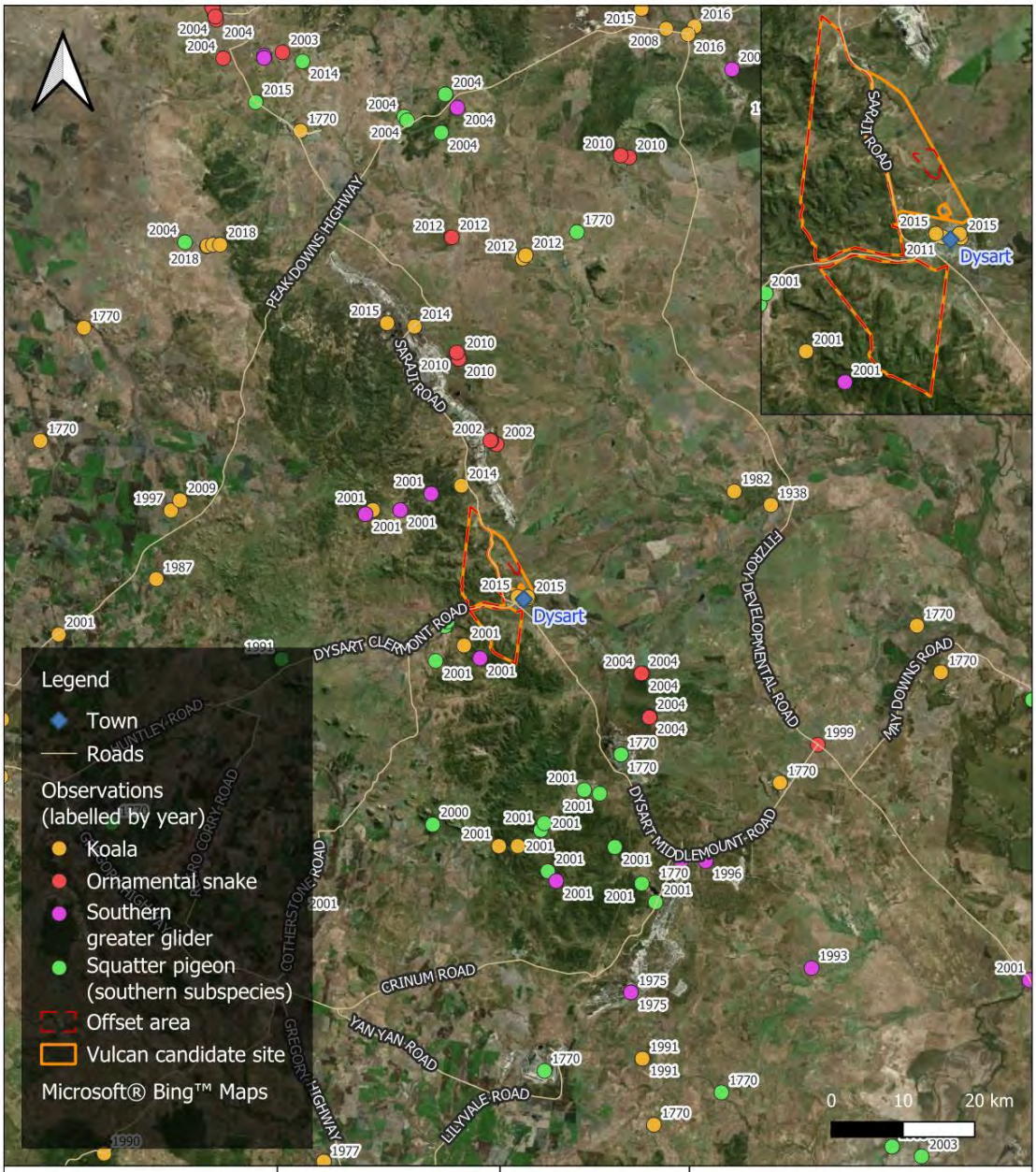


Figure Name: Threatened fauna records from region surrounding the offset site	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:700000	Spatial Reference: GDA2020 / MGA zone 55

Figure 2: MNES Surrounding Records

3. Habitat Quality of the Impact Site

BioCondition scores ranged from 15.6/100 to 83.8/100 across sampling locations at the Impact Site. Most of the variation in score was caused by variation in non-native plant cover, which was poorly corelated to whether the vegetation unit was remnant or previously cleared. Consequently, the average BioCondition of remnant locations (59.4/100) was not substantially different from regrowth (48.4/100) or non-remnant (37.6/100) areas. The average BioCondition score of the entire impact site, weighted by the relative size of each AU, was 53/100.

Species-specific scores for the Koala ranged from 44/100 to 83/100 across sampling locations at the impact site (Table 5). while other units had an average score of 54/100. Because high-quality habitat was extremely limited in extent, the average Koala score of the entire impact site, weighted by the relative size of each AU, was 57/100.

Species-specific scores for the Squatter Pigeon ranged between 50/100 and 98/100 across the impact site. The matter area for breeding habitat had a weighted average score of 81.3/100, while the matter area for foraging habitat had a weighted average score of 80.5/100 and the matter area for dispersal habitat had an average weighted score of 68.8/100.

The average species-specific score for the Greater Glider was 56.3/100.

Quality of Brigalow in the offset site, weighted by area was 47.28/100 whilst RE 11.3.2 was 56.9/100.

The relative value of BioCondition versus species-specific habitat score as a measure of overall habitat quality varies between species. Species such as the Koala and Greater Glider have well understood habitat preferences that are largely independent of most components of BioCondition (shrub richness, forb richness, grass richness, native grass cover, woody debris and non-native plant cover are irrelevant to arboreal mammals). For this reason, it is recommended that the species-specific habitat scores are adopted for use in offset calculations for the Koala and Greater Glider, rather than BioCondition.

In contrast, the ecological needs of the Squatter Pigeon (Breeding & Foraging) and Ornamental Snakes are less well understood.

For ecological communities, BioCondition can be directly used as a measure of quality.

Regarding the Squatter Pigeon (Dispersal, Breeding & Foraging), key food plants are not known, and no studies have examined the importance of feral predators, weeds and other habitat attributes. Due to these uncertainties, there is merit in considering BioCondition when assigning an overall habitat quality to the impact and offset sites. It is recommended that, for offset calculations, 1/3 of the overall habitat quality score is derived from BioCondition and the remaining 2/3 is derived from the species-specific scoring system. For the impact site, this results in an overall score of 68.8/100 for dispersal habitat, 80.5/100 for foraging habitat, and 81.3/100 for breeding habitat.

Table 4 presents the impact site BioCondition scores, and Table 5 presents the habitat values for impact sampling sites.

Table 4 BioCondition scores for each sampling location within the impact site

Unit	Site	Regional Ecosystem	Species Richness				Tree height	Ground cover (%)		Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Foliage cover		SUM	Score
			Trees	Shrubs	Grasses	Forbs		Native perennial grass	Organic litter					Trees	Shrub		
Maximum score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU10	I01	Remnant 11.10.1x1	5	5	5	5	5	1	5	3	0	5	0	5	3	47	58.8
AU12	I02	Remnant 11.10.7	5	5	5	5	3	1	5	5	5	2	0	2	5	48	60.0
AU10	I03	Remnant 11.10.1x1	5	5	5	2.5	3	3	5	3	0	5	0	2	0	38.5	48.1
AU11	I04	Remnant 11.10.3	5	5	5	5	5	3	5	5	5	5	3	5	5	61	76.3
AU09	I05	Remnant 11.10.1	5	5	5	2.5	3	3	5	5	10	5	5	5	0	58.5	73.1
AU11	I06	Remnant 11.10.3	5	5	5	5	3	1	3	5	5	5	5	5	3	55	68.8
AU09	I07	Remnant 11.10.1	5	5	2.5	2.5	3	3	5	5	15	2	10	5	3	66	82.5
AU11	I08	Remnant 11.10.3	5	5	5	5	3	1	3	5	0	5	5	5	3	50	62.5
AU12	I09	Remnant 11.10.7	2.5	2.5	2.5	2.5	5	0	5	3	0	5	0	2	3	33	41.3
AU11	I10	Remnant 11.10.3	5	5	5	5	5	1	3	5	0	5	10	5	3	57	71.3
AU18	I11	Non-Remnant 11.3.7	5	5	2.5	5	5	0	5	5	5	5	0	5	5	50.5	63.1
AU02	I12	Remnant 11.3.7	5	5	2.5	5	5	1	3	3	5	5	0	5	5	49.5	61.9
AU14	I13	Non-Remnant 11.10.7	5	5	2.5	5	3	1	5	5	5	5	0	0	5	46.5	58.1
AU14	I14	Non-Remnant 11.10.7	5	2.5	5	5	3	0	5	5	0	2	0	2	3	37.5	46.9
AU17	I15	Non-Remnant 11.5.9	5	5	5	5	3	5	5	3	5	5	10	2	3	61	76.3
AU07	I16	Remnant 11.5.9	5	2.5	5	5	3	1	3	3	15	5	5	0	0	52.5	65.6
AU21	I17	Remnant 11.5.9a	5	2.5	5	5	5	1	3	5	10	5	5	5	5	61.5	76.9
AU03	I18	Remnant 11.3.25	5	5	2.5	2.5	5	0	3	5	15	5	0	5	5	58	72.5
AU02	I19	Remnant 11.3.7	5	5	5	5	3	0	3	5	5	2	0	5	5	48	60.0
AU07	I20	Remnant 11.5.9	5	5	2.5	2.5	3	5	2	5	0	2	0	5	3	44.5	55.6
AU10	I21	Remnant 11.10.1x1	5	5	5	5	5	5	3	5	5	5	10	5	3	40	50.0
AU07	I22	Remnant 11.5.9	5	5	5	5	5	1	5	5	5	2	10	2	3	66	82.5
AU04	I23	Remnant 11.4.8	5	5	5	5	3	1	3	5	5	5	5	2	5	58	72.5
AU07	I24	Remnant 11.5.9	5	2.5	5	5	3	1	5	3	5	5	5	5	3	54	67.5
AU04	I25	Remnant 11.4.8	5	2.5	5	5	3	1	5	5	0	5	10	5	3	52.5	65.6

Unit	Site	Regional Ecosystem	Species Richness				Tree height	Ground cover (%)		Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Foliage cover		SUM	Score
			Trees	Shrubs	Grasses	Forbs		Native perennial grass	Organic litter					Trees	Shrub		
AU04	I26	Remnant 11.4.8	5	5	2.5	5	3	0	5	5	0	0	0	0	5	54.5	68.1
AU08	I27	Remnant 11.9.2	5	5	5	5	5	1	3	5	10	5	10	5	3	35.5	44.4
AU06	I28	Remnant 11.5.3	5	2.5	5	5	5	1	5	5	5	5	10	2	3	67	83.8
AU04	I29	Remnant 11.4.8	5	2.5	5	5	5	0	5	5	0	2	0	2	5	58.5	73.1
AU08	I30	Remnant 11.9.2	5	5	5	2.5	3	5	3	5	0	5	10	5	5	41.5	51.9
AU06	I31	Remnant 11.5.3	5	2.5	0	5	3	0	2	5	0	2	0	0	5	58.5	73.1
AU26	I32	Non-remnant 11.9.2	5	2.5	2.5	5	3	0	2	5	0	5	0	2	3	29.5	36.9
AU08	I33	Remnant 11.9.2	5	2.5	2.5	5	3	0	2	3	5	5	0	2	3	35	43.8
AU08	I34	Remnant 11.9.2	5	2.5	5	5	3	1	5	5	5	2	0	5	3	38	47.5
AU07	I35	Remnant 11.5.9	5	2.5	0	5	5	0	2	3	0	0	0	0	0	46.5	58.1
AU26	I36	Non-remnant 11.9.2	5	5	2.5	2.5	5	1	5	5	5	2	0	5	3	22.5	28.1
AU05	I37	Remnant 11.4.9	5	5	2.5	2.5	3	1	2	5	5	5	3	2	5	46	57.5
AU01	I38	Remnant 11.3.2	5	5	2.5	5	0	0	5	5	0	5	0	2	5	46	57.5
AU26	I39	Non-remnant 11.9.2	2.5	2.5	0	2.5	0	0	2	3	0	0	0	0	0	39.5	49.4
AU15	I40	Non-remnant 11.4.8	2.5	2.5	2.5	5	0	0	2	0	0	0	0	0	5	12.5	15.6
AU15	I41	Non-remnant 11.4.8	2.5	2.5	0	5	0	0	2	3	0	0	0	0	3	19.5	24.4
AU15	I42	Non-remnant 11.4.8	5	5	5	5	3	0	3	5	0	2	0	3	3	18	22.5
AU16	I43	Non-remnant 11.5.3	2.5	2.5	2.5	5	3	0	5	5	0	2	0	0	0	39	48.8
AU16	I44	Non-remnant 11.5.3	5	5	2.5	5	3	0	5	5	10	2	0	5	3	27.5	34.4
AU15	I45	Non-Remnant 11.4.8	5	5	0	2.5	5	0	2	0	0	0	0	0	3	50.5	63.1
AU15	I46	Non-remnant 11.4.8	5	2.5	0	2.5	3	0	5	0	0	0	0	0	3	21	26.3
AU01	I47	Remnant 11.3.2	5	2.5	0	0	5	0	3	5	15	2	0	5	0	48.5	60.6
AU03	I48	Remnant 11.3.25	2.5	2.5	0	2.5	3	0	3	3	10	0	0	2	0	42.5	53.1
AU16	I49	Non-Remnant 11.5.3	2.5	2.5	5	2.5	3	0	3	5	0	0	0	5	5	28.5	35.6
AU16	I50	Non-Remnant 11.5.3	5	0	5	2.5	3	1	3	5	5	5	10	5	3	33.5	41.9
AU13	I51	Non-Remnant 11.10.3	2.5	0	2.5	2.5	3	3	5	5	5	0	0	5	0	52.5	65.6
AU16	I52	Non-Remnant 11.5.3	5	5	2.5	2.5	3	0	3	5	0	2	10	5	0	33.5	41.9

Unit	Site	Regional Ecosystem	Species Richness				Tree height	Ground cover (%)		Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Foliage cover		SUM	Score
			Trees	Shrubs	Grasses	Forbs		Native perennial grass	Organic litter					Trees	Shrub		
AU13	I53	Non-Remnant 11.10.3	5	2.5	5	5	3	1	3	3	0	0	3	5	3	43	53.8
AU17	I54	Non-Remnant 11.5.9	2.5	5	5	5	3	0	5	5	0	5	0	2	3	38.5	48.1
AU16	I55	Non-Remnant 11.5.3	5	5	5	5	5	1	5	3	0	5	0	5	3	40.5	50.6

Table 5 Species-specific habitat quality scores at the impact site

KOALA												SQUATTER PIGEON (BREEDING & FORAGING)											GREATER GLIDER						
Unit	Site	Road	Dog	Drought	Total food	Large food trees	Canopy cover	Large non-food trees	Shade	Contiguous habitat	SUM	Buffel Grass	Feral predators	Distance to water 1	Ground cover	Understorey richness	Foraging Score	Distance to water 2	NDVI	Shelter/breeding Score	Mobility	SUM	Fire	Climate change	Total food	Large food trees	Large shelter trees	Habitat connectivity	SUM
Max score		8	8	9	20	5	10	10	5	25	**100**	16	9	1	15	10	25	1	25	25	25	**100**	10	15	20	5	25	25	**100**
AU10	I01	3	0	9	0	0	7	0	5	25	49	11	9	1	15	8	23	1	25	25	25	82	5	13	8	5	0	25	56
AU12	I02	6	0	5	0	0	2	4	5	25	47	11	3	1	15	8	0	0	25	0	25	61	5	13	5	2	0	25	50
AU10	I03	6	0	5	0	0	7	0	5	25	48	16	3	1	1	5	0	0	25	0	25	49	1	13	3	3	0	25	45
AU11	I04	3	0	5	0	0	7	7	5	25	52	16	3	1	5	8	0	0	25	0	25	63	5	13	1	3	0	25	47
AU09	I05	3	0	9	0	5	7	2	0	25	51	16	3	1	9	5	0	0	25	0	25	63	4	13	2	4	18	25	66
AU11	I06	6	0	9	0	3	7	0	5	25	55	16	3	1	9	8	0	0	25	0	25	64	5	13	2	4	0	25	49
AU09	I07	3	8	9	0	0	7	10	5	25	67	16	9	1	9	5	0	0	25	0	25	70	4	13	2	4	0	25	48
AU11	I08	6	8	9	0	0	7	0	5	25	60	16	9	1	9	8	0	0	25	0	25	66	1	13	3	2	0	25	44
AU12	I09	6	8	9	0	0	2	0	5	25	55	11	9	1	5	3	0	0	25	0	25	49	10	13	3	3	0	25	54
AU11	I10	6	8	9	0	0	7	0	5	25	60	16	9	1	15	5	0	0	25	0	25	70	5	13	4	2	0	25	49
AU18	I11	6	8	9	0	1	7	0	5	25	61	11	9	1	9	5	0	0	25	0	25	60	10	5	4	1	0	25	45
AU02	I12	0	8	9	1	0	2	4	5	25	54	16	9	1	9	5	14	1	25	25	25	80	7	5	3	5	5	25	50
AU14	I13	0	8	9	0	0	2	2	0	25	46	16	9	1	9	5	14	1	25	25	25	79	5	5	0	1	0	25	36
AU14	I14	0	8	9	0	0	7	0	0	25	49	16	9	1	15	8	23	1	25	25	25	81	5	5	1	2	0	25	38
AU17	I15	0	8	9	0	0	7	7	5	25	61	16	9	1	9	5	14	1	25	25	25	85	5	5	1	3	0	25	39
AU07	I16	0	8	9	0	0	7	10	5	25	64	16	9	1	9	5	14	1	25	25	25	81	5	5	1	1	0	25	37
AU21	I17	0	8	9	0	0	7	10	0	25	59	16	9	1	9	5	14	1	25	25	25	85	5	5	1	4	12	25	52

KOALA												SQUATTER PIGEON (BREEDING & FORAGING)											GREATER GLIDER						
Unit	Site	Road	Dog	Drought	Total food	Large food trees	Canopy cover	Large non-food trees	Shade	Contiguous habitat	SUM	Buffel Grass	Feral predators	Distance to water 1	Ground cover	Understorey richness	Foraging Score	Distance to water 2	NDVI	Shelter/breeding Score	Mobility	SUM	Fire	Climate change	Total food	Large food trees	Large shelter trees	Habitat connectivity	SUM
Max score		8	8	9	20	5	10	10	5	25	**100**	16	9	1	15	10	25	1	25	25	25	**100**	10	15	20	5	25	25	**100**
AU03	I18	0	8	9	5	3	10	10	5	25	75	16	9	1	15	3	18	1	25	25	25	86	5	13	5	5	18	25	71
AU02	I19	0	8	9	0	1	10	0	5	25	58	16	9	1	9	5	14	1	25	25	25	79	5	13	8	3	5	25	59
AU07	I20	0	8	9	0	0	7	2	0	25	51	16	9	1	9	5	14	1	25	25	25	78	5	5	0	1	0	25	36
AU10	I21	3	8	9	0	0	2	0	0	25	47	16	9	1	15	3	18	1	25	25	25	79	5	5	2	2	0	25	39
AU07	I22	0	8	9	1	0	7	2	5	25	57	16	9	1	9	5	14	1	25	25	25	87	5	5	5	3	0	25	43
AU04	I23	0	8	9	0	0	7	10	5	25	64	16	9	1	9	5	14	1	25	25	25	84	7	5	1	2	0	25	40
AU07	I24	3	8	9	1	0	7	7	5	25	65	11	9	1	15	8	23	1	25	25	25	85	5	5	2	3	0	25	40
AU04	I25	3	8	9	0	0	7	2	5	25	59	16	9	1	9	8	0	0	25	0	25	67	5	13	1	2	0	25	46
AU04	I26	0	8	9	0	0	10	0	5	25	57	16	9	1	9	5	14	1	25	25	25	82	5	5	3	1	0	25	39
AU08	I27	0	8	5	1	0	1	0	5	25	45	16	9	1	9	3	12	1	25	25	25	73	10	13	2	1	0	25	51
AU06	I28	3	8	5	0	0	7	7	5	25	60	11	9	1	9	5	0	0	25	0	25	67	5	5	3	2	0	25	40
AU04	I29	3	8	5	0	0	2	10	5	25	58	16	9	1	15	5	0	0	25	0	25	71	5	5	1	4	0	25	40
AU08	I30	3	8	5	1	0	2	0	5	25	49	16	9	1	9	5	0	0	25	0	25	60	10	13	3	4	0	25	55
AU06	I31	6	8	9	3	0	7	0	5	25	63	11	9	1	9	5	0	0	25	0	25	64	7	5	3	5	5	25	50
AU26	I32	3	8	5	0	0	1	0	0	25	42	16	9	1	1	5	0	0	25	0	25	50	10	0	0	1	0	1	12
AU08	I33	6	8	5	1	0	1	0	0	25	46	11	9	1	1	5	0	0	25	0	25	49	10	13	3	2	0	25	53
AU08	I34	8	8	9	1	3	1	0	5	25	60	11	9	1	1	5	0	0	25	0	25	50	10	13	1	3	12	25	64
AU07	I35	8	8	5	0	0	1	2	5	25	54	11	9	1	15	8	0	0	25	0	25	65	10	5	1	3	0	25	44
AU26	I36	3	8	9	0	0	1	0	0	25	46	16	9	1	1	3	0	0	25	0	25	45	10	0	0	1	0	1	12

KOALA												SQUATTER PIGEON (BREEDING & FORAGING)											GREATER GLIDER						
Unit	Site	Road	Dog	Drought	Total food	Large food trees	Canopy cover	Large non-food trees	Shade	Contiguous habitat	SUM	Buffel Grass	Feral predators	Distance to water 1	Ground cover	Understorey richness	Foraging Score	Distance to water 2	NDVI	Shelter/breeding Score	Mobility	SUM	Fire	Climate change	Total food	Large food trees	Large shelter trees	Habitat connectivity	SUM
Max score		8	8	9	20	5	10	10	5	25	**100**	16	9	1	15	10	25	1	25	25	25	**100**	10	15	20	5	25	25	**100**
AU05	I37	6	8	9	0	0	2	7	5	25	62	11	9	1	15	3	18	1	25	25	25	78	7	13	0	1	0	25	46
AU01	I38	6	8	9	1	5	2	0	5	25	61	16	9	1	5	5	10	1	25	25	25	76	7	13	1	3	0	25	49
AU26	I39	3	8	9	0	0	1	0	0	25	46	16	9	1	1	3	4	1	25	25	25	69	10	0	0	1	0	1	12
AU15	I40	3	8	9	0	0	1	0	0	25	46	16	9	1	5	3	8	1	25	25	25	61	10	0	0	1	0	1	12
AU15	I41	3	8	9	0	0	1	0	0	25	46	16	9	1	5	3	8	1	25	25	25	63	10	0	0	1	0	1	12
AU15	I42	3	8	5	0	0	1	0	0	25	42	16	9	1	5	3	0	0	25	0	25	46	10	0	0	1	0	1	12
AU16	I43	3	8	9	3	0	7	0	0	25	55	11	9	1	9	10	19	1	25	25	25	76	7	0	7	1	0	1	16
AU16	I44	3	8	9	1	0	1	0	0	25	47	3	9	1	5	3	8	1	25	25	25	59	10	0	1	1	0	1	13
AU15	I45	3	8	9	1	5	7	7	5	25	70	11	9	1	1	3	4	1	25	25	25	70	5	5	7	5	12	1	35
AU15	I46	3	8	9	0	0	1	0	5	25	51	16	9	1	1	3	4	1	25	25	25	61	10	0	1	1	0	25	37
AU01	I47	3	8	9	4	5	7	2	5	25	68	1	9	1	9	3	12	1	25	25	25	68	7	5	10	5	25	25	77
AU03	I48	3	8	9	8	5	10	10	5	25	83	16	9	1	1	1	2	1	25	25	25	69	10	13	2	5	25	25	80
AU16	I49	3	8	9	0	5	1	0	5	25	56	1	9	1	12	3	15	1	25	25	25	62	5	0	2	4	12	25	48
AU16	I50	3	8	9	0	0	2	0	5	25	52	11	9	1	12	3	15	1	25	25	25	71	7	0	1	2	0	25	35
AU13	I51	3	8	9	0	0	7	2	5	25	59	16	9	1	5	3	8	1	25	25	25	77	5	0	1	3	0	25	34
AU16	I52	3	8	9	2	0	2	2	0	25	51	11	9	1	12	3	15	1	25	25	25	71	7	0	2	1	0	25	35
AU13	I53	3	8	9	0	0	7	0	5	25	57	16	9	1	1	3	4	1	25	25	25	71	2	0	3	1	0	25	31
AU17	I54	0	8	9	0	0	2	0	5	25	49	11	9	1	12	5	17	1	25	25	25	74	5	0	3	1	0	25	34
AU16	I55	3	8	9	0	0	1	0	5	25	51	11	9	1	9	5	14	1	25	25	25	73	7	5	0	1	0	25	38

4. Vegetation Units within the Investigated Offset site

The regional ecosystem map published by the Queensland Herbarium details several RE's within the offset site. The boundaries of these RE's were refined based on satellite imagery, and their identities were ground-truthed during field surveys. The published mapping was largely correct, though field assessments verified a greater diversity of RE's within the Offset site

The AU's and the number of sampling locations assigned to the offset sites (Section 2.1, Table 2) were determined based on the RE and their relative disturbance levels, including areas of High-Value Regrowth (HVR), Remnant, Remnant disturbed and Non-remnant vegetation. Areas containing patches of *Acacia harpophylla* (Brigalow) woodland and suitable habitats for Koala, Greater Glider and Squatter Pigeon were identified and assigned to the relative habitat by AU (Table 7).

The Queensland Regulated Vegetation Management Map identifies the breakdown in these categories within the offset site shown in Figure 3 and Table 6

Table 6 Vegetation Management areas mapped within the Investigated Offset Site

VM Map Category	Colour on Map	Description	Area (ha)
B	Dark Blue	Remnant vegetation areas containing endangered, of concern, or a least concern RE	6838.27
C	Light Blue	High-value regrowth vegetation areas. (areas that has not been cleared for at least 15 years.	1.57
R	Yellow	Areas within 50m of a watercourse or drainage feature in all Great Barrier Reef catchments	2.55
X	White	Non-remnant areas, or Vegetation that is not mapped as a category A area, category B area, category C area or a category R area	3989.38
Water			0.69
TOTAL			10, 832.46

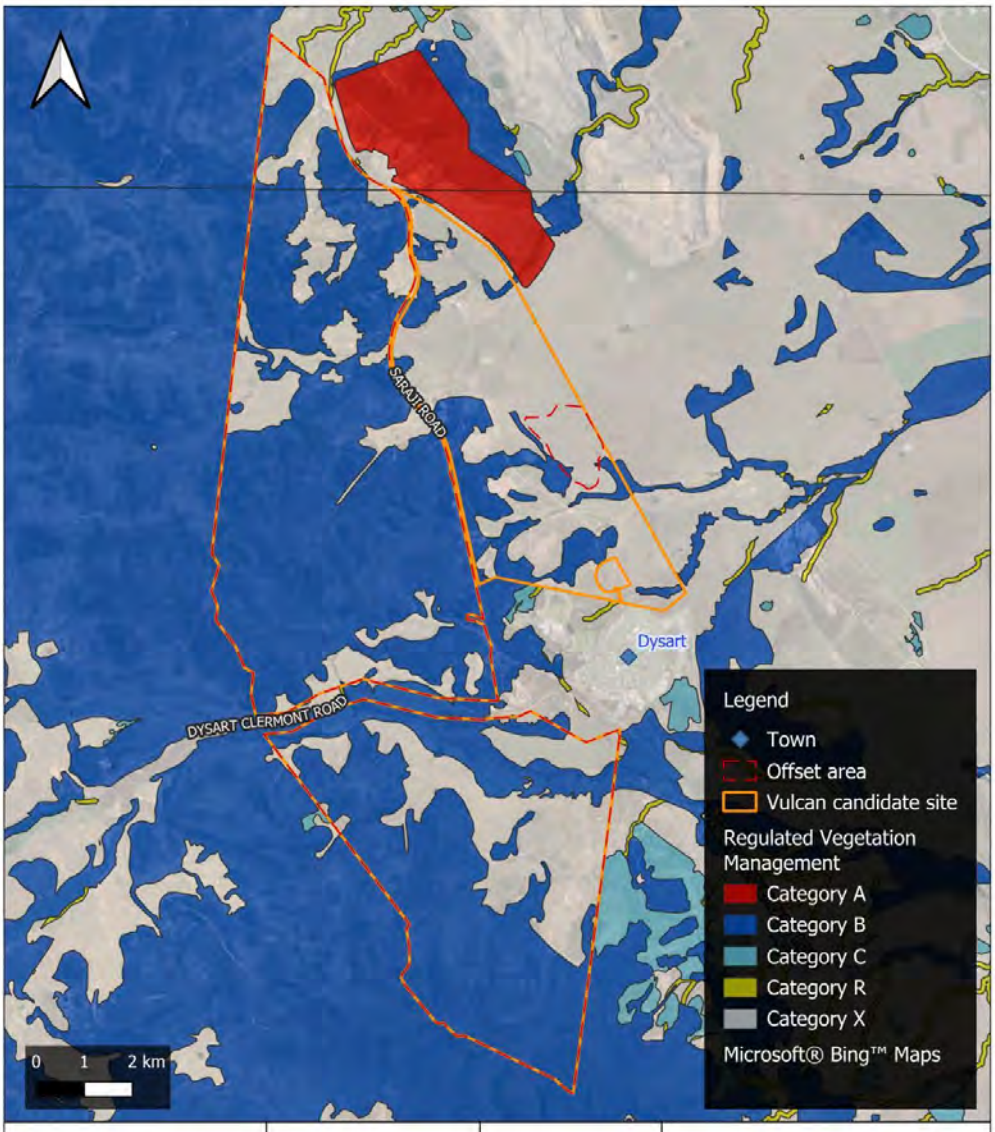


Figure Name: Regulated Vegetation Management Map	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 3: Regulated Vegetation Management Map

Table 7 Vegetation units within the Candidate Offset Site

Assessment Unit	Regional Ecosystem	Koala	Squatter Pigeon	Greater Glider	Area (ha)
AU01	Remnant 11.10.1	Foraging, Shelter and Dispersal	Dispersal	Current / Likely Denning	57.37
AU02	Non-Remnant 11.10.12	Dispersal	Dispersal	NA	77.91
AU03	High-value Regrowth 11.10.12	Dispersal	Dispersal	NA	3.08
AU04	Non-Remnant 11.10.1x1	Foraging, Shelter and Dispersal	Dispersal	NA	31.29
AU06	Remnant 11.10.1x1	Foraging, Shelter and Dispersal	Dispersal	Current / Likely Denning	2705.08
AU07	Non-Remnant 11.10.3	Foraging, Shelter and Dispersal	Dispersal	NA	46.89
AU08	High Value Regrowth 11.10.3	Foraging, Shelter and Dispersal	Dispersal	NA	28.51
AU09	Remnant 11.10.3	Foraging, Shelter and Dispersal	Dispersal	Current / Likely Denning	1229.72
AU10	Non-remnant 11.10.7	Foraging, Shelter and Dispersal	Dispersal	NA	259.65
AU11	High-value Regrowth 11.10.7	Foraging, Shelter and Dispersal	Dispersal	Future Denning	9.77
AU12	Remnant 11.10.7	Foraging, Shelter and Dispersal	Dispersal	Future Denning	567.59
AU13	Disturbed 11.10.7	Foraging, Shelter and Dispersal	Dispersal	Foraging	12.80
AU14	Remnant 11.10.8 (benchmark used for offset site 11.9.4a)	Foraging, Shelter and Dispersal	Dispersal	Future Denning	33.38
AU15	High-value Regrowth 11.3.1	Dispersal	Breeding, Foraging & Dispersal	NA	7.46
AU16	Remnant 11.3.1	Dispersal	Breeding, Foraging & Dispersal	NA	28.01
AU17	Non-remnant 11.3.2	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	NA	212.56
AU18	High-value Regrowth 11.3.2	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	NA	7.47

Assessment Unit	Regional Ecosystem	Koala	Squatter Pigeon	Greater Glider	Area (ha)
AU19	Remnant 11.3.2	Foraging, Shelter and **Dispersal**	Breeding, Foraging & Dispersal	Denning **& Future Denning**	9**2.03**
AU20	Disturbed 11.3.2	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	Denning **& Future Denning**	35.**20**
AU23	Remnant 11.3.25	Foraging, Shelter and **Dispersal**	Breeding, Foraging & Dispersal	Foraging	207.69
AU24	Disturbed 11.3.25	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	NA	6.3**6**
AU25	Non-remnant 11.3.3	Foraging	Breeding, Foraging & Dispersal	NA	47.6**9**
AU26	Remnant **11.3.3**	Foraging, Shelter and **Dispersal**	Breeding, Foraging & Dispersal	NA	61.4**9**
AU27	Disturbed 11.3.3	Dispersal	Breeding, Foraging & Dispersal	NA	15.3**3**
AU31	Non-Remnant 11.4.9	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	NA	34.05
AU32	Remnant 11.4.9	Shelter and Dispersal	Breeding, Foraging & Dispersal	NA	2.26
AU34	Non-Remnant 11.5.3	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	NA	401.22
AU35	High-value Regrowth 11.5.3	Foraging, **Shelter and Dispersal**	Foraging	NA	9.98
AU36	Remnant 11.5.3	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	NA	22.76
AU38	Non-remnant 11.5.9b	Foraging, Shelter and **Dispersal**	Breeding, Foraging & Dispersal	NA	785.52
AU39	High-value Regrowth 11.5.9b	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	NA	31.52
AU40	Remnant 11.5.9b	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	Denning & Future Denning	1085.59
AU41	Disturbed 11.5.9b	Foraging, Shelter and Dispersal	Breeding, Foraging & Dispersal	Denning & Future Denning	13.10
AU42	Remnant 11.5.12a	Dispersal	Breeding, Foraging & Dispersal	NA	110.17
AU43	Disturbed **11.10.12**	Foraging, Shelter and Dispersal	Dispersal	NA	2.7**5**
TOTAL					**8283.25**

5. Habitat Quality of the Offset site

BioCondition scores at the offset site ranged between 4.38/100 (Non-remnant 11.4.9) and 81.25/100 (remnant 11.10.3) (Table 9). Most variation among sites is related to the number of large trees, weed cover and native perennial grass cover. The Candidate Offset Site consistently scored low for Canopy Species Recruitment. This is generally a result of cattle grazing. Additionally canopy cover for the site and shrub cover were also consistently low.

The average BioCondition score across the offset site, weighted by the relative size of each AU, was 49.58/100. The impact site, however, had a weighted BioCondition average of 52.51/100.

Applying the same scoring approach to the impact and offset sites for each protected matter (see Section 3) results in weighted average scores for the matters shown below in Table 8.

Some scores within the offset site are below those of the impact site which means that the offset site alone does not currently meet the requirement of section 7.1 of the EPBC Act Environmental Offsets Policy, which states that an offset site must possess, at a minimum, the quality of the habitat at the impact site.

Table 8 Weighted averages for matters in the impact and offset sites

Matter	Weighted average for Impact site	Weighted average for Offset site (post management)	Difference	% offset
Koala (Foraging, Shelter and Dispersal)	54.0/100	65.09/100	+11.09	121.12%
Squatter Pigeon (Breeding)[1]	80.1/100	84.11/100	+4.11	225.53%
Squatter Pigeon (Foraging, dispersal)	81./100	82.37/100	+1.23	991.58%
Squatter Pigeon (Dispersal)	68.8/100	84.13/100	+15.33	188.26%
Greater Glider (Denning)	55.4/100	58.94/100	+3.45	163.51%
Greater Glider (Future)	39.10/100	75.35/100	+36.25	239.46%
Brigalow TEC (non-rem)	64.9/100	71.2/100	+6.3%	143.61%
Poplar Box	66.1/100	56.25/100	+10.88	492.13%

Table notes: [1] Offset score assumes water sources have been added for the Squatter Pigeon (refer to Section 8).

The individual score for each species and habitat attribute is listed in Table 9.

Table 9 BioCondition scores of the candidate offset site

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU36	HQ_BA01	11.5.3	5	5	2.5	2.5	5	0	0	3	5	2	0	3	3	36	45.00
AU1	HQ_BA02	11.10.1	5	5	2.5	2.	3	5	0	5	5	2	100	5	3	55	68.75
AU1	HQ_BA03	11.10.1	5	5	0	2.5	5	1	0	5	5	2	0	5	5	47.5	59.38
AU1	HQ_BA04	11.10.1	5	5	2.5	2.5	4	1	0	3	5	5	10	5	3	51	63.75
AU10	HQ_BA05	NR 11.10.7	2.5	2.5	2.5	0	0	3	0	5	0	5	3	0	3	23.5	29.38
AU10	HQ_BA06	NR 11.10.7	0	0	2.5	0	0	3	5	0	0	5	5	0	0	18.5	23.13
AU10	HQ_BA07	NR 11.10.7	0	0	2.5	0	0	5	3	0	0	5	0	0	0	18.5	23.13
AU10	HQ_BA08	NR 11.10.7	0	2.5	2.5	2.5	0	5	0	0	0	5	3	0	3	20.5	25.63
AU13	HQ_BA09	1.10.7 Disturbed	2.5	2.5	0	0	2.5	0	3	3	5	0	3	2.5	3	27	33.75
AU13	HQ_BA10	11.10.7 Disturbed	5	2.5	0	0	5	5	5	3	0	0	0	2	3	35	43.75
AU14	HQ_BA11	11.10.8	0	2.5	5	0	3	5	5	0	5	5	5	5	5	44.2	55.21

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU6	HQ_BA12	11.10.1x1	5	5	2.5	2.5	3	0	3	5	5	5	5	5	5	51	63.75
AU15	HQ_BA13	HVR 11.3.1	2.5	5	0	0	5	1	3	3	5	0	3	2	5	32.5	40.63
AU15	HQ_BA14	HVR 11.3.1	5	2.5	0	0	4	2	5	3	5	0	3	5	3	37.5	**46.88**
AU16	HQ_BA15	11.3.1	5	5	0	2.5	5	1	5	5	10	2	5	4	3	52.5	**65.63**
AU17	HQ_BA16	NR 11.3.2	0	0	0	0	0	0	5	0	0	2	5	0	0	12	**15.00**
AU17	HQ_BA17	NR 11.3.2	5	5	0	0	0	0	5	5	0	2	0	0	5	27	**33.75**
AU17	HQ_BA18	NR 11.3.2	2.5	2.5	0	0	3	5	3	0	0	0	5	1	5	27	**33.75**
AU17	HQ_BA19	NR 11.3.2	2.5	5	0	0	0	5	0	5	0	0	5	0	3	25.5	**31.88**
AU18	HQ_BA20	HVR 11.3.2	5	5	0	0	3	1	0	5	5	2	0	2	5	33	**41.25**
AU18	HQ_BA21	HVR 11.3.2	5	5	0	0	0	0	0	5	0	5	0	0	3	24	**30.00**
AU19	HQ_BA22	11.3.2	5	5	2.5	0	4	0	3	5	5	2	5	2	3	41.5	**51.88**
AU19	HQ_BA23	11.3.2	5	5	2.5	0	3	1	3	5	5	5	5	2	3	44.5	**55.63**
AU2	HQ_BA24	NR 11.10.12	2.5	5	0	0	1.5	5	5	3	0	5	5	0	5	37	**46.25**

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU2	HQ_BA25	NR 11.10.12	2.5	2.5	2.5	0	1.5	5	5	5	0	2	5	2	0	33	41.25
AU20	HQ_BA26	11.3.2 Disturbed	5	0	2.5	0	5	5	5	3	5	0	5	5	0	40.5	50.63
AU20	HQ_BA27	11.3.2 Disturbed	5	5	2.5	0	5	5	5	3	5	0	0	5	3	48.5	60.63
AU23	HQ_BA28	11.3.25	5	5	2.5	0	5	1	5	3	10	5	3	5	3	52.5	65.63
AU24	HQ_BA29	11.3.25 Disturbed	5	5	2.5	0	4	3	5	3	5	2	3	5	3	45.5	56.88
AU25	HQ_BA30	NR 11.3.3	2.5	5	0	0	0	5	0	5	0	2	5	0	3	27.5	34.38
AU25	HQ_BA31	NR 11.3.3	5	2.5	0	0	3	5	3	3	5	2	5	3.5	3	40	50.00
AU26	HQ_BA32	11.3.3	5	5	2.5	0	4	1	5	3	5	5	5	2.5	3	46	57.50
AU26	HQ_BA33	11.3.3	2.5	2.5	0	0	3	5	3	3	0	0	5	2	5	31	38.75
AU26	HQ_BA34	11.3.3	5	2.5	0	0	2.5	0	5	0	5	2	3	1.5	5	31.5	39.38
AU27	HQ_BA35	11.3.3 Disturbed	5	5	0	0	0	0	0	5	0	5	10	0	3	33	41.25

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU29	HQ_BA36	11.3.39	5	5	0	0	4	0	5	3	5	2	0	4	3	36	45.00
AU29	HQ_BA37	11.3.39	5	5	0	2.5	4	1	0	3	5	5	0	4	5	39.5	49.38
AU3	HQ_BA38	HVR 11.10.12	5	2.5	0	0	3	5	5	5	0	5	5	2.5	5	43	53.75
AU30	HQ_BA39	11.3.39 Disturbed	5	2.5	0	0	4	0	5	3	5	2	0	4	3	33.5	41.88
AU30	HQ_BA40	11.3.39 Disturbed	5	5	2.5	2.5	4	1	5	5	5	5	0	2.5	3	45.5	56.88
AU31	HQ_BA41	NR 11.4.9	0	5	2.5	0	0	5	3	0	0	0	5	0	3	23.5	29.38
AU31	HQ_BA42	NR 11.4.9	0	5	0	0	0	0	0	0	0	0	0	0	3	8	10.00
AU31	HQ_BA43	NR 11.4.9	0	2.5	0	0	0	1	0	0	0	0	0	0	0	3.5	4.38
AU32	HQ_BA44	11.4.9	5	5	0	0	5	0	5	5	10	5	0	4	3	47	58.75
AU33	HQ_BA45	11.4.9 Disturbed	5	5	0	2.5	5	0	3	5	5	2	0	5	3	40.5	50.63
AU34	HQ_BA46	NR 11.5.3	2.5	2.5	0	2.5	3	0	0	5	5	5	0	2	0	27.5	34.38
AU34	HQ_BA47	NR 11.5.3	0	0	2.5	0	3	5	3	0	0	2	5	0	0	20.5	25.63
AU34	HQ_BA48	NR 11.5.3	2.5	2.5	0	0	0	3	3	3	5	2	0	0	3	24	30.00

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU35	HQ_BA49	HVR 11.5.3	5	2.5	0	2.5	5	0	0	5	5	2	0	5	5	37	46.25
AU35	HQ_BA50	HVR 11.5.3	5	5	0	0	3	0	0	5	5	0	3	2	3	31	38.75
AU36	HQ_BA51	11.5.3	5	5	2.5	2.5	5	1	5	3	5	2	3	5	3	47	58.75
AU36	HQ_BA52	11.5.3	2.5	2.5	2.5	2.5	5	5	5	5	5	5	3	2	3	48	60.00
AU38	HQ_BA53	NR 11.5.9b	0	0	2.5	0	0	1	3	0	5	0	0	0	0	6.5	8.13
AU38	HQ_BA54	NR 11.5.9b	2.5	2.5	2.5	0	0	5	3	5	0	2	5	0	3	30.5	38.13
AU38	HQ_BA55	NR 11.5.9b	0	0	2.5	0	0	5	5	0	0	0	5	0	0	17.5	21.88
AU39	HQ_BA56	HVR 11.5.9b	2.5	2.5	0	0	3	0	3	5	5	2	10	1	3	37	46.25
AU39	HQ_BA57	HVR 11.5.9b	5	5	0	0	5	5	5	5	5	5	5	2.5	3	50.5	63.13
AU39	HQ_BA58	HVR 11.5.9b	2.5	0	2.5	2.5	4	5	0	5	5	5	5	5	0	41.5	51.88
AU4	HQ_BA59	NR 11.10.1x1	2.5	5	0	0	1.5	5	3	3	5	5	5	1	5	36	45.00
AU4	HQ_BA60	NR 11.10.1x1	5	2.5	2.5	0	0	1	5	5	0	2	10	0	0	33	41.25
AU41	HQ_BA61	11.5.9b Disturbed	2.5	2.5	2.5	0	4	5	3	3	5	5	5	2.5	3	43	53.75

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU41	HQ_BA62	11.5.9b Disturbed	5	5	2.5	0	5	1	5	3	5	2	0	5	3	41.5	51.88
AU42	HQ_BA63	11.5.12a	2.5	2.5	2.5	2.5	1.5	0	5	5	5	2	3	25	3	37	46.25
AU42	HQ_BA64	11.5.12a	2.5	5	2.5	2.5	3	0	5	5	5	2	0	2.5	5	40	50.00
AU42	HQ_BA65	11.5.12a	5	5	2.5	2.5	3	5	5	5	5	0	10	4	3	55	68.75
AU43	HQ_BA66	11.10.12	5	2.5	0	0	5	0	5	3	5	2	0	4	5	36.5	45.63
AU6	HQ_BA67	11.10.1x1	5	5	0	2.5	3	1	5	5	5	2	3	4	0	40.5	50.63
AU6	HQ_BA68	11.10.1x1	5	5	2.5	2.5	3	3	3	5	5	5	3	2.5	0	44.5	55.63
AU7	HQ_BA69	NR 11.10.3	2.5	2.5	5	0	0	5	5	5	0	5	5	0	5	40	50.00
AU7	HQ_BA70	NR 11.10.3	0	5	2.5	0	0	5	3	5	0	0	5	0	0	25.5	31.88
AU8	HQ_BA71	HVR 11.10.3	0	5	2.5	2.5	0	0	5	0	0	5	5	0	5	32.5	40.63
AU8	HQ_BA72	HVR 11.10.3	2.5	5	2.5	2.5	0	5	5	5	0	5	5	0	3	38	47.50
AU9	HQ_BA73	11.10.3	5	2.5	2.5	2.5	5	0	5	5	10	2	10	5	3	57.5	71.88
AU9	HQ_BA74	11.10.3	5	5	2.5	2.5	5	3	5	5	10	2	10	5	3	63	78.75

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU42	Site001	11.5.12a	5	5	5	2.5	4	0	5	5	5	2	0	2.5	3	44	55.00
AU12	Site002	11.10.7	5	5	5	5	5	3	5	5	10	5	3	5	3	64	80.00
AU23	Site003	11.3.25	5	5	2.5	2.5	5	0	5	5	10	5	0	3.5	3	51.5	64.38
AU9	Site004	11.10.3	5	2.5	2.5	5	3	5	5	5	10	5	10	5	3	66	82.50
AU38	Site005	NR 11.5.9b	2.5	2.5	2.5	2.5	0	3	3	5	0	5	3	0	5	34	42.50
AU38	Site006	NR 11.5.9b	2.5	5	2.5	2.5	0	5	0	5	0	2	0	0	0	24.5	30.63
AU12	Site007	11.10.7	5	5	2.5	2.5	5	1	3	5	5	5	3	2.5	3	47.5	59.38
AU12	Site008	11.10.7	5	5	5	2.5	5	5	5	5	5	5	5	5	3	60.5	75.63
AU6	Site009	11.10.1x1	5	5	2.5	2.5	3	1	5	5	5	5	3	5	3	50	62.50
AU9	Site010	11.10.3	5	5	2.5	2.5	5	3	5	5	10	2	10	5	5	68	85.00
AU11	Site011	HVR 11.10.7	5	2.5	2.5	2.5	4	5	0	5	5	5	3	3.5	5	48	60.00
AU11	Site012	HVR 11.10.7	2.5	2.5	2.5	2.5	5	5	3	5	5	5	3	5	0	46	57.50
AU40	Site013	11.5.9b	5	5	2.5	5	5	1	5	5	5	2	3	4	3	50.5	63.13

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU41	Site014	11.5.9b Disturbed	5	5	2.5	5	5	1	5	5	5	5	5	2.5	3	52	65.00
AU40	Site015	11.5.9b	5	2.5	2.5	2.5	5	1	5	5	5	2	5	2.5	3	54	67.50
AU40	Site016	11.5.9b	5	5	2.5	2.5	5	5	5	5	5	2	5	5	3	54	67.50
AU9	Site017	11.10.3	5	5	2.5	5	5	5	5	50	5	2	5	50	3	59.5	74.38
AU34	Site018	NR 11.5.3	0	0	2.5	2.5	0	1	3	0	0	0	0	0	3	12	15.00
AU41	Site019	11.5.9b Disturbed	5	5	2.5	2.5	5	3	5	5	5	5	3	2.5	0	48.5	60.63
AU12	Site020	11.10.7	5	5	2.5	5	4	1	3	5	5	5	0	4	3	47.5	59.38
AU12	Site021	11.10.7	5	5	2.5	5	5	5	5	5	5	5	10	4	3	64.5	80.63
AU16	Site022	11.3.1	5	5	2.5	2.5	5	0	3	5	10	2	3	2.5	3	48.5	60.63
AU6	Site023	11.10.1x1	5	5	2.5	2.5	3	5	5	5	0	5	10	4	5	57	71.25
AU40	Site024	15.5.9b	5	5	2.5	2.5	5	1	3	5	5	0	10	5	3	45	56.25
AU40	Site025	15.5.9b	5	5	2.5	2.5	5	3	3	3	5	5	3	5	3	57.5	71.88
AU40	Site026	15.5.9b	2.5	5	2.5	2.5	5	5	3	5	5	5	10	4	3	57.5	71.88

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU9	Site027	11.10.3	5	5	5	5	5	3	5	5	5	2	10	2	3	60	75.00
AU12	Site028	11.10.7	5	5	2.5	2.5	5	5	5	5	5	5	10	2.5	5	64.5	71.88
AU40	Site029	11.5.9b	2.5	5	2.5	2.5	0	5	5	5	5	5	10	5	5	52	65.00
AU6	Site030	11.10.1x1	5	5	2.5	2.5	4	3	3	5	5	2	5	2.5	3	47.5	59.38
AU12	Site031	11.10.7	2.5	5	0	5	5	5	0	5	5	5	10	3.5	5	56	70.00
AU38	Site032	NR 11.5.9b	0	2.5	0	2.5	0	1	0	5	0	2	0	0	5	18	22.50
AU19	Site033	11.3.2	5	5	2.5	2.5	5	1	3	5	5	5	5	2.5	3	49.5	61.88
AU2	Site034	NR 11.10.12	0	2.5	0	0	0	3	0	0	0	5	3	0	3	16.5	20.63
AU23	Site035	11.3.25	5	2.5	0	0	5	0	5	0	10	5	0	5	3	40.5	50.63
AU40	Site036	15.5.9b	2.5	5	2.5	2.5	5	3	3	5	5	5	5	3.5	5	48.5	60.63
AU40	Site037	15.5.9b	2.5	2.5	2.5	2.5	5	3	3	5	5	2	10	2.5	0	54	67.50
AU32	Site038	11.4.9	5	2.5	0	2.5	5	0	5	5	5	5	5	4	5	49	61.25
AU31	Site039	NR 11.4.9	5	5	2.5	2.5	5	1	5	5	5	5	0	3.5	3	47.5	59.38

			Species Richness					Ground cover (%)						Foliage cover			
Unit	Site	Regional Ecosystem	Trees	Shrubs	Grasses	Forbs	Tree height	Native perennial grass	Organic litter	Recruitment (%)	Large trees	Woody debris	Non-native plant cover	Trees	Shrub	SUM	Score
Max score			5	5	5	5	5	5	5	5	15	5	10	5	5	80	100
AU23	Site040	11.3.25	5	5	0	2.5	5	0	5	5	5	2	0	4	3	41.5	51.88
AU34	Site041	NR 11.5.3	5	0	0	2.5	5	0	5	0	5	2	0	5	3	32.5	40.63

Table 10 Koala-specific habitat quality scores at the offset site

Unit	Site	Risk of Road Based Mortality	Risk of Dog Attack	Importance of Drought Refuge	Density and Quality of Food Trees	Number of Large Food Trees	Canopy Cover of trees <4m	Large non-food trees	Presence of Dense Shade Trees	Contiguous habitat	Total
Max score		8	8	9	20	5	10	10	5	25	100
AU36	HQ_BA01	0	0	9	5	5	7	0	0	25	51
AU1	HQ_BA02	6	0	0	2	5	4	7	5	25	54
AU1	HQ_BA03	8	0	9	2	3	4	10	5	25	66
AU1	HQ_BA04	8	0	5	2	4	7	10	5	25	66
AU10	HQ_BA05	6	0	5	0	1	1	0	5	25	43
AU10	HQ_BA06	6	0	9	0	1	1	0	0	25	42
AU10	HQ_BA07	8	0	9	0	1	1	0	0	25	44
AU10	HQ_BA08	6	0	5	0	1	1	0	5	25	43
AU13	HQ_BA09	8	0	9	2	5	2	0	0	25	51
AU13	HQ_BA10	8	0	9	0	1	2	7	0	25	52
AU14	HQ_BA11	8	0	5	3	5	7	0	0	25	53
AU6	HQ_BA12	6	0	9	0	1	7	7	5	25	60
AU15	HQ_BA13	6	0	9	3	4	2	2	0	25	51
AU15	HQ_BA14	6	0	9	2	1	4	7	0	25	54
AU16	HQ_BA15	8	0	9	0	3	7	10	5	25	67
AU17	HQ_BA16	6	0	9	0	1	1	0	0	25	42
AU17	HQ_BA17	6	0	9	0	1	1	0	5	25	47
AU17	HQ_BA18	6	0	9	0	1	2	0	5	25	48
AU17	HQ_BA19	8	0	9	0	1	1	0	5	25	49
AU18	HQ_BA20	6	0	9	2	1	2	7	5	25	57
AU18	HQ_BA21	6	0	9	2	1	1	0	5	25	49
AU19	HQ_BA22	6	0	9	3	5	7	4	5	25	64
AU19	HQ_BA23	6	0	9	2	3	2	4	0	25	51
AU2	HQ_BA24	8	0	9	5	1	1	0	0	25	49
AU2	HQ_BA25	6	0	9	0	1	4	0	0	25	45
AU20	HQ_BA26	6	0	9	8	3	4	4	5	25	64
AU20	HQ_BA27	8	0	9	3	4	4	0	5	25	58
AU23	HQ_BA28	6	0	9	5	5	7	4	5	25	66
AU24	HQ_BA29	6	0	9	8	3	7	7	5	25	70

Unit	Site	Risk of Road Based Mortality	Risk of Dog Attack	Importance of Drought Refuge	Density and Quality of Food Trees	Number of Large Food Trees	Canopy Cover of trees <4m	Large non-food trees	Presence of Dense Shade Trees	Contiguous habitat	Total
Max score		8	8	9	20	5	10	10	5	25	100
AU25	HQ_BA30	6	0	9	0	1	1	0	5	25	47
AU25	HQ_BA31	6	0	9	2	1	2	7	0	25	52
AU26	HQ_BA32	6	0	9	3	2	4	4	0	25	53
AU26	HQ_BA33	6	0	9	2	1	2	0	5	25	50
AU26	HQ_BA34	3	0	9	2	2	4	10	5	25	60
AU27	HQ_BA35	6	0	9	0	1	1	0	0	25	42
AU29	HQ_BA36	8	0	9	8	3	4	4	5	25	66
AU29	HQ_BA37	6	0	5	5	4	10	7	5	17	59
AU3	HQ_BA38	6	0	9	0	1	2	0	0	25	43
AU30	HQ_BA39	3	0	9	12	3	4	0	5	17	53
AU30	HQ_BA40	6	0	5	3	2	4	0	5	17	42
AU31	HQ_BA41	6	0	0	0	1	1	0	0	17	25
AU31	HQ_BA42	6	0	9	0	1	1	0	5	17	39
AU31	HQ_BA43	6	0	9	0	1	1	0	5	17	39
AU32	HQ_BA44	6	0	9	2	1	4	10	5	17	54
AU33	HQ_BA45	6	0	9	0	1	4	10	5	17	52
AU34	HQ_BA46	6	0	0	0	2	2	0	0	17	27
AU34	HQ_BA47	6	0	9	0	1	2	0	0	25	43
AU34	HQ_BA48	6	0	9	0	1	1	2	0	25	44
AU35	HQ_BA49	8	0	0	0	5	4	7	5	17	46
AU35	HQ_BA50	6	0	0	0	1	2	4	0	17	30
AU36	HQ_BA51	3	0	9		4	4	0	5	17	42
AU36	HQ_BA52	0	0	5	3	5	4	4	5	17	43
AU38	HQ_BA53	6	0	0	0	1	1	0	0	17	25
AU38	HQ_BA54	6	0	0	0	1	1	0	0	25	33
AU38	HQ_BA55	6	0	9	0	1	1	0	0	25	42
AU39	HQ_BA56	3	0	5	0	2	4	7	5	25	51
AU39	HQ_BA57	6	0	5	2	3	7	0	5	25	53
AU39	HQ_BA58	3	0	5	5	4	4	0	0	17	38
AU4	HQ_BA59	6	0	9	2	1	4	0	5	25	52

Unit	Site	Risk of Road Based Mortality	Risk of Dog Attack	Importance of Drought Refuge	Density and Quality of Food Trees	Number of Large Food Trees	Canopy Cover of trees <4m	Large non-food trees	Presence of Dense Shade Trees	Contiguous habitat	Total
Max score		8	8	9	20	5	10	10	5	25	100
AU4	HQ_BA60	8	0	9	0	1	1	0	0	25	44
AU41	HQ_BA61	3	0	9	3	3	4	0	5	17	44
AU41	HQ_BA62	0	0	9	5	5	7	0	5	17	48
AU42	HQ_BA63	8	0	9	0	2	2	2	5	17	45
AU42	HQ_BA64	8	0	9	0	4	2	0	5	25	53
AU42	HQ_BA65	8	0	5	0	3	2	7	5	25	55
AU43	HQ_BA66	8	0	9	0	3	4	7	5	25	61
AU6	HQ_BA67	6	0	9	0	4	2	7	5	25	58
AU6	HQ_BA68	6	0	0	2	5	2	7	5	25	52
AU7	HQ_BA69	6	0	9	0	1	2	0	0	25	43
AU7	HQ_BA70	6	0	9	0	1	1	0	0	25	42
AU8	HQ_BA71	6	0	9	0	1	1	0	0	25	42
AU8	HQ_BA72	6	0	9	0	1	1	0	0	25	42
AU9	HQ_BA73	8	0	5	2	3	7	10	5	25	65
AU9	HQ_BA74	6	0	0	0	1	7	10	5	25	54
AU42	Site001	0	0	5	0	2	2	0	5	25	39
AU12	Site002	3	0	5	2	5	4	0	5	25	49
AU23	Site003	3	0	9	8	5	7	0	5	25	62
AU9	Site004	3	0	5	0	3	7	0	5	25	48
AU38	Site005	3	0	5	0	1	1	0	0	25	35
AU38	Site006	6	0	9	0	1	1	0	0	25	42
AU12	Site007	8	0	5	2	3	2	0	5	25	50
AU12	Site008	8	0	5	5	4	7	0	5	25	59
AU6	Site009	8	0	9	2	4	4	0	5	25	57
AU9	Site010	3	0	5	2	4	7	0	5	25	51
AU11	Site011	6	0	9	2	3	4	0	5	25	54
AU11	Site012	6	0	9	3	4	7	0	5	25	59
AU40	Site013	6	0	9	0	5	7	0	5	25	57
AU41	Site014	0	0	9	8	4	1	0	0	25	47
AU40	Site015	0	0	9	0	4	2	0	5	25	45

Unit	Site	Risk of Road Based Mortality	Risk of Dog Attack	Importance of Drought Refuge	Density and Quality of Food Trees	Number of Large Food Trees	Canopy Cover of trees <4m	Large non-food trees	Presence of Dense Shade Trees	Contiguous habitat	Total
Max score		8	8	9	20	5	10	10	5	25	100
AU40	Site016	6	0	5	2	3	7	0	5	25	53
AU9	Site017	6	0	5	2	3	10	0	5	25	56
AU34	Site018	0	0	9	0	1	0	0	0	25	35
AU41	Site019	3	0	9	3	3	4	0	5	25	52
AU12	Site020	6	0	5	2	3	7	0	5	25	53
AU12	Site021	6	0	5	3	4	4	0	5	25	52
AU16	Site022	0	0	5	0	1	4	0	5	25	40
AU6	Site023	6	0	5	2	2	4	0	5	25	49
AU40	Site024	6	0	9	2	3	4	0	5	25	54
AU40	Site025	6	0	5	3	3	4	0	5	25	51
AU40	Site026	8	0	9	5	3	7	0	5	25	62
AU9	Site027	8	0	5	2	3	2	0	5	25	50
AU12	Site028	8	0	9	3	5	4	0	5	25	59
AU40	Site029	8	0	5	3	4	1	0	0	25	46
AU6	Site030	3	0	9	2	2	4	0	5	25	50
AU12	Site031	8	0	9	3	3	7	0	5	25	60
AU38	Site032	0	0	5	0	1	1	0	0	25	32
AU19	Site033	0	0	5	5	5	4	0	5	25	49
AU2	Site034	8	0	9	0	1	1	0	0	25	44
AU23	Site035	8	0	9	5	5	7	0	5	25	64
AU40	Site036	6	0	9	3	4	7	0	5	25	59
AU40	Site037	6	0	5	3	2	2	0	5	25	48
AU32	Site038	3	0	9	0	1	10	0	5	25	53
AU31	Site039	3	0	9	2	3	4	0	5	25	51
AU23	Site040	3	0	9	16	5	7	0	5	25	70
AU34	Site041	0	0	9	0	2	4	0	5	25	45

Table 11 Squatter Pigeon-specific habitat quality scores at the offset site

Unit	Site	Invasion by Buffel Grass	Predation by feral predators	Distance to water (3 km)	Ground Cover Score	Understory Richness	Distance to water (1 km)	Normalised Difference Vegetation Index	Extent of, and distance to, large patches of contiguous habitat	Total
Max score		**16**	**9**	**1**	**15**	**10**	**1**	**25**	**25**	**100**
AU36	HQ_BA01	16	3	1	9	3	1	25	25	83
AU1	HQ_BA02	6	3	1	5	3	0	0	25	43
AU1	HQ_BA03	16	3	1	9	3	1	25	25	83
AU1	HQ_BA04	16	3	1	12	3	0	0	25	60
AU10	HQ_BA05	6	3	1	9	3	0	0	25	47
AU10	HQ_BA06	11	3	1	15	1	0	0	25	56
AU10	HQ_BA07	11	3	1	9	1	1	25	25	76
AU10	HQ_BA08	6	3	1	1	3	1	25	25	65
AU13	HQ_BA09	16	3	1	12	1	1	25	25	84
AU13	HQ_BA10	6	3	1	5	1	1	25	25	67
AU14	HQ_BA11	11	3	1	9	1	0	0	25	50
AU6	HQ_BA12	16	3	1	5	3	1	25	25	79
AU15	HQ_BA13	6	3	1	5	1	1	25	25	67
AU15	HQ_BA14	11	3	1	9	1	1	25	25	76
AU16	HQ_BA15	6	3	1	9	3	1	25	25	73
AU17	HQ_BA16	6	3	1	5	1	1	25	25	67
AU17	HQ_BA17	6	3	1	5	1	1	25	25	67
AU17	HQ_BA18	16	3	1	9	1	1	25	25	81
AU17	HQ_BA19	6	3	1	1	1	1	25	25	63
AU18	HQ_BA20	1	3	1	1	1	1	25	25	58
AU18	HQ_BA21	1	3	1	9	1	1	25	25	66
AU19	HQ_BA22	6	3	1	15	3	1	25	25	79
AU19	HQ_BA23	11	3	1	15	1	1	25	25	82
AU2	HQ_BA24	11	3	1	5	1	1	25	25	72
AU2	HQ_BA25	6	3	1	5	3	1	25	25	69
AU20	HQ_BA26	6	3	1	5	1	1	25	25	67
AU20	HQ_BA27	6	3	1	5	1	1	25	25	67
AU23	HQ_BA28	6	3	1	9	3	1	25	25	73
AU24	HQ_BA29	6	3	1	1	3	1	25	25	65

Unit	Site	Invasion by Buffel Grass	Predation by feral predators	Distance to water (3 km)	Ground Cover Score	Understory Richness	Distance to water (1 km)	Normalised Difference Vegetation Index	Extent of, and distance to, large patches of contiguous habitat	Total
Max score		**16**	**9**	**1**	**15**	**10**	**1**	**25**	**25**	**100**
AU25	HQ_BA30	6	3	1	1	1	1	25	25	63
AU25	HQ_BA31	16	3	1	1	1	1	25	25	73
AU26	HQ_BA32	6	3	1	15	3	1	25	25	79
AU26	HQ_BA33	16	3	1	1	1	1	25	25	73
AU26	HQ_BA34	16	3	1	5	3	1	25	25	79
AU27	HQ_BA35	1	3	1	5	1	1	25	25	62
AU29	HQ_BA36	6	3	1	5	3	1	25	25	69
AU29	HQ_BA37	6	3	1	1	3	0	0	25	39
AU3	HQ_BA38	11	3	1	9	1	1	25	25	76
AU30	HQ_BA39	6	3	1	5	1	0	0	25	41
AU30	HQ_BA40	6	3	1	9	3	0	0	25	47
AU31	HQ_BA41	16	3	1	5	3	0	0	25	53
AU31	HQ_BA42	1	3	1	1	1	1	25	25	58
AU31	HQ_BA43	1	3	1	1	1	1	25	25	58
AU32	HQ_BA44	16	3	1	9	1	1	25	25	81
AU33	HQ_BA45	1	3	1	5	1	1	25	25	62
AU34	HQ_BA46	1	3	1	1	1	0	0	25	32
AU34	HQ_BA47	16	3	1	1	3	1	25	25	75
AU34	HQ_BA48	6	3	1	9	1	1	25	25	71
AU35	HQ_BA49	1	3	1	1	1	0	0	25	32
AU35	HQ_BA50	6	3	1	15	1	0	0	25	51
AU36	HQ_BA51	11	3	1	12	3	1	25	25	81
AU36	HQ_BA52	16	3	1	5	3	0	0	25	53
AU38	HQ_BA53	6	3	1	5	1	0	0	25	41
AU38	HQ_BA54	16	3	1	1	3	0	0	25	49
AU38	HQ_BA55	16	3	1	9	3	0	0	25	57
AU39	HQ_BA56	16	3	1	1	3	1	25	25	75
AU39	HQ_BA57	16	3	1	12	1	0	0	25	58
AU39	HQ_BA58	6	3	1	1	3	0	0	25	39
AU4	HQ_BA59	16	3	1	15	1	1	25	25	87

Unit	Site	Invasion by Buffel Grass	Predation by feral predators	Distance to water (3 km)	Ground Cover Score	Understory Richness	Distance to water (1 km)	Normalised Difference Vegetation Index	Extent of, and distance to, large patches of contiguous habitat	Total
Max score		**16**	**9**	**1**	**15**	**10**	**1**	**25**	**25**	**100**
AU4	HQ_BA60	6	3	1	9	3	1	25	25	73
AU41	HQ_BA61	6	3	1	1	3	1	25	25	65
AU41	HQ_BA62	1	3	1	5	1	1	25	25	62
AU42	HQ_BA63	16	3	1	5	3	1	25	25	79
AU42	HQ_BA64	16	3	1	12	3	1	25	25	86
AU42	HQ_BA65	16	3	1	9	1	0	0	25	55
AU43	HQ_BA66	11	3	1	9	1	1	25	25	76
AU6	HQ_BA67	6	3	1	9	3	1	25	25	73
AU6	HQ_BA68	16	3	1	9	3	0	0	25	57
AU7	HQ_BA69	16	3	1	15	3	1	25	25	89
AU7	HQ_BA70	16	3	1	1	1	1	25	25	73
AU8	HQ_BA71	16	3	1	12	3	1	25	25	86
AU8	HQ_BA72	16	3	1	9	3	1	25	25	83
AU9	HQ_BA73	16	3	1	1	3	0	0	25	49
AU9	HQ_BA74	16	3	1	9	3	0	0	25	57
AU42	Site001	16	3	1	5	3	0	0	25	53
AU12	Site002	11	3	1	12	8	0	0	25	60
AU23	Site003	11	3	1	12	5	1	25	25	83
AU9	Site004	16	3	1	9	5	1	25	25	85
AU38	Site005	16	3	1	9	3	0	0	25	57
AU38	Site006	1	3	1	1	3	1	25	25	60
AU12	Site007	6	3	1	15	3	0	0	25	53
AU12	Site008	11	3	1	9	5	0	0	25	54
AU6	Site009	16	3	1	9	5	1	25	25	85
AU9	Site010	16	3	1	12	3	0	0	25	60
AU11	Site011	16	3	1	9	3	1	25	25	83
AU11	Site012	16	3	1	9	3	1	25	25	83
AU40	Site013	6	3	1	9	8	1	25	25	78
AU41	Site014	6	3	1	5	5	1	25	25	71
AU40	Site015	11	3	1	15	3	1	25	25	84

Unit	Site	Invasion by Buffel Grass	Predation by feral predators	Distance to water (3 km)	Ground Cover Score	Understory Richness	Distance to water (1 km)	Normalised Difference Vegetation Index	Extent of, and distance to, large patches of contiguous habitat	Total
Max score		**16**	**9**	**1**	**15**	**10**	**1**	**25**	**25**	**100**
AU40	Site016	16	3	1	12	3	0	0	25	60
AU9	Site017	16	3	1	5	5	1	25	25	81
AU34	Site018	16	3	1	9	3	1	25	25	83
AU41	Site019	11	3	1	9	5	1	25	25	80
AU12	Site020	16	3	1	9	5	0	0	25	59
AU12	Site021	16	3	1	15	5	0	0	25	65
AU16	Site022	11	3	1	9	3	0	0	25	52
AU6	Site023	16	3	1	15	3	0	0	25	63
AU40	Site024	16	3	1	15	5	1	25	25	91
AU40	Site025	16	3	1	9	3	0	0	25	57
AU40	Site026	16	3	1	5	3	1	25	25	79
AU9	Site027	16	3	1	9	5	0	0	25	59
AU12	Site028	16	3	1	5	3	1	25	25	79
AU40	Site029	16	3	1	9	3	0	0	25	57
AU6	Site030	16	3	1	12	3	1	25	25	86
AU12	Site031	16	3	1	1	3	1	25	25	75
AU38	Site032	16	3	1	9	3	0	0	25	57
AU19	Site033	11	3	1	12	3	0	0	25	55
AU2	Site034	11	3	1	9	3	1	25	25	78
AU23	Site035	11	3	1	12	1	1	25	25	79
AU40	Site036	11	3	1	9	3	1	25	25	78
AU40	Site037	11	3	1	12	3	0	0	25	55
AU32	Site038	11	3	1	9	3	1	25	25	78
AU31	Site039	6	3	1	9	3	1	25	25	73
AU23	Site040	16	3	1	12	3	1	25	25	86
AU34	Site041	6	3	1	12	3	1	25	25	76

Table 12 Greater Glider-specific habitat quality scores at the offset site

Unit	Site	Landscape Position Threat of intense canopy fires	Fuel Hazard Threat of intense canopy fires	Threat of intense canopy fires	Importance as a climate change refuge	Threat of Barb Wire	Density and quality of food trees	Number of Large food trees	Number of large shelter trees	Availability of suitably sized hollows	Size and connectivity of habitat patch	Total
Max score		**16**	**9**	**10**	**15**	**5**	**20**	**15**	**15**	**10**	**25**	**100**
AU36	HQ_BA01	Valley	Low	10	3	5	5	5	4	0	25	57
AU1	HQ_BA02	Crest	Low	8	7	5	3	5	4	0	25	57
AU1	HQ_BA03	Crest	Low	8	7	0	5	5	4	0	25	54
AU1	HQ_BA04	Midslope	High	2	7	5	5	5	4	0	25	53
AU10	HQ_BA05	Midslope	Moderate	5	3	5	0	1	0	0	25	39
AU10	HQ_BA06	Valley	Low	10	3	0	0	1	0	0	25	39
AU10	HQ_BA07	Valley	Low	10	3	5	0	1	0	0	25	44
AU10	HQ_BA08	Valley	Low	10	0	5	0	1	0	0	25	41
AU13	HQ_BA09	Valley	Low	10	7	5	2	5	4	0	25	58
AU13	HQ_BA10	Valley	Moderate	7	7	5	2	4	0	0	25	50
AU14	HQ_BA11	Midslope	Very High	2	7	5	5	5	10	0	25	59
AU6	HQ_BA12	Valley	Low	10	7	5	0	3	4	0	25	54
AU15	HQ_BA13	Valley	Moderate	7	7	0	5	4	10	1	25	59
AU15	HQ_BA14	Valley	Moderate	7	5	0	1	2	4	0	25	44
AU16	HQ_BA15	Valley	High	5	5	0	1	3	6	2	25	47
AU17	HQ_BA16	Valley	Low	10	3	0	0	1	0	0	25	39
AU17	HQ_BA17	Valley	Low	10	3	5	0	1	0	0	25	44
AU17	HQ_BA18	Valley	Low	10	3	5	0	1	0	0	25	44
AU17	HQ_BA19	Valley	Low	10	3	0	0	1	0	0	25	39
AU18	HQ_BA20	Valley	Low	10	5	5	1	3	0	0	25	49
AU18	HQ_BA21	Valley	Low	10	3	0	1	1	0	0	25	40
AU19	HQ_BA22	Valley	Low	10	7	0	3	5	4	0	25	54
AU19	HQ_BA23	Valley	Moderate	7	7	0	1	3	4	0	25	47
AU2	HQ_BA24	Valley	Low	10	3	0	1	1	0	0	25	40
AU2	HQ_BA25	Valley	Low	10	3	0	0	1	0	0	25	39
AU20	HQ_BA26	Valley	Moderate	7	5	0	2	4	4	0	25	47
AU20	HQ_BA27	Valley	Moderate	7	7	5	5	4	6	0	25	59
AU23	HQ_BA28	Crest	Moderate	4	7	5	10	5	10	0	25	66
AU24	HQ_BA29	Valley	Low	10	7	5	10	4	4	0	25	65
AU25	HQ_BA30	Valley	Low	10	0	0	0	1	0	0	25	36
AU25	HQ_BA31	Valley	Low	10	5	0	1	4	0	0	25	45
AU26	HQ_BA32	Valley	Moderate	7	5	0	5	3	0	0	25	45
AU26	HQ_BA33	Valley	Low	10	5	0	2	1	0	0	25	43
AU26	HQ_BA34	Valley	Low	10	5	0	1	5	4	0	25	50
AU27	HQ_BA35	Valley	Low	10	3	0	0	1	0	0	25	39
AU29	HQ_BA36	Valley	Moderate	7	1	0	5	3	4	2	25	47
AU29	HQ_BA37	Midslope	Low	9	5	0	7	5	10	0	23	59
AU3	HQ_BA38	Valley	Low	10	3	0	0	1	0	0	25	39

Unit	Site	Landscape Position Threat of intense canopy fires	Fuel Hazard Threat of intense canopy fires	Threat of intense canopy fires	Importance as a climate change refuge	Threat of Barb Wire	Density and quality of food trees	Number of Large food trees	Number of large shelter trees	Availability of suitably sized hollows	Size and connectivity of habitat patch	Total
Max score		**16**	**9**	**10**	**15**	**5**	**20**	**15**	**15**	**10**	**25**	**100**
AU30	HQ_BA39	Valley	Moderate	7	5	5	5	3	4	0	23	52
AU30	HQ_BA40	Midslope	Moderate	5	5	5	3	2	4	0	23	47
AU31	HQ_BA41	Valley	Low	10	0	5	0	1	0	0	23	39
AU31	HQ_BA42	Valley	Low	10	0	5	0	1	0	0	23	39
AU31	HQ_BA43	Valley	Low	10	3	5	0	1	0	0	23	42
AU32	HQ_BA44	Valley	Low	10	3	5	1	1	0	0	23	43
AU33	HQ_BA45	Valley	Low	10	3	5	0	2	4	0	23	47
AU34	HQ_BA46	Valley	Low	10	0	5	0	1	0	0	23	39
AU34	HQ_BA47	Valley	Low	10	3	0	0	1	0	0	25	39
AU34	HQ_BA48	Valley	Low	10	3	0	0	2	0	0	25	40
AU35	HQ_BA49	Valley	Low	10	0	5	2	5	6	2	23	53
AU35	HQ_BA50	Midslope	Low	9	0	0	1	3	0	0	23	36
AU36	HQ_BA51	Valley	High	5	5	0	3	5	0	0	23	41
AU36	HQ_BA52	Valley	Low	10	5	5	2	5	0	0	23	50
AU38	HQ_BA53	Valley	Low	10	0	5	0	1	0	0	23	39
AU38	HQ_BA54	Valley	Low	10	3	0	0	1	0	0	25	39
AU38	HQ_BA55	Valley	Low	10	0	5	0	1	0	0	25	41
AU39	HQ_BA56	Valley	Low	10	0	5	0	4	0	0	25	44
AU39	HQ_BA57	Valley	Moderate	7	0	5	5	3	0	0	25	45
AU39	HQ_BA58	Valley	Low	10	0	0	3	4	4	0	23	44
AU4	HQ_BA59	Valley	Low	10	3	0	2	1	0	0	25	41
AU4	HQ_BA60	Valley	Low	10	5	0	0	1	0	0	25	41
AU41	HQ_BA61	Valley	Moderate	7	3	5	2	3	4	0	23	47
AU41	HQ_BA62	Valley	High	5	5	5	10	5	4	0	23	57
AU42	HQ_BA63	Valley	Low	10	5	5	1	3	4	0	23	51
AU42	HQ_BA64	Valley	Low	10	5	5	1	5	0	2	25	53
AU42	HQ_BA65	Crest	Low	8	7	0	2	5	4	0	25	51
AU43	HQ_BA66	Valley	Moderate	7	7	0	3	5	4	0	25	51
AU6	HQ_BA67	Crest	Low	8	7	5	2	5	0	0	25	52
AU6	HQ_BA68	Midslope	Low	9	7	5	2	5	4	0	25	57
AU7	HQ_BA69	Valley	Low	10	3	5	0	1	0	0	25	44
AU7	HQ_BA70	Valley	Low	10	3	5	0	1	0	0	25	44
AU8	HQ_BA71	Valley	Low	10	0	5	0	1	0	0	25	41
AU8	HQ_BA72	Valley	Low	10	3	0	0	1	0	0	25	39
AU9	HQ_BA73	Midslope	Low	9	7	5	2	5	4	0	25	57
AU9	HQ_BA74	Midslope	Low	9	7	5	1	5	4	0	25	56
AU42	Site001	Valley	Moderate	7	0	5	1	2	0	3	25	43
AU12	Site002	midslope	high	2	7	5	1	5	4	10	25	59
AU23	Site003	Valley	Low	10	7	5	5	5	15	10	25	82
AU9	Site004	Midslope	Mod	5	7	0	0	3	0	0	25	40

Unit	Site	Landscape Position Threat of intense canopy fires	Fuel Hazard Threat of intense canopy fires	Threat of intense canopy fires	Importance as a climate change refuge	Threat of Barb Wire	Density and quality of food trees	Number of Large food trees	Number of large shelter trees	Availability of suitably sized hollows	Size and connectivity of habitat patch	Total
Max score		**16**	**9**	**10**	**15**	**5**	**20**	**15**	**15**	**10**	**25**	**100**
AU38	Site005	valley	low	10	0	0	0	1	0	0	25	36
AU38	Site006	valley	mod	9	3	0	0	1	0	0	25	38
AU12	Site007	midslope	high	2	7	0	1	3	4	10	25	52
AU12	Site008	crest	mod	4	7	0	5	4	0	0	25	45
AU6	Site009	midslope	high	2	7	5	2	5	4	10	25	60
AU9	Site010	midslope	low	9	7	5	3	4	4	0	25	57
AU11	Site011	crest	low	8	5	0	1	3	4	0	25	46
AU11	Site012	Crest	low	8	5	5	5	4	4	0	25	56
AU40	Site013	valley	high	5	5	0	2	5	0	0	25	42
AU41	Site014	Valley	Mod	7	3	5	7	5	6	10	25	68
AU40	Site015	Valley	Mod	7	5	0	1	4	6	0	25	48
AU40	Site016	mid slope	mod	5	7	5	2	3	4	0	25	51
AU9	Site017	crest	high	1	7	0	3	3	0	0	25	39
AU34	Site018	valley	low	10	3	0	0	1	0	0	25	39
AU41	Site019	valley	med	7	5	0	12	3	4	10	25	66
AU12	Site020	crest	mod	4	7	0	5	3	0	0	25	44
AU12	Site021	midslope	high	2	7	5	5	4	4	10	25	62
AU16	Site022	midslope	high	2	7	0	0	1	0	0	25	35
AU6	Site023	crest	mod	4	7	5	3	2	0	0	25	46
AU40	Site024	valley	low	10	7	0	3	3	4	6	25	58
AU40	Site025	valley	low	10	0	0	5	3	4	0	25	47
AU40	Site026	midslope	mod	5	7	0	3	3	0	0	25	43
AU9	Site027	Crest	very high	1	7	0	3	3	0	3	25	42
AU12	Site028	midslope	mod	5	7	0	3	5	0	3	25	48
AU40	Site029	midslope	high	2	7	0	3	4	0	0	25	41
AU6	Site030	valley	low	10	7	0	5	2	0	0	25	49
AU12	Site031	midslope	very high	2	7	0	3	3	6	10	25	56
AU38	Site032	valley	low	10	7	0	0	1	0	0	25	43
AU19	Site033	midslope	very high	2	7	5	12	5	4	10	25	70
AU2	Site034	valley	low	10	3	0	0	1	0	0	25	39
AU23	Site035	valley	low	10	7	0	8	5	15	10	25	80
AU40	Site036	valley	mod	7	5	0	2	4	4	0	25	47
AU40	Site037	valley	mod	7	5	5	3	2	0	0	25	47
AU32	Site038	valley	low	10	3	5	1	1	0	0	25	45
AU31	Site039	valley	mod	7	3	5	1	3	0	3	25	47
AU23	Site040	valley	high	5	5	0	12	5	10	10	25	72
AU34	Site041	valley	low	10	3	5	0	2	0	0	25	45

6. Landscape-scale Assessment

The Queensland Government's *Guide to Determining Terrestrial Habitat Quality version 1.3* specifies that the landscape-scale components of BioCondition are not considered as part of habitat quality for offsets. They are nevertheless to be reported, as position in the landscape must be appropriate for delivering an offset that achieves a conservation outcome. A "moderate" landscape score is required for an offset to be suitable, although the minimum acceptable landscape-scale attribute score is "determined by the administering agency on a case-by-case basis".

The offset site had a landscape score of 16/20, which was slightly higher than the impact site's score of 14/20 (Table 13). The high landscape score of the offset site is likely to be suitable for delivering offset gains for the Koala, Squatter Pigeon (Breeding & Foraging) and Greater Glider.

Table 13 Landscape scale BioCondition scores

Landscape Attribute	Impact Site	Offset Site
Size of patch	10/10	10/10
Connectivity	0/5	2/5
Context	4/5	4/5
Total Score	**14/20**	**16/20**

7. Utilisation by the Protected Matters

7.1 Squatter Pigeon (Dispersal, Breeding & Foraging)

The offset site contained ideal habitat for the species (sandy woodland with numerous water sources at farm dams and within Philips Creek and Stephens Creek). Squatter Pigeons were observed foraging during mornings and afternoons across the offset area. Any remnant or regrowth open forest to sparse, open-woodland or scrub dominated by Eucalyptus, Corymbia, Acacia or Callitris species, on sandy or gravelly soils (including but not limited to areas mapped as Queensland land zones 3. 5 or 7) and within 1 kilometre of a suitable, permanent or seasonal waterbody were assigned as breeding habitat for Squatter Pigeon, while any of the above-mentioned areas within 3 km of suitable, permanent or seasonal waterbody were assigned as foraging habitat. The list of AUs with the potential type of utilisation by Squatter Pigeons is shown in Figure 4 and Table 7).

Dispersal habitat is considered to be any forest or woodland occurring between patches of foraging or breeding habitat that facilitates movement between patches of foraging habitat, breeding habitat and/or waterbodies, and areas of cleared land less than 100 metres wide linking areas of suitable breeding and/or foraging habitat.

The offset site contained an ideal habitat for the species with 73 sampling sites (63.5%) being within 3 km of water: with dams, a barrage and earthen tanks, which provide foraging habitat for Squatter Pigeons throughout the site. However, 50 sampling sites (68%) were within 1 km of permanent water, making them suitable for breeding habitats. All 115 sites are considered suitable dispersal habitat for this species. Additionally, a significant portion of the site is open woodland within 3 km of a water source considered only dispersal habitat due to the soil type.

The offsite site contains several large dams, which provide year-round water for Squatter Pigeons. Furthermore, water was present along the entire length of Stephen Creek (a fifth-order stream on the Vegetation Management Watercourse Map).

In the north of the offset areas, Squatter Pigeons were observed along the wooded fringes of the Phillips Creek Biodiversity Corridor and along grassy non-remnant access tracks in the southern portion of the offset area, immediately south of the Stephens Creek Biodiversity Corridor (Plate 1).

Sightings of Squatter Pigeons within the offset site primarily occurred along access tracks and near the sites. The actual number of Squatter Pigeons present on the site is likely higher than recorded during surveys due to reduced visibility in grassy woodlands and large open areas of tall grass lacking gravel/dirt tracks.

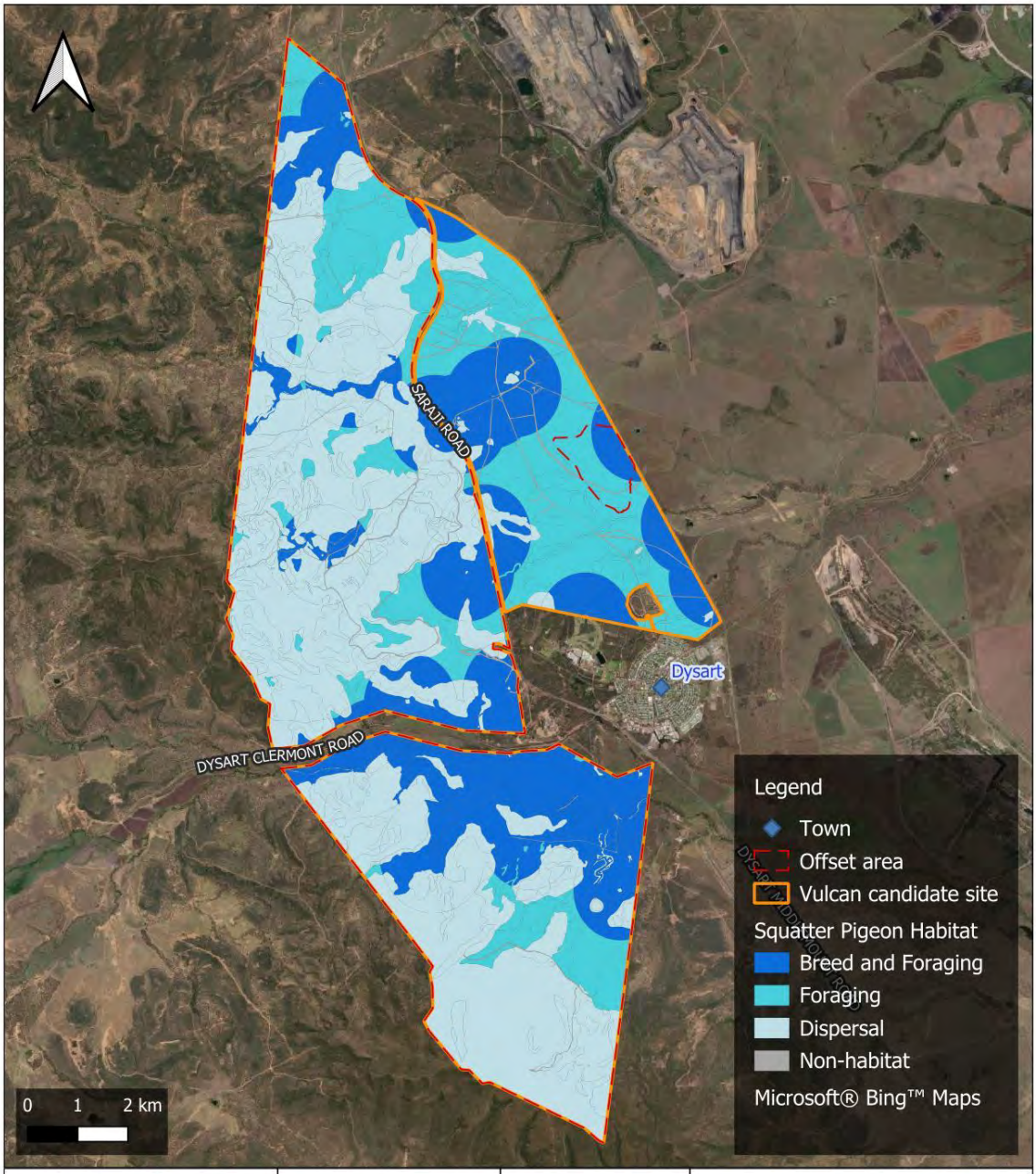


Figure Name: Matter areas for Squatter Pigeon	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 4: Squatter Pigeon Habitat

Photo Plate 1: Squatter Pigeon picture from the impact site METServe 2023.

7.2 Koala (Dispersal, Breeding & Foraging)

Most of the offset site comprises foraging, shelter and dispersal habitat for Koalas. The list of AUs with the potential type of utilisation by Koalas is shown in (Table 7).

This species was recorded during the July 2024 survey (**Error! Reference source not found.** 2). Koala activity w as observed through scratch marks on smooth-barked Eucalyptus trunks. One Statewide Biodiversity Corridor transverses the southern section of the offset area and a Regional Biodiversity corridor transvers the northern section of the offset area. The offset sites and surrounding tracts of remnant vegetation are linked by vegetated corridors, particularly along creek lines. As Koalas regularly traverse treeless areas up to 2 km wide (White 1999), the offset site is therefore likely to be well connected with other Koala habitats locally.

Dispersal habitats are habitats that are between foraging habitats without dispersal barriers, i.e., habitats that are no more than 4 km apart but themselves contain little or no resources for the species. They are not functional for the Koala as standalone habitats. Despite the addition of these areas to calculations, they are inconsequential to the species for offsetting purposes. Dispersal habitat is generally considered to have little to no value as shelter from hot or dry conditions.

Non-habitat areas are areas that contain little to no resources for the species. This includes areas considered dispersal habitat, but with preferred corridors within them that contain forage and shelter trees. For example, an open treeless area with a defined line of trees intersecting it would be considered non-habitat, where the defined line of trees is considered foraging/shelter and therefore a preferred dispersal pathway. In the context of the Project, the open areas between foraging/shelter habitats and Saraji Road to the east are considered non-habitat due to the lack of dispersal destinations. As for dispersal habitat, non-habitat is generally considered to have little to no value as shelter from hot or dry conditions. Habitat utilisation by Koalas within the offset site is presented on Figure 5.

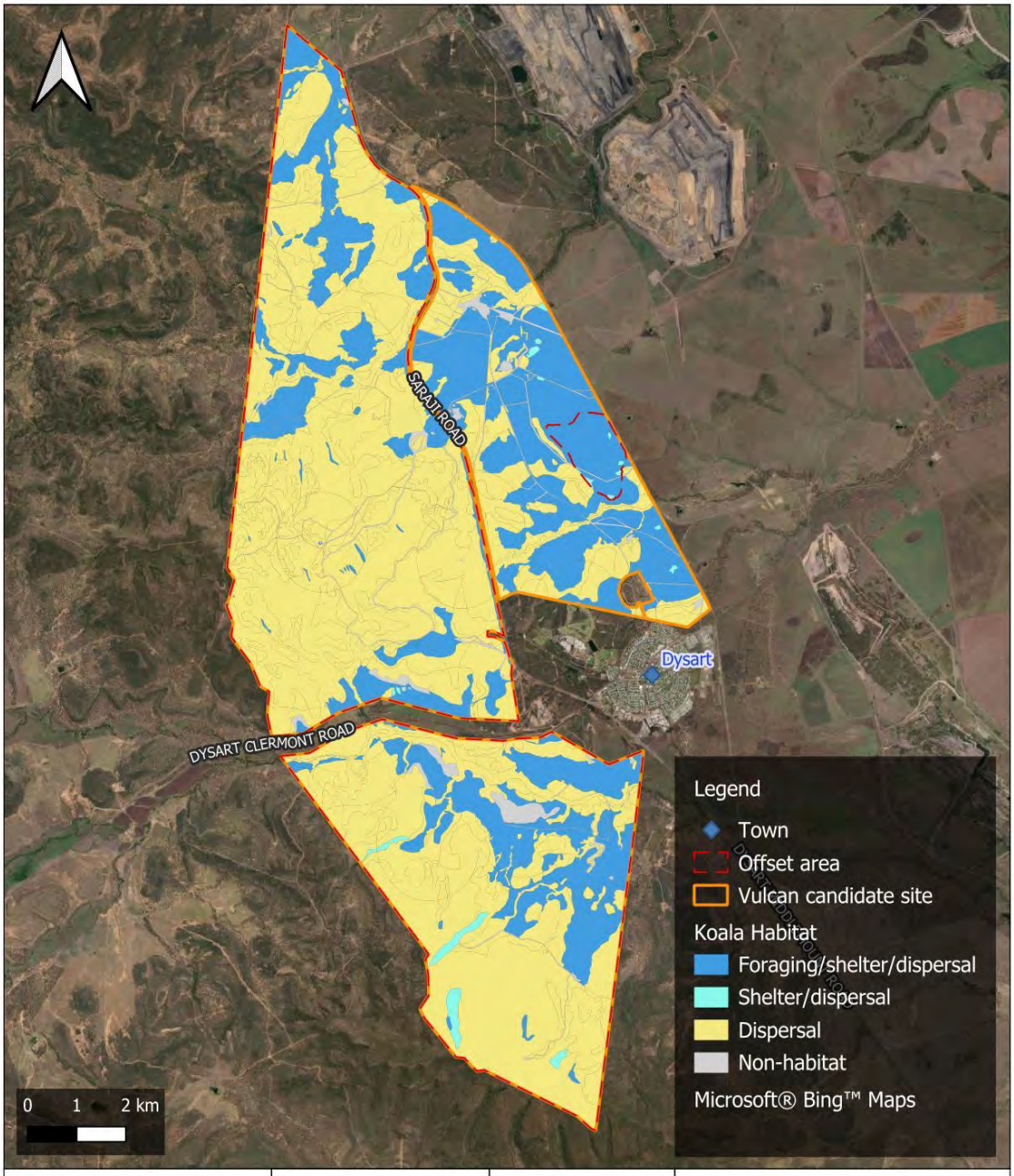


Figure Name: Matter areas for Koala	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 5: Koala Habitat

Photo Plate 2: Koala in a Eucalyptus crebra, photographed during the July 2024 survey site HA_BA04 (AU01)

7.3 Greater Glider (Denning, Foraging and Dispersal)

Greater Gliders use a range of trees for foraging and denning. The tree species present in the Project area as per the results of the BioCondition assessments that are also listed in *the Guide to Greater Glider Habitat in Queensland* (Eyre, et al., 2022) are outlined in Table 14, regarding their utility by the species and habitat requirements.

Table 14 Potential AU utilisation within the offset site and trees from the Eucalypt group that may be utilised by Greater Glider

Potential AU utilisation within the offset site	Area (ha)	Tree species	Usage by Greater Gliders
AU01	2705.99	*Corymbia citriodora*	Denning and foraging
AU06	1263.87	*Eucalyptus crebra*	Denning and foraging
AU09	631	*Eucalyptus molluccana*	Denning and foraging
AU12	12.79	*Eucalyptus tereticornis/Eucalyptus camaldulensis*	Denning and foraging
AU13	33.36	*Corymbia intermedia*	Foraging
AU14	7.45	*Corymbia tessellaris*	Denning and foraging
AU19	35.19	*Eucalyptus trachyphloia*	No use recorded
AU20	246.64	*Eucalyptus orgadophylla*	No use recorded
AU23	20.98	*Corymbia clarksoniana*	Unspecified use
AU29	337.73	*Corymbia dallachiana*	Unspecified use
AU35	1465.76	*Eucalyptus camaldulensis*	Unspecified use
AU40	109.2	*Corymbia erythrophloia*	Unspecified use
AU41	153.86	*Eucalyptus platyphylla*	Unspecified use
AU42	2.74	*Eucalyptus populnea*	Unspecified use

Dispersal habitats are areas with tree species that provide connectivity to isolated patches of denning and are at least 100 metres wide. That does not qualify as foraging or denning habitats. The Greater Glider foraging habitat is represented by areas containing locally important dominant trees (Table 14) for foraging with 200 metres of denning habitat.

Current denning habitats are areas with (*Eucalyptus* spp., *Corymbia* spp. and *Angophora* spp) with a DBH greater than the RE threshold for large trees, usually >40 cm. The potential future denning habitats are represented with areas with Greater Glider's preferable tree species with a DBH greater than 30 cm but less than the RE threshold for large trees, usually High Value Regrowth (HVR). The list of AUs with the potential type of utilisation by Greater Gliders is shown in Figure 6 and Table 7.

During habitat quality assessments, 106 hollows were recorded across 22 sites within suitable habitats for this species (a density of 8 hollows /ha). Greater Gliders require at least 2-4 large, hollow-bearing trees within their home range of 1-4 ha to inhabit an area of forest (Comport et al. 1996). The offset site therefore currently provides the hollow density required for the species within.

Habitat within the offset site is otherwise acceptable for Greater Gliders but could be improved upon. It contains many trees with trunk diameters exceeding 40 cm (favoured for foraging), a diversity of different food tree species, riparian areas providing refuge during drought, and in 5 sampling sites, a high density of the preferred food trees, *Eucalyptus tereticornis* and *E. camaldulensis* (Eyre et al. 2022).

Apart from the small-scale surveys undertaken during habitat quality assessments, there have been no prior surveys for Greater Gliders in the local area. There are numerous published records of the species from the broader region, however, and known populations at Blackdown Tablelands and along the Dawson River It is anticipated that Greater Gliders probably disperse along riparian areas within the offset site and, if the number of hollows present within the offset site is artificially increased, a resident population is expected to establish, if not already present in low densities

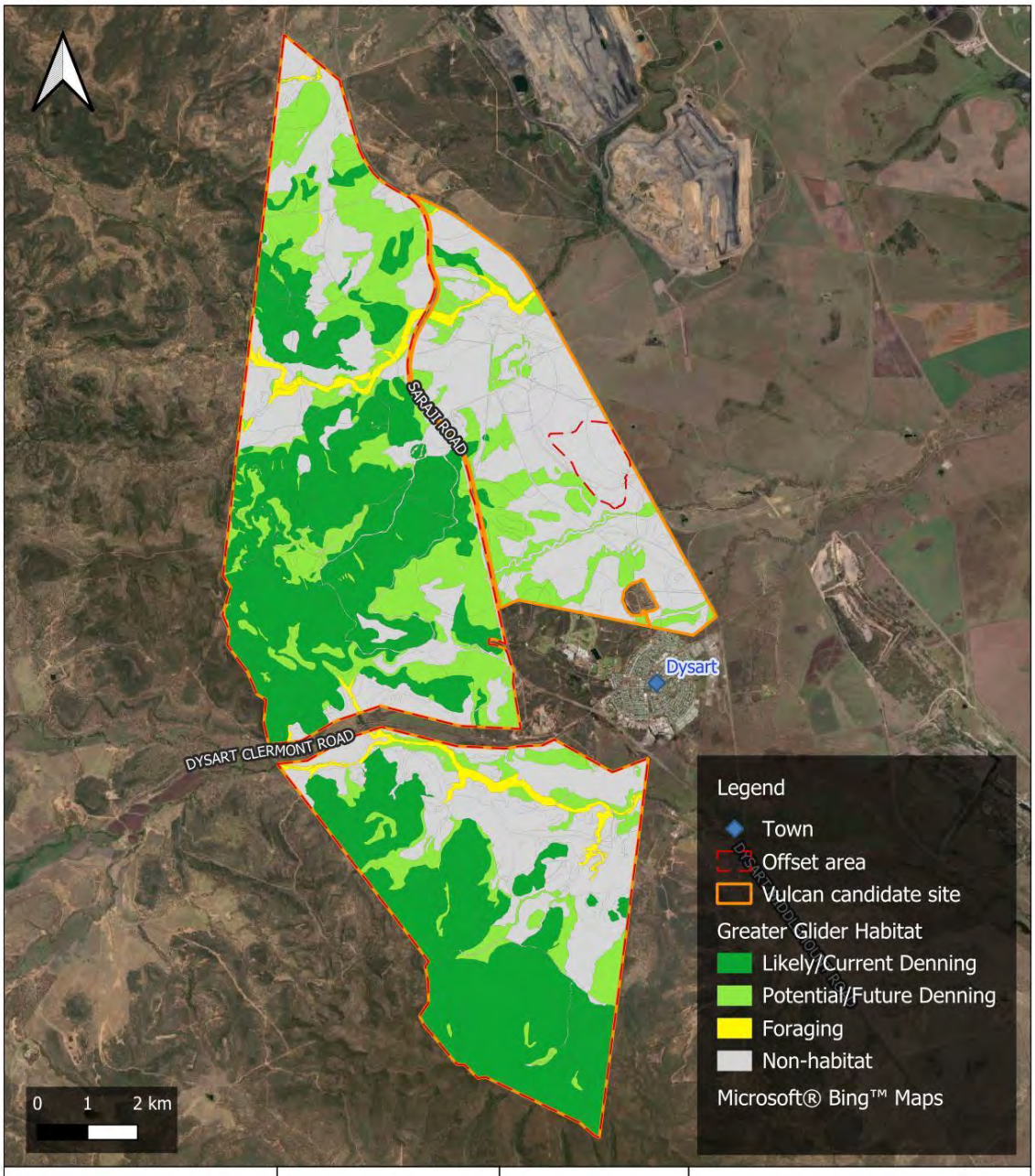


Figure Name: Matter areas for Greater Glider	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA	
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676		
		Date: August 2024	Project Manager: DJ	Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55	

Figure 6: Greater Glider Habitat.

8. Potential for Habitat Improvement

The potential for each attribute of habitat quality to be improved through management is discussed in detail in Table 15.

A summary of the key management actions and potential improvements in scores for each threatened species is listed in Table 16. The estimates presented determined the total expected improvements used as inputs into the Australian Government's Offsets Assessment Guide, when assessing the suitability of the offset site.

Note that the Offset Assessment Guide requires habitat quality to be rounded to the nearest whole number out of 10. This means that all three matters are expected to achieve a gain of 1/10 from a starting value of 6 for the Koala, and Greater Glider, and Squatter Pigeon (Breeding & Foraging) is expected to achieve an overall gain of 1/10 from 6.

Without management intervention, the habitat quality scores for all matters are likely to remain at baseline values, as the slight improvements in tree size that are expected over time will not be sufficient to shift scores out of 10 to the next integer.

Table 15 Potential for habitat improvement

Habitat attribute	Potential for improvement	Effect on overall habitat score
BioCondition Components		
Tree richness	A total of 42 sampling locations exceeded the reference values for tree richness, with an average of 116% of benchmark richness across all sites, though 12 sites were recorded as not achieving benchmark numbers. Lower scores for tree richness were mostly in non-remnant habitats, which is to be expected. It is likely that tree richness will increase as a natural consequence of the other management measures such as removal of cattle.	Small improvements to Squatter Pigeon scores may be gained with benchmark tree richness where deficient, with 0.77/100 for breeding and foraging habitat and 0.04/100 for dispersal habitat.
Shrub richness	Approximately 57% of all offset sampling sites exceeded the benchmark value for shrub richness, for these sites, no gains in BioCondition scores are possible by increasing shrub richness. Shrub richness may be increased where deficient by limiting livestock access to areas with excessive *Carissa ovata* cover as this species appears to be generally avoided by cattle, therefore if un-grazed, a greater variety of shrubs are likely to eventually grow. Control of *Carissa* may include careful burning; however, this is to be avoided in all Brigalow ecological communities. Shrub richness may also be improved by planting in strategic locations to act as source populations for deficient shrub species, as given the size of the offset site comprehensive planting is likely to be impractical.	Overall, shrub richness will only affect Squatter Pigeon habitat quality and will increase BioCondition scores for those sites that are below the benchmark values. Shrub richness scores can be increased in 16 sites (AUs), allowing for a gain of 2.1, and in 38 AUs sites allowing for a gain of 3.8. 22 sites cannot be improved as these sites are already scored as equal to or greater than reference values. Shrub richness will affect the BioCondition aspect of the Squatter Pigeon (Breeding & Foraging) scores. With shrubs increased to 100% of richness benchmarks, Squatter Pigeon breeding and foraging scores will increase by 0.72/100, while dispersal scores will increase by 0.05/100.
Grass richness	No offset sampling locations had more perennial grass species than the benchmark value. However, 100% of sites contained fewer grass species than the reference value. There is no strong correlation between Buffel grass presence (measured by cover) and native grass richness throughout the Offset site. Grass richness can be improved by thinning overhead shrub and canopy cover, optimising grazing intensity, or reducing weed cover.	Grass richness does not affect the habitat quality scores of the Koala or Greater Glider. Improving grass richness would generate minor improvements in BioCondition overall (up to 3.4/100), as well as the understorey richness component of Squatter Pigeon (Breeding & Foraging) habitat condition scores. Improving grass richness to reference values at the sites where this is deficient would only improve overall Squatter Pigeon breeding and foraging habitat quality by 0.64/100 and dispersal habitat by 0.19/100.
Forb richness	Of the 43 offset AUs sampling locations, 2 had more recorded forb species than the reference value. However, 41 of the sampling sites contained fewer forb species than the benchmark value. Forb richness can be improved by thinning overhead shrub and canopy cover, optimising grazing intensity or by reducing weed cover. Forb richness was largely unrelated to weed cover at the offset site, with a range of weed coverage values for the deficient sites.	Forb richness does not affect the habitat quality scores of the Koala or Greater Glider. Improving forb richness would generate minor improvements in BioCondition and the understorey richness component of Squatter Pigeon) habitat condition scores. Improving forb richness to reference values at the sites where this is deficient would only improve overall Squatter Pigeon breeding and foraging habitat quality by 0.77/100 and for dispersal habitat by 0.08/100.

Habitat attribute	Potential for improvement	Effect on overall habitat score
	Limiting grazing will likely increase forb richness as livestock are likely to browse on a variety of native forbs; with livestock removed, native grazing/browsing species will continue to feed on forbs, however the overall pressure on these species is likely to be reduced.	
Canopy height	To achieve maximum BioCondition scores for canopy height, sites must achieve >70% of the reference value. The average of each of the 38 AUs within the offset site, 18 achieved this target. The sites that failed to achieve this target had canopy heights that were 7-67% of the benchmark. It is expected that half of the deficient sites as they are non-remnant will achieve maximum points for canopy height within 20 years of additional growth. Where canopy cover is in excess, thinning of canopy trees may allow for less competition between canopy species, allowing these trees additional opportunity to achieve benchmark heights.	Canopy height is not a component of the species-specific habitat scores for any of the three species. Rather, it is a component of BioCondition, which makes up a third of the total score for Squatter Pigeons. Expected improvements in canopy height will only improve overall Squatter Pigeon breeding and foraging habitat quality by 0.25/100 and dispersal habitat improvements of only 0.05/100.
Native perennial grass cover	Five AUs achieved the maximum possible points for native grass cover within HVR, remnant and non-remnant vegetation. Six AUs that were deficient in native grass cover (under 10% of benchmark BioCondition) were dominated by exotic vegetation, mostly grasses. Canopy thinning where in excess will increase native perennial grass cover. Care must be taken to avoid the further colonisation of Buffel grass.	Native grass cover does not affect the habitat quality scores of the Koala and Greater Glider. It does, however, affect Squatter Pigeon (Breeding & Foraging) habitat quality via its contribution to BioCondition, though the groundcover component of the species-specific score remains unchanged as weeds were mostly replaced in the calculations and bare ground and rock were not affected. Improvements in native perennial grass cover have the potential to improve overall Squatter Pigeon breeding and foraging habitat quality by 0.21/100 and dispersal habitat by 0.09/100.
Organic litter cover	Organic litter cover is equal to or exceeds the reference value at 38 offset AUs. At 12 sites, the litter cover is >100% of the reference value, resulting in penalised BioCondition scores. The main way to reduce litter cover to reference values is through the thinning of the shrub and tree layers where these are in excess, to reduce the amount of leaf fall. Thinning can be achieved via fire or manual removal, with greater control possible for the latter.	Litter cover does not affect the habitat quality scores of the Koala and Greater Glider. It affects the habitat quality of the Squatter Pigeon (Breeding & Foraging) via its contribution to BioCondition and the groundcover component of the species-specific score. Reductions in litter cover can improve overall Squatter Pigeon breeding and foraging habitat quality by 0.45/100 and dispersal habitat by 0.05/100. Grass coverage will increase, as a result of these changes, though this will be difficult to quantify.
Recruitment	Recruitment levels were generally poor, with only 17 AUs possessing 75% or more of seedlings and saplings of the dominant canopy species and a significant portion of AU's had 0 recruitment. Improvements will be possible by reducing cattle within the site and potentially by thinning the grass layer (physically or using fire), thereby creating space for seedlings of canopy species. In general, however, recruitment is considered a constraint on current habitat quality scores. Supplementary planting of Koala and Greater Glider food plants is a	Recruitment scores only directly affect BioCondition, which is a component of the Squatter Pigeon (Breeding & Foraging) habitat quality score. The minor improvements that are possible would increase overall Squatter Pigeon scores for breeding and foraging habitat by 0.34/100 and dispersal habitat by 0.02/100.

Habitat attribute	Potential for improvement	Effect on overall habitat score
	potential in the heavily grazed areas, along waterways as well as in the non rem Brigalow, however natural recruitment with the removal of cattle is expected to occur.	
Number of large trees	Relatively minor improvements in the number of large trees are expected over the timescale of an offset (20 years). Based on studies in nearby Poplar Box woodlands, existing trees are expected to expand by 20% over 20 years (Back *et al.* 2009). Based on these projections, a small number of trees that are currently smaller than the threshold for a "large tree" will qualify as large trees after 20 years. Further improvements are possible by selective thinning of non-food trees and saplings to improve the growth rates of retained food trees. Back *et al.* (2009) found a 50% increase over 20 years in tree circumference in Poplar Box woodlands that had 80% of trees removed. Assuming the benefits of clearing are linear, with 0% clearing resulting in 20% increase in circumference and 80% clearing resulting in 50% increase, 30% clearing is expected to result in a 31% increase in circumference over 20 years. Analysis of the recorded large tree data indicates 159 individuals within 20% of the threshold with a further 153 within 30% of the threshold.	Number of large trees has a relatively minor influence on Squatter Pigeon habitat quality, through its effect on BioCondition. Without thinning, Squatter Pigeon scores are expected to increase by 0.70/100 for eucalypts and 0.65/100 for non-eucalyptus for breeding and foraging habitat, and 0.1/100 for eucalypts and 0.08/100 for non-eucalypts for dispersal habitat via expected increases in the number of large trees. Improvements to the number of large trees have greater effects on Koalas and Greater Gliders, due to the greater importance of this habitat feature for these species. Such improvements have been factored into the calculations presented under "basal area of Koala and Greater Glider food trees" (refer to the "species-specific habitat attributes" section of this table).
Woody debris	No AUs achieved the maximum possible score for total woody debris. The amount of woody debris at most sites is primarily a symptom of the long history of excessive stem densities of trees and shrubs locally, rather than recent mass tree death. Excessive woody debris could be reduced through controlled burns. In the long term, reducing the high density of small trees and encouraging fewer but larger trees would reduce total woody debris accumulation. For sites with insufficient woody debris, reducing fire frequency and allowing debris to accumulate to benchmark levels will be sufficient without further action. Hollow bearing trees felled during clearing operations within the disturbance footprint may be valuable if deposited in areas of insufficient woody debris. Depositing woody debris taken from areas being cleared for mining activities into debris deficient habitat for the Ornamental Snake is the only method that is practicable for increasing habitat scores for this species.	Increasing the woody debris naturally is expected to increase naturally in proportion to increase in large trees and will take significant time to increase from current levels to that of the benchmark. Improvements in the woody debris is conservatively expected to increase by 0.26/100 for breeding and foraging habitat and 0.10/100 for dispersal habitat for the Squatter Pigeon. Actions taken to improve other habitat attributes (e.g., to increase the number of large trees used by Koalas and Greater Gliders, and to improve ground cover composition) will likely generate more natural amounts of woody debris without additional interventions.
Weed cover	A total of 34 non-native plant species were recorded across the 115 offset sampling sites. Weeds comprised 0% to 100% of the understorey vegetation cover across sites. Over 25% (30 sites) had over 50% weed cover. Weed prevalence at the offset site was similar to the impact site, where weeds	Buffel grass cover is discussed in the species-specific attributes section below, and control of other weeds such as other exotic grasses may not be possible.

Habitat attribute	Potential for improvement	Effect on overall habitat score
	comprised at average of 34% of the understorey vegetation cover. The most widespread weeds were the pasture grasses *Melinis repens* (Natal Grass) and *Urochloa mosambicensis* (Sabi Grass). *Megathyrsus maximus* (Green Panic Grass) and *Cenchrus ciliaris* (Buffel Grass) was locally dominant in non-remnant pastures. Eight weed species recorded at the offset site are restricted plants under Queensland's *Biosecurity Act 2014*: *Opuntia tomentosa* (Velvet Tree Pear), *Opuntia stricta* (Common Prickly Pear), *Lantana camara* (Lantana), *Cryptostegia grandiflora* (rubber vine), *Parthenium hysterophorus* (Parthenium), *Harrisia martinii* (Harrisia), *Jatropha gossypiifolia* (Bellyache Bush), and *Parkinsonia* aculeata (Parkinsonia). Of these, Lantana and Rubber Vine pose the greatest risk to threatened fauna as they smother trees growing in riparian areas, hindering movement of the Koala and Greater Glider and potentially suppressing the growth of food trees (Tomley 1995). Rubber Vine densities can be reduced through the judicious use of fire (Bebawi and Campbell 2002) or herbicide treatment (Department of Agriculture and Fisheries 2020). There is little scope for reducing the density of other dominant weeds without significant cost, as these are largely pasture grasses. Exotic grasses are difficult to control due to fast growth rates and short generation times, alongside an absence of selective herbicides that do not kill native grasses.	Control of succulents such as cacti have not been quantified as coverage of these species was outside the scope of the field assessments. Improvements to non-native coverage would result in improvements of 0.5/100 for Squatter Pigeon foraging and breeding habitat and 0.06/100 for Squatter Pigeon dispersal habitat.
Tree canopy cover	Nine of the AUs exceeded the target values for tree canopy cover, at 6 AUs to the extent that the BioCondition scores were penalised. Tree cover in remnant vegetation was on average 1.8× higher than reference values. Vegetation at offset sites had an average of 60% of the canopy cover of reference sites. The site with the densest vegetation (Site038) had a canopy cover that was 2× higher than the reference values. Woodland thickening could be a symptom of historical clearing activities (stimulating dense regrowth), fire suppression, or prolonged grazing (reducing competition between trees and grass). Once a heavy tree cover is established, it tends to be self-sustaining; low grass cover is maintained (even in the absence of further grazing) via heavy leaf litter fall and shade, further reducing the capacity of the understorey to carry a fire. Tree cover is therefore best reduced by thinning. Most of the sites that have excessive canopy cover are deficient in shrub cover, as is to be expected. Therefore, thinning canopy cover will ensure shrubs will also likely approach benchmark coverage levels, which is included in the calculation.	The removal of excess canopy cover and allowing gaps in deficient sites to fill would deliver benefits to the Squatter Pigeon of 0.79/100 for foraging and breeding habitat, and 0.06/100 for dispersal habitat. Thinning trees could lead to short-term declines in the total food available to Koalas and Greater Gliders if not done carefully. Total food is determined by total basal area of food trees, so the removal of any food trees (even saplings) could slightly lower habitat quality scores. This effect is expected to be small if thinning targets non-food trees and the smallest food trees. This is because larger trees contribute disproportionately to total basal area (the loss of small trees has a small effect), and the reduction in competition with other trees will encourage greater growth rates in the remaining large food trees. Long-term gains in food trees from thinning are expected to far outweigh any minor short-term losses. Maximising canopy cover scores for BioCondition across offset sampling sites has the potential to improve the habitat score for the Koala by 0.017/100 for foraging, shelter and dispersal and 0.02/100 for dispersal but has no direct effect on the Greater Glider (although refer to fire, total food and large trees, which are indirectly affected by thinning canopy cover).

Habitat attribute	Potential for improvement	Effect on overall habitat score
	Conversely, allowing growth in sites deficient in canopy cover will ensure much of the vegetation that comprises the shrub layer will be promoted to canopy cover over time, thus reaching levels closer to the benchmark. For sites with excessive *Carissa ovata* cover, the thinning of this species will allow for an increase in canopy species.	
Shrub cover	Shrub cover mostly consisting of *Carissa ovata* exceeded the reference values at 2/3 of sampling locations in the offset site. At 22/147 sampling locations. Shrub cover was so high that BioCondition scores were penalised. At 13 sites, shrub cover was greater than 1.5× higher than the benchmark values. On average, shrub cover across all AUs is approximately 70% of benchmark. The primary cause of high shrub cover is likely to be selective grazing by livestock – allowing *Carissa* to grow in excess as it is selectively ignored at the expense of other species. Shrub cover is more amenable to management via fire than tree cover. Still, thinning manually is preferable to the use of fire in that it affords greater control over which shrubs and trees can be removed and retained. Thinning is also less likely to start fires that spread into Brigalow habitat. Removal of cattle will also improve shrub cover overall.	Shrub cover has no direct effect on the habitat scores for the Koala or Greater Glider. Achieving benchmark shrub cover levels at the 40 sites below benchmark and thinning sites above 150% of benchmark could improve the habitat scores for Squatter Pigeon by 0.26/100 for foraging and breeding habitat and 0.17/100 for dispersal habitat. Shrub cover being thinned will not affect woody debris and is unlikely to affect organic litter but will increase grass cover.
	Species-specific Habitat Attributes	
Distance to water	All portions of the proposed offset site are within 3 km of a watercourse and/or permanent water in the form of dams, waterholes and waterways. For the portions not within this distance of water, the habitat quality can be improved through provision of new, permanent water sources. These water sources need not be large or expensive. Squatter Pigeon (Breeding & Foraging's and other fauna can utilise cattle drinking troughs; minor modifications can make these more accessible to a wider range of fauna such as poles/branches for easy access from the ground and ramps for ease of egress for fauna that may fall in. Water sources must be made reliable throughout the year to allow for maximum value to fauna and to justify the increase in value applied to the Squatter Pigeon (Breeding & Foraging) habitats.	A maximum of 7.8/100 points may be gained for foraging habitat values, and 9.52/100 for dispersal values for the Squatter Pigeon by strategically adding permanent water sources to ensure the entire offset site is within 1 km of permanent water.
Threat from vehicles	Several roads and tracks likely to be used at night, restricts the maximum score achievable for the Koala and Ornamental Snake. There is no scope for improving this score.	No improvement possible.
Threat from dogs and other feral animals	The offset site lies partially within 10 km of Dysart, potentially providing supplementary food for dingoes and feral dogs. As these food sources are	Implementing a predator control program has the potential to improve habitat scores for the Koala by 0.048/100 for shelter and dispersal areas, 0.05 for foraging habitat

Habitat attribute	Potential for improvement	Effect on overall habitat score
	within the home range of a dingo, there is the potential for predator population densities to be artificially elevated within the offset site. A predator control program may include baiting or shooting. It is unlikely that dog and cat baits will affect native fauna if deployed correctly.	Habitat for Squatter Pigeon has the potential to improve 0.026/100 for breeding and foraging habitat, 0.04/100 for foraging habitat and 0.04/100 for dispersal habitats.
Threat from fire	Around half of the Greater Glider matter area possessed a fuel hazard score of "high" as a result of having >30% tree cover. Threat from a fire can be reduced through thinning the canopy and subcanopy layers. Thinning the total cover of trees over 4 m to 30% is expected to reduce the fire hazards at the cost of species diversity in these layers. It is expected that the grass and forb layer will also be affected, however, this is difficult to quantify and has thus been ignored in this calculation.	Minor improvements are expected in areas of high risk by undertaking burn offs or targeted grazing activities to reduce ground fuel load.
Dense shade trees	Dense shade trees were present at most sites with remnant vegetation and there is little scope to improve this habitat attribute relevant to the Koala. Dense shade trees are expected to develop naturally on non-remnant sites over a 20-year period.	Some improvements are possible for the Koala. A maximum gain of 0.01/100 for koala foraging shelter and breeding habitats and a gain of 0.029/100 for koala dispersal habitat is possible.
Basal area of Koala and Greater Glider food trees	The basal area of existing trees will expand over time. Back *et al.* (2009) found a 20% increase over 20 years in tree circumference in Poplar Box woodlands in central QLD. The starting size of trees and climate were similar to the offset site. This equates to a 48% increase in basal area. Further improvements are possible by selective thinning of non-food trees and saplings to improve the growth rates of retained food trees. Back *et al.* (2009) found a 50% increase over 20 years in tree circumference in Poplar Box woodlands that had 80% of trees removed. Assuming the benefits of clearing are linear, with 0% clearing resulting in 20% increase in circumference and 80% clearing resulting in 50% increase, 30% clearing is expected to result in a 31% increase in circumference over 20 years (equivalent to a 72% increase in basal area).	Through the natural expansion of existing tree trunks, habitat scores for the Koala and Greater Glider are expected to increase. Greater glider habitat can be expected to increase by 0.01/100 for future denning areas and 0.008/100 for current denning. Koala habitats can be expected to increase by 0.01/100 for foraging shelter and dispersal habitats and 0.01/100 for dispersal habitat. Thinning 30% of existing trees may be required to allow these gains to occur. These benefits assume that thinning removes a negligible number of food trees and canopy cover is not reduced to such an extent that habitat scores are affected. The current canopy cover suggests this is achievable. The lack of benefit of thinning to the Greater Glider is because sites in some AU's will reach their maximum-possible habitat quality scores for basal area over 20 years of natural expansion, such that any additional gains in basal area do not result in further score improvements. This is not surprising, given the abundance of Greater Glider food already contained within the offset site.
Buffel Grass	Buffel Grass was absent from around half of sampling locations and in varying densities (≤5 to 97% cover) at the sites where present. Some sites have a cover of over 95%, with most sites with Buffel grass with a coverage of under 25%. Removal of Buffel grass, though unlikely to be viable on a site-wide scale, will improve habitat scores for the Squatter Pigeon (Breeding & Foraging) in areas	Buffel grass, if absent will attract a score of up to 16 points on individual sites with heavy infestations, however if covering over 40% of a site will reduce the score to 1. It follows that if eradicated, lack of Buffel grass cover will increase scores for the Squatter Pigeon (Breeding & Foraging) by 0.003/100 for foraging and breeding habitat.

Habitat attribute	Potential for improvement	Effect on overall habitat score
	of heavy infestation. In the calculations, Buffel grass removal will see native perennial grass in its place. The ground cover ratio will not be affected. Buffel will re-invade constantly, especially into non remnant habitats, therefore improvement in other aspects of habitat will play a part in reducing Buffel cover, however the data shows no clear correlation between Buffel cover and canopy cover. In summary, targeted removal of Buffel grass is not viable, though the calculations make the assumption that this is possible.	Targeted grazing in areas of dense buffel grass will reduce the coverage of this species in some areas.
Groundcover composition	There is substantial scope for improving the groundcover composition (the cover of vegetation and extent of bare ground) to benefit Squatter Pigeons due to the current low grass cover and excessive litter cover. Only 10% achieve maximum scores for groundcover composition. This could be achieved by thinning canopy or shrub layers where these are in excess, the leaf litter and living aspects of groundcover will likely approach benchmark levels once thinning is undertaken. In areas of greater glider habitat groundcover reduction will improve risk of fire.	The benefits of improving groundcover composition for the Squatter Pigeon (Breeding & Foraging) have already been incorporated into the respective improvements for perennial grass cover and litter cover, as discussed in the BioCondition section of this table.
NDVI	The entire Tay-Glen offset site possesses dense woody vegetation with a Normalised Difference Vegetation Index exceeding 0.125 (the threshold density for Squatter Pigeon when measured on 8 August 2024 following a dry period. No actions can therefore be taken to improve the shelter score for the Squatter Pigeon (Breeding & Foraging).	No improvement possible (when within 1 km of water source).
Habitat connectivity	Habitat connectivity is largely driven by the spatial configuration of habitat beyond the boundary of the offset site. One Statewide Biodiversity Corridor transverses the southern section of the offset area and a Regional Biodiversity corridor transvers the northern section of the offset area. The offset sites and surrounding tracts of remnant vegetation are linked by vegetated corridors, particularly along creek lines (Figure 6). There is therefore no potential for improvement within the bounds of the offset site.	No improvement possible.

9. Potential for Ecological Community Improvement

Ecological Communities listed as Threatened under State legislation and/or Commonwealth legislation have some capacity for improvement within the Offset site. These are evaluated as their component State Regional Ecosystems, including:

- *Eucalyptus populnea* - Poplar Box woodland on alluvial plains (Poplar Box TEC)
- *Acacia harpophylla* - dominated woodlands (Brigalow TEC)

Poplar Box component RE 11.3.2 was recorded in four BioCondition sites, within four separate AUs. These AUs include AU17 (Non-remnant), AU18 (High-value Regrowth), AU19 (Remnant), and AU20 (Disturbed). Brigalow TEC was recorded in 11 BioCondition within five AU's. Component RE 11.3.1 was recorded in AU 15 (HVR) and AU 16 (Remnant), and component RE 11.4.9 was recorded in AU 31 (Non-remnant) and AU 32 (Remnant).

The greatest concentration of AUs associated with both Poplar Box TEC and Brigalow TEC occur along the banks and fringes of Stephens Creek. Focusing restoration efforts along the portion of Stephens Creek within the Project boundary that flows east-west would have the greatest impact on improving values for these AUs and increase ecological values for the State Biodiversity Corridor.

It is proposed that restoration activities to improve AU's BioCondition values take place within a 500 m buffer of the centreline of Stephens creek. This area encapsulates 347.14 ha of Poplar Box TEC and 35.89 ha of Brigalow TEC.

Improving the BioCondition values of the Poplar Box AUs within this proposed buffer from 2 to 4 would offset 120% of the 5.2 ha of impacted Poplar Box TEC.

Table 14 below outlines management methods to improve BioCondition scores for listed Ecological Communities.

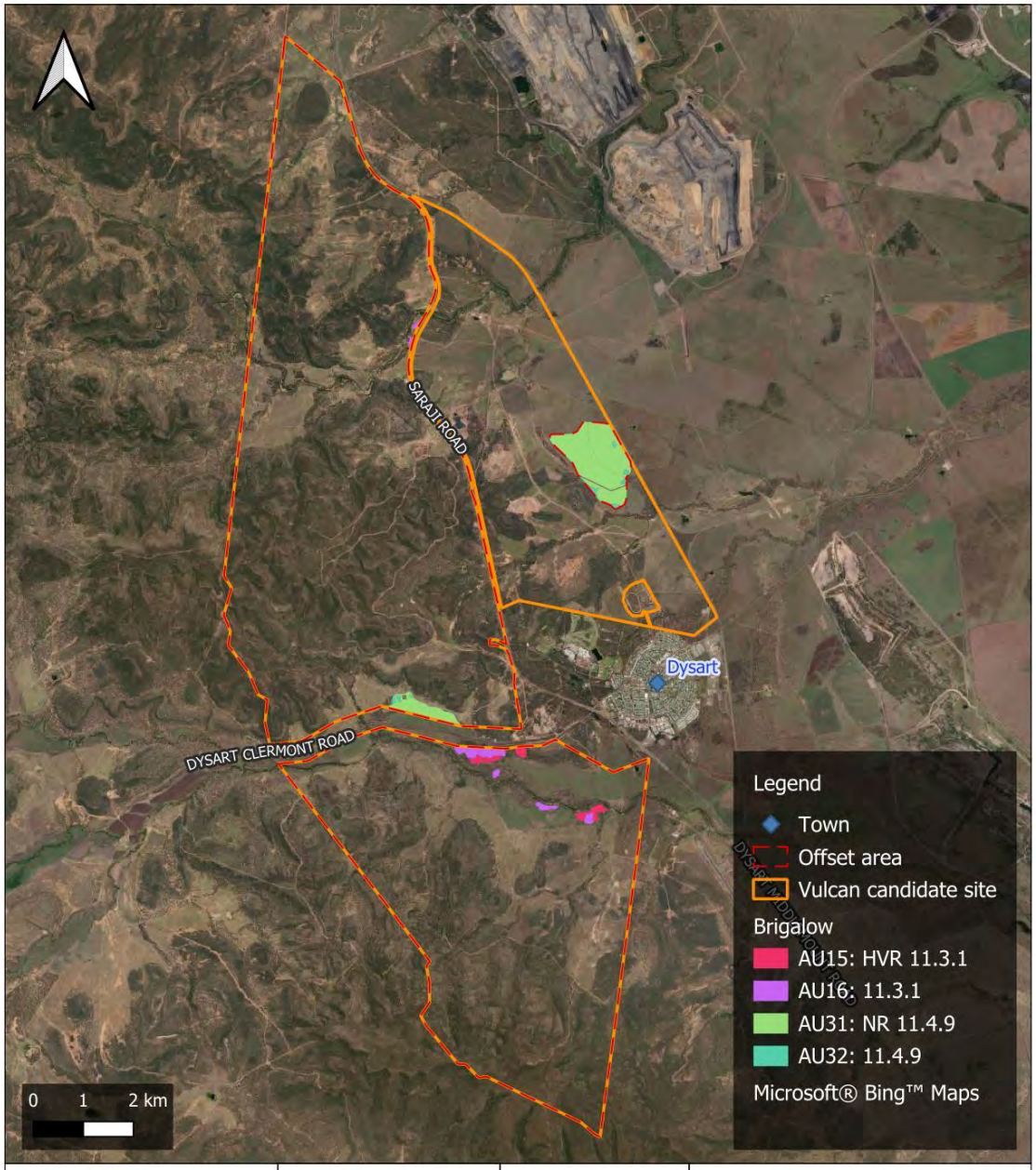


Figure Name: Matter areas for Brigalow	Location: Dysart, QLD	Client: MEC Mining	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ESQ6676	
		Date: August 2024	Project Manager: DJ / Drawn by: NE
		Scale: 1:100000	Spatial Reference: GDA2020 / MGA zone 55

Figure 7: Brigalow Proposed Offset

Table 16 Threatened ecological community's potential for Improvement

BioCondition attribute	Potential for improvement	Effect on overall score
Large trees	**Poplar Box TEC** RE 11.3.2 has a large tree benchmark of 18 large trees/ha, all of which are to be *Eucalyptus,* with *E populnea* being the dominant species. All Non-remnant Poplar Box TEC AUs within the candidate site were deficient in large trees falling short of the benchmark, with AU19 (Remnant) averaging 126% of the benchmark. The most cost-effective way of increasing the number of large trees would be allowing for the natural regeneration of the remaining deficient AU sites with the highest level of canopy species recruitment. AU 17 (Non-remnant) has an average canopy species recruitment of 50% and AU 18 has 100%. **Brigalow TEC** RE 11.3.1 large tree benchmark excludes Eucalypt species for large trees and requires 53 large trees (non-eucalypt) with *A. harpophylla* as the dominant species. AU 15 (HVR) is deficient of this benchmark at 32.1% and AU 16 (Remnant) exceeds meets this benchmark, achieving an average of 126.4% of the benchmark. The benchmarks for RE 11.4.9 has a large tree benchmark of 47 which excludes Eucalypt species and requires (non-eucalypt) with *A. harpophylla* as the dominant species. All AU's associated with RE 11.4.9 fall short of the benchmark . AU 31 (Non-remnant) fails significantly short of the benchmark at 6.4% of the benchmark, AU 32 (Remnant) and AU33 (Disturbed) come close, achieving 97.9% and 85.1% of the benchmark, respectively. All Aus associated with RE 11.3.1 and RE 11.4.9 will increase over the 20-year timeframe through natural regeneration, however, should tree canopy cover increase to levels that impede the continued growth of trees, selective thinning may be required. All land clearing activities within this AU should be restricted.	**Poplar Box TEC** For 11.3.2, allowing for the natural regeneration of large trees within AU 17 (Non-remnant) and AU 19 (Remnant). An average increase of 9 large trees across AU 17 is achievable in the 20-year offset timeframe and would contribute to an increase of 6.2/100 BioCondition score 1.2/100 An increase in large tree numbers for AU 19 (Remnant) would not contribute to a BioCondition score increase, as these scores are already the maximum 5. **Brigalow TEC** Large trees within AU 15 (HVR) are expected to increase significantly through natural regeneration, given that relatively fast natural growth rate of *A. harpophylla.* An increase to an average of 20, non-eucalypt tree species would contribute to a 3.1/100 increase in BioCondition scores.
Tree canopy height	**Poplar Box TEC** Three out of four AUs associated with RE 11.3.2 failed to reach the 18m height benchmark for canopy trees with only AU 20 (Disturbed) exceeding this benchmark at 112%.	**Poplar Box TEC** An increase of an average of 10 m in tree canopy height for AU 17 (Non-remnant) would contribute to an increase of 1.4/100 in BioCondition score

BioCondition attribute	Potential for improvement	Effect on overall score
	Within the 20-year offset timeframe, an increase to an average of 10 m for AU 17 (Non-remnant) is very achievable. AU 19 (Remnant) currently achieves 83% of the benchmark and only requires a small increase in height to achieve the benchmark. Increasing the height of tree canopy would be achievable through natural regeneration within the offset timeframe, however, if height increases were not reaching milestones, selective thinning and removal of shrubs, namely *Carrisa Ovata,* could expedite this increase. **Brigalow TEC** RE 11.3.1 and RE 11.4.9 both have a canopy height benchmark of 15m. Both AUs associated with RE 11.3.1 fail to meet this benchmark, with AU 15 (High-value Regrowth) achieving 66% and AU 16 (Remnant) achieving 97% of this benchmark. Three of the four AUs associated with RE 11.4.9 fail to reach the benchmark with AU 32 (Remnant) exceeding the benchmark at 162%. AU 33 (Disturbed) almost reaching the benchmark at 97%, and AU 31 (Non-remnant) scoring 6.4% of the benchmark. AU 33 (Disturbed) would only require an increase in canopy tree height of 0.4m to achieve benchmark levels. This could be achieved by allowing the site to naturally regenerate and avoiding land clearing activities. However, this marginal increase would have no effect on the final BioCondition score for this AU. Improvement in canopy tree height for AU 31 (Non-remnant) is likely not possible as three out of the four Bio Condition sites that comprise this AU have no trees and no recruitment.	While this is easily attainable over the 20-year timeframe, an increase to benchmark levels for AU 19 (Remnant) would only contribute to an increase of 0.8/100 in BioCondition score. **Brigalow TEC** RE 11.3.1 AU 15 (High-value Regrowth) achieving 66% and AU 16 (Remnant) achieving 97% of this benchmark. Improvement in canopy height for the deficient RE 11.4.9 AU's is either not possible or would have a negligible effect on the final BioCondition score.
Recruitment of Canopy Species	**Poplar Box TEC** RE 11.3.2 has a canopy species recruitment benchmark of 100%. Associated AUs are generally high, averaging 70% canopy species recruitment, however, only AU 18 (high-value Regrowth) achieved the 100% benchmark. AU 17 (Non-remnant) has an average recruitment of 50% and AU 19 (Remnant) has an average recruitment of 96%. These average recruitment levels are likely to increase over the 20-year timeframe through natural regeneration and are unlikely to require additional input through actions like replanting.	**Poplar Box TEC** Increasing average recruitment in AU 17 (Non-remnant) to 75% of the benchmark will contribute to an increase of 1.9/100 in BioCondition score. An increase of 4% recruitment in AU 19 (Remnant) to benchmark levels will not contribute to an increase BioCondition score. **Brigalow TEC** Increasing AU 15 (HVR) recruitment to 80% would contribute to an increase of 2.5/100 BioCondition score. It is likely that the recruitment score for AU 16 (Remnant) will

BioCondition attribute	Potential for improvement	Effect on overall score
	Brigalow TEC RE 11.3.1 and RE 11.4.9 both have a canopy species recruitment benchmark of 100%. AU 15 (HVR) and AU 16 (Remnant) were deficient of the 100% canopy species recruitment benchmark averaging 58% and 89% of the benchmark, respectively. AU 32 (Remnant) and AU 33 (Disturbed) achieved the 100% benchmark with AU 31 (Non-remnant) deficient at 25%. To allow maximum recruitment, thinning of *A harpophylla* stems or excessive *Carissa ovata* would allow greater growth due to lower competition between seedlings and established trees – especially those in the sucker state.	increase over time, however, any increase would be insignificant to change the BioCondition scoring. An increase of 20% recruitment in AU 31 (Non-remnant) assessment sites deficient of the benchmark over the 20-year timeframe is considered achievable. This increase in recruitment would contribute to an increase of 2.8/100 BioCondition score.
Tree canopy cover	**Poplar Box TEC** RE 11.3.2 has a tree canopy cover benchmark 37%. AUs associated with RE 11.3.2 averaged a tree canopy cover percentage of 32.5%. AU 17 (non-remnant) and AU 18 (HVR) failed to reach the benchmark at 16% and 4% of the benchmark, respectively, while AU 19 (Remnant) and AU 20 (Disturbed) exceeded the benchmark at 102.7% and 194.6%, respectively. Increasing tree canopy cover will occur naturally overtime in AU 17 (Non-remnant). An increase to an average cover of 19% is achievable over the 20-year timeframe. AU 18 (HVR) had higher starting cover than AU 17 (Non-remnant) and will likely exceed the increase of 19%. **Brigalow TEC** RE 11.3.1 has a tree canopy cover benchmark of 35%. All associated AUs were deficient of the benchmark with AU 15 (HVR) scoring 40% and AU 16 (Remnant) scoring 95% of the benchmark. RE 11.4.9 has a tree canopy cover benchmark of 25%, AU 31 (Non-remnant) and AU 33 (Disturbed) were deficient, with an average tree canopy cover of 14% and 74%, respectively. AU 32 (Remnant) exceeded the benchmark at 192%. Deficient AUs will improve within 20 years if given time to naturally regenerate.	**Poplar Box TEC** An increase 19% tree canopy cover for AU 17 (Non-remnant) would result in 4.4/100 increase to the BioCondition score. No increase in AU 19 (Remnant) required. **Brigalow TEC** An increase in canopy cover to an average of 20% for AU 15 (HVR) is considered achievable over the 20-year timeframe and would contribute to an increase of 0.9/100 BioCondition score. While an increase in canopy cover for AU 16 (Remnant) is likely, it will not contribute to an increase in BioCondition score. As with RE 11.3.1, an increase in tree canopy cover is going to occur as a result of natural regeneration over the 20-year period. An increase to 13% canopy cover in AU 31 (Non-remnant) will contribute to an increase of 2/100 BioCondition score. Any increase in canopy cover in AU 33 (Disturbed) will not contribute to an increase in BioCondition score.

BioCondition attribute	Potential for improvement	Effect on overall score
Shrub cover	**Poplar Box TEC** RE 11.3.2 as a shrub cover benchmark of 4%, AU 17 (Non-remnant) averages 56% of the benchmark and AU 18 (HVR) exceeds the benchmark at 148%. AU 19 (Remnant) and AU 20 (Disturbed) both vastly exceed this benchmark averaging 961% and 513, respectively. Results above 200% of benchmarks incurs a penalty to final BioCondition scores, as such, it is advised that thinning of shrub cover within these AUs to reduce the overall shrub cover to appropriate levels. **Brigalow TEC** RE 11.3.1 has a shrub canopy cover benchmark of 15%. AU 15 (HVR) was deficient, scoring 80% of the benchmark and AU 16 exceeded 200% of the benchmark, scoring 432% RE 11.4.9 has a canopy cover benchmark of 5%. AU 31 (Non-remnant) exceeded the benchmark at 176%, AU 32 (Remnant) and AU 33 (Disturbed) exceeded 200% of the benchmark, scoring 323% and 230% of the benchmark, respectively. Deficit AU 15 (HVR) will naturally regenerate over the 20-year timeframe. All other AUs would require selective thinning of shrubs to achieve a scoring within 200% of the benchmark.	**Poplar Box TEC** AU 17 (Non-remnant) will improve in shrub cover through natural regeneration, achieving benchmark levels in those assessment sites that were deficient. This increase will contribute to an increase of 2.2/100 BioCondition score. AU 19 (Remnant) and AU 20 (Disturbed) had their BioCondition scores penalised for exceed 200% of the benchmark. Thinning and removal of shrubs to benchmark levels will contribute to an increase of 2.5/100 in BioCondition scores for AU 19 (Remnant) and an increase of 4.4/100 for AU 20 (Disturbed). **Brigalow TEC** An increase of 6.5% cover in a single deficient assessment site within AU 15 (HVR) would contribute to an increase of 1.25/100 BioCondition score. Thinning shrub cover for AU's exceeding 200% of the benchmark to within 200% of the benchmark will result in the following increases in BioCondition scores: AU 16 (Remnant) - 2.5/100 AU 31 (Non-remnant) - 3.4/100 AU 32 (Remnant) - 1.3/100 AU 33 (Disturbed) - 2.5/100
Coarse woody debris	**Poplar Box TEC** RE 11.3.2 has a course woody debris benchmark of 281 m. All AU's associated with this RE were deficient of this benchmark. AU 17 (Non-remnant) averages 3.4 m of course woody debris (1% of the benchmark) and AU 19 (Remnant) averages 32.9 m (12% of the benchmark). As the number of large trees and canopy cover increase within each AU, coarse woody debris will rise due to natural tree falls and branch shedding. If milestones for this criteria are not being met, it may be possible to increase the amount of course woody debris by dropping select trees and lopping branches, however, careful consideration must be made to number of large trees and canopy cover before such actions are implemented.	**Poplar Box TEC** AU 17 (Remnant) was highly deficient in coarse woody debris. An increase on course woody debris to an average of 30 m within this AU would be achievable within the 20-year time frame. AU 19 (Remnant) averages 32.9 m (12% of the benchmark). It is expected that the course woody debris in this AU would increase significantly more than AU 17 (Non-remnant) due the number of large trees and canopy cover. An increase to an average of 145 m of coarse woody debris would contribute to an increase of 4.6/100 BioCondition score

BioCondition attribute	Potential for improvement	Effect on overall score
	Brigalow TEC RE 11.3.1 has a course woody debris benchmark of 1530 m per hectare. Both AU 15 (HVR) and AU 15 (Remnant) both are deficient scoring 1% of the benchmark. RE 11.4.9 as a course woody debris benchmark of 980 m per hectare. All associated AUs were deficient of the benchmark. AU 31 (Non-remnant) averaged 3%, AU 32 (Remnant) averaged 11% and AU 33 (Disturbed) averaged 5%. As the number of large trees and canopy cover increase within each AU, course woody debris will rise due to natural tree falls and branch shedding. If milestones for this criteria are not being met, it may be possible to increase the amount of course woody debris by dropping select trees and lopping branches, however, careful consideration must be made to number of large trees and canopy cover before such actions are implemented.	**Brigalow TEC** For RE 11.3.1, an increase to an average coarse woody debris of 170 m per hectare would contribute to an increase of 2.5/100 BioCondition score for both AU 15 (Non-remnant and AU 16 (Remnant). For RE 11.4.9, and increase of 140 m of coarse woody debris per hectare would result in the following increases in BioCondition score: AU 31 (Non-remnant – 1.9/100 AU 32 (Remnant) – 1.3/100 AU 33 (Disturbed) – 2.5/100
Tree richness	**Poplar Box TEC** RE 11.3.2 has a tree species richness benchmark of 2. AU 18 (HVR) exceeds this benchmark at 175%. AU 17 (Non-remnant) fails to reach this benchmark at 50%. AU 19 (Remnant) and AU 20 (Disturbed) both exceed the benchmark by more than 200%, achieving 433% and 550% of the benchmark, respectively. Given the low threshold to achieve 100% of the benchmark (2 tree species), it is highly likely that AU 17 (Non-remnant) will reach this benchmark through natural regeneration. **Brigalow TEC** RE 11.3.1 has a tree species richness benchmark of 4. AU 15 (HVR) is deficient, achieving 88% of the benchmark. AU 16 (Remnant) exceeds 200% of this benchmark, scoring 238%. RE 11.4.9 has a tree species richness benchmark of 2. AU 33 (Disturbed) achieves this benchmark at an average of 150%, while AU 31 (Non-remnant) is deficient at an average of 25% of the benchmark and AU 33 exceed 200% of the benchmark at an average of 225%. Natural regeneration is likely to be sufficient for AU 31 (Non-remnant) given the low benchmark, however, if the AU is failing to reach milestones in tree richness, selective planting of appropriate species may assist with this.	**Poplar Box TEC** AU 17 (Non-remnant) increasing by an average of 50% and achieving benchmark is expected within the 20-year timeframe and will contribute to an increase of 3.2/100 in BioCondition score. **Brigalow TEC** No improvement possible for RE 11.3.1 An increase to benchmark levels of tree species richness within AU 31 (Non-remnant) would contribute to an increase of 4.7/100 BioCondition Score.

BioCondition attribute	Potential for improvement	Effect on overall score
Shrub richness	**Poplar Box TEC** RE 11.3.2 has a tree species richness benchmark of 2. AU 17 (Non-remnant), AU 18 (HVR) and AU 20 (Disturbed) are within allowable excesses of the benchmark before being penalised, achieving 150%, 200%, and 125% of the benchmark, respectively. AU 19 (Remnant) was the only AU to exceed 200% of the benchmark, scoring 350%. Excluding cattle from offset areas will reduce pressure on species richness due to grazing. **Brigalow TEC** RE 11.3.1 has a shrub species richness benchmark of 4. AU15 (HVR) is deficient at 75% of this benchmark and AU 16 (Remnant) exceeds 200% of the benchmark scoring 238%. RE 11.4.9 has a shrub species richness benchmark of 5. AU 31 (Non-remnant) is deficient scoring 90% of the benchmark. AU 32 (Remnant) and AU 33 (disturbed) both achieve benchmark levels at 110% and 180%, respectively. Excluding cattle from offset areas will reduce pressure on species richness due to grazing.	**Poplar Box TEC** No improvement possible for RE 11.3.2 **Brigalow TEC** For RE 11.3.1, an increase to benchmark levels for AU 15 (HVR) would contribute to an increase of 1.6/100 BioCondition score. No increase is possible for AU 16 (Remnant). For RE 11.4.9, and increase to benchmark levels for AU 31 (Non-remnant) would contribute to an increase of 0.8/100 BioCondition score.
Forb richness	**Poplar Box TEC** RE 11.3.2 has a forb richness benchmark of 15. All AUs are deficient of this benchmark with AU 12 (Non-remnant) and AU 19 (Remnant) scoring the highest with 7% and 22% of the benchmark, respectively. AU 18 (HVR) and AU 20 (Disturbed) both scored zero. Forb richness will increase through natural regeneration over the course of the 20-year timeframe. However, selective planting of suitable groundcover species could aid in improving these values and ensure milestones are met. Excluding cattle from offset areas will reduce pressure on species richness due to grazing. **Brigalow TEC** Both RE 11.3.1 and RE 11.4.9 have a forb richness benchmark of 10. All AUs are deficient achieving the following percentage of the benchmark:	**Poplar Box TEC** Over the course of 20 years, AU 17 (Non-remnant) should recover enough to have an increase to an average of 7 forb species (47% of the benchmark), this would contribute to an increase of 3.1/100 in BioCondition score. Similarly, AU 19 (Remnant) should also recruit more forb species naturally over time. A similar increase of an average of 7 species would contribute to an increase of 2.1/100 in BioCondition score. **Brigalow TEC** An increase to an average of 5 forbs in each Brigalow AU will contribute to an average increase in BioCondition score of 1.8/100.

BioCondition attribute	Potential for improvement	Effect on overall score
	Forb richness will increase through natural regeneration over the course of the 20-year timeframe. However, selective planting of suitable groundcover species could aid in improving these values and ensure milestones are met. Excluding cattle from offset areas will reduce pressure on species richness due to grazing.	
Grass richness	**Poplar Box TEC** RE 11.3.2 has a grass species richness benchmark of 9, all AUs were deficient of this benchmark. AU 17 (Non-remnant) and AU 18 (HVR) achieved 11% and 17, respectively while and AU 19 (Remnant) and AU 20 (Disturbed) achieved both averaging 33% of the benchmark. As with the previous richness criteria, natural regeneration is likely sufficient to improve the grass species richness of these AUs. Removal of Buffel grass within sites is likely the greatest inhibitor to natural grass species recruitment. Removal of Buffel grass should be the main action taken should natural regeneration be insufficient to achieve grass species richness milestones. Excluding cattle from offset areas will reduce pressure on species richness due to grazing. **Brigalow TEC** RE 11.3.1 has a grass species richness benchmark of 6. All associated AUs are deficient with AU 15 (HVR) and AU (Remnant) averaging 17% and 25% of the benchmark, respectively. RE 11.4.9 has a grass species richness benchmark of 5. All associated AUs are deficient of this benchmark. AU 31 (Non-remnant) averaged 50%, AU 32 (Remnant) averaged 10%, and AU 33 (Disturbed) scoring 0% of the benchmark. As with the previous richness criteria, natural regeneration is likely sufficient to improve the grass species richness of these AUs. Removal of Buffel grass within sites is likely the greatest inhibitor to natural grass species recruitment. Removal of Buffel grass should be the main action taken should natural regeneration be insufficient to achieve grass species richness milestones. Excluding cattle from offset areas will reduce pressure on species richness as a result of grazing.	**Poplar Box TEC** AU 17 (Non-remnant) grass species richness was very low so an increase of an average of 5 grass species (56% of the benchmark) over the 20-year timeframe is considered achievable. This would contribute to an increase of 3.1/100 in BioCondition score. For there to be any change in BioCondition score for AU 19 (Remnant) from grass species richness increase alone, the AU would have to see an increase of an average of 6 species. This would contribute to an increase of 5.2/100 in BioCondition score. **Brigalow TEC** For RE 11.3.1, averaging an increase in grass species richness would contribute to an increase of 3.1/100 BioCondition score for AU 15 (HVR) and an contribute to an increase of 1.6/100 for AU 16 (Remnant). AU 31 (Non-remnant) is likely to achieve benchmark levels within the 20-year timeframe, this would contribute to an increase of 4.7/100 BioCondition score. For AU 32 (Remnant) and AU 33 (Disturbed) an average increase of 2 grass species would contribute to an increase of 3.1/100 BioCondition score for both AUs.
Non-native plants	Benchmark 0% for all relevant Re's. Data N/A	No Improvement possible

BioCondition attribute	Potential for improvement	Effect on overall score
Native perennial grass cover	**Poplar Box TEC** RE 11.3.2 has perennial grass cover benchmark of 26%. AU 18 (HVR) and AU 19 (Remnant) failed to reach the benchmark, recording 10% and 16%, respectively. AU 17 (Non-remnant) achieved the benchmark at 183%. AU 20 (Disturbed) exceeds 200% of the benchmark at 200% of the benchmark at 224%, resulting in a penalty to the final score for that AU. Perennial grass cover will increase through natural regeneration over the 20-year timeframe, however, removal of exotic grasses, primarily Buffel will increase the rate of increase. **Brigalow TEC** RE 11.3.1 has perennial grass cover benchmark of 33%. Associated AUs are deficient with AU 15 (HVR) averaging 95% and AU 16 (Remnant) averaging 10%. RE 11.4.9 has perennial grass cover benchmark of 16%. AU 31 (Non-remnant) achieves this benchmark at 125%, AU 32 (Remnant) and AU 33 (Disturbed) are both deficient, averaging 1% and 6% of the benchmark, respectively. Perennial grass cover will increase through natural regeneration over the 20-year timeframe, however, removal of exotic grasses, primarily Buffel will increase the rate of increase.	**Poplar Box TEC** AU 19 (Remnant) is likely to naturally regenerate perennial grass cover over the 20-year timeframe. The AU is expected to increase by at least an average of 13% cover (50% of the benchmark). This increase will contribute to an increase of 2.9/100 BioCondition score. **Brigalow TEC** It is likely that AU 15 (HVR) will achieve benchmark levels within the 20-year timeframe, however, any increase would not be sufficient in increase BioCondition scores for this AU. An average increase in perennial grass cover of 17% would contribute to an increase of 3.1/100 for AU 16 (Remnant). AU 31 (Non-remnant) increase of 10% in deficient assessment sites would contribute to an increase of 2.1/100 BioCondition score. An average increase in perennial grass cover of 8% would contribute to an increase of 3.8/100 BioCondition score for AU 32 (Remnant) and AU 33 (Disturbed).
Litter cover	**Poplar Box TEC** RE 11.3.2 has an organic litter cover benchmark of 35%. AU 17 (Non-remnant) and AU 18 (HVR) are deficient of this benchmark, recording 30% and 0%, respectively. AU 19 (Remnant) and AU 20 (Disturbed) exceed the benchmark at 40% and 63% of the benchmark, respectively. Organic litter cover will naturally increase over the 20-year timeframe through natural die off from annual grass and leaf fall from trees and shrubs. **Brigalow TEC** RE 11.3.1 has an organic litter cover benchmark of 30%. AUs associated were deficient with AU 15 (HVR) and AU 16 (Remnant) averaging 43% and 64% of the benchmark, respectively. RE 11.4.9 has an organic litter cover benchmark of 45%. AU 32 (Remnant) achieved this benchmark averaging 113%. AU 31 (Non-remnant) and AU 33 (Disturbed) were deficient, averaging 21% and 31%, respectively.	**Poplar Box TEC** AU 17 (Non-remnant) will naturally regenerated organic litter over time. It is expected that this AU will achieve a minimum increase of 7.5% over the 20-year timeframe, contributing to an increase of 2.2/100 BioCondition score. **Brigalow TEC** For RE 11.3.1, averaging an increase in organic litter of 15% would contribute to an increase of 1.3/100 for AU 15 (HVR) and AU 16 (Remnant). For RE 11.4.9, averaging an increase organic litter of 23% would contribute to an increase of 3.8/100 BioCondition score for AU 31 (Non-remnant) and increase of 2.5/100 for AU 33 (Disturbed). No improvement possible for AU 32 (Remnant).

BioCondition attribute	Potential for improvement	Effect on overall score
	Organic litter cover will naturally increase over the 20-year timeframe through natural die off from annual grass and leaf fall from trees and shrubs.	

10. Summary of potential for improvement

The projected habitat quality without management actions for the Offset site is assumed to be roughly the same as the current baseline as it is expected that there will be no major changes in land use between the last 20 years and the next 20 years, however there are several habitat qualities that would be expected to decline over the next 20 years.

Table 17 outlines a summary of expected improvements to habitat values with management actions, noting that the expected changes are not the sum of the changes outlined in Table 15 and Table 16 as the calculations used were repeated, and others were for illustrative purposes to inform management Actions.

Table 17 Summary of potential improvements for each matter

Type	Koala, (foraging shelter and dispersal)	Squatter Pigeon (breeding, foraging, dispersal)	Squatter Pigeon (Foraging and Dispersal)	Squatter Pigeon (Dispersal)	Greater Glider Denning	Glider Future	Glider foraging
Baseline habitat quality	52.49/100	65.93/100	54.54/100	67.85/100	48.00/100	48.34/100	71.12/100
Management actions	Predator control, weed control, removal of cattle to allow for species recruitment increasing shelter and diversity, thinning of excessive trees, allowing canopy to fill gaps where deficient and increasing basal area Removal of cattle grazing	Predator control, thinning of woody vegetation where this is excessive, thinning of excessive shrubs Removal of cattle grazing	Predator control, reduction of buffel grass, increasing ground cover composition, installation of permanent water sources Removal of cattle grazing	Predator control, reduction of buffel grass, increasing ground cover composition	Thinning of woody vegetation where excessive, replanting diverse Eucalypt species in areas of maximum degradation reducing ground cover in high fire areas, installing nest boxes in some areas of large trees but low hollows, removal of barbed wire. Removal of cattle grazing		
Expected change with management	+12.60 (~1/10)	+11.77 (~1/10)	+24.83 (~2/10)	+14.65 (~1/10)	+10.94(~1/10)	10.85 (~1/10	10.38 (1/10)
Percentage of offset	121.12% (of all Koala habitat	225.53%	991.58%	188.26%	163.51%	239.46%	113.01%

Type	RE 11.3.2 Rem	Brigalow TEC remnant	Brigalow TEC Non Remnant
Baseline habitat quality	56.25/100	62.39/100	25.78/100
Management actions	Thin excessive canopy, control exotic grasses, dropping select trees and lopping branches to increase course woody debris, Excluding cattle to reduce pressure on species richness as a result of grazing, selective replanting of appropriate native species to improve shrub, forb and grass species richness.	Thin excessive of Brigalow stems or Carissa ovata to promote growth of large trees and increase canopy cover, dropping select trees and lopping branches to increase course woody debris, selective replanting of appropriate native species to improve shrub, forb and grass species richness.	Control exotic grasses, monitor recruitment, planting or/or direct seeding of Brigalow, selective replanting of appropriate native species to improve shrub, forb and grass species richness.
Expected change with management	+18.29 (~110)	+11.37 (~1/10)	+46.4 (~4/10)

11. Averted Loss

In addition to habitat improvements through managing weeds, feral animals and dense regrowth, environmental gains can be delivered by protecting land otherwise threatened by external factors. The Australian Government's Offset Assessment Guide requires an estimate of risk of loss with and without offsets over the 20-year offset period. To calculate the background risk, historical clearing patterns were examined using data published for the Statewide Landcover and Trees Study. By overlaying data gathered between 2014 and 2019 with regional ecosystem mapping, the proportion of each land zone and vegetation management protection class that was cleared over the five years was calculated. Only freehold land was considered, to reflect risk at the offset site. The results of this analysis are presented in Table 18. As expected, vegetation with higher protection status (category B regulated vegetation) has a lower risk of loss than unprotected, non-remnant vegetation (category X vegetation). The weighted average risk of loss for the entire offset site is 11.9%.

Table 18 Risk of loss of regulated vegetation on land zones present within the offset site

Land Zone	Category of regulated vegetation	Woody vegetation present in 2014*	Loss between 2014 and 2019*	Percentage loss over 5 years	Percentage loss over 20 years
3	B	1,354,296.6 ha	19,146.0 ha	1.41%	5.65%
5	B	890,237.2 ha	16,069.6 ha	1.81%	7.22%
5	X	1,721,556.3 ha	139,823.1 ha	8.12%	32.49%

*Calculations are based on the entire Brigalow Belt bioregion

12. Recommendations

Based on habitat quality data at the impact and offset sites and the risk that this habitat could be lost without offsets, the candidate offset site meets the requirements of the *EPBC Act Environmental Offsets Policy*, as assessed using the Offset Assessment Guide (Table 19)

An assessment of the site identified a reduced portion of the offset site is suitable to provide 100% direct offsets for the impacts of the Vulcan Coal Mine. A subset of the surveyed offset site that is recommended as the final offset site is proposed in Figure 7. This prioritises the inclusion of remnant riparian vegetation (as the highest-quality habitat for the Koala and Squatter Pigeon and non-remnant vegetation (with the greatest potential for quality improvement and averted loss). Suggested inputs for the Offset Assessment Guide for this recommended subset of the offset site are presented in Table 19.

Table 19 Offset Assessment Guide inputs and outputs.

Matter	Area of impact (ha)	Quality of impact	Time loss is averted	Area of offset (ha)	Risk of loss without offset*	Risk of loss with offset	Quality of offset[1]	Future quality of offset	Confidence in averted loss	Confidence in quality gains	% of impact offset
Koala (Foraging, shelter & dispersal)	1166.9	6	20yr	7360	11%	1%	5	6	80%	80%	**121.12%**
Squatter Pigeon (foraging)	372.49	8	20yr	2283	11%	1%	5	8	80%	80%	**991.58%**
Squatter Pigeon (breeding)	78.94	6	20yr	3365	11%	1%	6	8	80%	80%	**225.53%**
Squatter Pigeon (dispersal)	767.73	7	20yr	5066	11%	1%	6	8	80%	80%	**188.26%**
Greater Glider (denning)	750	6	20yr	3992	11%	1%	4	6	80%	80%	**163.51%**
Greater Glider (foraging)	1057	6	20yr	5487	11%	1%	7	8	80%	80%	**113.01%**
Greater Glider (future denning)	235	4	20yr	1828	11%	1%	6	7	80%	80%	**239.46%**
Brigalow (Rem)	71.7	7	20yr	536	11%	1%	5	7	80%	80%	**118%**
Brigalow non rem	71.17	7	20yr	185	11%	1%	3	7	80%	80%	**121.98%**
Poplar box	5.22	6	20yr	122	14%	1%	5	6	80%	80%	**492.13%**

*Risk of loss increases due to the relatively greater contribution of non-remnant vegetation to the total area within the recommended offset site compared with the candidate offset site.

[1]While there were slight changes to the starting habitat quality due to changes in the weighting of the different AU's, these changes did not result in different scores when rounded to the nearest integer out of 10.

13. Incidental Benefits to other MNES

No threatened species other than the protected matters that are the target of the offset were recorded within the offset site. It is unlikely that the offset site provides important habitat for any non-target threatened species.

Two nightshade species listed as threatened under Queensland's *Nature Conservation Act 1992* (*Solanum adenophorum* and *Solanum elachophyllum*) are inhabitants of brigalow (*Acacia harpophylla*) dominated vegetation units on heavy soils. While these species are likely to inhabit suitable habitat patches in the general region associated with the offset site, they are unlikely to be found within the offset site.

Potential habitat for the Yakka Skink, Dunmall's Snake, Painted Honeyeater and Red Goshawk occurs within the offset site, but there are no recent records (last 40 years) of these species within 40 km of the offset site.

The offset site is likely to support small, transitory populations of the following migratory species protected under the EPBC Act: Satin Flycatcher (*Myiagra cyanoleuca*), Rufous Fantail (*Rhipidura rufifrons*), Oriental Cuckoo (*Cuculus optatus*), Fork-tailed Swift (*Apus pacificus*) and Latham's Snipe (*Gallinago hardwickii*).

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A-1 Appendix 1: Site Photographs

		
I01		I02
		
I03		I04

		
I05		I06
		
I07		I08

		
I09		I10
		
I11		I12

		
I13		I14
		
I15		I16

		
I17		I18
		
I19		I20

		
I21		I22
		
i23		I24

		
I25		I26
		
I27		I28

		
I29		I30
		
I31		I32

		
I33		I34
		
I35		I36

		
I37		I38
		
I39		I40

		
I41		I42
		
I43		I44

		
I45		I46
		
I47		I48

		
I49		I50
		
I51		I52

		
I53		I54
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I55		HQ_BA01

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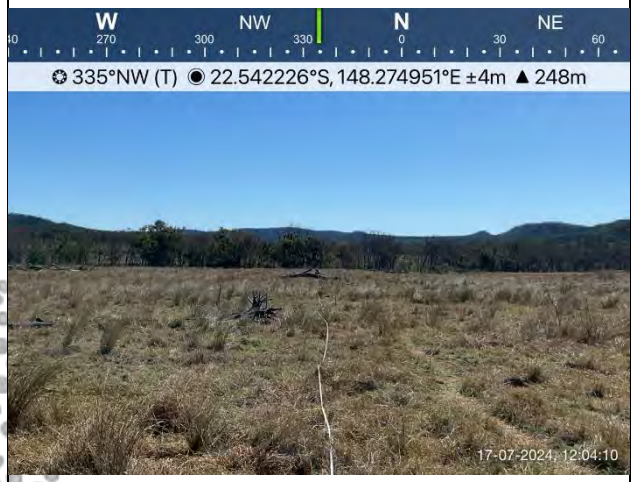

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		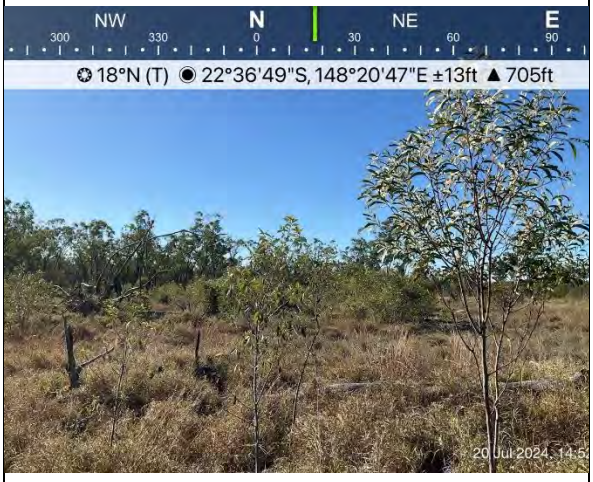
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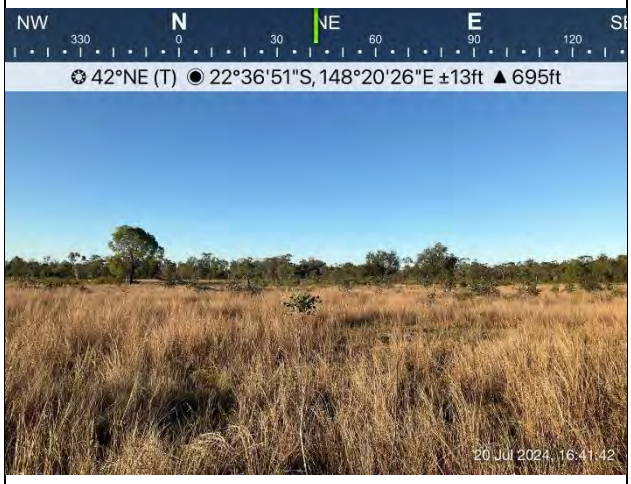		
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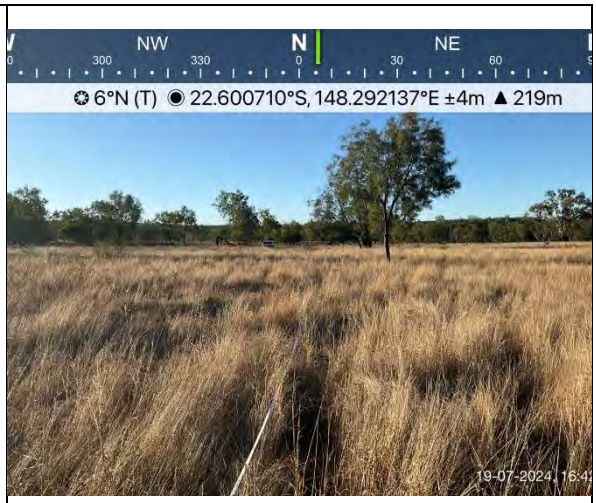

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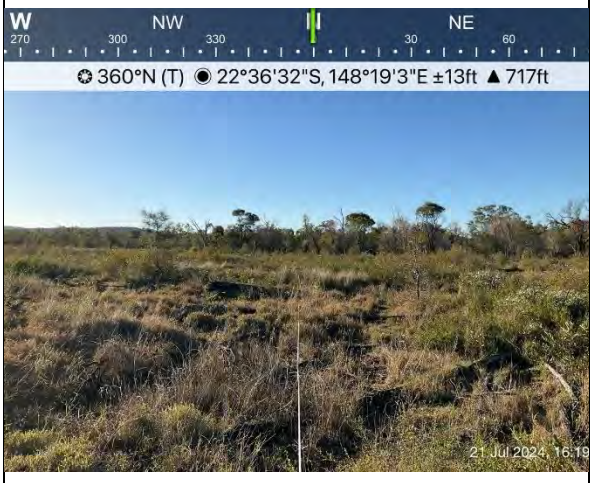

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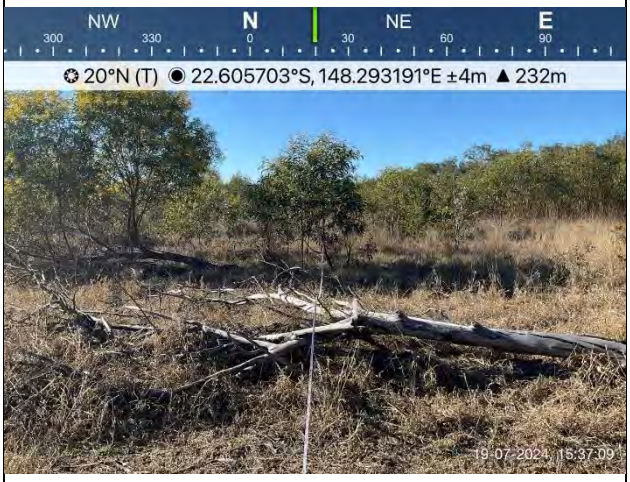		
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		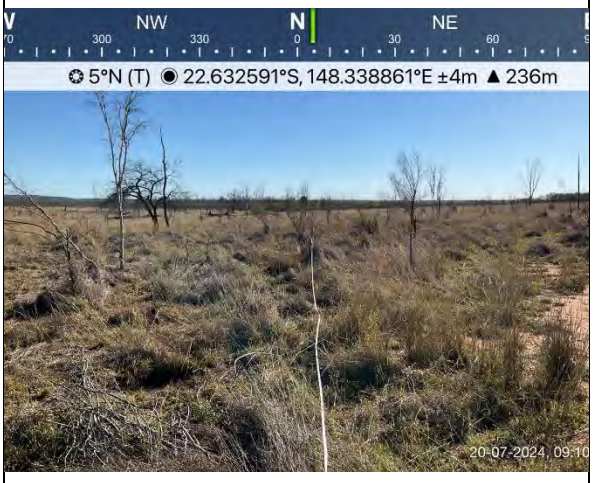
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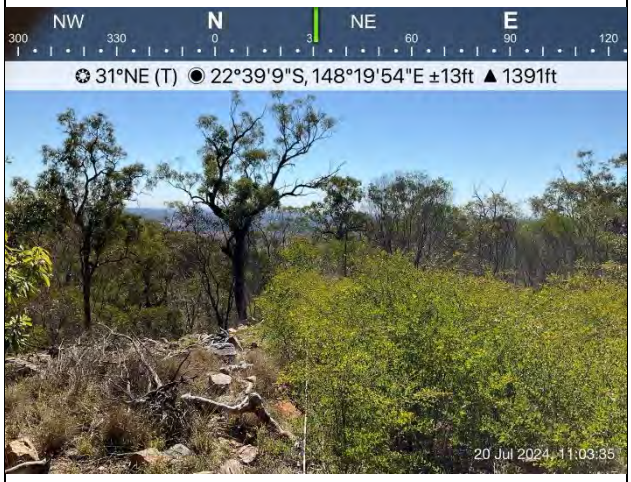
HQ_BA65

Photo not available

HQ_BA66

HQ_BA66		HQ_BA67
		
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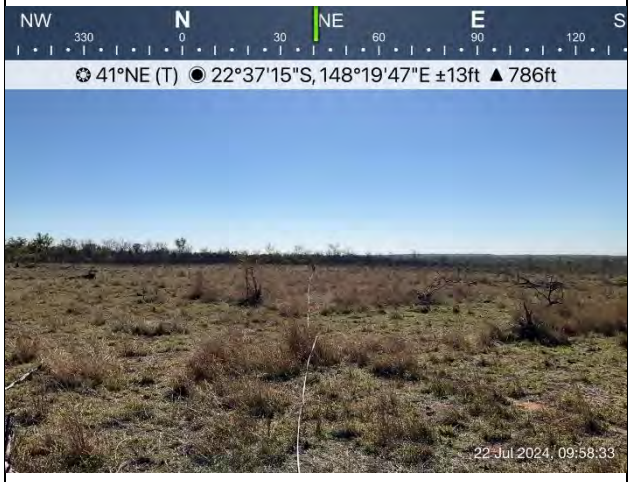		
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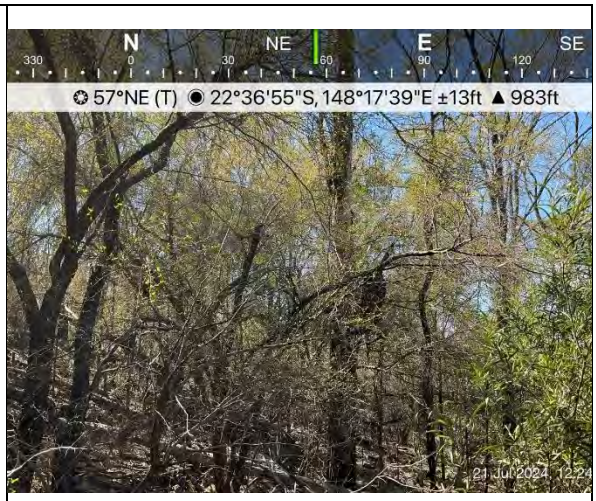
HQ_BA72



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Site01

Site02		Site03
		
Site04		Site05
		
Site06		Site07

		
Site08		Site09
		
Site10		Site11
		

Site12		Site13
		
Site14		Site15
No Photo Available		No Photo Available
Site16		Site17
		
Site18		Site19

Site20

Site21

Site22

Site23

Site24		Site25
		
Site26		Site27

A-2 Appendix 2: EPBC Calculations

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	Koala (Foraging, Shelter &
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

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	Koala	**Area**	1167	Hectares	Impact Assessment Report Metserve
			Quality	**6**	Scale 0-10	
			Total quantum of impact	700.14	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

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	700.14	Adjusted hectares	Habitat Quality Assessment BA	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	7360.16	**Risk of loss (%) without offset**	11%	**Risk of loss (%) with offset**	1%	736.02	80%	588.81	463.84	716.49	102.34%	Yes	
									Future area without offset (adjusted hectares)	6550.5	**Future area with offset (adjusted hectares)**	7286.6								
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**5**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**6**	1.00	80%	0.80	0.67				
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

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	700.14	716.49	102.34%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$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 (Foraging)
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

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 (Foraging)	**Area**	767.6	Hectares	Impact Assessment MetServe
			Quality	**7**	Scale 0-10	
			Total quantum of impact	537.34	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

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**	10%	**Risk of loss (%) with offset**	1%								
									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	537.34	Adjusted hectares	Habitat Quality Assessment BA	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	5065.76	**Risk of loss (%) without offset**	11%	**Risk of loss (%) with offset**	1%	506.58	80%	405.26	389.39	1011.57	188.26%	Yes	
									Future area without offset (adjusted hectares)	4508.5	**Future area with offset (adjusted hectares)**	5015.1								
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**8**	2.00	80%	1.60	1.55				
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

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	537.341	1011.57	188.26%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$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 (Breeding)
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

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 (Breed)	**Area**	372.5	Hectares	Impact Assessment Met Serve
			Quality	**8**	Scale 0-10	
			Total quantum of impact	297.99	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

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	297.99	Adjusted hectares	Habitat Quality Assessment BA	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	3365.48	**Risk of loss (%) without offset**	11%	**Risk of loss (%) with offset**	1%	336.55	80%	269.24	258.69	672.05	225.53%	Yes	
									Future area without offset (adjusted hectares)	2995.3	**Future area with offset (adjusted hectares)**	3331.8								
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**8**	2.00	80%	1.60	1.55				
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

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	297.992	672.05	225.53%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$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 (Dispersal)
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

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 (Dispersal)	**Area**	767.6	Hectares	Impact Assessment MetServe
			Quality	**7**	Scale 0-10	
			Total quantum of impact	537.34	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

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**	10%	**Risk of loss (%) with offset**	1%								
									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	537.34	Adjusted hectares	Habitat Quality Assessment BA	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	5065.76	**Risk of loss (%) without offset**	11%	**Risk of loss (%) with offset**	1%	506.58	80%	405.26	389.39	1011.57	188.26%	Yes	
									Future area without offset (adjusted hectares)	4508.5	**Future area with offset (adjusted hectares)**	5015.1								
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**8**	2.00	80%	1.60	1.55				
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

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	537.341	1011.57	188.26%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$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	Greater Glider (Denning)
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

	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	Greater Glider (Denning)	**Area**	750	Hectares	Impact Assessment Report Metserve
				Quality	**6**	Scale 0-10	
				Total quantum of impact	450.00	Adjusted hectares	
Impact calculator	**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

	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**	1%	**Risk of loss (%) with offset**	1%								
										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	450.00	Adjusted hectares	Middlemount Coal Southern Extension Offset Area - non rem areas	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	3992.15	**Risk of loss (%) without offset**	11%	**Risk of loss (%) with offset**	1%	399.22	80%	319.37	306.86	735.81	163.51%	Yes	
										Future area without offset (adjusted hectares)	3553.0	**Future area with offset (adjusted hectares)**	3952.2								
						Time until ecological benefit	15	**Start quality (scale of 0-10)**	**4**	**Future quality without offset (scale of 0-10)**	**4**	**Future quality with offset (scale of 0-10)**	**6**	2.00	80%	1.60	1.55				
Offset calculator	**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

	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
						Direct offset ($)	Other compensatory measures ($)	Total ($)
Summary	**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	450	735.81	163.51%	**Yes**	$0.00	N/A	$0.00
	Area of community	0				$0.00		$0.00
						$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	Greater Glider (Foraging)
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

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	Greater Glider (Foraging)	**Area**	1057	Hectares	Impact Assessment Report Metserve
			Quality	**6**	Scale 0-10	
			Total quantum of impact	634.08	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

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	634.08	Adjusted hectares	Middlemount Coal Southern Extension Offset Area - non rem areas	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	5487	**Risk of loss (%) without offset**	11%	**Risk of loss (%) with offset**	1%	548.70	80%	438.96	421.76	716.55	113.01%	Yes	
									Future area without offset (adjusted hectares)	4883.4	**Future area with offset (adjusted hectares)**	5432.1								
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**7**	**Future quality with offset (scale of 0-10)**	**8**	1.00	80%	0.80	0.78				
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

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	634.08	716.55	113.01%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$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	Greater Glider (Future Denning)
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	Greater Glider (Future Denning)	**Area**	234.6	Hectares	Impact Assessment Report Metserve
			Quality	**4**	Scale 0-10	
			Total quantum of impact	93.84	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	93.84	Adjusted hectares	Middlemount Coal Southern Extension Offset Area - non rem areas	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	1828.36	**Risk of loss (%) without offset**	11%	**Risk of loss (%) with offset**	1%								
									Future area without offset (adjusted hectares)	1627.2	**Future area with offset (adjusted hectares)**	1810.1	182.84	80%	146.27	140.54	224.71	239.46%	Yes	
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**7**	1.00	80%	0.80	0.78				
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	93.84	224.71	239.46%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$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 (Rem)
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	Brigalow	**Area**	71.7	Hectares	Impact Assessment Metserve
			Quality	**7**	Scale 0-10	
			Total quantum of impact	50.19	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**	102		
			Quality	**7**		
			Total quantum of impact	71.40		
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

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	50.19	Adjusted hectares	Habitat Quality Assessment BA	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	55.67	**Risk of loss (%) without offset**	11%	**Risk of loss (%) with offset**	1%	5.57	80%	4.45	3.51	5.77	11.50%	No		
									Future area without offset (adjusted hectares)	49.5	**Future area with offset (adjusted hectares)**	55.1									
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**7**	1.00	80%	0.80	0.67					
Threatened species habitat																					
Area of habitat	Yes	71.40	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	480	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	80%	0.00	0.00	64.22	89.94%	No		
									Future area without offset (adjusted hectares)	480.0	**Future area with offset (adjusted hectares)**	480.0									
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**3**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**5**	2.00	80%	1.60	1.34					
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

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	71.4	64.22	89.94%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	50.19	5.77	11.50%	**No**	$0.00	#DIV/0!	#DIV/0!
					$0.00	**#DIV/0!**	**#DIV/0!**

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 (Non-Rem)
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	Brigalow	**Area**	71.1	Hectares	Impact Assessment Metserve
			Quality	**7**	Scale 0-10	
			Total quantum of impact	49.77	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**	102		
			Quality	**7**		
			Total quantum of impact	71.40		
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

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	49.77	Adjusted hectares	Habitat Quality Assessment BA	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	185.4	**Risk of loss (%) without offset**	11%	**Risk of loss (%) with offset**	1%	18.54	80%	14.83	11.68	49.77	100.01%	Yes		
									Future area without offset (adjusted hectares)	165.0	**Future area with offset (adjusted hectares)**	183.5									
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**3**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**7**	4.00	80%	3.20	2.52					
Threatened species habitat																					
Area of habitat	Yes	71.40	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	480	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	80%	0.00	0.00	60.50	84.73%	No		
									Future area without offset (adjusted hectares)	480.0	**Future area with offset (adjusted hectares)**	480.0									
					Time until ecological benefit	20	**Start quality (scale of 0-10)**	**3**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**5**	2.00	80%	1.60	1.26					
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

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	71.4	60.50	84.73%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	49.77	49.77	100.01%	**Yes**	$0.00	N/A	$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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	Poplar Box
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	Poplar on Sand - RE11.3.2	**Area**	5.22	Hectares	Impact Assessment Report Metserve
			Quality	**6**	Scale 0-10	
			Total quantum of impact	3.13	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**	102		
			Quality	**7**		
			Total quantum of impact	71.40		
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

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	3.13	Adjusted hectares	Habitat Quality Assessment BA	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	122	**Risk of loss (%) without offset**	14%	**Risk of loss (%) with offset**	1%	15.74	80%	12.59	9.92	12.98	414.35%	Yes		
									Future area without offset (adjusted hectares)	105.0	**Future area with offset (adjusted hectares)**	120.8									
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**5**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**6**	1.00	80%	0.80	0.67					
Threatened species habitat																					
Area of habitat	Yes	71.40	Adjusted hectares		**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	2	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	80%	0.00	0.00	0.40	0.56%	No		
									Future area without offset (adjusted hectares)	2.0	**Future area with offset (adjusted hectares)**	2.0									
					Time until ecological benefit	15	**Start quality (scale of 0-10)**	**2**	**Future quality without offset (scale of 0-10)**	**2**	**Future quality with offset (scale of 0-10)**	**5**	3.00	80%	2.40	2.01					
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

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	71.4	0.40	0.56%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	3.132	12.98	414.35%	**Yes**	$0.00	N/A	$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**