Ecology Field Report

Graymont
Calliope Limestone Quarry
Calliope
BAA220009.01
9 June 2025

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1 INTRODUCTION

This Ecology Field Report has been prepared on behalf of Graymont (Australia) Pty Ltd (Graymont) to support the legislated environmental approvals process for the Calliope Limestone Quarry (the Project), located in Central Queensland. The Project involves the operation of an open cut limestone quarry that produces approximately 0.8 million tonnes per annum (Mtpa) of limestone products annually. The Project commenced operations in 1967 and, noting potential future changes in reserves and yearly sales quantities, has a planned end of mine life (EOML) in 2100.

1.1 Project Location

The Project is located approximately 11 kilometres (km) south of the township of Calliope and 30 km south of Gladstone within the Gladstone Local Government Area (LGA) (refer **Figure 1**). The current and proposed disturbance areas are displayed in **Figure 2** and **Figure 3**.

The Project has approval under Environmental Authority (EA) EPML00969013 which covers the following Mining Leases (ML): ML3594, ML3595, ML3596, ML3597, ML3598, ML3599, ML3600, ML3602, ML3603, ML3604, ML3605, ML3606, ML3608, ML3609, ML80036, ML80189, ML80190, ML80191, ML80192 (the Project area). The Project also has approval under EPPR00881913 for the following Environmentally Relevant Activities (ERAs):

- ERA 8 (3a) - Chemical storage >10m^3 but 1,000,000 tonnes (t) of material
- ERA 16(2)(d) – Extracting, in a year >1,000,000 t of material
- ERA 16 (3c) – Screening in a year >1,000,000 t of material
- ERA 50 (2) - Bulk material handling >100 t day

1.2 Scope and Purpose of Assessment

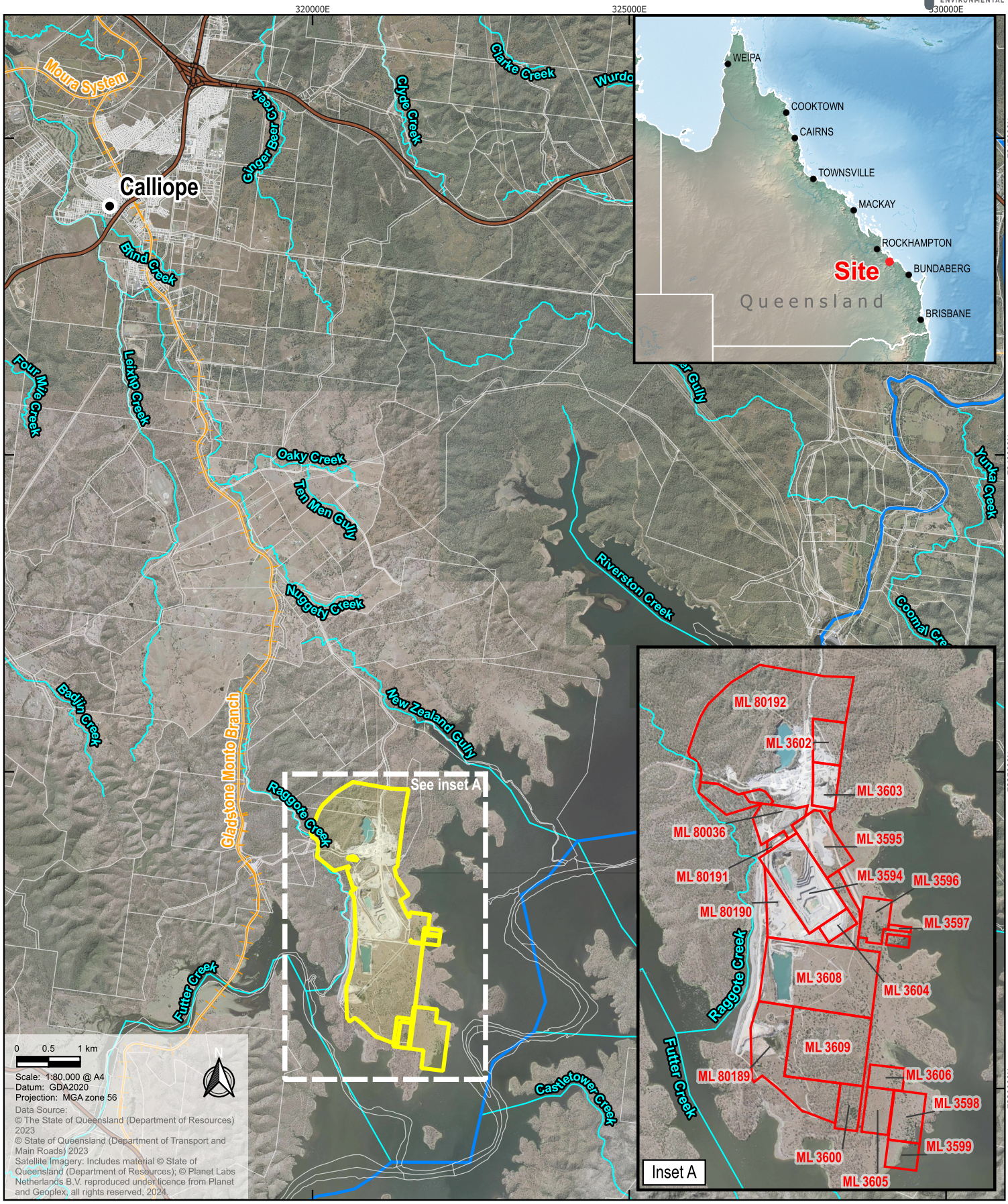
The purpose of this report is to document the baseline terrestrial ecological values of the Project area and provide avoidance, mitigation and management measures to adequately address impacts associated with the Project. The scope is defined as including the MLs listed in **Section 1.1**.

The description of baseline ecological values has been documented to support an application for an amendment to an existing Environmental Authority. Graymont are seeking to amend EA EPML00969013 for the Project via a major EA Amendment under the *Environmental Protection Act 1994* (EP Act), to address the discrepancies in disturbance areas and activity types for the mine until end of mine life (EOML).

Epic was engaged by Graymont to undertake terrestrial ecological surveys for the Project. The scope of this report includes a description of the terrestrial fauna and flora species and habitats within the Project area. The assessment includes an analysis under relevant State guidelines of the potential for significant residual impacts to the following:

- Matters of State Environmental Significance (MSES) as identified as Prescribed Environmental Matters (PEMs) under Schedule 2 of the *Environmental Offsets Regulation 2014* including conservation significant species and identified species habitat areas, listed vegetation communities, waterways and wetlands

The potential requirements for environmental offsets will be identified where significant residual impacts are identified as likely occurring to identified environmental matters as a result of the Project's activities.



Filepath: ~BAA\BAA220011.01 Graymont Calliope PRCP Stage 2\Workspaces\BAA220009.01 EA Amendment\2. Ecology Field Report\Rev 0\Figure 1 Site Location.qgz

Legend

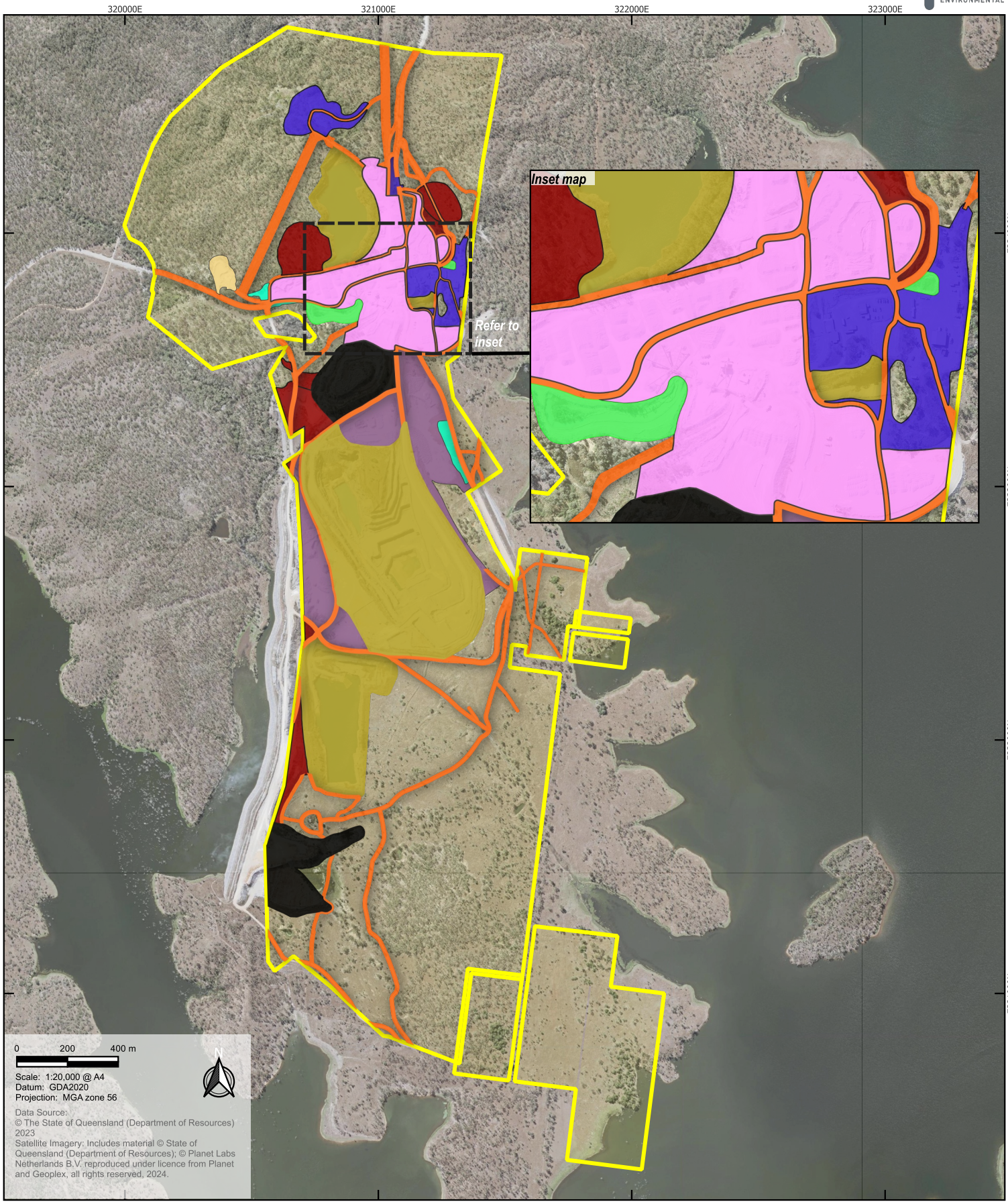
- Site boundary
- Mining leases
- Cadastre (DCDB)
- State controlled roads
- Railways

Watercourses

- Major
- Minor

Graymont
Calliope Limestone Quarry
Ecology Field Report

Figure 1
Site location



Filepath: ~BAA\BAA220011.01 Graymont Calliope PRCP Stage 2\Workspaces\BAA220009.01 EA Amendment\2. Ecology Field Report\Rev 0\Figure 2 Current disturbance area.qgz

Legend

- Site boundary

Current disturbance area

- Access tracks
- Cleared areas and laydowns
- Infrastructure and plant
- Sediment pond
- Pit
- ROM processing area
- Silt dump
- Temporary spoil storage area
- Topsoil stockpile
- Waste rock dump

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Calliope Limestone Quarry
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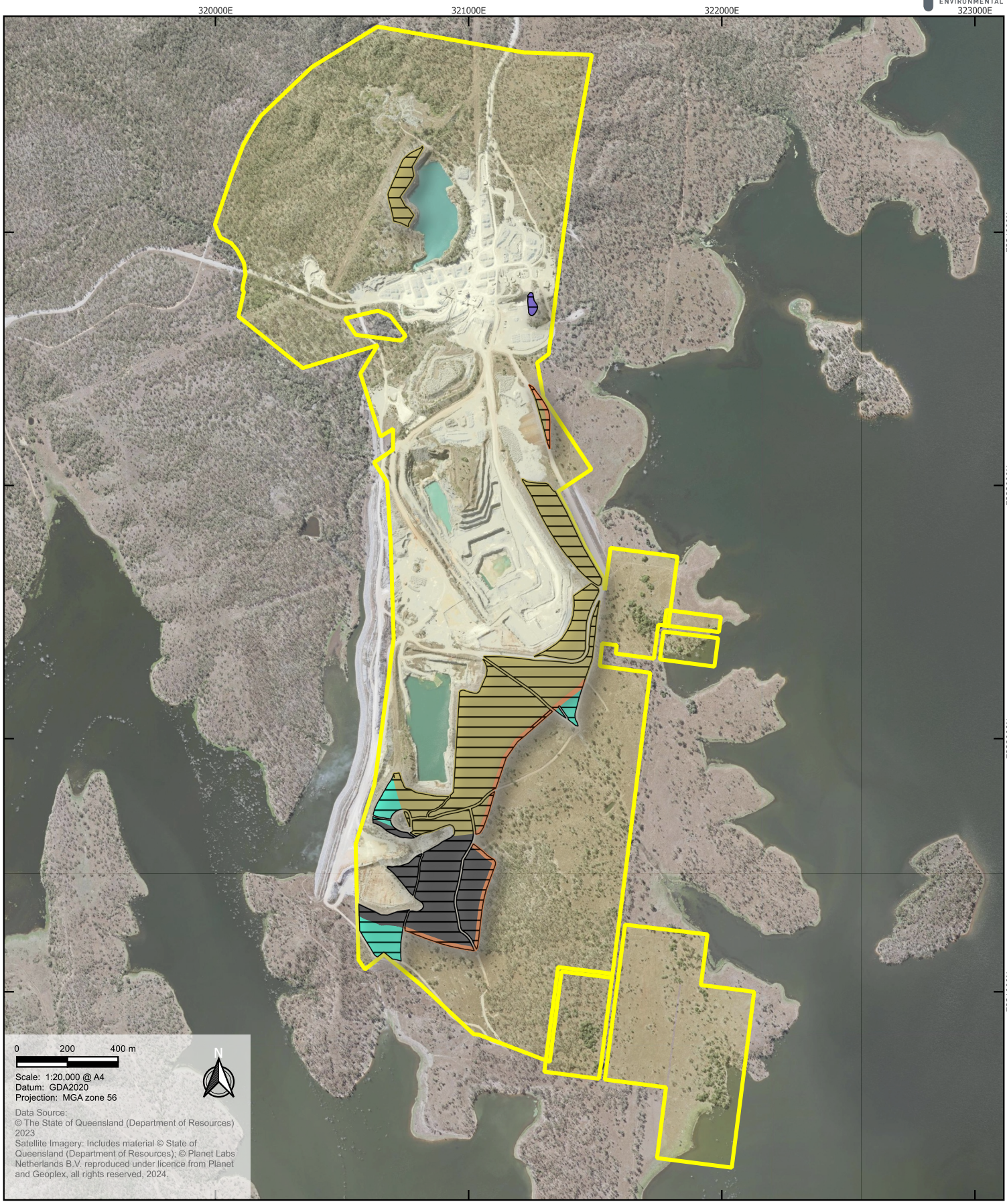
Figure 2
Current disturbance area



Filepath: ~BAA\BAA220011.01 Graymont Calliope PRCP Stage 2\Workspaces\BAA220009.01 EA Amendment\2. Ecology Field Report\Rev 0\Figure 3 Proposed disturbance area.qgz

Legend

- Site boundary
- Proposed disturbance expansion

Proposed disturbance expansion (by activity type)

- Access tracks
- Infrastructure and plant
- Pit
- Topsoil stockpile
- Waste rock dump

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Calliope Limestone Quarry
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Figure 3
Proposed disturbance area

2 PROJECT DESCRIPTION AND ACTIVITIES

Limestone mining has been ongoing at Calliope since 1967, with Graymont managing operations since 2019. Situated just west of Lake Awoonga, the Project produces approximately 0.8 million tonnes per annum of limestone products and intersects 19 MLs. The Project area covers 429.6 hectares (ha) and includes four open cut pits (**Figure 2**). The Project area includes 152.9 ha of existing disturbance (i.e. operational areas, pits etc) and 211.9 ha of proposed disturbance areas. Two non-operational pits (former Pit 1 and Pit 2) are located in the northern end of the ML. Pit 1 was completely back filled with waste rock in 2024 and is now utilised for ag-lime production, and Pit 2 is utilised for onsite water storage. Water from Pit 2 is primarily utilised for the wash plant. Pit 3 and Pit 4 are located to the southern extent of the ML. The Project adjoins land owned and operated by the Gladstone Area Water Board (GAWB), with some shared access tracks in the area used by both Graymont and the GAWB.

Other infrastructure located onsite includes the main office, weighbridge, run of mine (ROM) stockpile, access roads, crushing and screening plant, wash plant, main stockpile area of final product, silt ponds and spoil areas located in the northern portion of the Project (**Figure 2**).

Mining operations have remained consistent throughout the life of mine (LOM) and consists of conventional open cut benching methods and begins with topsoil stripping and removal of clay rich overburden and waste rock. Based on the Plan of Operations for the Project for July 2018 – June 2023, an estimated 142,000 t of overburden and waste rock will be shifted annually (Sibelco 2018).

Limestone ore is extracted by drilling and blasting, then crushed, screened and washed onsite before being loaded by a 120 tonne (t) excavator serviced by two 100 t and one 85 t off road dump trucks. Material is hauled either to the ROM pad for crushing, or to the stockpiles for screening or placement in the designated spoil dumps. There is a second 75 t excavator onsite which is utilised as a backup for the open cut operations.

Extractive activities are also conducted onsite where limestone of different grades and suitable physical properties follow a similar process to mining for the production of road base and aggregates. Extractive activities are authorised and conducted under ERA 16(2)(d) and EA EPPR00881913 (original permit # SPCE04023712 issued under the *Sustainable Planning Act 2009*).

The current Project schedule includes limestone ore to be mined exclusively from the existing open cut mining pit (Pit 4), which is located centrally within the Project area. Lateral and vertical expansion of Pit 4 is projected over the next 70 years, with amalgamation of Pit 3 expected to occur during southern expansion (**Figure 3**). All future disturbance until EOML will be authorised by, and undertaken in accordance with, the amended EA. Mine closure is scheduled for 2100. Limestone ore will continue to be processed onsite utilising pre-existing purpose-built infrastructure in the crushing and screening plant and wash plant, with a rate of production of 10-20,000 t a week.

3 LEGISLATIVE CONTEXT

3.1 Queensland State Legislation

3.1.1 Environmental Protection Act 1994

The objective of the *Environmental Protection Act 1994* (EP Act) is to protect Queensland's environment and to promote ecologically sustainable development. The EP Act defines a General Environmental Duty under which all persons in Queensland have a responsibility not to carry out an activity that causes or is likely to cause environmental harm, and to take all reasonable and practicable measures to prevent or minimise the harm.

The EP Act provides the key legislative framework for environmental management and protection in Queensland. The objective of the EP Act is to: "*Protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains ecological processes on which life depends*" (Section 3 of the EP Act).

Under the EP Act, Graymont must comply with the general environmental duty not to undertake an: "*Activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm are taken*" (Section 319 of the EP Act).

The Project has approval under Environmental Authority EPML00969013 which authorises activities within the MLs. The Project also has approval under EA EPPR00881913 for the following Environmentally Relevant Activities (ERAs):

1. ERA 8 (3a) - Chemical storage >10m^3 but 1,000,000 t of material
2. ERA 16 (3c) – Screening in a year >1,000,000 t of material
3. ERA 50 (2) - Bulk material handling >100 t day

Extractive activities are authorised and conducted under ERA 16(2)(d) and EA EPPR00881913 (original permit # SPCE04023712 issued under the *Sustainable Planning Act 2009*).

3.1.2 Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NC Act) regulates environmental impacts of development through the requirement for vegetation clearing permits, species management programs and other permits.

A clearing permit is required to clear protected plants unless an exemption applies. In general, clearing of Critically Endangered, Endangered, Vulnerable or Near Threatened protected plants will require a clearing permit. Clearing permit applications are assessed on a case-by-case basis and approvals will be subject to conditions.

Where activities involve tampering with 'animal breeding places', the tampering may be authorised by application to the Department of Environment, Tourism, Science and Innovation (DETSI) through an approved species management program.

3.1.3 Environmental Offsets Act 2014

Under the *Environmental Offsets Act 2014* (Offsets Act) an environmental offset is defined as 'an activity undertaken to counterbalance a significant residual impact of a prescribed activity on a PEM.' PEMs are described as MSES and defined under Schedule 2 of the *Environmental Offsets Regulation 2014*. Where a significant residual impact is assessed as occurring on a PEM there may be a requirement for environmental offsets to compensate for the impact. The Queensland Environmental Offsets Policy Significant Residual Impact Guideline (QEOIP Guidelines) (DEHP 2014) provides the framework for assessing the potential for significant residual impacts to MSES from a Project's activities.

3.1.4 Fisheries Act 1994

The *Fisheries Act 1994* (Fisheries Act) provides for the management, use, development and protection of fish habitats and resources. This includes waterways potentially used for 'fish passage' (considered as a MSES) as mapped within waterways for waterway barrier works mapping administered by the Department of

Agriculture and Fisheries (DAF). Environmental offsets may be required where significant residual impact to waterways for fish passage are identified (including permanent, partial and temporary barriers).

3.1.5 Biosecurity Act 2014

The *Biosecurity Act 2014* (Biosecurity Act) ensures a consistent, modern, risk-based and less prescriptive approach to biosecurity in Queensland. The Biosecurity Act provides comprehensive biosecurity measures to safeguard the economy, agricultural and tourism industries, environment and way of life from pests, diseases and contaminants. Decisions made under the Biosecurity Act will depend on the likelihood and consequences of risk, allowing for more appropriate management of risks.

Graymont have a statutory duty of care ("general biosecurity obligation (GBO)") under the Act (s23). Under the GBO, Graymont must:

- Take all reasonable and practical steps to prevent or minimise each biosecurity risk
- Minimise the likelihood of causing a 'biosecurity event', and limit the consequences if such an event is caused
- Prevent or minimise the harmful effects a risk could have, and not do anything that might make any harmful effects worse

Under the Biosecurity Act there are seven categories of 'restricted matter' with associated restrictions (under the Biosecurity Act). Several categories may apply to a single 'restricted matter' and include the following (as relevant to the Project):

- Category 3: You must not distribute this restricted matter. This means it must not be given as a gift, sold, traded or released into the environment unless the distribution or disposal is authorised in a regulation or under a permit
- Category 4: You must not move this restricted matter to ensure that it does not spread into other areas of the State
- Category 5: You must not keep in your possession this category of restricted matter
- Category 6: You must not feed this category of restricted matter. Feeding for the purpose of preparing for or undertaking a control program is exempted

4 ASSESSMENT METHODS

The ecological assessment for the Project consisted of a desktop review of publicly available ecological data sources and information. The desktop review was followed by a field survey carried out within the Project area to describe the ecological values present and to aid the evaluation of the potential impacts of the Project to values considered important to MSES. A summary of the assessment methods is provided in the following sections.

4.1 Desktop Assessment

Prior to commencing the field survey, desktop assessments were carried out to identify species and ecological communities of conservation significance (MSES) that potentially occur within the assessment Project area. Flora and fauna values of conservation significance in this report refer to:

- Flora and fauna species listed as Critically Endangered, Endangered or Vulnerable under the NC Act
- Regional Ecosystems (RE) listed as Endangered or Of Concern under the EP Act

The desktop assessment also aimed to identify other environmental values relevant to the Project area including Environmentally Sensitive Areas (ESAs) and MSES.

4.1.1 Data Sources

Flora and fauna records listed in publicly available databases and other resources were investigated to identify ecological matters relevant to the Project area. These resources included the following:

- Queensland Government Wildlife Online (WildNet) database (records within a 25 km radius around the point -24.1043, 151.2392) (**Appendix A**)
- Species Profile and Threats Database maintained by the Department of Climate Change, Energy, Environment and Water (DCCEEW) (DCCEEW 2023)
- Atlas of Living Australia (ALA), a web-based search tool that is a partnership between CSIRO, Australian museums, herbaria and other biological collections, and the Australian Government (ALA 2025)
- DETSI Matters of State Environmental Significance (MSES) mapping
- DETSI Map of ESAs
- Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development (DNRMMRRD)Regulated Vegetation Management Map and Vegetation Management Supporting Map, including REs, essential habitat, watercourse and wetland mapping
- DETSI certified RE mapping (Version 13).

4.1.2 Previous Studies

During an ecological assessment (flora and fauna) undertaken by Ansar Environmental in 1997, no rare, vulnerable, or endangered species or ecological communities were found in the Project area (Ansar Environmental 1997).

4.2 Field Assessment Methods

4.2.1 Survey Timing and Conditions

A field survey of the Project area was completed during 27 February to 1 March 2023. The survey included a baseline flora and fauna assessment, ground-truthing of REs, and assessment of habitat suitability for conservation significant species.

The nearest weather station providing continuous temperature and rainfall data is Gladstone Airport (39326), located approximately 25 km north of the Project area. During the field survey temperatures ranged between 19.4 and 30.5°C (BoM 2023). No rainfall occurred during the field survey. The region recorded slightly below average rainfall during the three months prior to the field survey, with a total of 300.6 millimetres (mm) during December to February (BoM 2023).

4.2.2 Flora

Native vegetation within the Project area was assessed and mapped into analogous REs. The survey and mapping of REs was in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland V6.0* (Neldner et al. 2022). A combination of tertiary and quaternary RE sites were used to verify the on-ground vegetation communities present. Quaternary assessments were carried out where simple confirmation of the RE present was considered based on the results of the more detailed quaternary assessments carried out elsewhere at the Project area.

Tertiary sites were used to identify REs with the quantification of vegetation community condition and floristic species composition. At a minimum the following data were recorded at each quaternary survey site:

- RE type
- Vegetation condition
- Dominant, co-dominant, sub-dominant and associated flora species, median height and cover for each strata level
- Ecologically dominant layer (EDL)
- Structural classification (Specht and Specht 2000) (i.e. grassland, open-woodland, woodland etc)
- Structure category (i.e. dense, mid-dense, sparse, very sparse)
- Landform
- Soil type
- Weed species and density
- Disturbance.

Quaternary were used to ground-truth the extent, classification and condition of vegetation communities within the Project area. At each quaternary site the following data were recorded:

- RE type
- Condition (i.e. remnant, regrowth, non-remnant)
- Dominant flora species at each strata level
- EDL strata
- EDL cover and median height
- Structural classification (Specht & Specht 2000) (i.e. grassland, open-woodland, woodland etc).

In addition to RE mapping, incidental observations of all native and non-native flora species observed within the Project area were recorded.

BioCondition assessments were also completed in accordance with *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland* (Eyre et al 2015) to provide a reference for future planned rehabilitation works.

4.2.3 Fauna

Fauna surveys comprised non-invasive methods and included the following:

- Diurnal bird surveys
- Habitat searches for herpetofauna
- Opportunistic observations throughout the survey.

4.2.4 Fauna Habitat

Fauna habitat assessments were conducted at sites across the Project area to ascertain the quality and availability of habitat, particularly for the potential presence of Koala (*Phascolarctos cinereus*), Squatter Pigeon (southern) (*Geophaps scripta scripta*) and Greater Glider (southern and central) (*Petauroides volans*). Habitat assessment sites were selected during the fauna surveys and assessed for the following features:

- Ground cover
  - Grass cover
  - Bare ground

  - Non-native cover
- Presence of tree hollows
- Rocky habitat
- Nearby water source
- Woody debris
- Recent fire
- Level of cattle disturbance (lack of grass cover and surface soil trampling)

4.2.5 Suitably Qualified Personnel

The field surveys were led by Senior Environmental Scientist Oliver Robertson.

Oliver Robertson

With almost 9 years in the industry, Oliver has extensive experience in undertaking surveys for listed weeds and conservation significant fauna and flora species as part of environmental monitoring and compliance programs for projects throughout Queensland for a broad range of industries and government sectors including road and rail transport, energy, communications, and defence. He is familiar with environmental legislative requirements in Queensland and NSW. Oliver is suitably qualified to complete Protected Plant Flora Surveys under the Queensland Department of Environment and Science Protected Plants Flora Survey Guidelines (DES 2020) Oliver holds a PhD in Ecology from University of Queensland as well as a Bachelor of Environmental Science and a Bachelor of Science (Zoology) from Deakin University and University of Melbourne respectively.

4.2.6 Permits and Ethics Approval

The field surveys were conducted in accordance with the following Queensland government permits and approvals:

- Scientific Use Registration Certificate (DAF) – Registration No. SUR001535)
- Animal Ethics Approval (DAF) – (Reference No. CA 2020/06/1377)
- Research Permit (DETSI) – Permit No. WA0027840

4.2.7 Limitations

In accordance with the *Terrestrial vertebrate fauna survey guidelines for Queensland* (Eyre et al. 2022) surveys in the Brigalow Belt Bioregion should be carried out in spring to early summer (September to mid-November) and autumn (March-mid-May). The field survey was completed during late summer.

4.3 Likelihood of Occurrence Assessment

Following the field survey, a likelihood of occurrence assessment was completed to categorise the potential for conservation significant flora and fauna to occur based on the habitat observed within the Project area and surrounds (refer **Section 6.1.3** and **Section 6.2.3**). The assessment provides the following criteria:

- Known to occur
  - Observed onsite during surveys
- Likely to occur
  - Observed close to the Project area during surveys and suitable habitat occurs within the Project area
  - Database records occurring close to the Project area (within 5 km) and suitable habitat occurs within the Project area
- Potential to occur
  - Database records occurring in wider area (>5 km and <25 km) and suitable habitat occurs within the Project area

  - Database records occurring close to the Project area (within 5 km) and marginally suitable habitat occurs although remain relatively isolated (due to vegetation clearing)
- Unlikely to occur
  - No database records in wider area and/or
  - Habitat present in generally unsuitable and/or
  - Project area generally outside of known distribution of species

4.4 Nomenclature and Taxonomy

The common names of many flora and fauna species frequently vary between regions, and many species lack them altogether. Taxonomy of flora presented in this report follows that currently endorsed by the Queensland Herbarium in the *Census of Queensland Flora and Fungi 2023* (Bean 2024)The taxonomy of fauna follows the Australian Faunal Directory (ABRS 2023). In this report, flora and fauna species are referred to initially by both their common and scientific names and then for ease of reading, only by their common name (where the species has a common name).

5 DESKTOP ASSESSMENT RESULTS

5.1 Existing Environment

The Project is located within the Brigalow Belt South Bioregion (BBSB). Within the BBSB the Project area lies within the Mount Morgan subregion. Large areas of the Brigalow Belt have been cleared of remnant native vegetation for grazing, agriculture and mining. Remaining vegetation is often confined to rockier hilly areas, linear strips of roadside vegetation, riparian vegetation and relatively small, isolated pockets of remnant vegetation.

5.1.1 Topography, Geology and Soils

The topography in the vicinity of the Project area is hilly with considerable height variance between 100 and 40 metres Australian Height Datum (mAHD). It falls to the east, south, and west to Lake Awoonga.

The Taragoola limestone deposits occur within the Early Devonian age (419-Ma) Calliope Beds. The Beds occupy a north-northwest striking belt about 40 km long and 3-4 km wide. They comprise predominantly volcanic rocks with relatively minor inter-bedded sedimentary rocks, including limestone. The rocks have been subjected to folding and faulting. Overburden consists of a shallow cover of soil. Boulders and cobbles of limestone and volcanics occur in much of the layer.

Underlying the overburden is predominantly limestone. Discontinuities within the limestone are clay filled and karst features are prevalent to a depth up to approximately 15 mBGL. Below this depth, karst and infill becomes less prevalent and apertures become tight. Bedding surfaces within the limestone generally dip very steeply towards the west. The major axes of the pits are parallel to the strikes of the beds. This characteristic is consistent with the regional structure.

The volcanics exposed in the walls of the pits include predominantly basic basalt and intermediate olive green andesite. The basalt occurs as lava flows. It is exposed primarily in the upper benches of the east and south walls of Pit 4. It is dark grey, has high to very high strength and is slightly weathered. The andesite generally occurs as steep dipping dykes following vertical to sub-vertical bedding and joints within the limestone. Two dominant systems strike north-north-west and east. Their widths range from stringers to a few meters. Reduced vertical stresses at shallower depths have allowed the andesite to extrude along shallow dipping joints. It has high to very high strength and is moderately to slightly weathered. A summary of the dominant surface geology of the Project area is provided below in **Table 1**.

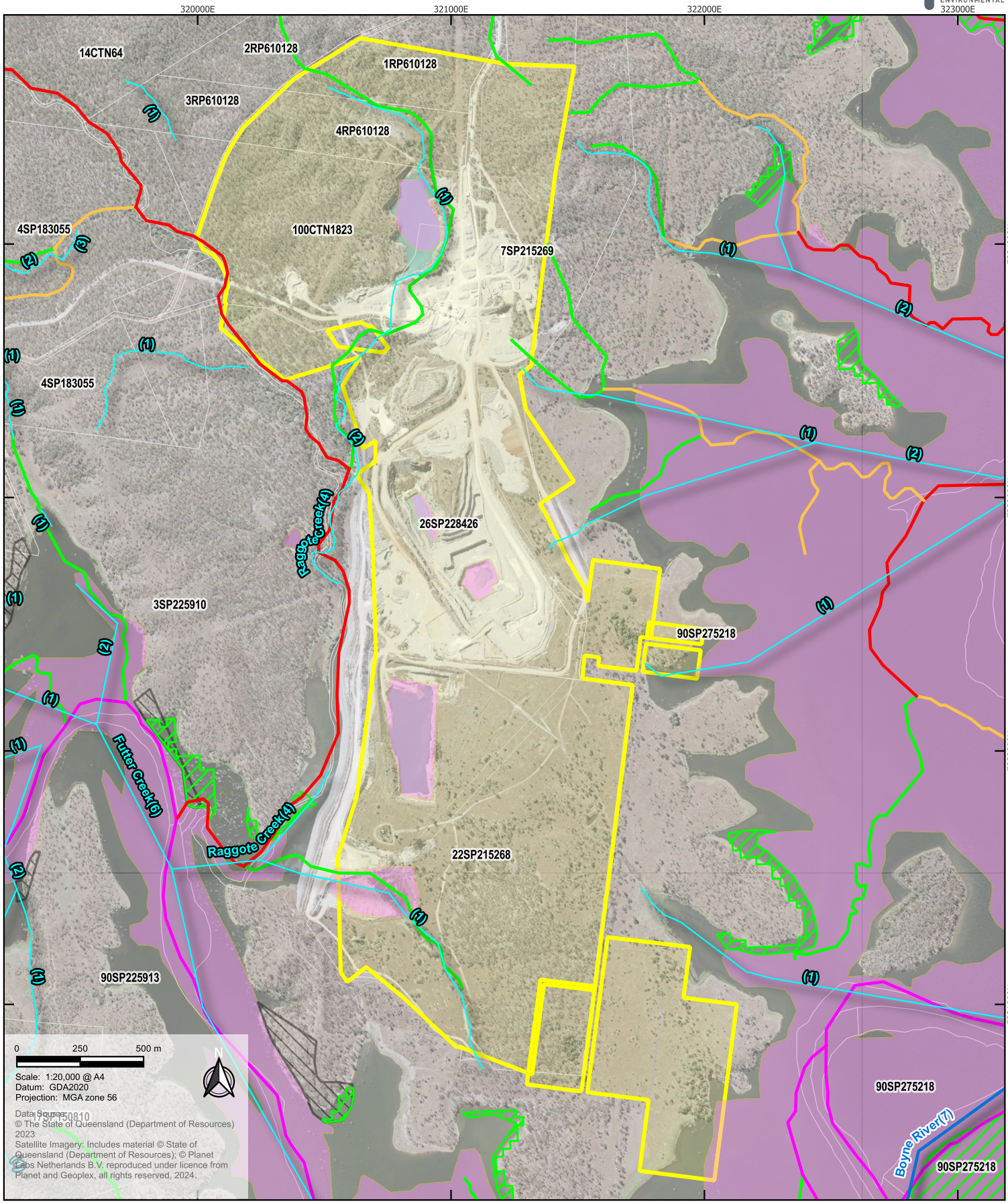
Table 1. Project area surface geology (QGlobe 2023)

Rock unit name	Lithological summary	Dominant rock	Age
SDa	Basaltic to andesitic (rarely dacitic and rhyolitic) volcaniclastic sandstone and conglomerate, limestone, siltstone, andesite	Stratified unit (including volcanic and metamorphic)	Silurian - early Devonian
DSa/l	Fossiliferous limestone, marble	Carbonates (limestone or dolomite)	Silurian - early Devonian

5.1.2 Wetland and Watercourse Mapping

The Project area is within the Boyne River drainage sub-basin. The Project area is intersected by nine stream order 1 watercourses and one stream order 2 watercourse (**Figure 4**). No wetlands of high ecological significance (HES) are mapped within the Project area. East of the Project area, the Boyne River, a stream order 7 watercourse flows into Awoonga Lake. Awoonga Lake is an artificial reservoir maintained by the Awoonga Dam wall. The farm dam is a mapped hydrologically modified or artificial wetland.

A total of six low-risk waterways for waterway barrier works are mapped within the Project area (**Figure 4**).



Filepath: ~BAA\BAA220011.01 Graymont Calliope PRCP Stage 2\Workspaces\BAA220009.01 EA Amendment\2. Ecology Field Report\Rev 0\Figure 4 Watercourse and waterways.qgz

Legend

- Site boundary
- Cadastre (DCDB)
- Vegetation management wetlands map v8.01

Wetland areas (Qld Wetland Mapping v6.0)

- Lacustrine Wetlands (hydrologically modified or artificial)
- Contains Wetlands (1 - 50%)

QLD waterways for waterway barrier works

- Low
- Moderate
- High
- Major

Vegetation management watercourses and drainage features v7 (stream order)

- Major
- Minor

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Figure 4
Wetlands, waterways and watercourses

5.2 Matters of State Environmental Significance

The Offsets Act is supported by the *Environmental Offsets Regulation 2014* (Offsets Regulation) which provides detail on prescribed activities and environmental matters (i.e. MSES) to which the Act applies. MSES include environmental values that are protected under Queensland legislation. The Queensland Government Environmental Reports Online portal identified five MSES as present within the Project area (as summarised in **Table 2**).

Table 2. Matters of State Environmental Significance relevant to the Project area

Matters of State Environmental Significance	Relevance to Project
Protected wildlife habitat under the NC Act:	
Conservation significant flora and fauna	A total of 26 fauna species and 18 flora species listed as threatened or near threatened under the NC Act were identified as potentially occurring within the Project area
Regulated vegetation under the *Vegetation Management Act 1999* (VM Act):	
Endangered/Of concern in Category B	**Not relevant**. Remnant RE 11.3.4/11.3.25 is mapped outside of the Project area to the south-west along the banks of Futter Creek.
Endangered/Of concern in Category C	**Not relevant**. Regrowth RE 11.3.4/11.3.25 is mapped outside of the Project area to the west along the banks of Futter Creek.
Category R (Great Barrier Reef (GBR) riverine regrowth)	Small patches of riverine regrowth vegetation are mapped within the Project area in association with tributaries of Raggote Creek close to Pit 2 and along the eastern boundary of the Project area in association with gullies draining into Awoonga Lake.
Intersecting a watercourse	Regulated vegetation intersecting a watercourse identified on the VM Act watercourse map occur in the far northern and southern portions of the Project area.
Within 100 m of a Vegetation Management Wetland	**Not relevant**. Regulated vegetation within 100 m of a Vegetation Management Wetland is mapped outside of the Project area adjacent to the western boundary and to the south and east of the Project area.
Connectivity areas:	
Remnant vegetation	Remnant vegetation providing connectivity is mapped within the Project areas
Wetlands and watercourses under the EP Act:	
Waterway providing fish passage	Waterways mapped as low risk Queensland waterways for waterway barrier works occur within the Project area

5.3 Environmentally Sensitive Areas

No Environmentally Sensitive Areas (ESAs) are mapped within the Project area. The nearest ESA is Category C ESA Boyne Range State Forest, located 3 km to the west of the Project area.

5.4 Flora

5.4.1 Vegetation Communities

Current Queensland regulated vegetation mapping indicates the majority of the Project area is Category X non-remnant vegetation. Areas of Category B, C and R vegetation are mapped in the far northern and southern portions of the Project area (**Appendix A**). The extent of this mapping within the Project area is detailed in **Table 3**. Current DNRMMRRD vegetation community mapping identified three REs within the Project area mapped as a mix of homogenous and heterogenous polygons. The REs are described in **Table 4** and depicted in **Figure 5**.

Table 3. Regulated vegetation mapped within the Project area

Regulated vegetation category	Extent (ha)
Category X (non-remnant)	278.50
Category B (remnant)	103.50
Category C (high-value regrowth)	28.60
Category R (riverine regrowth)	18.90

Table 4. Regional Ecosystems currently mapped within Project area

RE	Short description (Queensland Herbarium 2021)	VM Act status	EP Act status
11.11.15	*Eucalyptus crebra* woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics	Least concern	No concern at present
11.11.4	*Eucalyptus crebra* woodland on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges	Least concern	No concern at present
11.11.4a	*Eucalyptus tereticornis* dominated woodland. Other tree species listed above may occur as sub or co-dominant species. Not a wetland	Least concern	No concern at present

5.4.2 Conservation Significant Flora

The desktop assessment revealed there are no areas mapped as 'high risk' on the Queensland Flora Survey Trigger Map within the Project area (refer DNRMMRRD Vegetation Management Report in **Appendix A**).

The Wildlife Online database search results identified 18 flora species listed as threatened or near threatened under the NC Act, including five Near Threatened, four Critically Endangered, three Endangered and six Vulnerable species.

Historical database records from ALA (2025) identified 15 threatened or near threatened flora species within 25 km of the assessment area including the following (refer **Figure 6**):

- *Scleromitrion gibsonii* (Critically Endangered – NC Act) - 14 records 18 km south south-west of the Project area within Wietalaba National Park
- *Rhodamnia glabrescens* (Critically Endangered – NC Act) - 11 occurrence records 20 km southeast of the Project area
- Narrow-leaved Malletwood (*Rhodamnia angustifolia*) (Critically Endangered – NC Act) - 21 records 18 km south-southwest of the Project area
- Discolorous-leaved Ironbark (*Eucalyptus decolor*) (Near Threatened – NC Act) - 11 records 6-15 km southeast of the Project area
- *Acacia* sp. (Castletower N.Gibson TOI345) (Vulnerable – NC Act) - one record 9 km southeast of the Project area
- Cudgerie (*Hernandia bivalvis*) (Near Threatened – NC Act) - one record 21 km southeast of the Project area
- Scarlet Fuchsia (*Graptophyllum excelsum*) (Near Threatened – NC Act) - one record 16 km north of the Project area and one record 18 km south southwest of the Project area
- *Parsonsia kroombitensis* (Vulnerable – NC Act) - two records 3-5 km west of the Project area
- *Cassinia collina* (Vulnerable – NC Act) - one record 14 km southeast of the Project area
- Many Peaks Apatophyllum (*Apatophyllum olsenii*) (Endangered - NC Act) – four records 6.5-9 km southeast of the Project area
- *Macropteranthes leiocaulis* (Near Threatened NC Act) - one record 19 km north-northeast of the Project area and two records 22 km southeast of the Project area
- *Cycas megacarpa* (Endangered NC Act) - one record 24 km southwest of the Project area and one record 20 km northeast of the Project area
- *Bergera crenulata* (Critically Endangered – NC Act) - one record 15 km south-southeast of the Project area

- Grevillea (*Grevillea venusta*) (Vulnerable – NC Act) -20 occurrence records within 25 km of the Project area with the nearest record located 6 km southeast of the Project area
- Scrub Ironbark (*Rhodamnia spongiosa*) (Critically Endangered – NC Act) – one record 20 km northeast of the Project area and one record 25 km northwest of the Project area

5.5 Fauna

5.5.1 Conservation Significant Fauna

The desktop review identified 27 fauna species listed as conservation significant under the NC Act as potentially occurring within the wider area surrounding the Project area (refer **Appendix A** for database search results).

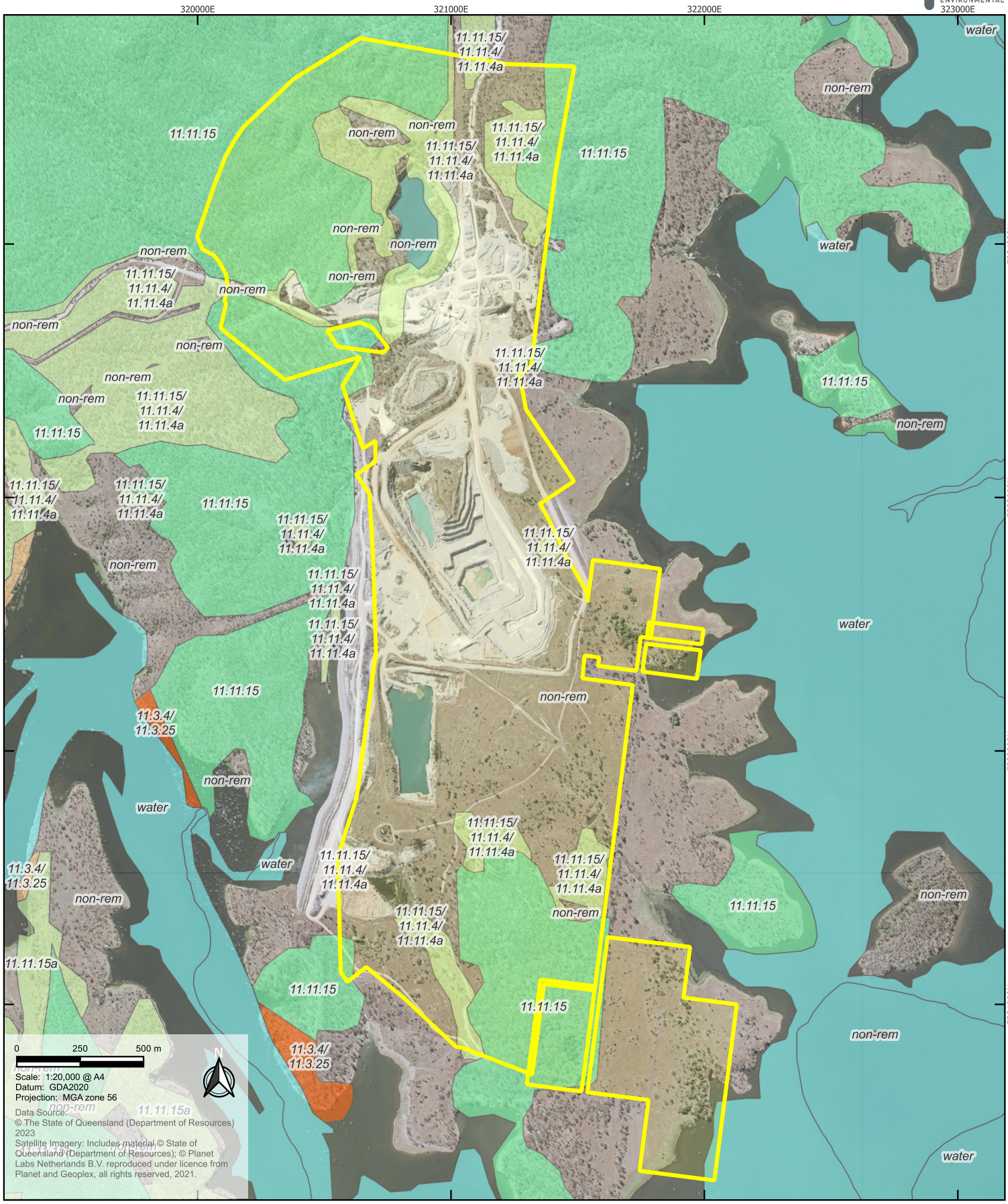
Conservation significant fauna species identified as occurring within 25 km of the Project area from the ALA (2025) database include the following (refer **Figure 6** for locations):

- White-throated Needletail (*Hirundapus caudacutus*) (Vulnerable - NC Act) – 19 occurrence records within 25 km with the nearest record 1.5 km northeast of the Project area
- Curlew Sandpiper (*Calidris ferruginea*) (Critically Endangered - NC Act) – 23 occurrence records within 25 km with the nearest record 1.5 km northeast of the Project area
- Greater Sand Plover (*Charadrius leschenaultii*) (Vulnerable - NC Act) – six occurrence records with 25 km of the Project area with the nearest record located 16 km east of the Project area
- Red Goshawk (*Erythrotriorchis radiatus*) (Endangered - NC Act) – one record from Boyne Island 20 km north-northeast of the Project area
- Squatter Pigeon (*Geophaps scripta scripta*) (Vulnerable - NC Act) – 24 occurrence records with 25 km of the Project area with the nearest record located 3.5 km west of the Project area
- Western Alaskan Bar-tailed Godwit (*Limosa lapponica baueri*) (Endangered - NC Act) – three occurrence records within 25 km of the Project area at Boyne Island with the nearest record located 20 km to the north-northeast of the Project area
- Eastern Curlew (*Numenius madagascariensis*) (Critically Endangered - NC Act) – 88 occurrence records within 25 km of the Project area
- Yellow-bellied Glider (*Petaurus australis australis*) (Vulnerable - NC Act) – f occurrence records within 25 km of the Project area with the nearest record located 11 km south southeast of the Project area
- Koala (*Phascolarctos cinereus*) (Endangered - NC Act) – 17 occurrence records within 25 km of the Project with the nearest record located 3.5 km west-southwest of the Project area
- Beach Stone-curlew (*Esacus magnirostris*) (Vulnerable - NC Act) – 20 occurrence records within 25 km of the Project area with the nearest record located 17 km east of the Project area
- Lesser Sand Plover (*Charadrius mongolus*) (Endangered - NC Act) – 19 occurrence records within 25 km of the Project area with the nearest record located 17 km east of the Project area
- Great Knot (*Calidris tenuirostris*) (Critically Endangered - NC Act) – two occurrence records within 25 km of the Project area with the nearest record located 20 km north-north-east of the Project area
- Powerful Owl (*Ninox strenua*) (Vulnerable - NC Act) – seven occurrence records within 25 km of the Project area with the nearest record located 11 km south-southeast of the Project area
- Black-breasted Button-quail (*Turnix melanogaster*) (Vulnerable - NC Act) – eight occurrence records within 25 km of the Project area with the nearest record located 20 km northeast of the Project area on Boyne Island
- Australian Humpback Dolphin (*Sousa sahulensis*) (Vulnerable - NC Act) – one record within 25 km of the Project area located 20 km northeast of the Project area
- Greater Glider (southern and central) (*Petauroides volans*) (Endangered – NC Act) – six occurrence records within 25 km of the Project area with the nearest record located 11 km south-southeast of the Project area
- Red Knot (*Calidris canutus*) (Endangered - NC Act) - Three occurrence records within 25 km of the Project area with the nearest record located 1.5 northeast of the Project area

- Flatback Turtle (*Natator depressus*) (Vulnerable – NC Act) – one record 18 km northeast of the Project area, numerous additional records within Wild Cattle Island National Park
- Glossy Black-cockatoo (northern) (*Calyptorhynchus lathami erebus*) (Vulnerable – NC Act) – numerous records within 25 km of the Project area, the closest record located 19 km northeast of the Project area
- Grey Plover (*Pluvialis squatarola*) (Vulnerable – NC Act) – Two records within 25 km of the Project area, with the closest record 21 km to the north northeast of the Project area
- Ruddy Turnstone (*Arenaria interpres*) (Vulnerable – NC Act) – Two records 22 km northeast of the Project area
- Sharp-tailed Sandpiper (*Calidris acuminata*) (Vulnerable – NC Act) – 10 records within 25 km of the Project area, the closest of which is located 6.5 km northeast of the Project area
- Latham's Snipe (*Gallinago hardwickii*) (Vulnerable – NC Act) – seven records within 25 km of the Project area, the closest of which is located 1.9 km north-northeast of the Project area
- Common Greenshank (*Tringa nebularia*) (Vulnerable – NC Act) – three records within 25 km of the Project area, the closest record, located 1.9 km northeast of the Project area
- Terek Sandpiper (*Xenus cinereus*) (Vulnerable – NC Act) – four records within 25 km of the Project area, the closest record, 17 km east of the Project area

5.5.2 Habitat Mapping

Assessment of DETSI threatened wildlife habitat suitability models determined that habitat for conservation significant fauna species is absent from the Project area (**Appendix A**).



Filepath: ~BAA\BAA220011.01 Graymont Calliope PRCP Stage 2\Workspaces\BAA220009.01 EA Amendment\2. Ecology Field Report\Rev 0\Figure 5 Queensland Herbarium RE mapping.qgz

Legend

- Site boundary

Regional Ecosystems v13.00

- Category A or B area containing of concern
- Category A or B area that is least concern
- Category C or R area containing of concern
- Category C or R area that is of least concern
- water
- Non-remnant

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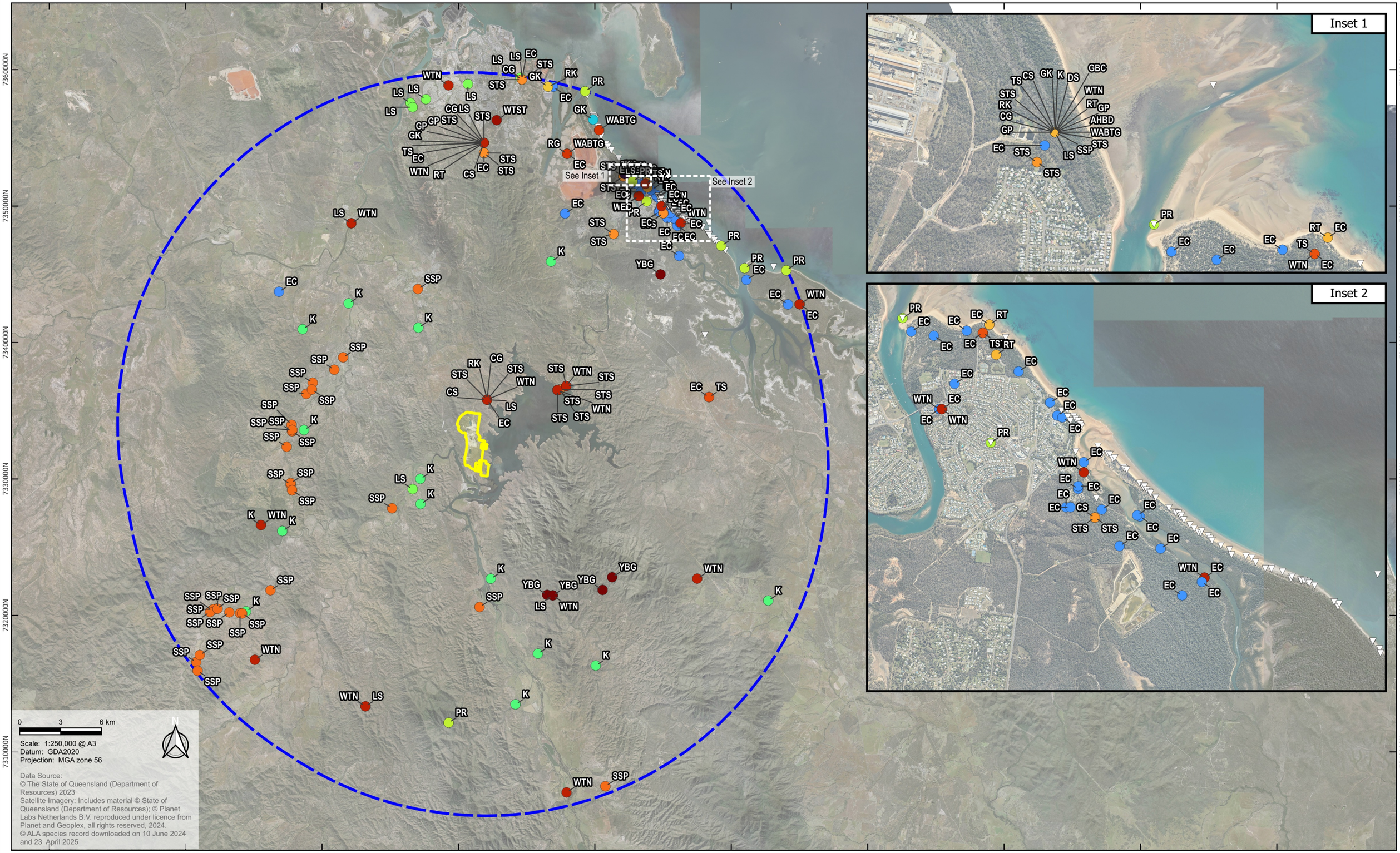
Figure 5
Queensland herbarium RE mapping



Filepath: ...BAA\BAA220011.01 Graymont Calliope PRCP Stage 2\Workspaces\BAA220009.01 EA Amendment\2. Ecology Field Report\Rev 0\Figure 6 ALA record of threatened species and Migratory within 25 km.qgz

Legend

- Site boundary
- 25 km buffer of site boundary

Threatened fauna

- Australian Hump-backed Dolphin (AHBD)
- Common Greenshank (CG)
- Curlew Sandpiper (CS)
- Dunmall's Snake (DS)
- Eastern Curlew (EC)
- Flatback Turtle (FT)
- Great Knot (GK)
- Grey Plover (GP)
- Koala (K)
- Latham's Snipe (LS)
- Pacific Ridley (PR)
- Red Goshawk (RG)
- Red Knot (RK)
- Ruddy Turnstone (RT)
- Sharp-tailed Sandpiper (STS)
- Southern Squatter Pigeon (SSP)
- Terek Sandpiper (TS)
- Western Alaskan Bar-tailed Godwit (WABTG)
- White-throated Needletail (WTN)
- White-throated Snapping Turtle (WTST)
- Yellow-bellied Glider (YBG)

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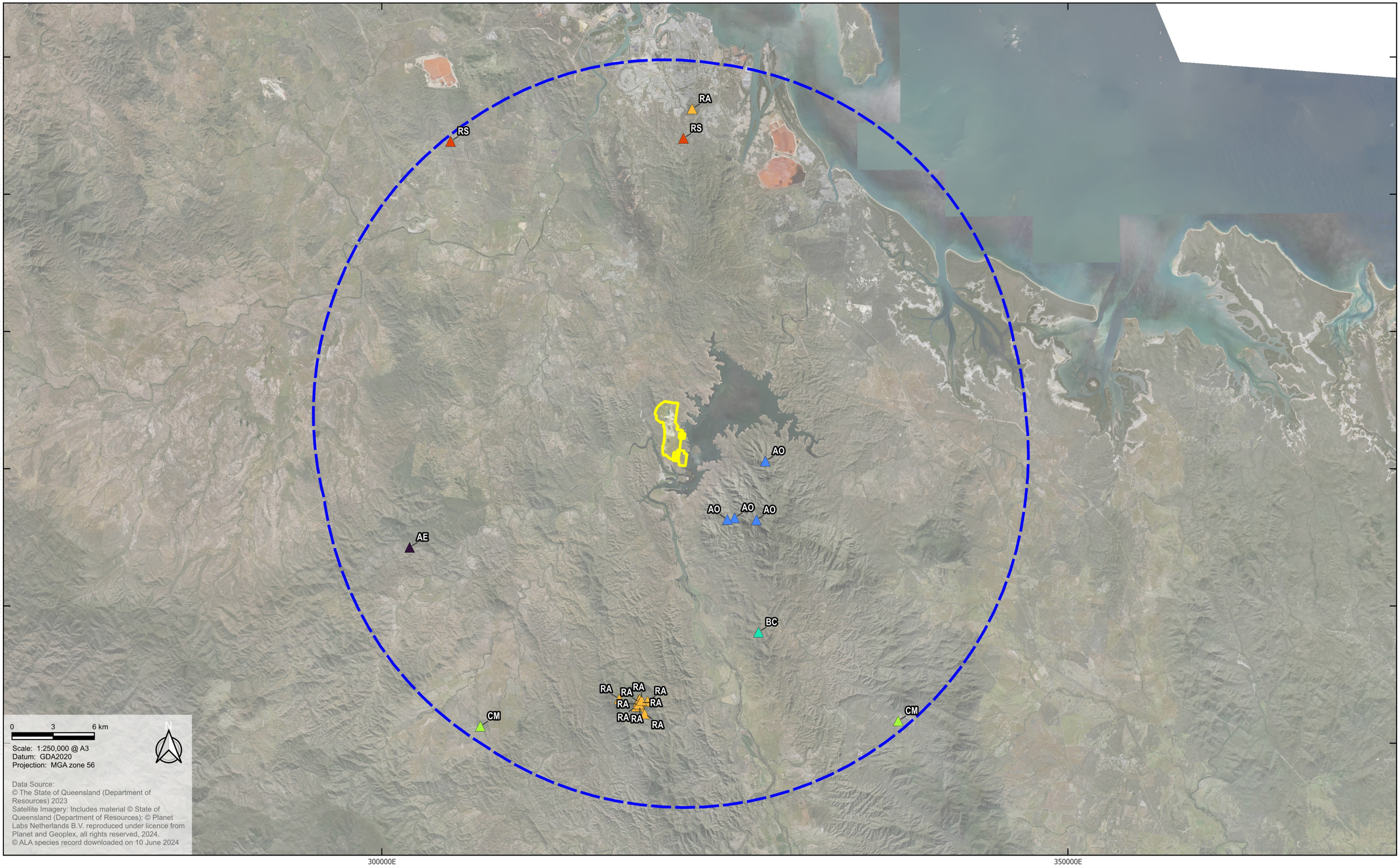
Calliope Limestone Quarry
Significant Impact Assessment (MNES) Report

Figure 6a
Conservation significant flora and fauna species records within 25 km of the project area - Threatened fauna species



Filepath: ~BAA\BAA220011.01 Graymont Calliope PRCP Stage 2\Workspaces\BAA220009.01 EA Amendment\2. Ecology Field Report\Rev 0\Figure 6 ALA record of threatened species and Migratory within 25 km.qgz

Legend

- Site boundary
- 25 km buffer of site boundary

Threatened flora

- Acacia eremophiloides (AE)
- Apatophyllum olsenii (AO)
- Bergera crenulata (BC)
- Cycas megacarpa (CM)
- Rhodamnia angustifolia (RA)
- Rhodamnia spongiosa (RS)

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Figure 6b
Conservation significant flora and fauna species records within 25 km of the project area - Threatened flora species

6 FIELD ASSESSMENT RESULTS

6.1 Flora Survey Results

6.1.1 Flora Diversity

A total of 85 flora species were identified within the Project area, including 26 non-native flora species. The floral assemblage is dominated by eucalypts with an understorey of native woody shrubs, herbs and tussock grasses. Narrow-leaved Ironbark (*Eucalyptus crebra*) was the dominant eucalypt within the Project area. A full list of recorded flora species is provided in **Appendix B**.

6.1.2 Ground-truthed Regional Ecosystems

A total of 10 tertiary RE assessments and six quaternary RE assessments were completed across the Project area (refer **Figure 7**). Ground-truthing of current RE mapping confirmed the presence of four vegetation communities analogous to two RE types. Large portions of the Project area currently mapped as a mixed polygon of multiple RE types was confirmed as remnant RE 11.11.15 *Eucalyptus crebra* woodland. Some areas currently mapped as non-remnant or regrowth vegetation on the regulated vegetation map meet the definition of remnant vegetation analogous to RE 11.11.15. Water bodies and non-remnant areas impacted by vegetation clearing were also mapped. The description, status and area of each RE is provided in **Table 5**, and the extent illustrated in **Figure 7**. Further detail regarding vegetation community floristics, structure and representative photos is provided in the following sections. Tertiary and quaternary RE assessment data is provided in **Appendix B**.

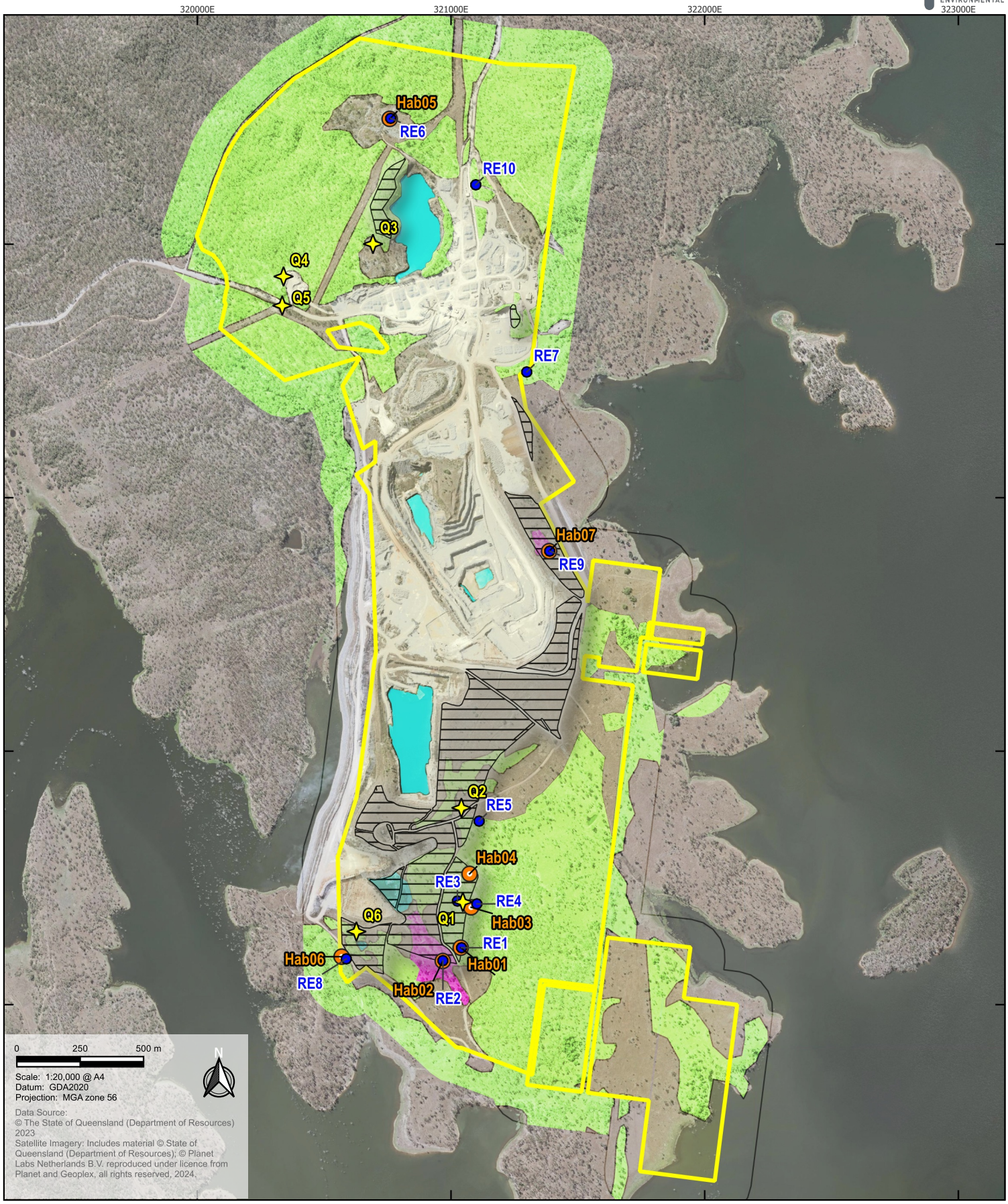
Table 5. Ground-truthed REs within the Project area

Vegetation community	RE	Regulated vegetation category	EP Act (biodiversity)	Extent within Project area (ha)
1. Remnant *Eucalyptus crebra* woodland	11.11.15	B	No concern at present	115.2
2. Regrowth *Eucalyptus crebra* woodland	11.11.15	C	No concern at present	65.8
3. Remnant *Eucalyptus tereticornis* fringing woodland	11.3.25	B	Of concern	4.1
4. Disturbed non-remnant vegetation	N/A	X	N/A	230.1

6.1.2.1 Remnant *Eucalyptus crebra* Woodland

This vegetation community occurs on deformed and metamorphosed sediments with interbedded volcanics. The structure of the vegetation community varies from woodland to open-forest (**Plate 1**). The vegetation community is dominated by Narrow-leaved Ironbark with associated Variable-barked Bloodwood (*Corymbia erythrophloia*) and sub-dominant Moreton Bay Ash (*Corymbia tessellaris*). With a median canopy height range of 14-17 m and a canopy cover range of 18-36 %. A sparse sub-canopy always occurred and included Narrow-leaved Ironbark, Variable-barked Bloodwood, Moreton Bay Ash, and Queensland Bluegum (*Eucalyptus tereticornis*) with a median height range of 7-8.5 m and a median cover range of 3-6%.

A very-sparse to mid-dense shrub layer typically occurred and included Dogs Balls (*Grewia retusifolia*), Spiked Sida (*Sida subspicata*), Glycine Pea (*Glycine tabacina*), Narrow-leaved Ironbark, Pretty Wattle (*Acacia decora*), Catkin Wattle (*Acacia julifera*), Cockatoo Wattle (*Planchonia careya*), Dysentery Plant (*Grewia latifolia*), (*Capparis canescens*), Queensland Bluegum, and Green Wattle (*Acacia deanei*) with a median height range of 0.9-2.5 m and a median canopy cover range of 5-30%.



Filepath: ~BAA\BAA220011.01 Graymont Calliope PRCP Stage 2\Workspaces\BAA220009.01 EA Amendment\2. Ecology Field Report\Rev 0\Figure 7 Field-verified regional ecosystems, survey sites and proposed impacts.qgz

Legend

- Site boundary
- Proposed disturbance expansion

Ground-truthed regional ecosystems

- 11.11.15
- 11.3.25
- Non-remnant
- Water

- Quaternary RE
- Secondary RE
- Habitat assessment sites

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Calliope Limestone Quarry
Ecology Field Report

Figure 7
Field-verified regional ecosystems, survey sites and proposed impacts

Groundcover was dense and dominated by native tussock grasses and herbs including Dark Wiregrass (*Aristida calycina*), Cotton Panic (*Digitaria brownii*), Queensland Bluegrass (*Dichanthium sericeum*), Pitted Bluegrass (*Bothriochloa decipiens*), Black Speargrass (*Heteropogon contortus*), Slender Bamboo Grass (*Austrostipa verticillata*), Kangaroo Grass (*Themeda triandra*), Fuzzweed (*Peripleura hispidula*), Barbed-wire Grass (*Cymbopogon refractus*), White Speargrass (*Aristida leptopoda*), Slender Sedge (*Cyperus gracilis*), High Sida (*Sida trichopoda*),Rusty Glycine (*Glycine tomentella*), Hairy Panic (*Panicum effusum*), Birdsville Indigo (*Indigofera linnaei*), Australian Millet (*Panicum decompositum*), Wiregrass (*Aristida queenslandica*), Nine-awn Grass (*Enneapogon lindleyanus*), Fairy Grass(*Sporobolus caroli*), Desert Bluegrass (*Bothriochloa ewartiana*), Chaff Flower (*Achyranthes aspera*), Spurge (*Phyllanthus maderaspatensis*), and Asthma Plant (*Euphorbia hirta*) with a median height range of 0.2-1.5 m and a median cover range of 80-90%.

Non-native plant cover ranged from 10% to 45% and included African Lovegrass (*Eragrostis curvula*), Cobbler's Pegs (*Bidens pilosa*), Flannel Weed (*Sida cordifolia*), Shrubby Stylo (*Stylosanthes scabra*), Creeping Lantana (*Lantana montevidensis*), Cayenne Snake Weed (*Stachytarpheta cayennensis*), Dwarf Poinsettia (*Euphorbia cyathophora*), Corky Passion Flower (*Passiflora suberosa*), Rubber Vine (*Cryptostegia grandiflora*), Siratro (*Macroptilium atropurpureum*), Canadian Fleabane (*Conyza bonariensis*), American Rat's Tail Grass (*Sporobolus jacquemontii*), Woolly Rattlepod (*Crotalaria incana*), and Lantana (*Lantana camara*). This vegetation community was subject to low cattle disturbance and edge effects from adjacent access tracks.

Plate 1. Remnant *Eucalyptus crebra* woodland

6.1.2.2 Regrowth Eucalyptus crebra Woodland

This vegetation community occurs on deformed and metamorphosed sediments with interbedded volcanics and occurs as woodland (**Plate 2**). The vegetation community is dominated by Narrow-leaved Ironbark with sub-dominant Moreton Bay Ash and Queensland Bluegum with a median canopy height range of 17-17.5 m and a canopy cover range of 11-12%. A very-sparse sub-canopy always occurred and included Narrow-leaved

Ironbark, Moreton Bay Ash, and Queensland Bluegum with a median height range of 6-7 m and a median cover range of 4-5%.

A very-sparse to sparse shrub layer always occurred and included Spiked Sida and Catkin Wattle with a median height range of 1.2-2.4 m and a median canopy cover range of 2-20%.

A dense ground layer was dominated by native tussock grasses with sub-dominant native forbs and was comprised of Pitted Bluegrass, Hairy Panic, Barbed-wire Grass, Wiregrass, Black Spear Grass, Slender Bamboo Grass, Kangaroo Grass, Fuzzweed, Rusty Glycine, and Rycho (*Rhynchosia minima*) with a median height range of 0.7-1.1 m and a median cover range of 90-95%.

Non-native plant cover occurred at 5% and included Shrubby Stylo, Cobbler's Pegs, Canadian Fleabane, Balloon Cotton Bush (*Gomphocarpus physocarpus*). The vegetation community was subject to disturbance resulting from historical land clearing.

Plate 2. Regrowth *Eucalyptus crebra* woodland

6.1.2.3 Remnant *Eucalyptus tereticornis* Fringing Woodland

This vegetation community occurs along alluvial drainage line and varies from woodland to open-forest (**Plate 3**). The vegetation community is dominated by Queensland Bluegum with sub-dominant Moreton Bay Ash and Narrow-leaved Ironbark with a mean height range of 20-21 m and a median canopy cover range of 24-40%. A very-sparse sub-canopy always occurred and included Queensland Bluegum and Moreton Bay Ash with a median height range of 5-9 m and a median cover range of 1-10%.

A very-sparse shrub layer always occurred and was comprised of Tuckeroo (*Cupaniopsis anacardioides*), Currantbush (*Carissa ovata*) and Dysentery Plant with a median height range of 1.2-1.8 m and a median cover of 1%. A secondary low-shrub layer sometimes occurred and was comprised of Dysentery Plant.

A mid-dense to dense ground layer was dominated by native tussock grasses and herbs including Slender Bamboo Grass, Pitted Bluegrass, Black Speargrass, Reedgrass (*Arundinella nepalensis*), Fuzzweed, High Sida, Common Rush (*Juncus usitatus*), Slender Sedge and Woolly Rattlepod with a median height range of 0.5-1.5m and a median cover range of 60-80%.

Non-native plant cover was sparse and comprised of Shrubby Stylo, Lantana, Canadian Fleabane, Corky Passion Flower, Siratro, Cayenne Snake Weed, Noogoora Burr (*Xanthium occidentale*), Argentine Peppercress (*Lepidium bonariense*), and Castor Oil Bush (*Ricinus communis*) with a median cover of 10%. This vegetation community was subject to disturbance from wash-out erosion and Feral Pig (*Sus scrofa*) rooting and wallowing.

Plate 3. Remnant *Eucalyptus tereticornis* fringing woodland

6.1.2.4 Disturbed Non-remnant Vegetation

This vegetation community occurs as a grassland dominated by native tussock grasses although it is not considered analogous to any RE type (**Plate 4**). A sparse, low, emergent shrub layer is comprised of Australian Indigo (*Indigofera australis*) with a median height of 0.6 m and a median cover of 2%. A sparse ground layer was dominated by native tussock grasses including Pitted Blue Grass, Black Speargrass, Queensland Wiregrass, Hairy Panic, and Narrow-leaved Indigo (*Indigofera linifolia*) with a median height of 0.3 m and a median cover of 20%.

Non-native plant cover was sparse and comprised of Cayenne Snake Weed, Shrubby Stylo, and Blue Billygoat Weed (*Ageratum houstonianum*) with a median cover of 25%.

This vegetation community was subject to very high level of current and historical disturbance including cattle grazing, land clearing, and mining operations (i.e. stock piles and laydowns).

Plate 4. Disturbed non-remnant vegetation

6.1.3 Conservation Significant Flora

The likelihood of occurrence assessment for conservation significant flora species identified in database searches determined that no conservation significant flora species are considered likely to occur within the Project area (**Table 6**). Two flora species area considered a possible occurrence within the Project area:

- *Cassinia collina*
- *Cycas megacarpa*

The remaining flora species area considered unlikely to occur within the Project area and are not considered further in the report.

Table 6. Likelihood of occurrence assessment of conservation significant flora species

Species	Distribution and habitat	Likelihood of occurrence
Acacia sp. (Castletower N. Gibson TO1345) NC Act: V	The species is endemic to Queensland and in restricted to a single known population in the Mt Castletower area along a stream order 3 waterway (Queensland Herbarium 2011a). The single known population occurs in riverine vegetation at 45 m ASL (Halford 2011).	**Unlikely**. Suitable riverine habitat does not occur within the Project area. The nearest historical record of the species is located 9 km southeast of the Project area (ALA 2025).
Acacia eremophiloides NC Act: V	This species is a resinous shrub which grows in shallow well-drained sandy soils on exposed granite ridges at altitudes between 460-550 m. The species occurs in a small isolated population restricted to a distribution range of less than 10 km, in the Burnett Pastoral District of south-eastern Queensland, located 46 km south southwest of Gayndah (DCCEWW 2025).	**Unlikely.** The species has a highly restricted range located over 200 km southwest of the Project area (ALA 2025). The nearest unverified record is located 20 km southwest of the Project area which does not align with its known distribution and is likely incorrectly recorded (ALA 2025).
Bergera crenulata (Turcz.) F.J.Mou NC Act – CR	The species is in the *Rutaceae* family and is a small shrub or tree. The species distribution in Australia is restricted to isolated and scattered records recorded as far north as Goodedulla National Park northwest of Rockhampton and as far south as Gatton in southeast Queensland.	**Unlikely.** The species only occurs in scattered and isolated locations, the closest record is located 15 km south-southeast of the Project area (ALA 2025).
Cassinia collina NC Act: V	The species occurs three locations including Mount Walsh NP, Wongi SF and Mt Stanley (Queensland Herbarium 2011b). Suitable habitat for the species includes open forest on stony soils or sandy loams, along rocky creek banks in fine-grained granite, tall woodland with *Eucalyptus dura, Corymbia trachyphloia* and *Acacia blakei*, and woodland dominated by *Corymbia citriodora, E, acmenoides, C. trachyphloia* and *E. crebra* on shallow sandy soils (Queensland Herbarium 2011b).	**Possible**. Suitable habitat occurs within the Project area in the form of remnant woodland on stony granite soils, however the nearest historical record occurs 14 km southeast of the Project area (ALA 2025).
Cudgerie (*Hernandia bivalvis*) NC Act: NT	This species is restricted to the central coastal and south-east Queensland, between Dryander Creek south to Mt Tamborine. It has also been recorded from Mt Colosseum National Park (DESI 2024). This species grows in vine thicket, microphyll vine forest, or rainforests on rock pavements and outcrops with shallow soils. It occurs up to 620 m altitude (DESI 2024).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest historical record of the species is located 21 km southeast of the Project area (ALA 2025).
Cycas megacarpa NC Act: E	This species is endemic to south-east Queensland. It is found from as far south as Woolooga to Bouldercombe in the north (Queensland Herbarium 2007). This species is found in woodland, open woodland and open forests, often in conjunction with a grassy understory, as well as on the edge of rainforest habitat. Associated species included *Eucalyptus crebra* and *Corymbia citriodora* as well as *Corymbia erythrophloia*, *Eucalyptus melanophloia* and *Lophostemon confertus* (Queensland Herbarium 2007).	**Possible**. Suitable habitat for the species occurs within the Project area in the form of remnant woodland and open-forest with a grassy understorey. The nearest historical record of the species is located 24 km southwest of the Project area (ALA 2025).
Dansiea elliptica NC Act: NT	The species is known to occur across two disjunct regions including the Wet Tropic of NE Qld and central Queensland (Queensland Herbarium 2012a). Suitable habitat for the species includes lowland dry rainforest and vine thicket communities (Queensland Herbarium 2012a).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. No historical records of the species occur within 25 km of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Discolorous-leaved Ironbark (*Eucalyptus decolor*) NC Act: NT	This species is restricted to Queensland. It is distributed as far north as Castle Tower National Park (north west of Miriam Vale) to south to the ranges south of Biggenden (Mount Walsh National Park). The species occurs within Castle Tower National Park; Many Peaks Range; Eurimbula National Park; Gongiberoo Range; and Mt Walsh National Park, near Biggenden (DESI 2024). This species grows in open forest or open tall woodland on ridges, crest or steep slopes on grey loams or shallow soils derived from granite or sandstone from 160 to 550 metres above sea-level. Associated species include: C*orymbia citriodora, C. trachyphloia subsp. trachyphloia, Eucalyptus major, E. moluccana, E. acmenoides, E. montivaga, E. exserta, Allocasuarina littoralis, Lophostemon confertus, Leptospermum neglectum, Pomaderris argyrophylla, Arundinella nepalensis* and *Eremochloa bimaculata*, and *E. montivaga.*	**Unlikely**. The Project area is beyond the known distribution of the species and suitable habitat in the form of open forest or open tall woodland on ridges, crest or steep slopes does not occur within the Project area. The nearest historical record of the species is located 6 km southeast of the Project area (ALA 2025).
Graptophyllum excelsum	The species occurs across the coastal regions of northern and southern Queensland (Queensland Herbarium 2012b). Suitable habitat for the species includes semi-evergreen vine thickets and grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* (Queensland Herbarium 2012b).	**Unlikely**. Suitable habitat for the species in the form of semi-evergreen vine thickets or grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* do not occur within the Project area. The nearest historical record of the species is located 16 km north of the Project area (ALA 2025).
Grevillea (*Grevillea venusta*)	The species is restricted to central eastern Queensland, where it occurs in coastal areas from Many Peaks Range to Shoalwater Bay (Makinson, 2000). Suitable habitat for the species includes rocky areas at the foot of mountains, along drainage lines in sandy soil, and forests and woodlands on granite. Suitable vegetation communities include *Eucalyptus acmenoides*, *Corymbia trachyphloia*, *Eucalyptus exserta* open forest on shallow rocky soil with granite, and open forest with *Corymbia intermedia*, *Syncarpia glomulifera* and *Eucalyptus acmenoides*.	**Unlikely**. Habitat with suitable vegetation communities does not occur within the Project area. Historical records include 17 occurrence records within 25 km of the Project area with the nearest record located 6 km southeast of the Project area (ALA 2025).
Macropteranthes leiocaulis NC Act: NT	*Macropteranthes leiocaulis* grows in vine thickets and dry rainforest from approximately Gayndah to Townsville (Harden et al 2018).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest historical record occurs 19 km north north-east of the Project area (ALAL 2025).
Many Peaks Apatophyllum (*Apatophyllum olsenii*) NC Act: E	This species is known from three localities in the Many Peak Range, south of Gladstone, Queensland. Two populations occur in the vicinity of Castle Tower National Park (NP). One population occurs in the NP on the east slopes of Many Peaks Range and contains six plants. The other population occurs just out of the Park, west of Castletower Mountain, and is described as small. The third population occurs about 40 km to the south of Castle Tower NP (DEWHA, 2008). This species inhabits granite ridges and granite boulder outcrops in open forest or tall shrubland with *Eucalyptus exserta, Lophostemon confertus, and Xanthorrhoea johnsonii* (DEWHA, 2008a).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. Historical records of the species include four records 6.5-9 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Narrow-leaved Mallettwood (*Rhodamnia angustifolia*) NC Act: CR	The species is known from a single location at the head of Cedar Creek along a single ridgetop and subtending slopes in the Wietalaba National Park, 45 km south of Gladstone (Queensland Herbarium 2012c). Suitable habitat for the species includes microphyll vineforest with *Backhousia subargentea, Barklya syringifolia, Archidendropsis thozetiana, Backhousia kingii, Sterculia quadrifida, Mallotus philippensis, Croton stigmatosus* and *Araucaria cunninghamii* as the dominant tree species. The substrate is reddish or brown loam from mudstones of Muncon volcanics. The elevation range is from 200 to 560 metres (Snow and Guymer, 1999).	**Unlikely**. Suitable habitat for the species in the form of microphyll vine forest does not occur within the Project area. The nearest historical record is located 18 km south-southwest of the Project area (ALA 2025).
Parsonsia kroombitensis NC Act: V	The species occurs in central east Queensland at Kroombit Tops NP, Boyne Range SF and Cania Gorge NP north-west of Monto (Wang 1998, William 1996). Suitable habitat for the species includes low shrubby woodland and open shrubland along the escarpments of deep valleys, outcrops of acidic volcanic rocks and on skeletal soils derived from sandstone (Queensland Herbarium 2011c).	**Unlikely**. Suitable habitat for the species in the form of low shrubby woodland or open shrubland does not occur within the Project area. The nearest historical record is located 3 km west of the Project area (ALA 2025).
Rib-fruited Malletwood (*Rhodamnia dumicola*) NC Act: E	Occurs in sub-coastal dry rainforest communities from Beenleigh north to the Gladstone area (Leiper et al. 2014, ALA 2022).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest record of the species is 20 km northeast of the Project area (ALA 2025)
Scarlet Fuchsia (*Graptophyllum excelsum*) NC Act: NT	The species occurs across the coastal regions of northern and southern Queensland (Queensland Herbarium 2012c). Suitable habitat for the species includes semi-evergreen vine thickets and grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* (Queensland Herbarium 2012c).	**Unlikely**. Suitable habitat for the species in the form of semi-evergreen vine thickets or grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* do not occur within the Project area. The nearest historical record of the specie is located 16 km north of the Project area (ALA 2025).
Scleromitrion gibsonii NC Act: E	The species is restricted to an area west of Miriam Vale in central Queensland where it is known to occur in Araucarian microphyll vineforest and dry rainforest (DES 2023).	**Unlikely**. Suitable habitat for the species in the form of *Araucarian* microphyll vine forest and dry rainforest do not occur within the Project area. The nearest historical record of the species is located 18 km south-southwest of the Project area (ALA 2025).
Scrub Ironbark (*Rhodamnia spongiosa*) NC Act: CR	The species is a rainforest tree or shrub which occurs in North and Central east Queensland as well as the Cape York Peninsula. Scrub Ironbark occurs as an understory tree in a variety of established drier rainforest environments and is commonly associated with Kauri Pine (*Agathis robusta)* (Zich et al 2020).	**Unlikely**. Suitable habitat for the species in the form of dry rainforest and Kauri Pine do not occur within the Project area. The nearest record of the species is located 20 km northeast of the Project area (ALA 2025).
Smooth Malletwood (*Rhodamnia glabrescens*) NC Act: NT	The species is known to occur around the districted of Miriam Vale, Mt Boogooramunya and Proserpine (Harden et al 2018). Suitable habitat for the species includes dry rainforest and subtropical rainforest (Harden et al 2018).	**Unlikely**. Suitable habitat for the species in the form of rainforest does not occur within the Project area. The nearest historical record of the species is located 20 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Southern Penda (*Xanthostemon oppositifolius*)	The species is distributed from Miriam Vale in the north to Noosa Heads in the south (ALA 2024). Suitable habitat for the species includes notophyll and microphyll vineforest and wet sclerophyll forest (DESI 2024).	**Unlikely**. Suitable vineforest habitat does not occur within the Project area. There are no historical records within 25 km with the nearest record located 57 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Acacia sp. (Castletower N. Gibson TO1345) NC Act: V	The species is endemic to Queensland and in restricted to a single known population in the Mt Castletower area along a stream order 3 waterway (Queensland Herbarium 2011a). The single known population occurs in riverine vegetation at 45 m ASL (Halford 2011).	**Unlikely**. Suitable riverine habitat does not occur within the Project area. The nearest historical record of the species is located 9 km southeast of the Project area (ALA 2025).
Acacia eremophiloides NC Act: V	This species is a resinous shrub which grows in shallow well-drained sandy soils on exposed granite ridges at altitudes between 460-550 m. The species occurs in a small isolated population restricted to a distribution range of less than 10 km, in the Burnett Pastoral District of south-eastern Queensland, located 46 km south southwest of Gayndah (DCCEWW 2025).	**Unlikely.** The species has a highly restricted range located over 200 km southwest of the Project area (ALA 2025). The nearest unverified record is located 20 km southwest of the Project area which does not align with its known distribution and is likely incorrectly recorded (ALA 2025).
Bergera crenulata (Turcz.) F.J.Mou NC Act – CR	The species is in the *Rutaceae* family and is a small shrub or tree. The species distribution in Australia is restricted to isolated and scattered records recorded as far north as Goodedulla National Park northwest of Rockhampton and as far south as Gatton in southeast Queensland.	**Unlikely.** The species only occurs in scattered and isolated locations, the closest record is located 15 km south-southeast of the Project area (ALA 2025).
Cassinia collina NC Act: V	The species occurs three locations including Mount Walsh NP, Wongi SF and Mt Stanley (Queensland Herbarium 2011b). Suitable habitat for the species includes open forest on stony soils or sandy loams, along rocky creek banks in fine-grained granite, tall woodland with *Eucalyptus dura, Corymbia trachyphloia* and *Acacia blakei*, and woodland dominated by *Corymbia citriodora, E, acmenoides, C. trachyphloia* and *E. crebra* on shallow sandy soils (Queensland Herbarium 2011b).	**Possible**. Suitable habitat occurs within the Project area in the form of remnant woodland on stony granite soils, however the nearest historical record occurs 14 km southeast of the Project area (ALA 2025).
Cudgerie (*Hernandia bivalvis*) NC Act: NT	This species is restricted to the central coastal and south-east Queensland, between Dryander Creek south to Mt Tamborine. It has also been recorded from Mt Colosseum National Park (DESI 2024). This species grows in vine thicket, microphyll vine forest, or rainforests on rock pavements and outcrops with shallow soils. It occurs up to 620 m altitude (DESI 2024).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest historical record of the species is located 21 km southeast of the Project area (ALA 2025).
Cycas megacarpa NC Act: E	This species is endemic to south-east Queensland. It is found from as far south as Woolooga to Bouldercombe in the north (Queensland Herbarium 2007). This species is found in woodland, open woodland and open forests, often in conjunction with a grassy understory, as well as on the edge of rainforest habitat. Associated species included *Eucalyptus crebra* and *Corymbia citriodora* as well as *Corymbia erythrophloia*, *Eucalyptus melanophloia* and *Lophostemon confertus* (Queensland Herbarium 2007).	**Possible**. Suitable habitat for the species occurs within the Project area in the form of remnant woodland and open-forest with a grassy understorey. The nearest historical record of the species is located 24 km southwest of the Project area (ALA 2025).
Dansiea elliptica NC Act: NT	The species is known to occur across two disjunct regions including the Wet Tropic of NE Qld and central Queensland (Queensland Herbarium 2012a). Suitable habitat for the species includes lowland dry rainforest and vine thicket communities (Queensland Herbarium 2012a).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. No historical records of the species occur within 25 km of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Discolorous-leaved Ironbark (*Eucalyptus decolor*) NC Act: NT	This species is restricted to Queensland. It is distributed as far north as Castle Tower National Park (north west of Miriam Vale) to south to the ranges south of Biggenden (Mount Walsh National Park). The species occurs within Castle Tower National Park; Many Peaks Range; Eurimbula National Park; Gongiberoo Range; and Mt Walsh National Park, near Biggenden (DESI 2024). This species grows in open forest or open tall woodland on ridges, crest or steep slopes on grey loams or shallow soils derived from granite or sandstone from 160 to 550 metres above sea-level. Associated species include: C*orymbia citriodora, C. trachyphloia subsp. trachyphloia, Eucalyptus major, E. moluccana, E. acmenoides, E. montivaga, E. exserta, Allocasuarina littoralis, Lophostemon confertus, Leptospermum neglectum, Pomaderris argyrophylla, Arundinella nepalensis* and *Eremochloa bimaculata*, and *E. montivaga.*	**Unlikely**. The Project area is beyond the known distribution of the species and suitable habitat in the form of open forest or open tall woodland on ridges, crest or steep slopes does not occur within the Project area. The nearest historical record of the species is located 6 km southeast of the Project area (ALA 2025).
Graptophyllum excelsum	The species occurs across the coastal regions of northern and southern Queensland (Queensland Herbarium 2012b). Suitable habitat for the species includes semi-evergreen vine thickets and grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* (Queensland Herbarium 2012b).	**Unlikely**. Suitable habitat for the species in the form of semi-evergreen vine thickets or grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* do not occur within the Project area. The nearest historical record of the species is located 16 km north of the Project area (ALA 2025).
Grevillea (*Grevillea venusta*)	The species is restricted to central eastern Queensland, where it occurs in coastal areas from Many Peaks Range to Shoalwater Bay (Makinson, 2000). Suitable habitat for the species includes rocky areas at the foot of mountains, along drainage lines in sandy soil, and forests and woodlands on granite. Suitable vegetation communities include *Eucalyptus acmenoides*, *Corymbia trachyphloia*, *Eucalyptus exserta* open forest on shallow rocky soil with granite, and open forest with *Corymbia intermedia*, *Syncarpia glomulifera* and *Eucalyptus acmenoides*.	**Unlikely**. Habitat with suitable vegetation communities does not occur within the Project area. Historical records include 17 occurrence records within 25 km of the Project area with the nearest record located 6 km southeast of the Project area (ALA 2025).
Macropteranthes leiocaulis NC Act: NT	*Macropteranthes leiocaulis* grows in vine thickets and dry rainforest from approximately Gayndah to Townsville (Harden et al 2018).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest historical record occurs 19 km north north-east of the Project area (ALAL 2025).
Many Peaks Apatophyllum (*Apatophyllum olsenii*) NC Act: E	This species is known from three localities in the Many Peak Range, south of Gladstone, Queensland. Two populations occur in the vicinity of Castle Tower National Park (NP). One population occurs in the NP on the east slopes of Many Peaks Range and contains six plants. The other population occurs just out of the Park, west of Castletower Mountain, and is described as small. The third population occurs about 40 km to the south of Castle Tower NP (DEWHA, 2008). This species inhabits granite ridges and granite boulder outcrops in open forest or tall shrubland with *Eucalyptus exserta, Lophostemon confertus, and Xanthorrhoea johnsonii* (DEWHA, 2008a).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. Historical records of the species include four records 6.5-9 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Narrow-leaved Mallettwood (*Rhodamnia angustifolia*) NC Act: CR	The species is known from a single location at the head of Cedar Creek along a single ridgetop and subtending slopes in the Wietalaba National Park, 45 km south of Gladstone (Queensland Herbarium 2012c). Suitable habitat for the species includes microphyll vineforest with *Backhousia subargentea, Barklya syringifolia, Archidendropsis thozetiana, Backhousia kingii, Sterculia quadrifida, Mallotus philippensis, Croton stigmatosus* and *Araucaria cunninghamii* as the dominant tree species. The substrate is reddish or brown loam from mudstones of Muncon volcanics. The elevation range is from 200 to 560 metres (Snow and Guymer, 1999).	**Unlikely**. Suitable habitat for the species in the form of microphyll vine forest does not occur within the Project area. The nearest historical record is located 18 km south-southwest of the Project area (ALA 2025).
Parsonsia kroombitensis NC Act: V	The species occurs in central east Queensland at Kroombit Tops NP, Boyne Range SF and Cania Gorge NP north-west of Monto (Wang 1998, William 1996). Suitable habitat for the species includes low shrubby woodland and open shrubland along the escarpments of deep valleys, outcrops of acidic volcanic rocks and on skeletal soils derived from sandstone (Queensland Herbarium 2011c).	**Unlikely**. Suitable habitat for the species in the form of low shrubby woodland or open shrubland does not occur within the Project area. The nearest historical record is located 3 km west of the Project area (ALA 2025).
Rib-fruited Malletwood (*Rhodamnia dumicola*) NC Act: E	Occurs in sub-coastal dry rainforest communities from Beenleigh north to the Gladstone area (Leiper et al. 2014, ALA 2022).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest record of the species is 20 km northeast of the Project area (ALA 2025)
Scarlet Fuchsia (*Graptophyllum excelsum*) NC Act: NT	The species occurs across the coastal regions of northern and southern Queensland (Queensland Herbarium 2012c). Suitable habitat for the species includes semi-evergreen vine thickets and grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* (Queensland Herbarium 2012c).	**Unlikely**. Suitable habitat for the species in the form of semi-evergreen vine thickets or grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* do not occur within the Project area. The nearest historical record of the specie is located 16 km north of the Project area (ALA 2025).
Scleromitrion gibsonii NC Act: E	The species is restricted to an area west of Miriam Vale in central Queensland where it is known to occur in Araucarian microphyll vineforest and dry rainforest (DES 2023).	**Unlikely**. Suitable habitat for the species in the form of *Araucarian* microphyll vine forest and dry rainforest do not occur within the Project area. The nearest historical record of the species is located 18 km south-southwest of the Project area (ALA 2025).
Scrub Ironbark (*Rhodamnia spongiosa*) NC Act: CR	The species is a rainforest tree or shrub which occurs in North and Central east Queensland as well as the Cape York Peninsula. Scrub Ironbark occurs as an understory tree in a variety of established drier rainforest environments and is commonly associated with Kauri Pine (*Agathis robusta)* (Zich et al 2020).	**Unlikely**. Suitable habitat for the species in the form of dry rainforest and Kauri Pine do not occur within the Project area. The nearest record of the species is located 20 km northeast of the Project area (ALA 2025).
Smooth Malletwood (*Rhodamnia glabrescens*) NC Act: NT	The species is known to occur around the districted of Miriam Vale, Mt Boogooramunya and Proserpine (Harden et al 2018). Suitable habitat for the species includes dry rainforest and subtropical rainforest (Harden et al 2018).	**Unlikely**. Suitable habitat for the species in the form of rainforest does not occur within the Project area. The nearest historical record of the species is located 20 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Southern Penda (*Xanthostemon oppositifolius*)	The species is distributed from Miriam Vale in the north to Noosa Heads in the south (ALA 2024). Suitable habitat for the species includes notophyll and microphyll vineforest and wet sclerophyll forest (DESI 2024).	**Unlikely**. Suitable vineforest habitat does not occur within the Project area. There are no historical records within 25 km with the nearest record located 57 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Acacia sp. (Castletower N. Gibson TO1345) NC Act: V	The species is endemic to Queensland and in restricted to a single known population in the Mt Castletower area along a stream order 3 waterway (Queensland Herbarium 2011a). The single known population occurs in riverine vegetation at 45 m ASL (Halford 2011).	**Unlikely**. Suitable riverine habitat does not occur within the Project area. The nearest historical record of the species is located 9 km southeast of the Project area (ALA 2025).
Acacia eremophiloides NC Act: V	This species is a resinous shrub which grows in shallow well-drained sandy soils on exposed granite ridges at altitudes between 460-550 m. The species occurs in a small isolated population restricted to a distribution range of less than 10 km, in the Burnett Pastoral District of south-eastern Queensland, located 46 km south southwest of Gayndah (DCCEWW 2025).	**Unlikely.** The species has a highly restricted range located over 200 km southwest of the Project area (ALA 2025). The nearest unverified record is located 20 km southwest of the Project area which does not align with its known distribution and is likely incorrectly recorded (ALA 2025).
Bergera crenulata (Turcz.) F.J.Mou NC Act – CR	The species is in the *Rutaceae* family and is a small shrub or tree. The species distribution in Australia is restricted to isolated and scattered records recorded as far north as Goodedulla National Park northwest of Rockhampton and as far south as Gatton in southeast Queensland.	**Unlikely.** The species only occurs in scattered and isolated locations, the closest record is located 15 km south-southeast of the Project area (ALA 2025).
Cassinia collina NC Act: V	The species occurs three locations including Mount Walsh NP, Wongi SF and Mt Stanley (Queensland Herbarium 2011b). Suitable habitat for the species includes open forest on stony soils or sandy loams, along rocky creek banks in fine-grained granite, tall woodland with *Eucalyptus dura, Corymbia trachyphloia* and *Acacia blakei*, and woodland dominated by *Corymbia citriodora, E, acmenoides, C. trachyphloia* and *E. crebra* on shallow sandy soils (Queensland Herbarium 2011b).	**Possible**. Suitable habitat occurs within the Project area in the form of remnant woodland on stony granite soils, however the nearest historical record occurs 14 km southeast of the Project area (ALA 2025).
Cudgerie (*Hernandia bivalvis*) NC Act: NT	This species is restricted to the central coastal and south-east Queensland, between Dryander Creek south to Mt Tamborine. It has also been recorded from Mt Colosseum National Park (DESI 2024). This species grows in vine thicket, microphyll vine forest, or rainforests on rock pavements and outcrops with shallow soils. It occurs up to 620 m altitude (DESI 2024).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest historical record of the species is located 21 km southeast of the Project area (ALA 2025).
Cycas megacarpa NC Act: E	This species is endemic to south-east Queensland. It is found from as far south as Woolooga to Bouldercombe in the north (Queensland Herbarium 2007). This species is found in woodland, open woodland and open forests, often in conjunction with a grassy understory, as well as on the edge of rainforest habitat. Associated species included *Eucalyptus crebra* and *Corymbia citriodora* as well as *Corymbia erythrophloia*, *Eucalyptus melanophloia* and *Lophostemon confertus* (Queensland Herbarium 2007).	**Possible**. Suitable habitat for the species occurs within the Project area in the form of remnant woodland and open-forest with a grassy understorey. The nearest historical record of the species is located 24 km southwest of the Project area (ALA 2025).
Dansiea elliptica NC Act: NT	The species is known to occur across two disjunct regions including the Wet Tropic of NE Qld and central Queensland (Queensland Herbarium 2012a). Suitable habitat for the species includes lowland dry rainforest and vine thicket communities (Queensland Herbarium 2012a).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. No historical records of the species occur within 25 km of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Discolorous-leaved Ironbark (*Eucalyptus decolor*) NC Act: NT	This species is restricted to Queensland. It is distributed as far north as Castle Tower National Park (north west of Miriam Vale) to south to the ranges south of Biggenden (Mount Walsh National Park). The species occurs within Castle Tower National Park; Many Peaks Range; Eurimbula National Park; Gongiberoo Range; and Mt Walsh National Park, near Biggenden (DESI 2024). This species grows in open forest or open tall woodland on ridges, crest or steep slopes on grey loams or shallow soils derived from granite or sandstone from 160 to 550 metres above sea-level. Associated species include: C*orymbia citriodora, C. trachyphloia subsp. trachyphloia, Eucalyptus major, E. moluccana, E. acmenoides, E. montivaga, E. exserta, Allocasuarina littoralis, Lophostemon confertus, Leptospermum neglectum, Pomaderris argyrophylla, Arundinella nepalensis* and *Eremochloa bimaculata*, and *E. montivaga.*	**Unlikely**. The Project area is beyond the known distribution of the species and suitable habitat in the form of open forest or open tall woodland on ridges, crest or steep slopes does not occur within the Project area. The nearest historical record of the species is located 6 km southeast of the Project area (ALA 2025).
Graptophyllum excelsum	The species occurs across the coastal regions of northern and southern Queensland (Queensland Herbarium 2012b). Suitable habitat for the species includes semi-evergreen vine thickets and grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* (Queensland Herbarium 2012b).	**Unlikely**. Suitable habitat for the species in the form of semi-evergreen vine thickets or grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* do not occur within the Project area. The nearest historical record of the species is located 16 km north of the Project area (ALA 2025).
Grevillea (*Grevillea venusta*)	The species is restricted to central eastern Queensland, where it occurs in coastal areas from Many Peaks Range to Shoalwater Bay (Makinson, 2000). Suitable habitat for the species includes rocky areas at the foot of mountains, along drainage lines in sandy soil, and forests and woodlands on granite. Suitable vegetation communities include *Eucalyptus acmenoides*, *Corymbia trachyphloia*, *Eucalyptus exserta* open forest on shallow rocky soil with granite, and open forest with *Corymbia intermedia*, *Syncarpia glomulifera* and *Eucalyptus acmenoides*.	**Unlikely**. Habitat with suitable vegetation communities does not occur within the Project area. Historical records include 17 occurrence records within 25 km of the Project area with the nearest record located 6 km southeast of the Project area (ALA 2025).
Macropteranthes leiocaulis NC Act: NT	*Macropteranthes leiocaulis* grows in vine thickets and dry rainforest from approximately Gayndah to Townsville (Harden et al 2018).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest historical record occurs 19 km north north-east of the Project area (ALAL 2025).
Many Peaks Apatophyllum (*Apatophyllum olsenii*) NC Act: E	This species is known from three localities in the Many Peak Range, south of Gladstone, Queensland. Two populations occur in the vicinity of Castle Tower National Park (NP). One population occurs in the NP on the east slopes of Many Peaks Range and contains six plants. The other population occurs just out of the Park, west of Castletower Mountain, and is described as small. The third population occurs about 40 km to the south of Castle Tower NP (DEWHA, 2008). This species inhabits granite ridges and granite boulder outcrops in open forest or tall shrubland with *Eucalyptus exserta, Lophostemon confertus, and Xanthorrhoea johnsonii* (DEWHA, 2008a).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. Historical records of the species include four records 6.5-9 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Narrow-leaved Mallettwood (*Rhodamnia angustifolia*) NC Act: CR	The species is known from a single location at the head of Cedar Creek along a single ridgetop and subtending slopes in the Wietalaba National Park, 45 km south of Gladstone (Queensland Herbarium 2012c). Suitable habitat for the species includes microphyll vineforest with *Backhousia subargentea, Barklya syringifolia, Archidendropsis thozetiana, Backhousia kingii, Sterculia quadrifida, Mallotus philippensis, Croton stigmatosus* and *Araucaria cunninghamii* as the dominant tree species. The substrate is reddish or brown loam from mudstones of Muncon volcanics. The elevation range is from 200 to 560 metres (Snow and Guymer, 1999).	**Unlikely**. Suitable habitat for the species in the form of microphyll vine forest does not occur within the Project area. The nearest historical record is located 18 km south-southwest of the Project area (ALA 2025).
Parsonsia kroombitensis NC Act: V	The species occurs in central east Queensland at Kroombit Tops NP, Boyne Range SF and Cania Gorge NP north-west of Monto (Wang 1998, William 1996). Suitable habitat for the species includes low shrubby woodland and open shrubland along the escarpments of deep valleys, outcrops of acidic volcanic rocks and on skeletal soils derived from sandstone (Queensland Herbarium 2011c).	**Unlikely**. Suitable habitat for the species in the form of low shrubby woodland or open shrubland does not occur within the Project area. The nearest historical record is located 3 km west of the Project area (ALA 2025).
Rib-fruited Malletwood (*Rhodamnia dumicola*) NC Act: E	Occurs in sub-coastal dry rainforest communities from Beenleigh north to the Gladstone area (Leiper et al. 2014, ALA 2022).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest record of the species is 20 km northeast of the Project area (ALA 2025)
Scarlet Fuchsia (*Graptophyllum excelsum*) NC Act: NT	The species occurs across the coastal regions of northern and southern Queensland (Queensland Herbarium 2012c). Suitable habitat for the species includes semi-evergreen vine thickets and grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* (Queensland Herbarium 2012c).	**Unlikely**. Suitable habitat for the species in the form of semi-evergreen vine thickets or grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* do not occur within the Project area. The nearest historical record of the specie is located 16 km north of the Project area (ALA 2025).
Scleromitrion gibsonii NC Act: E	The species is restricted to an area west of Miriam Vale in central Queensland where it is known to occur in Araucarian microphyll vineforest and dry rainforest (DES 2023).	**Unlikely**. Suitable habitat for the species in the form of *Araucarian* microphyll vine forest and dry rainforest do not occur within the Project area. The nearest historical record of the species is located 18 km south-southwest of the Project area (ALA 2025).
Scrub Ironbark (*Rhodamnia spongiosa*) NC Act: CR	The species is a rainforest tree or shrub which occurs in North and Central east Queensland as well as the Cape York Peninsula. Scrub Ironbark occurs as an understory tree in a variety of established drier rainforest environments and is commonly associated with Kauri Pine (*Agathis robusta)* (Zich et al 2020).	**Unlikely**. Suitable habitat for the species in the form of dry rainforest and Kauri Pine do not occur within the Project area. The nearest record of the species is located 20 km northeast of the Project area (ALA 2025).
Smooth Malletwood (*Rhodamnia glabrescens*) NC Act: NT	The species is known to occur around the districted of Miriam Vale, Mt Boogooramunya and Proserpine (Harden et al 2018). Suitable habitat for the species includes dry rainforest and subtropical rainforest (Harden et al 2018).	**Unlikely**. Suitable habitat for the species in the form of rainforest does not occur within the Project area. The nearest historical record of the species is located 20 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Southern Penda (*Xanthostemon oppositifolius*)	The species is distributed from Miriam Vale in the north to Noosa Heads in the south (ALA 2024). Suitable habitat for the species includes notophyll and microphyll vineforest and wet sclerophyll forest (DESI 2024).	**Unlikely**. Suitable vineforest habitat does not occur within the Project area. There are no historical records within 25 km with the nearest record located 57 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Acacia sp. (Castletower N. Gibson TO1345) NC Act: V	The species is endemic to Queensland and in restricted to a single known population in the Mt Castletower area along a stream order 3 waterway (Queensland Herbarium 2011a). The single known population occurs in riverine vegetation at 45 m ASL (Halford 2011).	**Unlikely**. Suitable riverine habitat does not occur within the Project area. The nearest historical record of the species is located 9 km southeast of the Project area (ALA 2025).
Acacia eremophiloides NC Act: V	This species is a resinous shrub which grows in shallow well-drained sandy soils on exposed granite ridges at altitudes between 460-550 m. The species occurs in a small isolated population restricted to a distribution range of less than 10 km, in the Burnett Pastoral District of south-eastern Queensland, located 46 km south southwest of Gayndah (DCCEWW 2025).	**Unlikely.** The species has a highly restricted range located over 200 km southwest of the Project area (ALA 2025). The nearest unverified record is located 20 km southwest of the Project area which does not align with its known distribution and is likely incorrectly recorded (ALA 2025).
Bergera crenulata (Turcz.) F.J.Mou NC Act – CR	The species is in the *Rutaceae* family and is a small shrub or tree. The species distribution in Australia is restricted to isolated and scattered records recorded as far north as Goodedulla National Park northwest of Rockhampton and as far south as Gatton in southeast Queensland.	**Unlikely.** The species only occurs in scattered and isolated locations, the closest record is located 15 km south-southeast of the Project area (ALA 2025).
Cassinia collina NC Act: V	The species occurs three locations including Mount Walsh NP, Wongi SF and Mt Stanley (Queensland Herbarium 2011b). Suitable habitat for the species includes open forest on stony soils or sandy loams, along rocky creek banks in fine-grained granite, tall woodland with *Eucalyptus dura, Corymbia trachyphloia* and *Acacia blakei*, and woodland dominated by *Corymbia citriodora, E, acmenoides, C. trachyphloia* and *E. crebra* on shallow sandy soils (Queensland Herbarium 2011b).	**Possible**. Suitable habitat occurs within the Project area in the form of remnant woodland on stony granite soils, however the nearest historical record occurs 14 km southeast of the Project area (ALA 2025).
Cudgerie (*Hernandia bivalvis*) NC Act: NT	This species is restricted to the central coastal and south-east Queensland, between Dryander Creek south to Mt Tamborine. It has also been recorded from Mt Colosseum National Park (DESI 2024). This species grows in vine thicket, microphyll vine forest, or rainforests on rock pavements and outcrops with shallow soils. It occurs up to 620 m altitude (DESI 2024).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest historical record of the species is located 21 km southeast of the Project area (ALA 2025).
Cycas megacarpa NC Act: E	This species is endemic to south-east Queensland. It is found from as far south as Woolooga to Bouldercombe in the north (Queensland Herbarium 2007). This species is found in woodland, open woodland and open forests, often in conjunction with a grassy understory, as well as on the edge of rainforest habitat. Associated species included *Eucalyptus crebra* and *Corymbia citriodora* as well as *Corymbia erythrophloia*, *Eucalyptus melanophloia* and *Lophostemon confertus* (Queensland Herbarium 2007).	**Possible**. Suitable habitat for the species occurs within the Project area in the form of remnant woodland and open-forest with a grassy understorey. The nearest historical record of the species is located 24 km southwest of the Project area (ALA 2025).
Dansiea elliptica NC Act: NT	The species is known to occur across two disjunct regions including the Wet Tropic of NE Qld and central Queensland (Queensland Herbarium 2012a). Suitable habitat for the species includes lowland dry rainforest and vine thicket communities (Queensland Herbarium 2012a).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. No historical records of the species occur within 25 km of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Discolorous-leaved Ironbark (*Eucalyptus decolor*) NC Act: NT	This species is restricted to Queensland. It is distributed as far north as Castle Tower National Park (north west of Miriam Vale) to south to the ranges south of Biggenden (Mount Walsh National Park). The species occurs within Castle Tower National Park; Many Peaks Range; Eurimbula National Park; Gongiberoo Range; and Mt Walsh National Park, near Biggenden (DESI 2024). This species grows in open forest or open tall woodland on ridges, crest or steep slopes on grey loams or shallow soils derived from granite or sandstone from 160 to 550 metres above sea-level. Associated species include: C*orymbia citriodora, C. trachyphloia subsp. trachyphloia, Eucalyptus major, E. moluccana, E. acmenoides, E. montivaga, E. exserta, Allocasuarina littoralis, Lophostemon confertus, Leptospermum neglectum, Pomaderris argyrophylla, Arundinella nepalensis* and *Eremochloa bimaculata*, and *E. montivaga.*	**Unlikely**. The Project area is beyond the known distribution of the species and suitable habitat in the form of open forest or open tall woodland on ridges, crest or steep slopes does not occur within the Project area. The nearest historical record of the species is located 6 km southeast of the Project area (ALA 2025).
Graptophyllum excelsum	The species occurs across the coastal regions of northern and southern Queensland (Queensland Herbarium 2012b). Suitable habitat for the species includes semi-evergreen vine thickets and grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* (Queensland Herbarium 2012b).	**Unlikely**. Suitable habitat for the species in the form of semi-evergreen vine thickets or grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* do not occur within the Project area. The nearest historical record of the species is located 16 km north of the Project area (ALA 2025).
Grevillea (*Grevillea venusta*)	The species is restricted to central eastern Queensland, where it occurs in coastal areas from Many Peaks Range to Shoalwater Bay (Makinson, 2000). Suitable habitat for the species includes rocky areas at the foot of mountains, along drainage lines in sandy soil, and forests and woodlands on granite. Suitable vegetation communities include *Eucalyptus acmenoides*, *Corymbia trachyphloia*, *Eucalyptus exserta* open forest on shallow rocky soil with granite, and open forest with *Corymbia intermedia*, *Syncarpia glomulifera* and *Eucalyptus acmenoides*.	**Unlikely**. Habitat with suitable vegetation communities does not occur within the Project area. Historical records include 17 occurrence records within 25 km of the Project area with the nearest record located 6 km southeast of the Project area (ALA 2025).
Macropteranthes leiocaulis NC Act: NT	*Macropteranthes leiocaulis* grows in vine thickets and dry rainforest from approximately Gayndah to Townsville (Harden et al 2018).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest historical record occurs 19 km north north-east of the Project area (ALAL 2025).
Many Peaks Apatophyllum (*Apatophyllum olsenii*) NC Act: E	This species is known from three localities in the Many Peak Range, south of Gladstone, Queensland. Two populations occur in the vicinity of Castle Tower National Park (NP). One population occurs in the NP on the east slopes of Many Peaks Range and contains six plants. The other population occurs just out of the Park, west of Castletower Mountain, and is described as small. The third population occurs about 40 km to the south of Castle Tower NP (DEWHA, 2008). This species inhabits granite ridges and granite boulder outcrops in open forest or tall shrubland with *Eucalyptus exserta, Lophostemon confertus, and Xanthorrhoea johnsonii* (DEWHA, 2008a).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. Historical records of the species include four records 6.5-9 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Narrow-leaved Mallettwood (*Rhodamnia angustifolia*) NC Act: CR	The species is known from a single location at the head of Cedar Creek along a single ridgetop and subtending slopes in the Wietalaba National Park, 45 km south of Gladstone (Queensland Herbarium 2012c). Suitable habitat for the species includes microphyll vineforest with *Backhousia subargentea, Barklya syringifolia, Archidendropsis thozetiana, Backhousia kingii, Sterculia quadrifida, Mallotus philippensis, Croton stigmatosus* and *Araucaria cunninghamii* as the dominant tree species. The substrate is reddish or brown loam from mudstones of Muncon volcanics. The elevation range is from 200 to 560 metres (Snow and Guymer, 1999).	**Unlikely**. Suitable habitat for the species in the form of microphyll vine forest does not occur within the Project area. The nearest historical record is located 18 km south-southwest of the Project area (ALA 2025).
Parsonsia kroombitensis NC Act: V	The species occurs in central east Queensland at Kroombit Tops NP, Boyne Range SF and Cania Gorge NP north-west of Monto (Wang 1998, William 1996). Suitable habitat for the species includes low shrubby woodland and open shrubland along the escarpments of deep valleys, outcrops of acidic volcanic rocks and on skeletal soils derived from sandstone (Queensland Herbarium 2011c).	**Unlikely**. Suitable habitat for the species in the form of low shrubby woodland or open shrubland does not occur within the Project area. The nearest historical record is located 3 km west of the Project area (ALA 2025).
Rib-fruited Malletwood (*Rhodamnia dumicola*) NC Act: E	Occurs in sub-coastal dry rainforest communities from Beenleigh north to the Gladstone area (Leiper et al. 2014, ALA 2022).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The nearest record of the species is 20 km northeast of the Project area (ALA 2025)
Scarlet Fuchsia (*Graptophyllum excelsum*) NC Act: NT	The species occurs across the coastal regions of northern and southern Queensland (Queensland Herbarium 2012c). Suitable habitat for the species includes semi-evergreen vine thickets and grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* (Queensland Herbarium 2012c).	**Unlikely**. Suitable habitat for the species in the form of semi-evergreen vine thickets or grassy woodland dominated by *Eucalyptus cullenii* and *Corymbia erythrophloia* do not occur within the Project area. The nearest historical record of the specie is located 16 km north of the Project area (ALA 2025).
Scleromitrion gibsonii NC Act: E	The species is restricted to an area west of Miriam Vale in central Queensland where it is known to occur in Araucarian microphyll vineforest and dry rainforest (DES 2023).	**Unlikely**. Suitable habitat for the species in the form of *Araucarian* microphyll vine forest and dry rainforest do not occur within the Project area. The nearest historical record of the species is located 18 km south-southwest of the Project area (ALA 2025).
Scrub Ironbark (*Rhodamnia spongiosa*) NC Act: CR	The species is a rainforest tree or shrub which occurs in North and Central east Queensland as well as the Cape York Peninsula. Scrub Ironbark occurs as an understory tree in a variety of established drier rainforest environments and is commonly associated with Kauri Pine (*Agathis robusta)* (Zich et al 2020).	**Unlikely**. Suitable habitat for the species in the form of dry rainforest and Kauri Pine do not occur within the Project area. The nearest record of the species is located 20 km northeast of the Project area (ALA 2025).
Smooth Malletwood (*Rhodamnia glabrescens*) NC Act: NT	The species is known to occur around the districted of Miriam Vale, Mt Boogooramunya and Proserpine (Harden et al 2018). Suitable habitat for the species includes dry rainforest and subtropical rainforest (Harden et al 2018).	**Unlikely**. Suitable habitat for the species in the form of rainforest does not occur within the Project area. The nearest historical record of the species is located 20 km southeast of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Southern Penda (*Xanthostemon oppositifolius*)	The species is distributed from Miriam Vale in the north to Noosa Heads in the south (ALA 2024). Suitable habitat for the species includes notophyll and microphyll vineforest and wet sclerophyll forest (DESI 2024).	**Unlikely**. Suitable vineforest habitat does not occur within the Project area. There are no historical records within 25 km with the nearest record located 57 km southeast of the Project area (ALA 2025).

6.1.4 Weed Species

A total of 26 non-native flora species were identified within the Project area and included invasive grasses, shrubs, vines, herbs and cactus (**Table 7**). A total of six category 3 Biosecurity matters and four WoNS were identified within the Project area with Lantana and Creeping Lantana the most common. Rubber Vine was also relative common in disturbed areas (i.e. rock dumps, residual voids, and adjacent to access tracks) (**Plate 5**). Non-native plant cover ranged from 5% to 45%.

Large infestation of White Cedar (*Melia azedarach*) occurred in rock dump areas (**Plate 6**). The species is technically native to the state of Queensland, however it is not considered a natural component of local vegetation communities and appears to be responding to anthropological disturbance resulting in a novel vegetation community.

Table 7. Non-native flora species identified within the Project area

Common name (Species name)	Species name	Biosecurity status	WoNS
African Lovegrass	*Eragrostis curvula*	-	-
American Ratstail Grass	*Sporobolus jacquemontii*	3	Yes
Argentine Peppercress	*Lepidium bonariense*	-	-
Balloon Cottonbush	*Gomphocarpus physocarpus*	-	-
Blue Billygoat Weed	*Ageratum houstonianum*	-	-
Canadian Fleabane	*Conyza bonariensis*	-	-
Castor Oil Bush	*Ricinus communis*	-	-
Cobbler's Pegs	*Bidens pilosa*	-	-
Corky Passion Flower	*Passiflora suberosa*	-	-
Creeping Lantana	*Lantana montevidensis*	3	-
Dwarf Poinsettia	*Euphorbia cyathophora*	-	-
Flannel Weed	*Sida cordifolia*	-	-
Lantana	*Lantana camara*	3	Yes
Lippia	*Phyla canescens*	-	-
Maynes pest	*Glandularia aristigera*	-	-
Mimosa Bush	*Vachellia farnesiana*	3	-
Noogoora Burr	*Xanthium occidentale*	-	-
Prickly Pear	*Opuntia stricta*	3	Yes
Red Natal Grass	*Melinis repens*	-	-
Rubber vine	*Cryptostegia grandiflora*	3	Yes
Shrubby Stylo	*Stylosanthes scabra*	-	-
Siratro	*Macroptilium atropurpureum*	-	-
Snake Weed	*Stachytarpheta cayennensis*	-	-
Urena Weed	*Urena lobata*	-	-
Verbena	*Verbena littoralis*	-	-
Woolly Rattlepod	*Crotalaria incana*	-	-

Plate 5. Rubber Vine infestation

Plate 6. White Cedar infestation

6.1.5 BioCondition

Two BioCondition assessments were completed, one in remnant RE 11.11.15 in the far north of the Project area, and a second within a derived native grassland in the south of the Project area (**Figure 7**).

BioCondition assessment data is provided in **Appendix B**.

6.2 Fauna Survey Results

6.2.1 Fauna Diversity

A total of 23 fauna species (or evidence of) were observed within the Project area during the field survey, including three non-native species. The faunal assemblage was dominated by common diurnal birds, particularly those species that are tolerant of disturbance and able to utilise cleared open areas. A full list of fauna species recorded during the field survey is provided in **Table 8**.

Table 8. Fauna species observed within the Project area

Common name	Species name	Non-native	Biosecurity status
Agile Wallaby	*Notamacropus agilis*	-	-
Bearded Dragon	*Pogona barbata*	-	-
Black Cormorant	*Phalacrocorax sulcirostris*	-	-

Common name	Species name	Non-native	Biosecurity status
Brown Goshawk	*Accipiter fasciatus*	-	-
Brown Quail	*Coturnix ypsilophora*	-	-
Dragon species	*Diporiphora sp.*	-	-
Eastern Grey Kangaroo	*Macropus giganteus*	-	-
Eastern Sedge Frog	*Litoria fallax*	-	-
Feral Pig	*Sus scrofa*	*	3,4,6
Grey Butcherbird	*Cracticus torquatus*	-	-
Kestrel	*Falco cenchroides*	-	-
Magpie	*Gymnorhina tibicen*	-	-
Noisy Friarbird	*Philemon corniculatus*	-	-
Noisy Miner	*Manorina melanocephala*	-	-
Pacific Black Duck	*Anas superciliosa*	-	-
Pied Butcherbird	*Cracticus nigrogularis*	-	-
European Rabbit (scat)	*Oryctolagus cuniculus*	*	3,4,5,6
Red-backed Fairy-wren	*Malurus melanocephalus*	-	-
Striated Pardalote	*Pardalotus striatus*	-	-
Wedge-tailed Eagle	*Audax aquila*	-	-
White-Faced Heron	*Egretta novaehollandiae*	-	-
White-throated Honeyeater	*Melithreptus albogularis*	-	-
Wild Dog/dingo (scat)	*Canis sp.*	*	3,4,6

6.2.2 Fauna Habitats

A total of seven habitat assessments were completed within the Project area (**Figure 7**). Fauna habitat within the Project is limited relative to the broader landscape. Remnant open-forests and woodland provide suitable habitat for birds, reptiles and mammals. Mature trees (i.e. Narrow-leaved Ironbark) within the Project area provided very few hollows and no large tree hollows were observed within the Project area. The Project area is unlikely to provide habitat for hollow-dependent arboreal mammals.

Fauna abundance and diversity generally declined from remnant to regrowth vegetation, and was poorest in cleared areas, with the exception of Agile Wallabies, which were in high abundance in disturbed areas such as cleared areas, easements and access tracks.

A range of microhabitats suitable for a various fauna occurred onsite. Rock piles were common and likely provide suitable habitat for reptiles and small mammals. Several small farm dams also occur within the southern portion of the Project area, and likely provide drinking water for a range of mammals and birds. Fauna habitat assessment data is provided in **Appendix B**.

6.2.3 Conservation Significant Fauna

The likelihood of occurrence assessment for conservation significant fauna species identified in database searches determined that three conservation significant fauna species, Koala, Squatter Pigeon and White-throated Needletail, are considered likely to occur within the Project area (**Table 10**). An additional conservation significant fauna species is considered a possible occurrence and listed below:

- Powerful Owl

Marine species such as marine mammals and turtles were excluded from the assessment due to the absence of marine environments from the Project area or adjacent areas and not considered in this report.

The remaining conservation significant fauna species area considered unlikely to occur within the Project area and are not considered further in the report.

6.2.4 Pest Species

Three non-native fauna species were observed during the field survey within the Project area, either directly or indirectly through evidence of occurrence (i.e. scats) (**Table 9**).

Table 9. Pest species identified within the Project area

Common name	Species name	Biosecurity Act categories
Feral Pig	*Sus scrofa*	3,4,6
European Rabbit (scat)	*Oryctolagus cuniculus*	3,4,5,6
Wild Dog/dingo (scat)	*Canis sp.*	3,4,6

Table 10. Likelihood of occurrence assessment of conservation significant fauna species

Species	Distribution and habitat	Likelihood of occurrence
Beach-stone Curlew (*Esacus magnirostris*) NC Act: V	The species is distributed along the coast of northern and eastern Australia (ALA 2024). Suitable habitat for the species includes beaches, foredunes, mangroves, tidal flats and offshore islands (Menkhorst et al 2017).	**Unlikely**. Suitable coastal habitat for the species does not occur within the Project area. Historical records include 20 occurrence records within 25 km of the Project area with the nearest record located 17 km east of the Project area (ALA 2025).
Black-breasted Button-quail (*Turnix melanogaster*) NC Act: V	Has been recorded from the Byfield region in the north to at least the Border Ranges rainforests, generally east of the Great Dividing Range, although some observations have been made on its western slopes, up to 300 km inland at locations such as Palm Grove National Park and Barakula State Forest in Queensland (Marchant & Higgins 1993; Smyth & Pavey 2001; Garnett et al. 2011). Habitat considered critical to the survival of the black-breasted button-quail includes: Vine thickets and rainforest vegetation types, particularly semi-evergreen vine thicket, low microphyll vine forest, *Araucarian* microphyll vine forest, *Araucarian* notophyll vine forest and *Brachychiton* scrubs; Low thickets or woodlands with a dense understorey but little ground cover, typically dominated by Acacia spp.; and in littoral situations, dry vine scrubs, acacia thickets and areas densely covered in shrubs, particularly *Austromyrtus dulcis* and Lantana (DEECCW 2022).	**Unlikely**. Suitable rainforest/thicket vegetation does not occur within the Project area. The species was not observed within the Project area during field surveys. The nearest record of the species is located 20 km northeast of the Project area on Boyne Island (ALA 2025).
Common Greenshank (*Tringa nebularia*) NC Act: E	Recorded in most coastal regions. Inland, there have been a few records south of a line from near Dalby to Mt Guide, and sparsely scattered records elsewhere. Sites of international importance in Queensland include the south-east Gulf of Carpentaria and the Great Sandy Strait (DotE 2015a). The species occurs in all types of wetlands. This species inhabits a wide variety of inland wetlands and sheltered coastal habitats of varying salinity, including sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass, both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats (DotE 2015a).	**Unlikely** - Suitable coastal and wetland habitats are not present within the Project area. The closest occurrence record for the species was recorded 1.9 km northeast of the Project area (ALA 2025)**.**
Curlew Sandpiper (*Calidris ferruginea*) NC Act: CR	The species migrates to coastal regions of Australia with scattered location inland (DE 2015a). This species usually forages and roosts in intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (DE 2015a).	**Unlikely**. Suitable wetland habitat for the species does not occur within the Project area. Historical records of the species include 23 occurrence records within 25 km with the nearest record 1.5 km northeast of the Project area (ALA 2025).
Eastern Curlew (*Numenius madagascariensis*) NC Act: E	Coastal distribution in all states. Rarely recorded inland. Continuous distribution along the Qld coast. Internationally important sites occur in Great Sandy Strait, Moreton Bay, Shoalwater Bay and Broad Sound, Notch Point (Ilbilbie), SE Gulf of Carpentaria and Mackay Town Beach (DCCEEW 2023). Typically inhabit sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets.	**Unlikely**. Suitable habitat for the species does not occur within the Project area. Historical records of the species include 88 occurrence records within 25 km of the Project area (ALA 2025).

Species	Distribution and habitat	Likelihood of occurrence
Glossy Black-cockatoo (northern) (*Calyptorhynchus lathami erebus*) NC Act: V	This species is widespread across the north and central east coast of Queensland and is found north of the Dawes and Many Peaks ranges to north of the Connors-Clarke Ranges and as far west as the Denham Ranges. The Glossy Black-cockatoo (northern) has a similar preferred habitat to the Glossy Black-cockatoo (south-eastern) preferring woodlands dominated by casuarina and Allocasuarina species (Horigan 2012). The species is visually similar to the Glossy Black-cockatoo (south-eastern) and can be distinguished by the smaller size of its bill (DCCEEW 2022).	**Unlikely.** Suitable habitat for the species was not recorded within the Project area, and no Casuarina or Allocasuarina species were identified. The closest occurrence record for the species is located approximately 19 km northeast of the Project area (ALA 2025)**.**
Great Knot (*Calidris tenuirostris*) NC Act: CR	The species is known to occur along the entire Australian coastline (DCCEEW 2023). Suitable habitat for the species includes sheltered coastal habitats, with large intertidal mudflats or sandflats, inlets, bays, harbours, estuaries and lagoons, exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, saltlakes and non-tidal lagoons (DCCEEW 2023).	**Unlikely**. Suitable wetland or coastal habitats do not occur within the Project. Historical records of the species include two occurrence records within 25 km of the Project area with the neatest record located 20 km north-northeast of the Project area (ALA 2025).
Greater Sand Plover (*Charadrius leschenaultii*) NC Act: V	Greater Sand Plovers occur along most of the coastline but are more widespread in northern Australia (DCCEEW 2022). There are 5 sites in Australia of international importance including the south-eastern corner of Gulf of Carpentaria, Queensland (Bamford et al. 2008). The species forages on intertidal mudflats and sandflats, usually in sheltered bays and estuaries but also on ocean beaches, coral reefs and rock platforms. It roosts on beaches, sandbars and estuarine lagoons and occasionally rocky islets and reefs (Marchant & Higgins 1993).	**Unlikely**. Suitable wetland or coastal habitats do not occur within the Project. Historical records of the species include six occurrence records with 25 km of the Project area with the nearest record located 16 km east of the Project area (ALA 2025).
Grey plover (*Pluvialis squatarola*) NC Act: V	The Grey Plover is a migratory shorebird which breeds in Alaska, northern Siberia and northern Canada, migrating during the non-breeding season (austral summer). The Australian distribution of the species is located primarily along the west and south coasts; however, they can be found in all States. The species distribution in Queensland is most recorded around the south-eastern Gulf of Carpentaria. The Grey Plover feeds within the whole tidal range, feeding diurnally on polychaete worms, marine molluscs and crustaceans, and to a lesser extent, insects. The species roosts in sandy areas such as unvegetated sandbanks and sheltered habitats such as estuaries, lagoons or sheltered beaches (DCCEEW 2024a).	**Unlikely –** Suitable coastal habitat for the species does not occur within the Project area. The closes record for the species is approximately 22 km northeast of the Project area along the coast (ALA 2025).
Koala (*Phascolarctos cinereus*) NC Act: LC	In Queensland, the species contains scattered populations throughout moist forests along the coastline, subhumid woodlands in central and southern regions and within eucalypt woodlands along watercourses within semi-arid areas further west. Koalas occur in a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by *Eucalyptus* species (preference varying regionally). Diet is thought to be a major determinant of habitat selection, with the use small remnants of original vegetation where suitable habitat is present. Koalas are also known to occur in modified or regenerating native vegetation communities, as well as urban and rural landscapes where food trees or shelter trees may be highly scattered (DE 2014).	**Likely**. Suitable habitat for the species occurs within the Project area in the form of eucalypt woodland. Historical records of the species include 17 occurrence records within 25 km of the Project with the nearest record located 3.5 km west-southwest of the Project area (ALA 2024).

Species	Distribution and habitat	Likelihood of occurrence
Latham's Snipe (*Gallinago hardwickii*) NC Act: V	Widespread although scattered occurrence in both coastal and inland areas. Extends inland over the eastern tablelands in south-eastern Queensland (and occasionally from Rockhampton in the north), and to west of the Great Dividing Range in New South Wales (Barrett et al. 2003; Blakers et al. 1984; Frith et al. 1977). Occasionally recorded in south-western Queensland. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity. Various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains (DotE 2015b).	**Unlikely** - Suitable wetland habitat is not present within the Project area. The closest occurrence record for the species was recorded 1.9 km northeast of the Project area (ALA 2025)**.**
Lesser Sand Plover (*Charadrius mongolus*) NC Act: E	The species is known to occur along the Australian coastline. Suitable habitat for the species includes coastal littoral and estuarine environments (DCCEEW 2023).	**Unlikely**. Suitable coastal or estuarine habitat for the species does not occur within the Project area. Historical records of the species include 19 occurrence records within 25 km of the Project area with the nearest record located 17 km east of the Project area (ALA 2024).
Powerful Owl (*Ninox strenua*) NC Act: V	In Queensland, Powerful Owl occurs as far north as the Eungella area and west to Carnarvon Gorge (Debus 2012). This species lives in open forests and woodlands, sometimes with dense forest nearby. It is often found in tall open wet sclerophyll forest, mainly in sheltered gullies containing old-growth forest with dense understorey and often near permanent streams (Higgins 1999). Roost and nest sites are usually in gullies (Debus 2012). It nests in hollows in large old trees (Higgins 1999; Kavanagh 2002), usually a living eucalypt, often in trees near creeks. Roost sites are mostly in closed forest but occasionally in open forest and woodland (Higgins 1999). The species also occurs in large areas of urban bushland and large botanic gardens in cities (Debus 2012)	**Possible**. Marginal habitat for the species exists within the Project area in the form of eucalypt woodland and open forest, although no suitably large hollows were observed. Historical records of the species include seven occurrence records within 25 km of the Project area with the nearest record located 11 km south-southeast of the Project area (ALA 2024).
Red Goshawk (*Erythrotriorchis radiatus*) NC Act: E	Sparsely dispersed across 15% of coastal and sub-coastal Australia, from the Kimberley in Western Australia to north-eastern New South Wales (DCCEEEW 2023). Also recorded along major rivers in central Australia, most likely to be transient birds (DCCEEEW 2023). Recent records in Queensland suggest that both southern and northern Queensland birds are in existing national parks or state forests with a strongholds in north-east Queensland and eastern Cape York Peninsula (DERM 2012). The species prefers landscapes containing a mosaic of habitats including coastal and sub-coastal tall open forest, woodland and rainforest edges. Forests of intermediate density are particularly favoured, as are ecotones between variably dense habitats. Habitat utilisation is influenced by the location of large populations of birds (primary prey). It is rarely encountered over agricultural land as it avoids open habitats. Nesting occurs in tall trees within 1 km of permanent water, generally in open, biologically rich forest or woodland (TSSC 2015a).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. Historical records of the species include one record from 2016 taken from Boyne Island 20 km northeast of the Project area. It should be noted that this record is highly dubious due to the lack of suitable habitat in this area and that the population of this species has largely disappeared from southeast Queensland (DCCEEW 2023b).

Species	Distribution and habitat	Likelihood of occurrence
Ruddy Turnstone (*Arenaria interpres*) NC Act: V	The Ruddy Turnstone is a shorebird which migrates to Australia from Europe, Asia and North America during the non-breeding season (austral summer). The species is found across Australia in coastal regions, with occasional inland records. In Queensland, the species distribution extends the entire east coast and the north coast. A carnivorous species, the Ruddy Turnstone feeds diurnally and nocturnally on insects, crustaceans, molluscs arachnids and worms in the tidal range, with a preference for upper tidal flats. The species prefers to roost on platforms, rock shelves or shingle coral and gravel beaches, adjacent to shallow pools and are occasionally observed in estuaries, coastal lagoons, harbours, bays, sewage ponds and mudflats (DCCEEW 2024c).	**Unlikely** - Suitable coastal habitat is not present within the Project area. The closest occurrence record for the species was recorded 22 km northeast of the Project area (ALA 2025).
Southern Greater Glider (*Petauroides volans volans*) NC Act: E	This species occurs in Eastern Australia with a broad distribution from around Proserpine in Qld, south through NSW and the ACT, to Wombat State Forest in central Vic. The species is generally restricted to eucalypt forests and woodlands, particularly favouring forest with a diversity of eucalypt species. During the day the species shelters in tree hollows, with a particular selection for large hollows in large, old trees (DCCEEW 2023). Modelling suggests they require native forest patches of at least 160 km^2 to maintain viable populations (Eyre 2002).	**Unlikely**. Eucalypt woodland does occur within the although field surveys determined that suitably large hollows where absent for the Project area. The species was not observed during field surveys within the Project area. Historical records of the species include six occurrence records within 25 km of the Project area with the nearest record located 11 km south-southeast of the Project area (ALA 2025).
Sharptailed Sandpiper (*Calidris acuminata*) NC Act: V	This species is recorded in most regions of Queensland and their distribution is widespread along much of the coast and very sparsely scattered inland, particularly in central and south-western regions (Higgins & Davies 1996). The Sharptailed Sandpiper typically inhabits muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. The species may use flooded paddocks, sedgelands and other ephemeral wetlands, but vacate these habitats during dry conditions. Marine habitats for the species include intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. Sometimes occur on rocky shores and rarely on exposed reefs (DotE 2015b).	**Unlikely –** Suitable wetland habitat is not present within the Project area. The closest occurrence record for the species was recorded 1.9 km northeast of the Project area (ALA 2025)
Squatter Pigeon (southern) (*Geophaps scripta scripta*) NC Act: V	Squatter Pigeon is now largely restricted to Queensland, where the southern subspecies occurs north to the Burdekin River (Frith 1982). The species extends west to Longreach and Charleville. There is a subpopulation from Warwick to Texas. A small population may persist in the upper Brisbane valley, where the last Bird data record is from 2014 (Ward et al. 2021). Squatter Pigeon does not appear to undertake any large-scale seasonal movement and is probably locally nomadic, or perhaps sedentary (Frith 1982; Blakers et al. 1984). The southern subspecies of the Squatter Pigeon occurs mainly in dry grassy woodlands and open forests (Frith 1982; Crome & Shields 1992).	**Likely**. Suitable habitat for the species occurs within the Project area in the form of grassy woodlands. Historical records of the species include 24 occurrence records with 25 km of the Project area with the nearest record located 3.5 km west of the Project area (ALA 2025), although the occurrence record is generalised to 10km and

Species	Distribution and habitat	Likelihood of occurrence
		undated. Numerous records to the west are dated 2003-2018 (ALA 2025).
Terek Sandpiper (*Xenus cinereus*) NC Act: V	This migratory shorebird migrates from Russia during non-breeding periods to coastal, western and central Africa, South Africa, throughout Asia including but not limited to the Persian Gulf, the Indian subcontinent and southeast Asia and as far south as New Guinea, Australia and New Zealand. The species distribution within Australia is primarily restricted to coastal distributions in all Australian States and Territories (with the exception of the ACT) and will occasionally be recorded inland. In Queensland, the species is commonly recorded along the coast from the southeast of the Gulf of Carpentaria and extends as far north as the Torres Strait. This species is carnivorous, and its primary diet comprises crustaceans and insects and feed within the supralittoral or upper littoral zone of mudflats in estuaries. The species prefers to roost in mudflats and mangrove swamps (DCCEEW 2024b)	**Unlikely** – Suitable coastal and estuarine mudflats are not present within the Project area. The closest record for the species is located 17 km east of the Project area (ALA 2025).
Western Alaskan Bar-tailed Godwit (*Limosa lapponica baurei*) NC Act: V	The species is known to occur along the coast of northern, southern, and eastern Australia (with the exception of the WA) (DCCEEW 2023). Suitable habitat for the species includes intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays (DCCEEW 2023).	**Unlikely**. Suitable habitat for the species does not occur within the Project area. The species was not detected during recent field surveys within the Project area. Historical records of the species include three occurrence records within 25 km of the Project area at Boyne Island with the nearest record located 20 km to the north-northwest of the Project area (ALA 2025).
White-throated Needletail (*Hirundapus caudacutus*) NC Act: V	In Australia, White-throated Needletail is almost completely an aerial species, possibly even sleeping on the wing. The species is sometimes found roosting in trees and may on rare occasions rest in trees and on the ground during the day (Higgins 1999). White-throated Needletail is found over a wide variety of habitat, including open areas, modified land and the ocean but is most often recorded over wooded areas (Higgins 1999). They sometimes forage over recently disturbed areas, such as forest that has been cleared or burnt (Blakers et al. 1984).	**Likely**. Suitable habitat for the species occurs within the Project area. Historical records of the species include 19 occurrence records within 25 km with the nearest record 1.5 km northeast of the Project area (ALA 2025).
White-throated Snapping Turtle (*Elseya albagula*) NC Act – CE	Found only in Queensland in the Fitzroy, Mary and Burnett Rivers and associated smaller drainages in southeastern Queensland. The Fitzroy catchment population has been separated from the Mary and Burnett catchments for an extended period. It has been suggested that the two lineages can be considered to be Evolutionarily Significant Units (Todd et al. 2013). Prefers clear, flowing, well-oxygenated waters. The species does occur in non-flowing waters, but typically at much reduced densities (DE 2014a).	**Unlikely** – Suitable habitat for the species is not located within the Project area. The closest verified occurrence record for the species is located approximately 49 km northeast of the Project area (ALA 2025).
Yellow-bellied Glider (*Petaurus australis australis*) NC Act: V	The species has a widespread but patchy distribution from south-eastern Queensland (Qld) to far south-eastern SA, near the SA-Vic border in found at altitudes ranging from sea level to 1400 m above sea level (DAWE 2022). The species occurs in tall mature eucalypt forest in areas with high	**Unlikely**. Suitable habitat for the species does not occur within the Project area. Soils within the Project area low in fertility and woodlands are low

Species	Distribution and habitat	Likelihood of occurrence
	rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forest in the north; moist coastal gullies and creek flats to tall mountain forests in the south (OEH 2017).	without suitable hollows. Historical records of the species include five occurrence records within 25 km of the Project area with the nearest record located 11 km south-southeast of the Project area (ALA 2025).

7 POTENTIAL PROJECT IMPACT AND MITIGATION MEASURES

The majority of impacts within the Project area are pre-existing. The proposed extensions to the extent of current mining impact areas area, includes increases in the size of open pits and stockpiles, in addition to new access tracks and other operational areas (hereby referred to as proposed impacts). Proposed impacts areas are shown in **Figure 7** overlaid on the field-verified vegetation mapping. For conservation significant species considered as potentially occurring, impacts were assessed for loss of habitat by the construction of proposed impacts.

7.1 Potential Project Impacts

The proposed impacts have the potential to directly and indirectly impact a range of ecological values, including vegetation communities and habitat for conservation significant flora and fauna. The proposed impacts will occur incrementally, as open pits and stockpiles increase in size over time. Proposed impacts include the following:

- Access tracks – 1.73 ha
- Infrastructure and plant – 0.24 ha
- Pit – 27.77 ha
- Topsoil stockpile – 3.66 ha
- Waste rock dump – 11.78 ha

7.1.1 Clearing Vegetation

The clearing of vegetation is the most significant and direct impact of the Project on ecological values of the Project area. The removal of habitat reduces the size of local populations of flora and fauna dependent on that habitat. These impacts are immediate and significant in the short-term. Impacts may persist in the long-term if habitat created during rehabilitation does not closely resemble pre-disturbance ecosystems. In addition, if sufficient habitat refuges are not maintained locally, prior to the maturation of rehabilitated land, local extinction of certain species may occur.

The predicted extent of overall impact to vegetation communities and habitat for conservation significant species is provided in **Table 11**. The extent of impact is based on the results of the ground-truthed vegetation mapping, analysis of aerial imagery, and onsite habitat assessments. The proposed impacts of the Project area are predicted to impact 5.57 ha of remnant vegetation and 9.86 ha of regrowth habitat under the current layout. The primary potential impact to conservation significant fauna species is on remnant woodland vegetation suitable Koala, which is considered likely to occur within the Project area.

Table 11. Predicted vegetation clearing resulting from Project proposed impacts

GTRE	Biodiversity (EP Act) status	Potential habitat	Proposed impact area (ha)
11.11.15 remnant	No concern at present	Koala, Powerful Owl, Squatter Pigeon, *Cycas megacarpa, Cassinia collina*.	3.27
11.11.15 regrowth	No concern at present	Koala, Squatter Pigeon.	9.86
11.3.25 remnant	Of concern	Koala, Powerful Owl, Squatter Pigeon, *Cassinia collina*.	2.30
		Overall area	15.43

7.1.2 Habitat Fragmentation and Connectivity

Highly fragmented habitats support fewer species than connected blocks of habitat of the same size. This is because fragmentation restricts dispersal of fauna and plant seeds between available habitat. The impacts of habitat fragmentation depend on the degree to which dispersal is inhibited by habitat gaps., the size of the remaining habitat fragments, and ecological attributes of the species.

The landscape associated with the Project has been heavily impacted by tree clearing for pastoralism and open cut mining. Remnant and regrowth vegetation communities within the Project area are largely consolidated, although in the southern portion of the Project area vegetation is isolated by the dam impoundment and mining activities. Vegetation communities in the northern portion of the Project area are connected to a large expanse of remnant vegetation to the north of the Project area, although the proposed impacts of the expansion are largely concentrated in the south of the Project area. The proposed impacts of the Project will not further fragment remnant and regrowth vegetation communities within the Project area, with negligible impacts to connectivity.

The farm dam within the southern portion of the Project area likely provides drinking water for a range of mammals and birds. It may also support native and exotic aquatic fauna species. The removal of the farm dam is not considered to be a significant impact to terrestrial and aquatic ecology due to the proximity of the farm dam to Lake Awoonga which provides similar, yet more extensive habitat suitable for these species.

7.1.3 Fauna Mortality

Clearing of vegetation for the Project presents a risk of direct mortality or injury to fauna. Fauna of low mobility are at risk to injury or death from heavy machinery and vehicular movements during the construction and operational phases of the Project.

Clearing will only occur within designated areas and only during designated time periods. The presence of qualified Wildlife Spotter-Catcher/s to assist with vegetation clearing will decrease incidences of fauna mortality. Educating employees and contractors with regard to fauna and flora will further reduce direct mortality as part of the Project.

7.1.4 Airborne Dust

Earthworks, vehicular traffic, mobile plant movements and mining activities associated with construction and operation can generate substantial amounts of dust during dry weather (Field et al. 2010). Dust can have both a physical and chemical impact on plants, either through the smothering of leaves, whereupon the rate of deposition is important, or through chemical changes to the soil or directly to the plant surface. Changes in soil properties, such as pH, can ultimately impact plant species assemblages. Dust can form a hard crust on plant photosynthesis, respiration transpiration and productivity (Farmer 1993; Chaston & Dooley 2006). Evidence of potential impacts on entire vegetation communities is scarce. Many studies focus on specific impacts to single species and findings may not be conclusive. Because a limestone quarry is already operating within the Project area, additional impacts to airborne dust resulting from the proposed expansion area considered negligible.

7.1.5 Noise and Lighting

Understanding of the impacts of noise on fauna is limited. There are no current government policies or guidelines that recommend noise thresholds or limits for development activities to mitigate potential harm to fauna. Noise may affect wildlife through a variety of impacts such as: interfering with communication calls; interfering with foraging/defence through cloaking the sound of predators and prey; causing general stress or avoidance reactions; or changes in reproductive or nesting behaviours. Excessive noise may lead some species to avoid noisy areas, which could result in the localised fragmentation of habitat at the specie or individual territory level. Radle (2007) states the consensus that terrestrial fauna will avoid any industrial plant or construction area where noise or vibration presents an annoyance to them. Nevertheless, many animals may interpret a new noise as a potential danger at first, but rapidly understand the noise is not associated with any threats (Radle 2007).

Artificial lighting may have a range of impacts across different groups of taxa and between species within these groups. Some taxa such as rodents may avoid brightly lit areas at night. Alternatively, nocturnal fauna such as many microbat species, frogs and some reptiles may congregate at artificial lights to feed on insects attracted to light (Perry et al. 2008; Rich and Longcore 2006). Although, other microbat species may avoid well-lit areas (Threlfall et al. 2013). Artificial light can alter foraging and calling by frogs and probably impairs their vision (Buchanan 1993) and may lead to individuals being killed by vehicles when attracted to lights for feeding on invertebrates. The Project area is already subject to artificial lighting and noise from the existing limestone quarry and further increases from the proposed expansion area are considered negligible.

7.1.6 Weeds and Pest Animals

Introduced weeds have the potential to impact on terrestrial and aquatic ecological values as native flora can become displaced through competition with weed species, and adversely affected by browsing and soil trampling caused by feral herbivores. Native fauna populations, particularly small to medium sized species, may be impacted by predation from introduced carnivores such as feral cats (*Felis catus*) and Red Fox (*Vulpes vulpes*). These are indirect impacts which may not manifest themselves in the short-term and are likely to be exacerbated by proposed cattle grazing activities within the Project area. Introduced weed species are already present throughout the Project area including six Category 3 Biosecurity matters and four WoNS with Lantana and Creeping Lantana the most common. Rubber Vine was common in heavily disturbed areas such as rock-dumps, roadsides and topsoil stockpiles.

The following activities associated with the Project have the potential to promote the proliferation of weeds and pests within the Project area, or introduce new weeds and pests from surrounding areas:

- The use of construction machinery, plant and materials sourced from outside the region and increased vehicular traffic in general may introduce and spread weed seeds if biosecurity hygiene measures are not in place
- Land clearance favours the establishment of weeds due to increased light and soil disturbance
- Inappropriate disposal and storage of putrescible wastes may attract feral animals

Mobile plant and vehicular movements have association with future Project activities have a very high potential to further the spread of American Ratstail Grass (*Sporobolus jacquemontii*) within the Project area, with adverse impacts on proposed post-mining pastoralism.

7.1.7 Fire

The Project area is comprised of operational mining areas, cleared areas, and woodland/open-forest vegetation to the north and south. Woodland/open-forest areas have potential to be severely impacted by accidental high-intensity fires caused by Project activities. Fire hazard mapping indicates the majority of woodland and open-forests within the Project area as having a medium potential bushfire intensity with a small patch of high and very-high potential bushfire intensity bordering the northern pit.

7.1.8 Surface Water

7.1.8.1 Construction Impacts

The Project has potential to impact surface water and associated aquatic ecology values through a variety of processes:

- During construction disturbance, uncontrolled sedimentation of watercourses (particularly during and following heavy rainfall events) can impact aquatic ecology by smothering stream beds with fine material, and decreasing bed roughness and reducing habitat diversity
- Similarly, uncontrolled sedimentation movements associated with construction disturbance may lead to localised increased turbidity and suspended solids which may negatively impact fish and macroinvertebrates (through reduced respiratory and feeding efficiency), and adversely affect submerged aquatic plants as light penetration (required for photosynthesis) is reduced
- Poorly designed and constructed waterway crossings may create waterway barriers that prevent or impede movements of aquatic fauna
- Waterway crossings may cause bank instability if remediation works are not adequately designed and implemented. This may lead to bank erosion (causing impacts to instream sedimentation and turbidity) and adverse impacts to riparian vegetation

The Project area is intersected by six stream order 1 watercourses (**Figure 4**). A total of six low-risk waterways for waterway barrier works are mapped within the Project area and three of these waterways will be impacted by the proposed impact area. Waterways within the Project area are ephemeral and were dry at the time of the field survey. Furthermore, the environmental values of the potentially impacted waterways are very low as all are artificially impounded. The potentially impacted stream in the north flows directly into Pit 2, and a

potentially impacted stream in the east is impounded by a steep embankment. The potentially impacted stream in the south is impounded by the existing waste rock stockpile and mine longwall.

7.1.8.2 Waterway Barrier Works

The Project is expected to impact 3 low risk waterways with barrier works. Barrier works (i.e. maintenance or upgrade of existing culvert crossings) should be completed in accordance with *Accepted development requirements for operational work that is constructing or raising waterway barrier works* (DAF 2018). All low risk waterways impacted by the Project are subject to artificial impoundment and no longer connected to the wider catchment.

7.1.8.3 Aquatic Pollutant Release

The accidental release of pollutants from Project activities has the potential to degrade the surrounding environment and local waterways within and downstream of the Project area. Potential sources of contaminants may include runoff from chemical and fuel/oil storage areas and general wastewater from vehicle/machinery washdown areas. In the event of a significant fuel spill (>200 litres) (L) to waterways there is potential to have a local impact on both flora and fauna. The extent of impact will of course be dependent on the size of the spill and the volume of water in the waterway (including whether there is flow), thereby influencing the length of stream potentially impacted.

Waterways in the Project area are ephemeral (no flows occurring the majority of the time) and are predominantly likely to be considered to be of low value.

7.2 Proposed Mitigation Measures

The proponent will commit to a range of measures to minimise impacts to MSES and general ecological values associated with Project area. Avoidance is largely not possible as the majority of Project impacts have already occurred. A range of mitigation strategies will be implemented under an overarching Environmental Management Plan (EMP). The current EMP for the existing EA for the Project will be amended to reflect the proposed amendments to the EA. The EMP is informed by a number of updated management plans relevant to ecological impacts including (but not limited to):

- Water Management Plan
- PRC Plan
- Erosion and Sediment Control Plan (ESCP)
- Pest and Weed Management Plan

The EMP and various sub-plans comprise a range of measures that will mitigate the potential impact to ecological values as detailed in **Table 12**.

Table 12. Recommended mitigation measures proposed for general impacts resulting from proposed impacts

Impact	Management measure
Vegetation clearing	The Project has an EMP in place. Vegetation clearing protocols are established within the EMP and will be updated to include the following mitigation measures below at a minimum.
	A PRCP including rehabilitation measures following mine closure
	Project employees and contractors should be made aware of environmental obligations and compliance requirements through the induction program.
	Vegetation clearing extents will be clearly demarcated with flagging or bunting prior to clearing to limited the area safely and reasonably required for permanent and temporary works
	Targeted pre-clearance surveys will be carried out prior to vegetation clearing and will incorporate searches for conservation significant plants that potentially occur, including: • *Cassinia collina* • *Cycas megacarpa.* Pre-clearance surveys will be carried out by suitable qualified ecologists prior to vegetation clearing.

Impact	Management measure
	Topsoil should be stockpiled in designated areas and used for rehabilitation.
	Disturbed areas that are no longer required will be immediately reinstated to a non-polluting and stable landform.
Conservation significant flora and fauna	Fauna and Flora Management Plan will be in place prior to construction works being carried out. Plan will establish species-specific management procedures for conservation significant species considered to be potentially or likely to be present in this report.
	Searches for conservation significant flora and fauna species will be carried out by a suitably qualified ecologist as part of pre-clearance surveys.
	Procedures will be in place where injured fauna are encountered during clearing works. Local wildlife carer and/or veterinarian will be identified prior to works being carried out and be notified that clearing works are being carried out (prior to clearing).
	Project inductions will outline species of significance that may occur on the project area.
	Project employees will be required to notify fauna spotter/catchers when a species of significance is observed in the Project area. All encounters with a conservation significant species will recorded in the project fauna register maintained by the designated Environmental Officer.
	Fauna spotter-catchers (licensed) will inspect sites prior to vegetation clearing. Fauna habitat shelter features (large hollows) will be clearly marked where they are unable to be accessed/inspected prior to tree felling.
	EMP will incorporate procedures for tree felling that will minimise potential impacts on resident fauna where habitat shelter features are identified.
	Procedures will be in place where injured fauna are encountered during clearing works. Local wildlife carer and/or veterinarian will be identified prior to works being carried out and be notified that clearing works are being carried out (prior to clearing).
	Onsite speed limits will be established throughout Project area to limit the potential for road collisions.
Noise and lighting	The final Project design process will incorporate the use of low light spill lighting components and directional lighting (away from adjacent fauna habitat) where night lighting is considered necessary.
	All Project-associated construction/operational machinery will be maintained as per manufacturer design specifications to ensure project noise is minimised.
	Onsite speed limits will be established throughout Project area to limit noise levels as a result of vehicle movements.
Airborne dust	Monitoring of weather conditions will be carried out to inform Project activities and planning during high-wind weather conditions.
	Ensure employees made aware of potential dust generating activities and mitigation and management measures to prevent nuisance
	Monitoring of air/dust emissions will be carried out in accordance with regulatory requirements.
	Dust from areas likely to be a source of airborne dust (such as tracks and topsoil stockpiles) will be suppressed during construction using water trucks/wetting to keep dust related impacts to a minimum. Water used for dust suppression will be obtained from Pit 2 and onsite water tanks.
	Onsite speed limits will be established to minimise dust caused by vehicle movements
	Areas subject to vegetation clearing and no longer required for construction will be subject to vegetation reinstatement as soon as is practicable as per the assigned post-mining land-use.
Weeds and pest	Pest and Weed Management Plan is in place prior to construction works being carried out. Plan will detail all required management measures and monitoring procedures.
	Mapping of the extent of weed/pest occurrence within the Project footprint will be recorded during pre-clearance surveys.
	Vehicle wash-downs will be required for all new vehicles (including earthmoving and other construction machinery) entering the Project area.
	Disposal and storage of putrescible wastes must be undertaken appropriately to ensure feral animals aren't attracted to the Project area.
	Storage of construction/operation materials carried out in a manner so as to not encourage the establishment of resident pest fauna.
	Regular monitoring of weed and pest occurrence in association with Project works areas and in response to complaints from adjacent landowners.

Impact	Management measure
Fire	Monitoring of weather conditions will be carried out to inform Project activities and planning during high fire-risk weather conditions.
	The Project will maintain communications with local representatives for the Queensland Fire and Emergency Services (QFES) regarding Project activities and bushfire hazard conditions.
	Appropriate fire breaks will be maintained around above ground Project infrastructure.
	Site will include designated smoking areas.
	Onsite fire-fighting equipment will be regularly maintained and staff training will be developed and implemented.
Surface water	An ESCP will be developed and implemented prior to construction commencing. The ESCP will be developed by a Certified Professional in Erosion and Sediment Control.
	Access track crossings of watercourses will be designed and constructed in accordance with the accepted development requirements for waterway barrier works (DAF 2018) to minimise impacts to fish passage.
	Earth bunds and diversion drains are maintained around the perimeter of the site, particularly on the upslope, of excavations to prevent surface water entering these areas.
	Stabilised diversion drains are maintained to direct dirty water to sediment traps (e.g. straw bale filter, sandbag filter, sediment dams).
	Applicable Project materials/chemicals will be stored and handled in accordance with relevant legislative requirements and Australian Standards (AS) including: • AS 3780:2008 – The storage and handling of corrosive substances • AS 1940:2004 – The storage and handling of flammable and combustible liquids • AS 3833:2007 – Storage and handling of mixed classes of dangerous goods in packaged and intermediate bulk containers
	All storage of chemicals associated with Project works will be stored away from watercourse and in bunded areas
	Refuelling will be in designated bunded areas away from watercourses. Or in accordance with the existing refuelling procedures – 620-P8.200.213 Main Hardstand Refuelling.
	Spill response equipment (e.g. booms and absorbent materials) will be available at refuelling areas and other sites (where relevant). Staff will be trained in the appropriate use of spill response equipment.
	Onsite washdown areas for Project vehicles/machinery will be located and clearly demarcated to prevent contaminated run-off from entering waterways.

8 MSES SIGNIFICANT RESIDUAL IMPACT ASSESSMENT

An assessment of the potential for significant impacts resulting from the proposed Project has been carried out only on those MSES considered as potentially subject to substantial impacts. The assessments have been carried out in accordance with the *Queensland Environmental Offsets Policy Significant Residual Impact Guideline* (MSES Guideline) (DEHP 2014) to determine if offsets under the Offsets Act are not required for the proposed Project. The assessment is focused on MSES identified in **Section 5.2** as potentially occurring within the Project area, including:

- Listed conservation significant species
- Category R (GBR) Riverine Regulated Vegetation
- MSES regulated vegetation (defined watercourse)
- Waterways providing fish passage

8.1 Conservation Significant Species

The likelihood of occurrence assessment in **Section 4.3** has determined the following listed conservation significant species to be relevant for the significant residual impact assessment:

- Likely to occur:
  - Koala (*Phascolarctos cinereus*) – Endangered
  - Squatter Pigeon (Southern) (*Geophaps scripta scripta*) – Vulnerable
- Possibly occurs:
  - *Cycas megacarpa* – Endangered
  - Powerful Owl - Vulnerable
  - *Cassinia collina* - Vulnerable

White-throated Needletail is an aerial species that may occur over any habitat including inland, coastal and marine areas and disturbed habitat such as urban areas. The species is only occasionally recorded as landing in Australia. The species is highly mobile and may forage anywhere up to 100s of metres above ground (Higgins 1999; DCCEEW 2023). Given the species' aerial habits it is inconceivable the Project area would support an important population or represent important habitat (as defined in DE 2013a) for the species and the proposed impacts would be highly unlikely to impact the species in any way. Therefore, it has not been considered in the significant residual impact assessment.

8.1.1.1 Koala – Endangered

Ecology

Koalas have a distinct association with eucalypt woodland and forest habitats comprising suitable food trees, mainly of the following genus: Eucalyptus, Corymbia, Angophora and Melaleuca (Moore and Foley, 2000; and Martin et al. 2008). They are not necessarily restricted to bushland areas and are known to occur and breed where suitable tree species occur within farmland and the urban environment (Dique et al. 2004). Similarly, movement is not confined to vegetated corridors, as they also move across cleared rural land and through suburbs (Martin et al. 2008). They may use a variety of trees, including many non-eucalypts, for feeding, shelter and breeding purposes (Dique et al. 2004; Martin et al. 2008).

They are known to have localised and variable preferences throughout their range, favouring some tree species over others (Pahl and Hume 1990). At the local level they are known to prefer individual trees. It has been suggested this could be a response to a number of factors such as high leaf moisture and/or nitrogen content, and low levels of toxic chemical compounds which are expressed by eucalypts as a result of herbivory (Pahl and Hume 1990; Hume and Esson 1993; Moore and Foley 2000).

Breeding occurs in spring / summer when males become territorial. Young permanently leave the pouch after seven months but may continue to ride on the mothers back until approximately 12 months. After this time adolescent females may remain in the natal habitat. Males generally disperse to new territories from one to three years of age (Dique et al. 2003; Martin et al. 2008).

Association with the Project area

The species was not observed during field surveys within the Project area. Numerous records of the species occur in the wider landscape include 17 occurrence records within 25 km of the Project with the nearest record from 1987 located 3.5 km west-southwest of the Project area (ALA 2025). The majority of Koala records in the wider landscape are from 1987 or earlier. More recent records from 1992 and 1997 occur further west at Dan Dan National Park located 15 km southwest of the Project area (ALA 2025).

Suitable habitat for Koala within the Project area is provided by remnant and regrowth RE 11.11.15 and remnant RE 11.3.25 with a total area of 168.7 ha of which, 15.43 ha is proposed to be disturbance by the Project.

Government approved species documents

The *National recovery plan for the Koala* Phascolarctos cinereus *combined populations of Queensland, New South Wales and the Australian Capital Territory* (the Koala recovery plan) (DAWE 2022b) was approved on 8 April 2022. The Koala Recovery plan notes the following threats to the species:

- Habitat loss, fragmentation and modification including the impact of native forestry activities
- Drought, extreme heat events including associated with climate change
- Altered fire regimes
- Mortality from dog attack and vehicle collisions
- Diseases including Chlamydia and Koala retrovirus
- Plant pathogens impacting Koala habitat such as Myrtle Rust

The *Conservation Advice for* Phascolarctos cinereus *(Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE 2022c) notes (with relevance to Queensland) the priority management actions associated with the south-east Queensland population and that sub-populations on the western edge of the species range may be 'climate-sensitive' and comprise genes adapted to environmental extremes which may prove critical to populations elsewhere in the future through translocation programs.

The Koala recovery plan does not specifically identify any areas comprising 'valued populations' of Koala but does note an imperative to conserve populations:

- That may act as source populations to adjacent areas
- Occur in areas of climatic refugia (specifically from droughts and heat waves)
- Genetically diverse
- Contain adaptive genes to potential environmental stressors or
- Are geographical or environmental outliers

The Koala recovery plan identified the following objectives:

- The area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised then increased
- The area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased
- Metapopulation processes are maintained or improved
- Partners, communities and individuals have a greater role and capability in listed Koala monitoring, conservation and management.

Table 13 provides as assessment of the potential for significant residual impacts on Koala from the Project using the assessment criteria for Endangered and Vulnerable wildlife habitat outlined in the Guideline. It is important to note that Koala is also listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and will also need to be assessed as a Matter of National Environmental Significance (MNES) as per the EPBC Act.

Table 13. Significant residual impact criteria assessment: Koala

Criteria	Endangered species assessment
Lead to long-term decrease in the size	The species was not observed during the recent field survey within the Project area although the species is considered likely to occur. Historical records of the species include 17 occurrence records within 25 km of the Project area with the nearest record from 1987 located 3.5 km west-

Criteria	Endangered species assessment
of a local population	southwest of the Project area (ALA 2025). Pre-clearance surveys will be completed prior to clearing and a licenced Wildlife spotter-catcher will be present during clearing. The Project will result in the clearing of 15.43 ha of suitable habitat for Koala. Suitable habitat for Koala within the Project area is adjacent to areas of existing disturbance. The majority of suitable Koala habitat proposed for clearing is in a highly isolated location between the existing mine and Awoonga Reservoir. Significant areas of continuous and undisturbed Koala habitat occurs to the north and west of the Project area. Whilst the species is likely to occur, there is no evidence to suggest that a local population occurs within the Project area. The Project is considered unlikely to lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	The extent of occurrence (EOO) of the species is estimated at 1,665,850 km^2 (DAWE 2022). The Project will result in the clearing of 15.43 ha of suitable habitat for Koala. The Project area is not near the limit of the species distribution. The Project is considered unlikely to reduce the extent of occurrence of the species.
Fragment an existing population	The species was not observed during recent field surveys within the Project area although the species is considered likely to occur. Whilst the species is likely to occur, there is no evidence to suggest that a local population occurs within the Project area. Although operational mining areas will be unsuitable for Koala movements, Koalas will be able to move freely to the north along the eastern boundary of the Project area. In addition, the extent of the proposed impacts relatively minor in relation to the extent of existing operation mining areas within the Project area.
Result in genetically distinct populations forming as a result of habitat isolation	The species was not observed during recent field surveys within the Project area although the species is considered likely to occur. Whilst the species is likely to occur, there is no evidence to suggest that a local population occurs within the Project area. Although operational mining areas will be unsuitable for Koala movements, Koalas will be able to move freely to the north via the eastern boundary of the Project area. Remnant vegetation to the north and south of the operational areas will remain consolidated. The Project is considered unlikely to result in genetically distinct populations forming as a result of habitat isolation.
Result in invasive species that area harmful to an endangered to vulnerable species becoming established in the endangered or vulnerable species habitat	The species is vulnerable to predation from Wild Dogs. A Pest and Weed Management Plan will be in place prior to construction works being carried out. The Project is considered unlikely to result in invasive species that are harmful to an endangered species becoming established in the endangered species habitat.
Introduce disease that may cause the population to decline	Koala retrovirus (KoRV) and Chlamydia (*Chlamydia percorum*) are known threats to the species. It is inconceivable the Project activities will result in the introduction of these diseases into the Project area. The Project is considered unlikely to introduce disease that may cause the population to decline.
Interfere with the recovery of the species	The Koala recovery plan identified the following objectives: • The area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised then increased • The area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased • Metapopulation processes are maintained or improved • Partners, communities and individuals have a greater role and capability in listed Koala monitoring, conservation and management. There is no evidence to suggest a Koala population occurs within the Project area and is therefore not a known area of occupancy. The Project is not expected to significantly increase he isolation of habitat suitable for Koala. The Project is unlikely to interfere with any of the recovery actions identified in the Koala recovery plan.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration	The species was not observed during recent field surveys within the Project area although the species is considered likely to occur. Whilst the species is likely to occur, there is no evidence to suggest that a local population occurs within the Project area. The Project area is not considered an ecologically significant location for Koala. The proposed impacts are considered unlikely to cause disruptions to ecologically significant locations of a species.

Criteria	Endangered species assessment
or resting sites) of a species	
Assessment result	Significant residual impacts to Koala resulting from the proposed impacts are considered unlikely to occur in accordance with the Guideline. Offsets for impacts to Koala habitat under the *Queensland Environmental Offsets Policy* are not required.

8.1.1.2 *Cycas megacarpa* – Endangered

Ecology

The species is a small to medium sized cycad reaching a maximum height of 8 m with green new growth and eggs shaped seeds (DESI 2024). Suitable habitat for the species is described as Spotted Gum and Narrow-leaved Ironbark woodland or open-forest on hill tops and steep slopes with stony sandy loams or stony shallow clay loams. The species typically occurs at 40-600 m above sea level (ASL). Fruiting occurs during May to February and ripen from March. Seeds remain infertile for a minimum of nine months (DES1 2024).

Relationship with the Project area

The species was not observed during recent field surveys within the Project area. No Cycad species were identified within the Project area during the field survey. Cycad species are highly distinctive and easily located in the field. The nearest historical record of the species is located 24 km south-west of the Project area from 2003. Numerous records of the species occur further south and west. Suitable habitat for the species within the Project area is provided by remnant RE 11.11.15 with an area of 115.2 ha of which 3.27 ha is proposed to be impacted by the Project.

Government documents species documents

There is no approved conservation advice or listing advice for the species. The *National Multi-species Recovery Plan for the cycads*, Cycas megacarpa, Cycas ophiolitica, Macrozamia cranei, Macrozamia lomandroides, Macrozamia pauli-guilielmi *and* Macrozamia platyrhachis (Queensland Herbarium 2007) identifies the following threats relevant to the species:

- Land clearing
- Illegal harvesting
- Loss of genetic variation and insect pollinators
- Timber harvesting
- Fire.

The recovery plan also identifies the following recovery objectives relevant to the species:

- Protect existing populations
- Prevent loss of individuals and populations from legal harvesting and salvage
- Prevent loss of individuals, plant parts and seeds to illegal harvesting and destruction
- Determine habitat, ecological and reproductive needs
- Populations managed according to the best available knowledge
- Recovery of populations

Table 14 provides as assessment of the potential for significant residual impacts on *Cycas megacarpa* from the proposed impacts using the assessment criteria for Endangered and Vulnerable wildlife habitat outlined in the Guideline.

Table 14. Significant residual impact criteria assessment: *Cycas megacarpa*

Criteria	Endangered species assessment
Lead to long-term decrease in the size of a local population	The species was not observed during field surveys within the Project area although its occurrence is considered possible. The nearest historical record of the species is located 24 km south-west of the Project area from 2003 (ALA 2025). The proposed impacts will result in the clearing of 3.27 ha of suitable habitat for the species, although there is no evidence to suggest a

Criteria	Endangered species assessment
	population of Cycas megacarpa occurs within the Project area. The proposed impacts area considered unlikely to lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	The EOO of the species is estimated at 18,726 km^2 (DCCEEW 2023). The species was not observed during field surveys within the Project area and there is no evidence to suggest a population occurs within the Project area. The proposed impacts are considered unlikely to reduce the EOO of the species.
Fragment an existing population	The species was not observed during field surveys within the Project area and there is no evidence to suggest a population occurs within the Project area. The proposed clearing areas are adjacent to areas of existing disturbance. The proposed impacts are considered unlikely to fragment an existing population.
Result in genetically distinct populations forming as a result of habitat isolation	The species was not observed during field surveys within the Project area and there is no evidence to suggest a population occurs within the Project area. The proposed impacts areas area consolidated with the existing Project area and will not increase the current degree of habitat isolation within the Project area (i.e. suitable habitat in the southern portion of the Project area). The proposed impacts are unlikely to result in genetically distinct populations forming as a result of habitat isolation.
Result in invasive species that area harmful to an endangered to vulnerable species becoming established in the endangered or vulnerable species habitat	There are no invasive species known to be harmful to the species, although dense weed infestation may adversely impact recruitment. A large number of non-native plant species are already established within the Project area. A Pest and Weed Management Plan will be in place prior to construction works being carried out. The proposed impacts area considered unlikely to result in invasive species that are harmful to an endangered species becoming established in the endangered species habitat.
Introduce disease that may cause the population to decline	The species was not observed during field surveys within the Project area and there is no evidence to suggest a population occurs within the Project area. The species is not known to be vulnerable to any diseases. The Project is considered unlikely to introduce disease that may cause the population to decline.
Interfere with the recovery of the species	The species was not observed during field surveys within the Project area and there is no evidence to suggest a population occurs within the Project area. The proposed impacts will not interfere with any of the recovery objectives identified in the recovery plan for the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	The following important populations of the species have been identified in the recovery plan for the species: • Population 8 (Biloela) • Population 19 (Kroombit) • Population 30 (Woonbah) • Population 2 (Bouldercombe) • Population 3 (Mt Morgan) • Population 5 (Dee Range) • Population 14 (Biloela). The proposed impacts will not impact any of the locations listed above. The proposed impacts are unlikely to cause disruptions to ecological significant locations of the species.
Assessment result	Significant residual impact to *Cycas megacarpa* resulting from the proposed impacts are considered unlikely to occur.

8.1.1.3 Squatter Pigeon – Vulnerable

Ecology

Largely terrestrial pigeon species, foraging and breeding on the ground. Mainly occurs in dry grassy eucalypt woodlands and open forests (Frith 1982; Crome and Shields 1992). May also inhabit *Callitris*/*Acacia* dominated woodlands. Reported from open plains in its historical southern range (Frith 1982). Most birds live in sandy sites within 3 km of a permanent water source (Blakers et al. 1984). They remain common in heavily grazed country in tropical Queensland (Reis 2012) but they are typically more common in ungrazed lands (Woinarski and Ash 2002; Reis 2012). This species mainly feeds on grass seed although insects are seasonally important in the diet (Reis 2012).

The species may breed throughout the year but this appears to be greatly influenced by rainfall and abundance of foraging resources. Peak breeding is likely to occur during the dry season (April to October) (Squatter Pigeon Workshop 2011; DCCEEW 2023). The nest is a shallow depression on the ground usually sheltered by a bush or log (Reis 2012). The total population size is estimated at 40,000 breeding birds and is thought to occur as a single continuous interbreeding population (DCCEEW 2023).

The subspecies was historically found from the Dubbo region in New South Wales north to the Burdekin River area in in Queensland. There have been no official records in New South Wales since the 1970s. Although the species has declined greatly in southern Queensland in the past it appears this decline has slowed, and the species now persists over a wide area and can be locally abundant in central Queensland (Garnett et al. 2011) where groups of up to 30 individuals can still be seen (Reis 2012). South of the Carnarvon Range the species appears to occur only in scattered areas.

Association with Project area

The species was not detected during field surveys within the Project area. Historical records of the species include 24 occurrence records with 25 km of the Project area with the nearest record located 3.5 km west of the Project area. Suitable habitat for the species includes remnant and regrowth RE 11.11.15 and remnant RE 11.3.25 with a total area of 168.7 ha of which 15.43 ha is proposed to be impacted by the Project. The entire Project area is within 3 km of permanent water provided by Awoonga Reservoir.

Government approved species documents

There is no approved recovery plan for the species. The Approved Conservation Advice for the species (TSSC 2015b) notes the following threats to the species:

- Habitat loss through land clearing, particularly for livestock grazing which decreases foraging resources
- Overgrazing by livestock and feral herbivores
- Unsuitable fire regimes
- Changes to habitats caused by invasive weeds and/or thickening of understorey vegetation (Higgins & Davies 1996; Garnett et al 2011)

Relevant threat abatement plans considered applicable to the species include:

- *Threat abatement plan for competition and land degradation by rabbits* (DEE 2016)
- *Threat abatement plan for predation by feral cats* (DE 2015b)
- *Threat abatement plan for predation by the European red fox* (DEWHA 2008c)

The Approved Conservation Advice for the species also identifies the following primary conservation actions:

- Identify sub-populations of high conservation priority, especially in the southern part of the Squatter Pigeon's (southern) 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.

All of the small, isolated and sparsely distributed populations south of the Carnarvon Range area are considered as important subpopulations of Squatter Pigeon (southern) including:

- Populations occurring in the Condamine River catchment and Darling Downs
- Populations known to occur in the Warwick-Inglewood-Texas area
- Populations potentially occurring in northern NSW (Squatter Pigeon Workshop 2011; DCCEEW 2023).

An important sub-population of the species is not known to occur within the Project area. There is no definition of habitat critical to the survival of the species is the available literature. This is likely due to the relatively broad habitat requirements of the species and the abundance of similar habitat across the wider landscape.

Table 15 provides an assessment of the potential for significant impacts to Squatter Pigeon from the proposed impacts using the assessment criteria for Vulnerable species outlined in the Guideline.

Table 15. Significant residual impact criteria assessment: Squatter Pigeon

Criteria	Vulnerable species assessments
Lead to long-term decrease in the size of a local population	The species was not detected during the recent field survey within the Project area, although the species is considered a likely occurrence. There is no evidence to suggest that a local population occurs within the Project area. The proposed impacts will result in the clearing of 15.43 ha of suitable habitat for the species. The habitat proposed for clearing is adjacent to areas of existing disturbance and is partially isolated by the existing mine and Awoonga Reservoir. Ther species has limited dispersal abilities and required woodland or forest habitat to move between areas of suitable breeding or foraging habitat (Squatter Pigeon Workshop 2011). Extensive areas of suitable habitat for the species occurs to the north and west of the Project area. Pre-clearance surveys will be completed prior to clearing to survey for any breeding places for the species, however individual birds are likely to fly away from any disturbance during the construction phase. The proposed impacts are considered unlikely to lead to a long-term decrease in the size of local population of the species.
Reduce the extent of occurrence of the species	The species was not detected during field surveys within the Project area, although the species is considered a likely occurrence. There is no evidence to suggest that a population occurs within the Project area. The current EOO of the species is estimated at 440,000km^2 (DCCEEW 2023). The Project area is not at the limit of the species distribution. The proposed impacts will result in the clearing of 15.43 ha of suitable foraging habitat for the species. The proposed impacts are considered unlikely to reduce the EOO of the species.
Fragment an existing population	The species was not detected during field surveys within the Project area, although the species is considered a likely occurrence. There is no evidence to suggest that a population occurs within the Project area. The species is highly mobile and able to fly, the Project will not form a barrier to the species. The proposed impacts are considered unlikely to fragment an existing population into two or more populations.
Result in genetically distinct populations forming as a result of habitat isolation	The species was not detected during field surveys within the Project area, although the species is considered a likely occurrence. There is no evidence to suggest that a population occurs within the Project area. The species is highly mobile and able to fly, the Project will not form a barrier to the species. The proposed impacts will not increase the existing degree of habitat isolation within the Project area. The proposed impacts area considered unlikely to result in genetically distinct populations forming as a result of habitat isolation.
Result in invasive species that area harmful to an endangered to vulnerable species becoming established in the endangered or vulnerable species habitat	Predation by feral Cats (*Felis catus*) and Foxes (*Vulpes vulpes*) is a known threatening process for the species, as is habitat degradation resulting from Buffel Grass (*Cenchrus ciliaris*) invasion. Cats and foxes area expected to be common within the Project and wider landscape. Buffel Grass was not observed within the Project area. The Project is unlikely to introduce Buffel Grass into the Project area. A Pest and Weed Management Plan will be in place prior to construction works being carried out. The proposed impacts are considered unlikely to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat.
Introduce disease that may cause the population to decline	The species may be susceptible to avian bird flu. The Project is unlikely to introduce avian bird flu into the Project area. Machinery imported from outside the region for Project earthworks, transportation and other construction activities will be required to be certified free of weed seeds and soil matter prior to entry onsite. It is inconceivable the proposed impacts will result in the introduction of a disease causing the species to decline.
Interfere with the recovery of the species	The Project will not interfere with any recovery strategies identified in the Approved Conservation Advice for the species.
Cause disruption to ecologically significant locations (breeding,	The species was not observed during recent field surveys within the Project area although the species is considered likely to occur. Historical records of the species include 24 occurrence records with 25 km of the Project area with the nearest record located 3.5 km

feeding, nesting, migration or resting sites) of a species	west of the Project area from 2003 (ALA 2024). There is no evidence to suggest that a local population occurs within the Project area. The Project area is not considered an ecologically significant location for the species. The proposed impacts are considered unlikely to cause disruptions to ecologically significant locations of a species.
Assessment result	Significant impacts to Squatter Pigeon are considered unlikely to occur.

8.1.1.4 Powerful Owl – Vulnerable

Ecology

The Powerful Owl is a large hawk-owl with no facial disc and yellow eyes. Suitable habitat for the species includes open forests and woodlands, and sheltered gullies in wet forests with abundant tree hollows to provide habitat for their preferred prey (Birdlife Australia 2023). The species prey primarily on arboreal mammals such as Common Ring-tail Possum (*Pseudocheirus peregrinus*) and Greater Glider. Nesting occurs in large vertical tree hollows provided by old-growth eucalypt vegetation communities. Breeding pairs of Powerful Owls defend home ranges of 400-4,000 ha, depending on habitat quality (NSW Scientific Committee 2008). The species is distributed from Mackay in the north to western Victoria in the south across a band along the coast and up to 200 km inland, with the exception of the Carnarvon Ranges and the Pilliga (ALA 2024).

Association with the Project area

The species was not observed during the field surveys within the Project area. Historical records of the species include seven occurrence records within 25 km of the Project area with the nearest record located 11 km SSE of the Project area. Marginal habitat for the species within the Project area is provided by remnant RE 11.11.15 and remnant RE 11.3.25 with a total area of 5.57 ha. The habitat is considered marginal due to the absence of suitably large hollows required for nesting and scarcity of smaller hollows to support prey species (I.e. arboreal mammals). Powerful owls may intermittently use the habitat as part of a wider home range.

Government documents

There are no Commonwealth or Queensland Government documents relevant to the species. The NSW Government Saving Our Species Program identifies the following critical actions for the species:

- Consolidate all available information, knowledge and assessment protocols to create a consensus of best practice guidelines, providing a single point source to advise land managers about powerful owl conservation
- Negotiate with relevant landholders to enter into agreements, particularly in-perpetuity covenants or stewardship agreements, that promote the retention of large old trees, riparian habitat, owl roost sites and other high value habitat
- In regions where high priority powerful owl populations can be increased and stabilised, improve habitat quality and reconstruct connectivity
- At sites where tree hollows are few or declining within high priority powerful owl populations, trial the installation of nest boxes to increase mammalian prey densities
- Encourage development of citizen science programs in urban areas where an increase in community engagement is likely to create broader conservation awareness of powerful owls
- Document and protect known nests.

Table 16 provides an assessment of the potential for significant impacts to Powerful Owl from the Proposed impacts using the assessment criteria for Vulnerable species outlined in the Guideline.

Table 16. Significant residual impact criteria assessment: Powerful Owl

Criteria	Vulnerable species assessments
Lead to long-term decrease in the size of a local population	The species was not observed during recent field surveys within the Project area. Historical records of the species include seven occurrence records within 25 km of the Project area with the nearest record located 11 km south southeast of the Project area from 2003 (ALA 2025). There is no evidence to suggest that a local population occurs within the Project area. The proposed impacts will result in the clearance of 18.0 ha of

Criteria	Vulnerable species assessments
	marginal habitat for the species. The habitat proposed for clearing is adjacent to areas of existing disturbance and is partially isolated by the existing mine and Awoonga Reservoir. The proposed impacts are considered unlikely to lead to a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	The EOO of the species is estimated at 1,290,000 km^2 (Garnet & Baker 2020). The Project area is not at the limit of the species distribution. The proposed impacts will result in the clearance of 18.0 ha of marginal habitat for the species. The proposed impacts are considered unlikely to reduce the EOO of the species.
Fragment an existing population	The species was not observed during recent field surveys within the Project area. There is no evidence to suggest that a population exists within the Project area. The proposed impact area of 18.0 ha of marginal habitat for the species is relatively minor compared to the existing operational areas within the Project area. The majority of marginal habitat for the species proposed to be impacted is currently isolated to the south of the existing mine. The proposed impacts will not further the current degree of habitat fragmentation within the Project area. The proposed impacts are considered unlikely to fragment an existing population.
Result in genetically distinct populations forming as a result of habitat isolation	The species was not observed during recent field surveys within the Project area. There is no evidence to suggest that a population exists within the Project area. The proposed impact area of 18.0 ha of marginal habitat for the species is relatively minor compared to the existing operational areas within the Project area. The proposed impacts will increase the degree of habitat fragmentation within the Project area. The proposed impacts are considered unlikely to fragment an existing population.
Result in invasive species that area harmful to an endangered to vulnerable species becoming established in the endangered or vulnerable species habitat	There are no invasive species that area a known threat to the species. A Pest and Weed Management Plan will be in place prior to construction works being carried out. The proposed impacts are considered unlikely to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat.
Introduce disease that may cause the population to decline	The species may be susceptible to avian bird flu. The Project is unlikely to introduce avian bird flu into the Project area. Machinery imported from outside the region for Project earthworks, transportation and other construction activities will be required to be certified free of weed seeds and soil matter prior to entry onsite. It is inconceivable the proposed impacts will result in the introduction of a disease causing the species to decline.
Interfere with the recovery of the species	The Project will not interfere with any critical actions identified for the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	The species was not observed during recent field surveys within the Project area although the species is considered likely to occur. There is no evidence to suggest that a local population occurs within the Project area. The Project area is not considered an ecologically significant location for the species. The proposed impacts are considered unlikely to cause disruptions to ecologically significant locations of a species.
Assessment result	Significant impacts to Powerful Owl are considered unlikely to occur.

8.1.1.5 Cassinia collina – Vulnerable

Ecology

Cassinia collina is a shrub reaching 2 m in height, with brown branches and leaves 3 to 7 cm in length. Inflorescences are up to 16 cm long (DESI 2024). Flowering has been observed during April-June and also September-October (Wang 1999; Queensland Herbarium 2011b). Suitable habitat for the species includes tall woodland and open forest on stony soils and sandy loams, including fine-grained granite soils (DESI 2024). The species is restricted to eight populations, including six within Mount Walsh National Park, one within Wongi State Forest and one near Mount Stanley in the Many Peaks Range.

Association with the Project area

The species was not observed within the Project area during the recent field survey. A single record of the species occurs within 25 km of the Project area, located 14 km to the southeast (ALA 2025). Suitable habitat for the species within the Project area is provided by remnant RE 11.11.15 and 11.3.25 with a total area of 5.57 ha.

Government approved documents

There are no government documents relevant to the species. The DETSI species profile for the species identifies the following threat as relevant to the species:

- Habitat clearing on private land

The following management recommendations are also identified:

- Establishment of protective buffers that exclude clearing in areas where the species occurs
- Adaptive management techniques to be implemented during timber harvesting.

Table 17 provides an assessment of the potential for significant impacts to *Cassinia collina* from the proposed impacts using the assessment criteria for Vulnerable species outlined in the Guideline.

Table 17. Significant residual impact criteria assessment: *Cassinia collina*

Criteria	Vulnerable species assessments
Lead to long-term decrease in the size of a local population	The species was not recorded during the recent ecology field survey within the Project area, although a formal protected plant survey was not completed. Known populations occur at Mount Walsh National Park, Wongi State Forest and near Mount Stanley. A single record of the species occurs within 25 km of the Project area, located 14 km to the southeast (ALA 2025). There is no evidence to suggest a local population of the species occurs within the Project area. The proposed impacts will result in the clearance of 18 ha of suitable habitat for the species. The habitat proposed for clearing is adjacent to areas of existing disturbance and is partially isolated by the existing mine and Awoonga Reservoir. A pre-clearance survey targeting the species will be completed within areas of suitable habitat prior to clearing. In the event that a population is discovered within the proposed disturbance areas, further mitigation measures including avoidance will be required to prevent a significant impact. The proposed impacts are considered unlikely to result in a long-term decrease in the size of a local population.
Reduce the extent of occurrence of the species	The species was not recorded during recent surveys within the Project area. The Project area is likely to be outside of the known EOO of the species. A pre-clearance survey targeting the species will be completed within areas of suitable habitat prior to clearing. In the event that a population is discovered within the proposed disturbance areas, further mitigation measures including avoidance will be required to prevent a significant impact. The proposed impacts area considered unlikely to reduce the extent of occurrence of the species.
Fragment an existing population	The species was not recorded during recent surveys within the Project area. There is no evidence to suggest a local population of the species occurs within the Project area. The proposed impacts will not increase the degree of fragmentation of suitable habitat for the species within the Project area. A pre-clearance survey targeting the species will be completed within areas of suitable habitat prior to clearing. In the event that a population is discovered within the proposed disturbance areas, further mitigation measures including avoidance will be required to prevent a significant impact. The proposed impacts are considered unlikely to fragment an existing population.
Result in genetically distinct populations forming as a result of habitat isolation	The species was not recorded during recent surveys within the Project area. There is no evidence to suggest a local population of the species occurs within the Project area. The proposed impacts will not increase the isolation of suitable habitat for the species within the Project area. The proposed impacts are considered unlikely to result in genetically distinct populations forming as a result of habitat isolation.
Result in invasive species that area harmful to an endangered to	There are no invasive species that are known threats to the species, although the species may be vulnerable to herbivory from non-native fauna and habitat degradation from invasive plants. A Pest and Weed Management Plan will be in place prior to construction works being carried out. The proposed impacts are considered unlikely to result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat.

Criteria	Vulnerable species assessments
vulnerable species becoming established in the endangered or vulnerable species habitat	
Introduce disease that may cause the population to decline	There are no diseases that are known to adversely impact the species. A Pest and Weed Management Plan will be in place prior to construction works being carried out. The proposed impacts are considered unlikely to introduce disease that may cause the population to decline.
Interfere with the recovery of the species	The proposed impacts are considered unlikely to interfere with the management recommendation for the species. Flora surveys associated with the Project may increase understanding of the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	The species was not recorded during recent surveys within the Project area. There is no evidence to suggest a local population of the species occurs within the Project area. The only known location of the species near Mt Castletower is considered an ecologically significant location for the species. A pre-clearance survey targeting the species will be completed within areas of suitable habitat prior to clearing. In the event that a population is discovered within the proposed disturbance areas, it may be considered an ecologically significant location for the species and further mitigation measures including avoidance will be required to prevent a significant impact. The proposed impacts are considered unlikely to cause disruption to ecological significant locations of a species.
Assessment result	Significant impacts to *Cassinia collina* are considered unlikely to occur.

8.2 Category R (GBR Riverine regrowth) Regulated Vegetation

The Project is mapped as a key resource area (KRA) (State of Queensland 2024a). KRAs are a planning tool designed to protect resources from being rendered inaccessible by urban expansion. Further, they are designed to maintain adequate separation distances between sensitive uses and any future extractive industry (State of Queensland 2024b).

Category A, B, and C regulated vegetation has been completely avoided in developing the proposed future mine plan for the Project. However, the proposed expansion of the Southern WRD to the east will impact 2.95 ha of mapped MSES category R (GBR riverine) least concern vegetation. This area is specifically within the separation area of KRA19 (Taragoola- hard rock operation). The *Accepted Development Clearing Code- Clearing for an Extractive Industry* (DoR 2020) and *List of exempt clearing work* (State of Queensland 2019) notes that clearing in a category C area or category R area within a KRA is exempt clearing work. Therefore, an approval or notification prior to clearing this area is not required.

Under the Offsets Regulation, offsets may be required for any significant residual impact on prescribed environmental matters defined in Schedule 2, Section 1. A prescribed RE is defined as a RE, other than a RE mentioned in the VM Act, section 8(b), located in a category B area on the regulated vegetation management map, to the extent the ecosystem contains remnant vegetation. Therefore, the Category R area is not considered a prescribed environmental matter for offsets under the Offsets Regulation as it is regrowth vegetation. Therefore, there are no significant residual impacts to Category R regulated vegetation considered applicable for the Project.

8.3 Clearing in a RE that is within the Defined Distance of a Watercourse

The Project will require clearing of two areas of mapped regulated vegetation within the defined distance from the defining bank of a relevant watercourse for both linear (access track) and non-linear infrastructure (Southern WRD and future Pit 3-4). The mapping of the MSES regulated vegetation (defined watercourse) is considered to be inconsistent with ground conditions as it partially overlaps existing Project disturbance areas authorised under the Project's EA. The alignment does not reflect the topography of the area, as in both instances the MSES regulated vegetation (defined watercourses) mapping crosses the eastern and western levees at a perpendicular angle, despite being a nominal 15 m taller than the adjacent land.

The MSES defined watercourse mapping follows the same alignment as 'unmapped' watercourse mapping under the *Water Act 2000* and are labelled as stream order 1. Both areas are also mapped low risk (green) waterways for waterway barrier works. Based on the satellite imagery and field surveys undertaken by Epic in March 2023, these waterways are ephemeral, short-in length, and do not provide fish habitat as they are either totally (artificially) impounded and isolated from downstream waterways, or significantly modified by earthworks and/or mining operations. In this context the waterways do not function as mapped and would be heavily altered by historic mining activities. Irrespective of this, an assessment of potential significant residual impact to prescribed REs within the defined distance of a watercourse has been considered in **Table 18,** in relation to Section 2.1 of the SRI Guideline (DEHP 2014).

Under Schedule 2 Section 2 of the Offsets Act, a prescribed RE is a matter of state environmental significance to the extent the ecosystem is located within a defined distance from the defining banks of a relevant watercourse or relevant drainage feature. In Schedule 2, Section 2 (6) of the Offsets Regulation, the 'defined distance' for RE is defined as a distance identified in the *Queensland Environmental Offsets Policy 2023* (Appendix 3, V1.15) as the relevant distance from the defining banks of a relevant watercourse or relevant drainage feature. For stream order 1 watercourses in a non-coastal bioregion, the defined distance is 25 metres. Excluding the existing disturbance, the RE within the proposed disturbance areas is RE 11.3.25 which has a woodland structure code. Therefore, criteria for the 'sparse' structural category applies.

Table 18. Significant residual impact test for MSES regulated vegetation (defined watercourse)

Ref.	Vegetation Clearing Type	Trigger specified in Section 2.1 of guideline	Proposed Project disturbance
1	Clearing for linear infrastructure in a sparse RE	Greater than 20 m wide	Nil- all tracks are no more than 10 m wide
	Clearing other than for linear infrastructure in a sparse RE	Area greater than 2 ha	1.86 ha
2	Clearing within 50 m of the defining bank	N/A	N/A
3	Clearing within 5 m of the [25 m] defining bank	Any clearing	0.42 ha

For a prescribed activity to have a significant residual impact on a RE that is within the defined distance of watercourses, criteria 1 and 3 must be exceeded. Significant impacts are unlikely based on the SRI Guideline (DEHP 2014), however the watercourse does not exist as mapped and therefore there is no potential impact. No offsets under Queensland's *Environmental Offsets Act 2014* are required.

8.4 Waterways Providing for Fish Passage

The Project is expected to impact 3 low risk waterways with barrier works. An environmental offset may be required for any part of a waterway that provides for passage of fish if the construction, installation or modification of waterway barrier works caried out under an authority will limit the passage of fish along the waterway. An assessment of the potential for significant residual impacts to a waterway providing fish passage against the criteria provided in the Guideline is provided below in **Table 19**.

Table 19. Significant residual impact criteria assessment: waterway providing for fish passage

Criteria	Waterway providing fish passage assessment
A permanent modification to the volume, depth, timing, duration or flow frequency on the waterway	Two of the low risk waterways will be impacted by the proposed expansion of Pit 2 and Pit 3-4. A third low risk waterway will be impacted by the proposed waste rock dump. All three waterways and ephemeral, short in length and already subject to artificial impoundment. The expected flow volume and duration is expected to be zero except during very high rainfall event triggering surface flow across the wider area. Expansion of the pits and waste rock dump is not expected to reduce flow the flow of the waterways. The proposed Project is considered unlikely to result in a permanent modification to the volume, depth, timing, duration or flow frequency on the waterway.

Criteria	Waterway providing fish passage assessment
Permanent modification or fragmentation of fish habitat including but not limited to in stream vegetation, snags or woody debris, substrate, bank or riffle formation necessary for breeding and/or survival of native fish	The expected impact areas of all three waterways do not provide fish habitat as they are either totally impounded and isolated from downstream waterways or significantly modified by earthworks and/or mining operations. The proposed Project in considered unlikely to result in permanent modification or fragmentation of fish habitat including but not limited to in stream vegetation, snags or woody debris, substrate, bank or riffle formation necessary for breeding and/or survival of native fish.
The mortality or injury of fish species	Native fish are considered highly unlikely to occur within any of the proposed impact areas. The proposed Project is considered unlikely to result in the mortality or injury of fish.
Works that permanently reduce the level of fish passage provided in a tidal waterway or a waterway identified as a major high risk waterway for waterway barrier works, to a level that would increase stress on fish populations	The waterways or not tidal or major risk. The proposed Project is considered unlikely to result in works that permanently reduce the level of fish passage provided in a tidal waterway or a waterway identified as a major high risk waterway for waterway barrier works, to a level that would increase stress on fish populations.
Assessment result	Significant residual impacts to waterways providing fish passage resulting from the Project are considered unlikely to occur.

8.5 Significant Residual Impacts – Environmental Offsets

Under the Offsets Act, environmental offsets may be required for significant residual impacts to MSES from the proposed Project. As described in **Section 0** and in accordance with the MSES Guideline, significant residual impacts to the following MSES are not expected to be likely:

- Listed conservation significant species
- Regulated vegetation (prescribed RE within the defined distance from the defining banks of a watercourse identified on the vegetation management watercourse map)
- Category R (GBR riverine regrowth) regulated vegetation
- Waterways providing for fish passage

Therefore, no offsets under the Offsets Act are required.

9 SUMMARY AND CONCLUSION

A field survey of the Project area was completed during 27 February to 1 March 2023. The survey included a baseline flora and fauna assessment, verification of REs and regulated vegetation, and assessment of habitat suitability for conservation significant species.

A total of two different RE types were verified within the Project area, including remnant and regrowth vegetation analogous to Category B and Category C regulated vegetation.

The likelihood of occurrence assessment for conservation significant flora species determined that no conservation significant flora species are likely to occur within the Project area (**Table 6**), although two flora species area considered a possible occurrence within the Project area:

- *Cassinia collina*
- *Cycas megacarpa*

The likelihood of occurrence assessment for conservation significant fauna species determined that three conservation significant fauna species, Koala, Squatter Pigeon (southern) and White-throated Needletail, are considered likely to occur within the Project area (**Table 10**), whilst Powerful Owl is considered a possible occurrence within the Project area.

Significant residual impacts from the proposed Project were considered for these listed species considered likely to occur, as well as for regulated vegetation (prescribed RE within the defined distance from the defining banks of a watercourse identified on the vegetation management watercourse map), Category R (GBR riverine) regulated vegetation, and waterways providing for fish passage. It was determined that no significant impact is expected from the proposed Project and therefore, no offsets under the Queensland *Environmental Offsets Act 2014* are required.

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11 ACRONYMS

Acronym	Description
ALA	Atlas of Living Australia
AS	Australian Standards
ASL	Above sea level
BBSB	Brigalow Belt South Bioregion
Biosecurity Act	*Biosecurity Act 2014*
BoM	Bureau of Meteorology
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAF	Department of Agriculture and Fisheries
DAWE	Department of Agriculture, Water, and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEHP	Department of Environment and Heritage Protection
DNRMMRRD	Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development
DESI	Department of Environment, Science and Innovation (formerly DES)
DETSI	Department of Environment, Tourism, Science and Innovation (formerly DESI)
DoR	Department of Resources
EA	Environmental Authority
EDL	Ecologically dominant layer
EMP	Environmental Management Plan
EOML	End of mine life
EOO	Extent of occurrence
EP Act	*Environmental Protection Act 1994*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EP Regulation	*Environmental Protection Regulation 2019*
ERAs	Environmentally Relevant Activities
ESAs	Environmentally Sensitive Areas
ESCP	Erosion and Sediment Control Plan
Fisheries Act	*Fisheries Act 1994*
GAWB	Gladstone Area Water Board
GBO	General biosecurity obligation
GBR	Great Barrier Reef
ha	hectares
HES	High ecological significance
km	kilometres
KRA	Key resource area
L	Litres
LGA	Local Government Area
LOM	Life of mine
ML	Mining Leases
m	metre
mAHD	Metres Australian Height Datum
mBGL	Metres below ground level
mm	millimetre
MNES	Matter of national environmental significance
MSES	Matter of state environmental significance
Mtpa	Million tonnes per annum
NC Act	*Nature Conservation Act 1992*
NSW	New South Wales
Offsets Act	*Environmental Offsets Act 2014*
Offsets Regulation	*Environmental Offsets Regulation 2014*
PEM	Prescribed environmental matter
PMLU	Post mining land use
PRC Plan	Progressive Rehabilitation and Closure Plan
QFES	Queensland Fire and Emergency Services
RE	Regional ecosystem

Acronym	Description
ROM	Run of mine
t	tonne
VM Act	*Vegetation Management Act 1999*
WildNet	Wildlife Online
°C	Degrees Celsius
%	Percent

APPENDIX A DESKTOP SEARCH RESULTS

Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Longitude: 151.2392 Latitude: -24.1043 with 2 kilometre radius

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and a field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

Disclaimer

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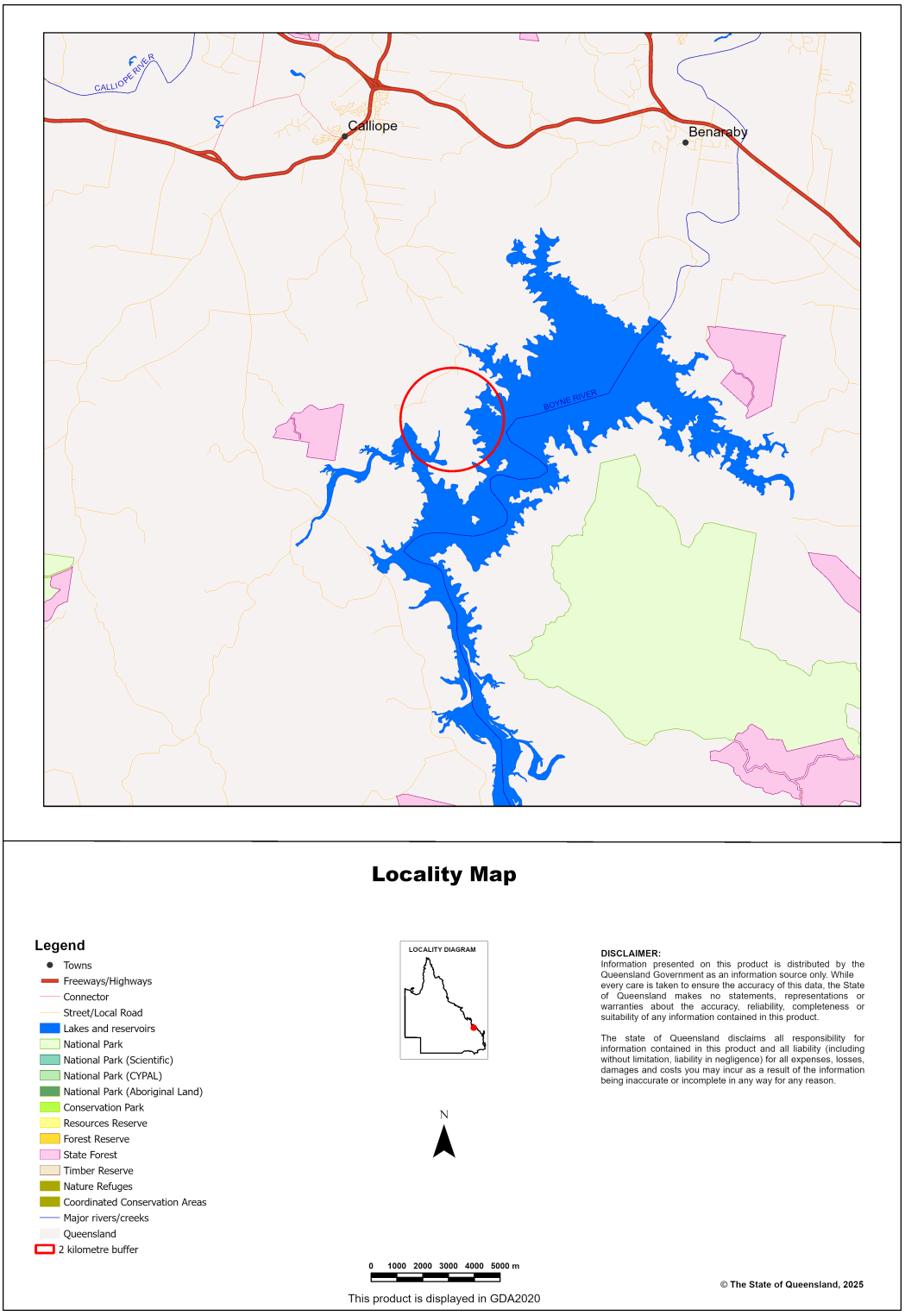
Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI: Longitude: 151.2392 Latitude: -24.1043 with 2 kilometre radius, with area 1256.64 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Gladstone Regional	Boyne	Brigalow Belt	Mount Morgan Ranges



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992;*

- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the Marine Parks Act 2004 ;

- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;

- *Threatened wildlife under the Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;

- Regulated vegetation under the *Vegetation Management Act 1999* that is:

  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;

- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;

- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;

- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0 ha	0.0%
1b Protected Areas- nature refuges	0 ha	0.0%
1c Protected Areas- special wildlife reserves	0 ha	0.0%
2 State Marine Parks- highly protected zones	0 ha	0.0%
3 Fish habitat areas (A and B areas)	0 ha	0.0%
4 Strategic Environmental Areas (SEA)	0 ha	0.0%
5 High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values	0 ha	0.0%
6a High Ecological Value (HEV) wetlands	0 ha	0.0%
6b High Ecological Value (HEV) waterways	0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	0 ha	0.0%
7b Special least concern animals	0 ha	0.0%
7c i Koala habitat area - core (SEQ)	0 ha	0.0%
7c ii Koala habitat area - locally refined (SEQ)	0 ha	0.0%
7d Sea turtle nesting areas	0 km	Not applicable
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	2.07 ha	0.2%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	1.79 ha	0.1%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	28.33 ha	2.3%
8d Regulated Vegetation - Essential habitat	0 ha	0.0%
8e Regulated Vegetation - intersecting a watercourse	26.5 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	0 ha	0.0%
9a Legally secured offset areas- offset register areas	0 ha	0.0%
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0 ha	0.0%

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(No results)

1b. Protected Areas - nature refuges

(No results)

1c. Protected Areas - special wildlife reserves

(No results)

2. State Marine Parks - highly protected zones

(No results)

3. Fish habitat areas (A and B areas)

(No results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(No results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Not applicable

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

7d. Wildlife habitat (sea turtle nesting areas)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
Boronia keysii	Keys boronia	V	None
Calyptorhynchus lathami	Glossy black cockatoo	V	None
Casuarius casuarius johnsonii	Sthn population cassowary	E	None
Crinia tinnula	Wallum froglet	V	None
Denisonia maculata	Ornamental snake	V	None
Euastacus bindal	Mount Elliot crayfish	CR	None
Euastacus binzayedi		CR	None
Euastacus eungella		E	None
Euastacus hystricosus		E	None
Euastacus jagara	Jagara hairy crayfish	CR	None
Euastacus maidae		CR	None
Euastacus monteithorum		E	None
Euastacus robertsi		E	None
Taudactylus pleione	Kroombit tinkerfrog	E	None
Litoria freycineti	Wallum rocketfrog	V	None
Litoria olongburensis	Wallum sedgefrog	V	None
Macadamia integrifolia		V	None
Melaleuca irbyana	swamp tea-tree	E	None
Macadamia ternifolia		V	None
Macadamia tetraphylla	bopple nut	V	None
Petrogale penicillata	brush-tailed rock-wallaby	V	None
Petrogale coenensis	Cape York rock-wallaby	E	None
Petrogale purpureicollis	purple-necked rock-wallaby	V	None
Petrogale sharmani	Sharmans rock-wallaby	V	None
Petrogale xanthopus celeris	yellow-footed rock-wallaby (Qld subspecies)	V	None
Petaurus gracilis	Mahogany Glider	E	None
Petrogale persephone	Proserpine rock-wallaby	E	None
Phascolarctos cinereus	Koala - outside SEQ*	E	None
Pezoporus wallicus wallicus	Eastern ground parrot	V	None
Xeromys myoides	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

(No results)

Special least concern animal species records

(No results)

Shorebird habitat (critically endangered/endangered/vulnerable)

Not applicable

Shorebird habitat (special least concern)

Not applicable

**Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL). Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)*

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

https://www.qld.gov.au/environment/plants-animals/species-list/

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** and **Map 3c - MSES - Wildlife habitat (sea turtle nesting areas)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

https://environment.ehp.qld.gov.au/regional-ecosystems/

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.4/11.3.25	O-dom	rem_oc

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.4/11.3.25	O-dom	hvr_oc

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number
R	9149

8d. Regulated Vegetation - Essential habitat

Not applicable

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Not applicable

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

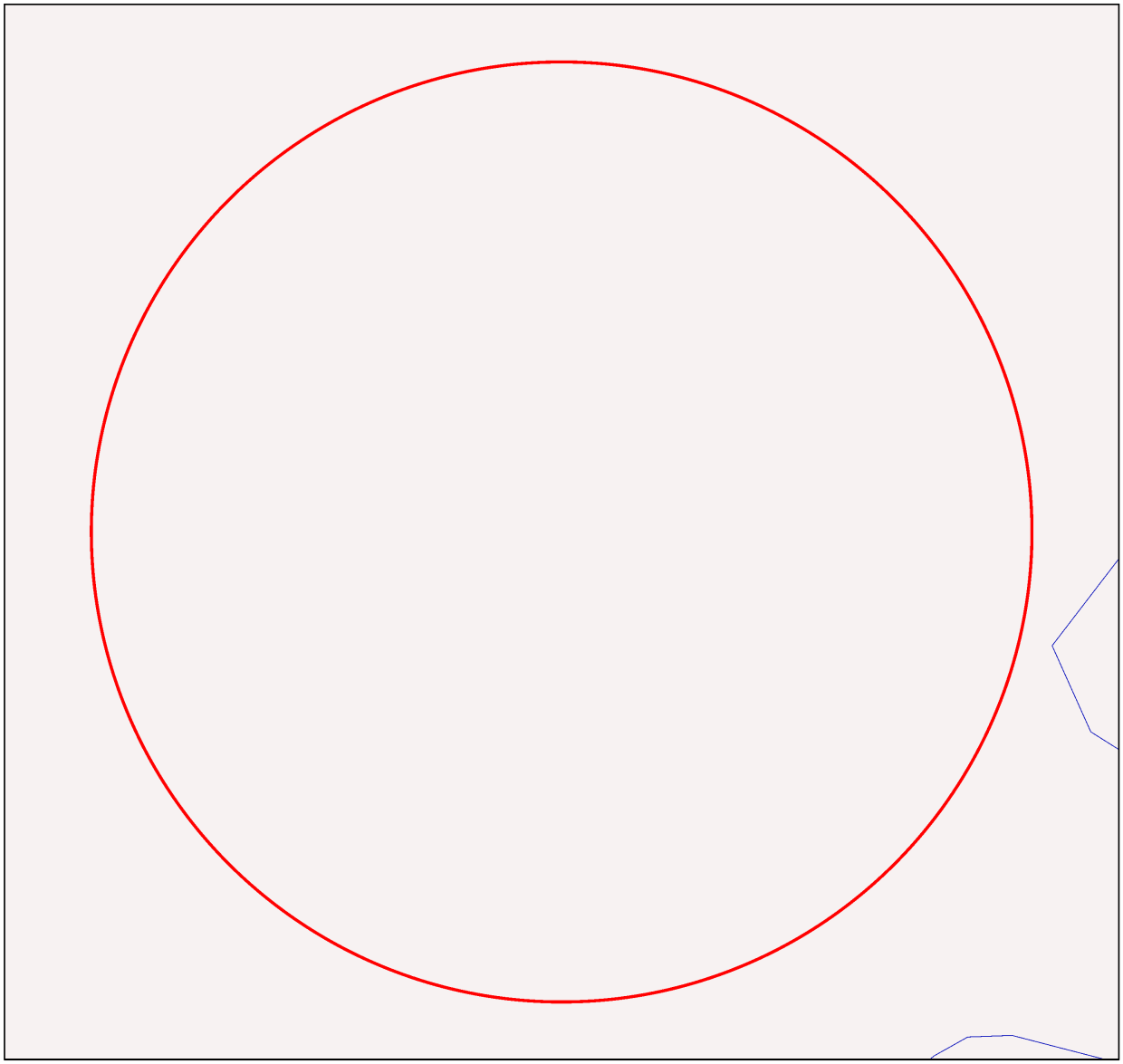
(No results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

(No results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)
- 2 kilometre buffer

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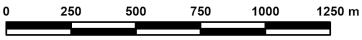
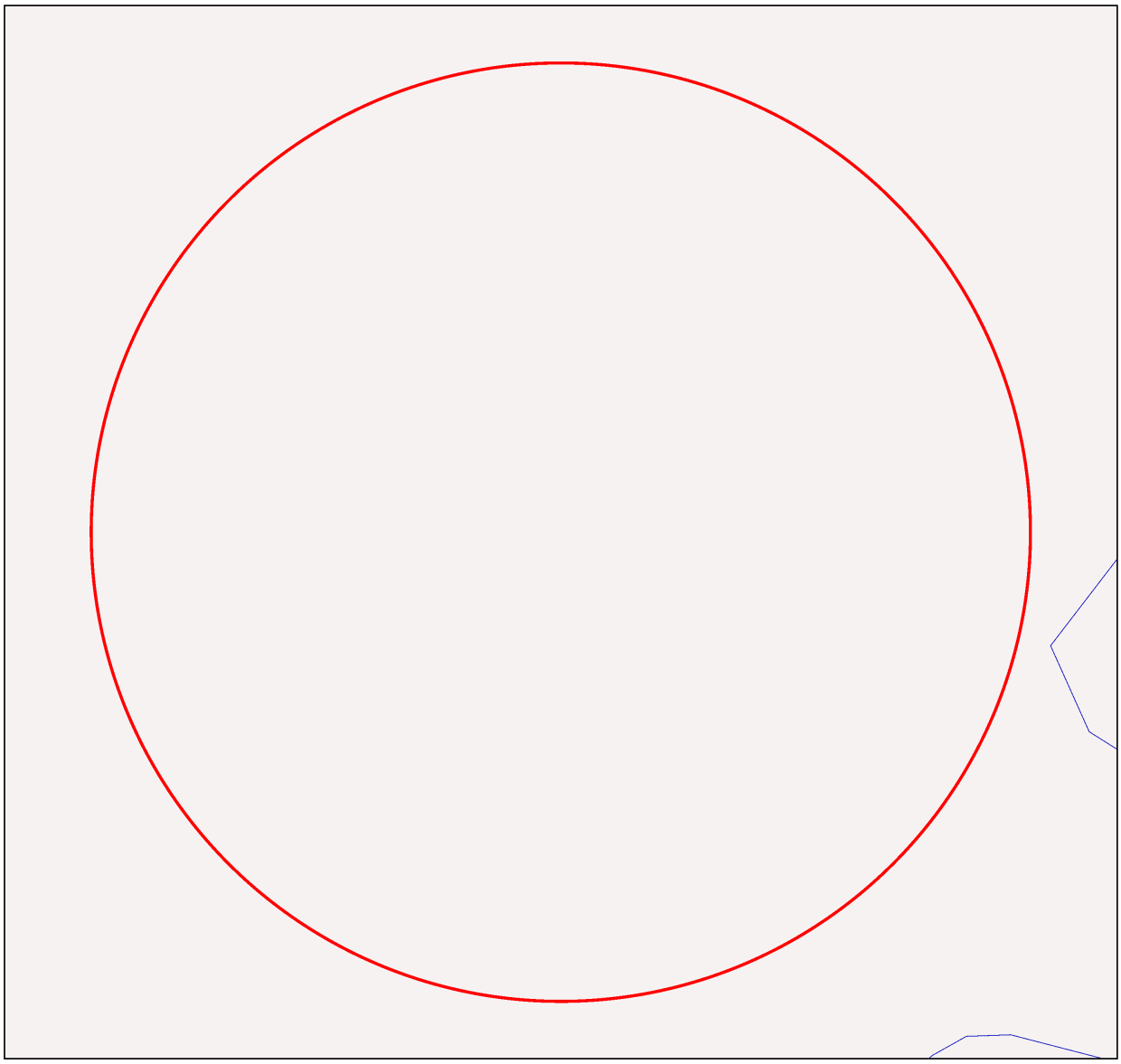


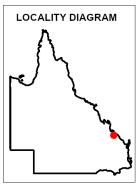
This product is displayed in GDA2020

Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands
- 2 kilometre buffer

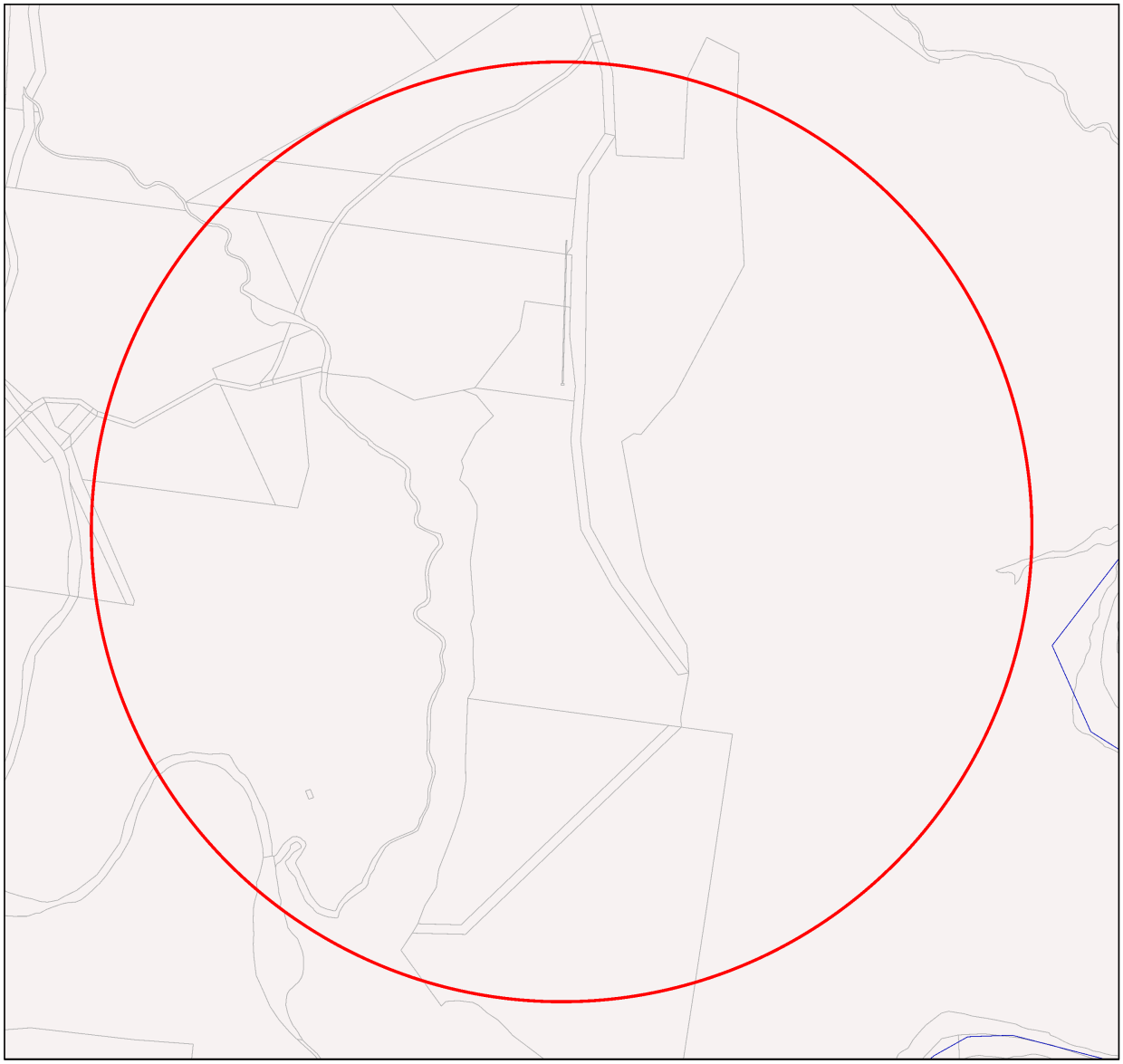


N

0 250 500 750 1000 1250 m

This product is displayed in GDA2020

Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



MSES - Species
Threatened (endangered or vulnerable) wildlife and special least concern animals

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)
- 2 kilometre buffer

N

0 250 500 750 1000 1250 m

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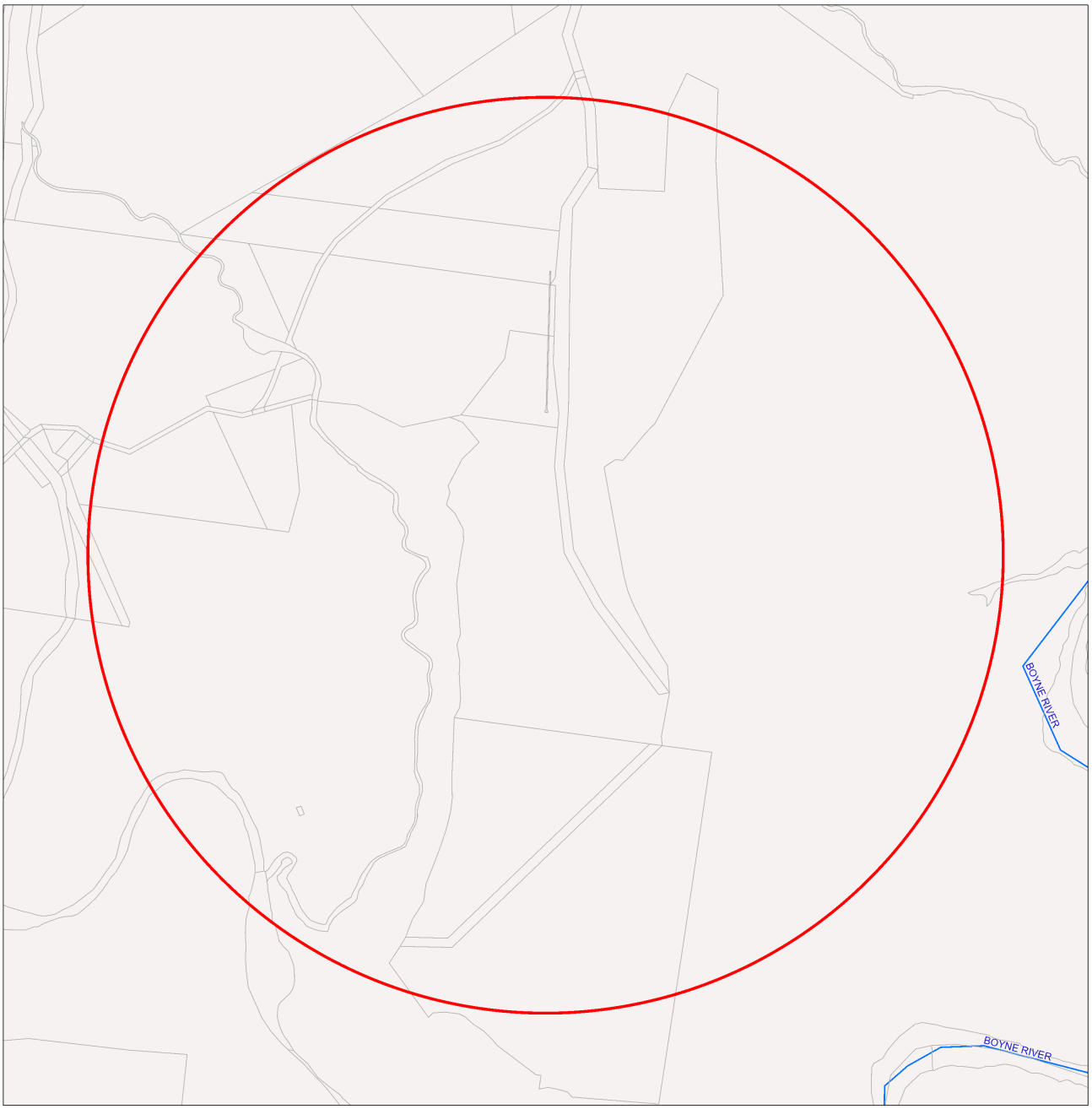
Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species
Koala habitat area (SEQ)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)
- 2 kilometre buffer

LOCALITY DIAGRAM

While every care is taken to ensure the accuracy of this product, the Department of the Environment, Tourism, Science and Innovation acting on behalf of the State of Queensland makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason. Due to varying sources of data, spatial locations may not coincide when overlaid.

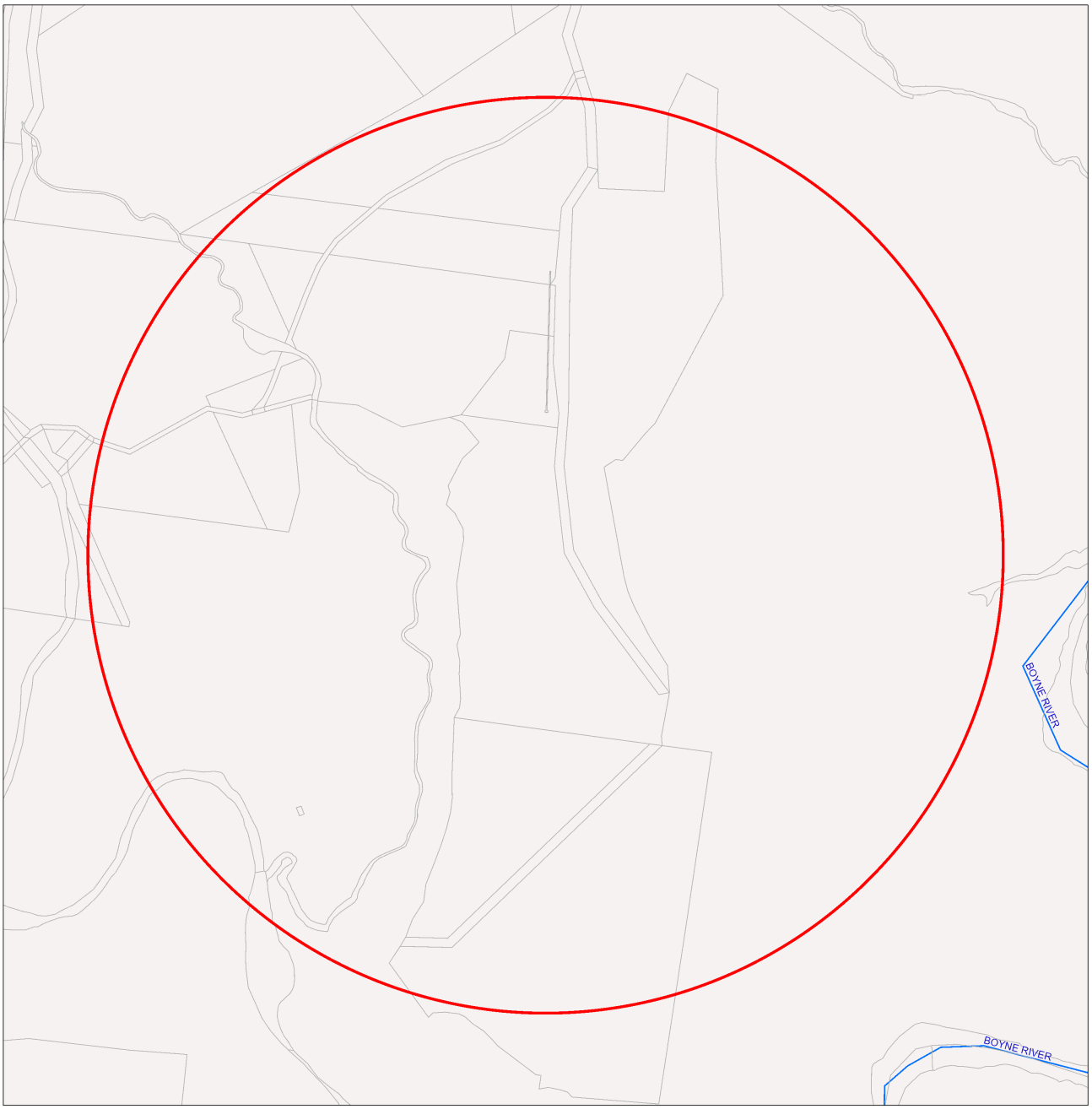
The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

0 240 480 720 960 1,200 m

This product is displayed in GDA2020

Map 3c - MSES - Species - Wildlife habitat (sea turtle nesting areas)



MSES - Wildlife habitat (sea turtle nesting areas)

- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (sea turtle nesting areas)
- 2 kilometre buffer

LOCALITY DIAGRAM

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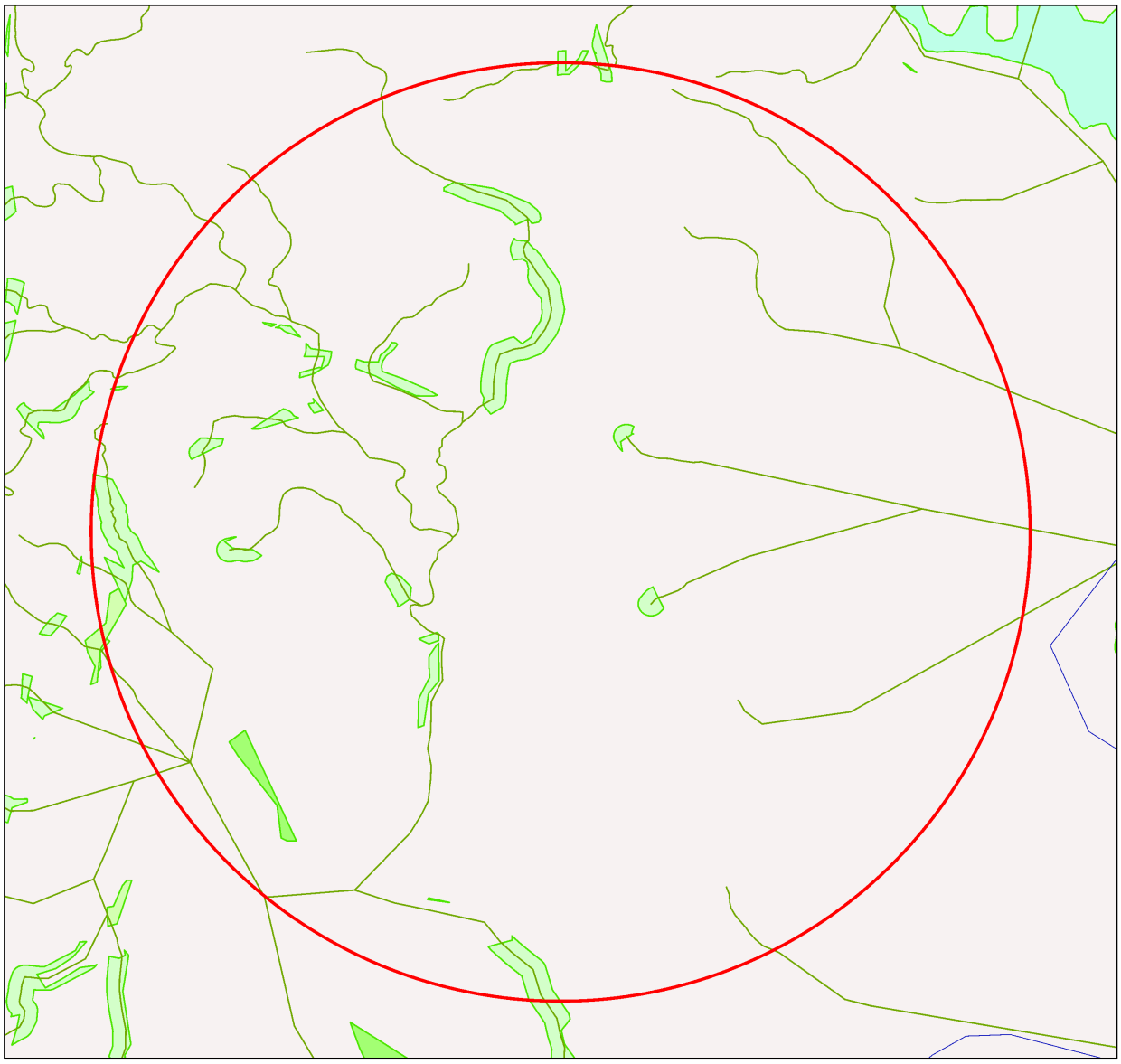
MSES mapping of sea turtle nesting areas identifies beaches where the recorded number of turtle nests are over 1% of the turtle species or genetic stock. The linework is also deliberately extended along nearby rocky coastlines and headlands to recognise that significant numbers of nesting adults and hatchlings can become disoriented by light pollution from development on rocky coastlines and headlands while navigating offshore from nesting beaches.

0 240 480 720 960 1,200 m

This product is displayed in GDA2020

Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)
- 2 kilometre buffer

N

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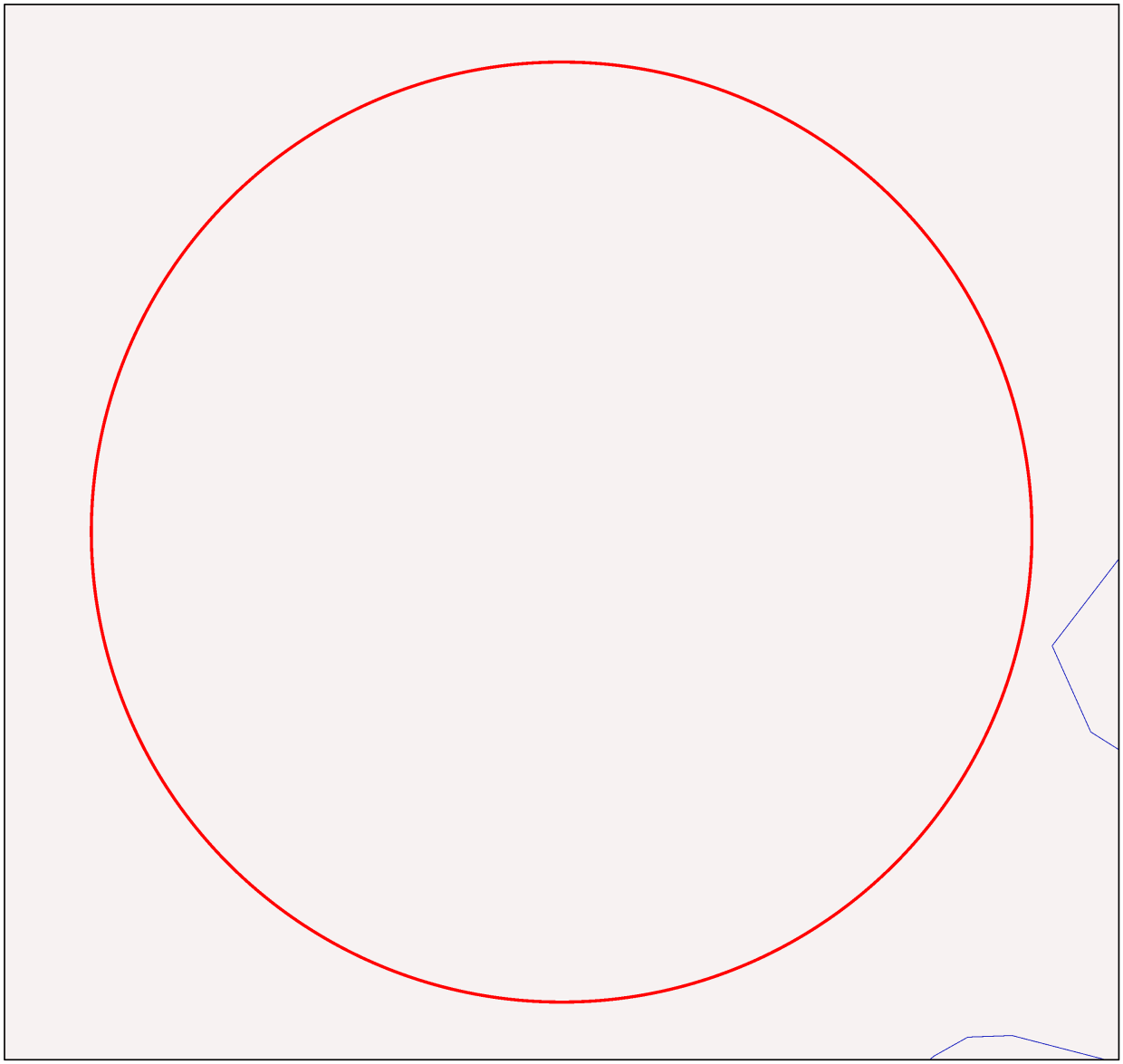
0 250 500 750 1000 1250 m

This product is displayed in GDA2020

Map 5 - MSES - Offset Areas



MSES - Offsets

- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)
- 2 kilometre buffer

N

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0 250 500 750 1000 1250 m

This product is displayed in GDA2020

Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). Its primary purpose is to support implementation of the SPP biodiversity policy.

MSES mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations.

MSES mapping does not determine whether state or local development assessment is required. For state assessment triggers refer to the Development Assessment Mapping System (DAMS). For local assessment triggers, refer to the relevant local planning scheme.

The Queensland Government's "Method for mapping - matters of state environmental significance can be downloaded from:

http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html .

Appendix 2 - Source Data

The datasets listed below are available on request from:

http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	**current QSpatial data (http://qspatial.information.qld.gov.au)**
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DETSI
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DETSI	- Department of the Environment, Tourism, Science and Innovation
EP Act	- Environmental Protection Act 1994
EPP	- Environmental Protection Policy
GDA2020	- Geocentric Datum of Australia 2020
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- Nature Conservation Act 1992
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- Vegetation Management Act 1999

Queensland Government

Department of the Environment, Tourism, Science and Innovation

Environmental Reports

Regional Ecosystems

Biodiversity Status

For the selected area of interest
Longitude: 151.2392 Latitude: -24.1043 with 2 kilometre buffer

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the input coordinates.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 2020). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Important Note to User

Information presented in this report is based upon the Queensland Herbarium & Biodiversity Science's Regional Ecosystem framework. The Biodiversity Status has been used to depict the extent of "Endangered", "Of Concern" and "No Concern at Present" regional ecosystems in all cases, rather than the classes used for the purposes of the *Vegetation Management Act 1999* (VMA). Mapping and figures presented in this document reflect the Queensland Herbarium & Biodiversity Science's Remnant and Pre-clearing Regional Ecosystem Datasets, and not the certified mapping used for the purpose of the VMA.

For matters relevant to vegetation management under the VMA, please refer to the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development website https://www.nrmmrrd.qld.gov.au/

Please direct queries about these reports to: Queensland.Herbarium@qld.gov.au

Disclaimer

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Table of Contents

Summary Information

The following table provides an overview of the AOI with respect to selected topographic and environmental themes. Refer to **Map 1** for locality information.

Table 1: Details for area of interest:
Longitude: 151.2392 Latitude: -24.1043 with 2 kilometre buffer, with area 1256.64 ha

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Gladstone Regional	Boyne	Brigalow Belt	Mount Morgan Ranges

The table below summarizes the extent of remnant vegetation classed as "Endangered", "Of concern" and "No concern at present" regional ecosystems classified by Biodiversity Status within the area of interest (AOI).

Table 2: Summary table, biodiversity status of regional ecosystems within the AOI

Biodiversity Status	Area (Ha)	% of AOI
Endangered	0.00	0.00
Of concern	2.07	0.16
No concern at present	393.81	31.34
Total remnant vegetation	395.87	31.50

Refer to **Map 2** for further information.

Regional Ecosystems

1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with particular combinations of geology, landform and soil (Sattler and Williams 1999). Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem classification and descriptions are reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and may be distinguished by differences in structure or sub-dominant species in the ecologically dominant layer. Vegetation communities with different dominant species in the ecologically dominant layer may be amalgamated in to a regional ecosystem if they are not mappable and predictable in the landscape at 1:100 000 scale. Vegetation communities may be mappable at a scale larger than 1:100 000. Vegetation communities within a regional ecosystem are denoted by a letter following the regional ecosystem code (e.g. a, b, c). Vegetation communities and regional ecosystems are amalgamated into a higher level classification of broad vegetation groups (BVGs).

A published methodology for survey and mapping of regional ecosystems across Queensland (Neldner et al 2023) provides further details on regional ecosystem concepts and terminology.

This report provides information on the type, status, and extent of vegetation communities, regional ecosystems and broad vegetation groups present within a user specified area of interest. Please note, for the purpose of this report, the Biodiversity Status is used. This report has not been developed for application of the *Vegetation Management Act 1999* (VMA). Additionally, information generated in this report has been derived from the Queensland Herbarium & Biodiversity Science's Regional Ecosystem Mapping, and not the regulated mapping certified for the purposes of the VMA. If your interest/matter relates to regional ecosystems and the VMA, users should refer to the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development website https://www.nrmmrrd.qld.gov.au/.

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

- remnant vegetation is less than 10 per cent of its pre-clearing extent across the bioregion; or 10-30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares, or
- less than 10 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss*, or
- 10-30 percent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 hectares; or
- it is a rare** regional ecosystem subject to a threatening process.***

"Of concern" regional ecosystems are described as those where:

- the degradation criteria listed above for 'Endangered' regional ecosystems are not met and,
- remnant vegetation is 10-30 per cent of its pre-clearing extent across the bioregion; or more than 20 per cent of its pre-clearing extent remains and the remnant extent is less than 10,000 hectares, or
- 10-30 percent of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss.****

and "No concern at present" regional ecosystems are described as those where:

- remnant vegetation is over 30 percent of its pre-clearing extent across the bioregion, and the remnant area is greater than 10,000 hectares, and
- the degradation criteria listed above for 'Endangered' or 'Of concern' regional ecosystems are not met.

**Severe degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 50 years even with the removal of threatening processes; or soil surface is severely degraded, for example, by loss of A horizon, surface expression of salinity; surface compaction, loss of organic matter or sheet erosion.*

***Rare regional ecosystem: pre-clearing extent (<1000 ha); or patch size (<100 ha and of limited total extent across its range).*

****Threatening processes are those that are reducing or will reduce the biodiversity and ecological integrity of a regional ecosystem. For example, clearing, weed invasion, fragmentation, inappropriate fire regime or grazing pressure, or infrastructure development.*

*****Moderate degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 20 years even with the removal of threatening processes; or soil surface is moderately degraded.*

2. Remnant Regional Ecosystems

The following table identifies the remnant regional ecosystems and vegetation communities mapped within the AOI and provides their short descriptions, Biodiversity Status, and remnant extent within the selected AOI. Please note, where heterogeneous vegetated patches (mixed patches of remnant vegetation mapped as containing multiple regional ecosystems) occur within the AOI, they have been split and listed as individual regional ecosystems (or vegetation communities where present) for the purposes of the table below. In such instances, associated area figures have been generated based upon the estimated proportion of each regional ecosystem (or vegetation community) predicted to be present within the larger mixed patch.

Table 3: Remnant regional ecosystems, description and status within the AOI

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
11.11.15	Eucalyptus crebra woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics	No concern at present	393.81	31.34
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	0.31	0.02
11.3.4	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Of concern	1.76	0.14
non-remnant	None	None	645.45	51.36
water	None	None	214.49	17.07

Refer to **Map 2** for further information. **Map 3** also provides a visual estimate of the distribution of regional ecosystems present before clearing.

Table 4 provides further information in regards to the remnant regional ecosystems present within the AOI. Specifically, the extent of remnant vegetation remaining within the bioregion, the 1:1,000,000 broad vegetation group (BVG) classification, whether the regional ecosystem is identified as a wetland, and extent of representation in Queensland's Protected Area Estate. For a description of the vegetation communities within the AOI and classified according to the 1:1,000,000 BVG, refer to **Table 6**.

Table 4: Remnant regional ecosystems within the AOI, additional information

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.11.15	Pre-clearing 892000 ha; Remnant 2021 519000 ha	13c	Not a Wetland	Low
11.3.25	Pre-clearing 813000 ha; Remnant 2021 531000 ha	16a	Riverine	Low
11.3.4	Pre-clearing 684000 ha; Remnant 2021 178000 ha	16c	Not a Wetland	Low

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
non-remnant	None	None	None	None
water	None	None	None	None

Representation in Protected Area Estate: High greater than 10% of pre-clearing extent is represented; Medium 4 - 10% is represented; Low less than 4% is represented, No representation.

The distribution of mapped wetland systems within the area of interest is displayed in **Map 6**.

The following table lists known special values associated with a regional ecosystem type.

Table 5: Remnant regional ecosystems within the AOI, special values

Regional Ecosystem	Special Values
11.11.15	11.11.15: Potential habitat for NCA listed species: Capparis humistrata, Corymbia clandestina, Corymbia xanthope, Cycas megacarpa, Cycas ophiolitica.
11.3.25	11.3.25: Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle Rheodytes leukops. Known to be important habitat for other riparian freshwater turtle species. This ecosystem is also known to provide suitable habitat for koalas (Phascolarctos cinereus).
11.3.4	11.3.4: Potential habitat for NCA listed species: Acacia pedleyi, Callicarpa thozetii, Cycas megacarpa, Cycas ophiolitica, Digitaria porrecta, Eriocaulon carsonii subsp. orientale, Livistona nitida, Rhaponticum australe, Samadera bidwillii, Sannantha brachypoda. This ecosystem is also known to provide suitable habitat for koalas (Phascolarctos cinereus).
non-remnant	None
water	None

3. Remnant Regional Ecosystems by Broad Vegetation Group

BVGs are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid climatic zones. BVGs provide an overview of vegetation communities across the state or a bioregion and allow comparison with other states. There are three levels of BVGs which reflect the approximate scale at which they are designed to be used: the 1:5,000,000 (national), 1:2,000,000 (state) and 1:1,000,000 (regional) scales.

A comprehensive description of BVGs is available at: https://publications.qld.gov.au/dataset/redd/resource/

The following table provides a description of the 1:1,000,000 BVGs present and their associated extent within the AOI.

Table 6: Broad vegetation groups (1 million) within the AOI

BVG (1 Million)	Description	Area (Ha)	% of AOI
None	None	859.94	68.43

BVG (1 Million)	Description	Area (Ha)	% of AOI
13c	Woodlands of Eucalyptus crebra (sens. lat.) (narrow-leaved red ironbark), E. drepanophylla (grey ironbark), E. fibrosa (dusky-leaved ironbark), E. shirleyi (shirley's silver-leaved ironbark) on granitic and metamorphic ranges.	393.81	31.34
16a	Open forest and woodlands dominated by Eucalyptus camaldulensis (river red gum) (or E. tereticornis (blue gum)) and/or E. coolabah (coolabah) (or E. microtheca (coolabah)) fringing drainage lines. Associated species may include Melaleuca spp., Corymbia tessellaris (carbeen), Angophora spp., Casuarina cunninghamiana (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded.	0.31	0.02
16c	Woodlands and open woodlands dominated by Eucalyptus coolabah (coolabah) or E. microtheca (coolabah) or E. largiflorens (black box) or E. tereticornis (blue gum) or E. chlorophylla on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded.	1.76	0.14

Refer to **Map 4** for further information. **Map 5** also provides a representation of the distribution of vegetation communities as per the 1:5,000,000 BVG believed to be present prior to European settlement.

4. Technical and BioCondition Benchmark Descriptions

Technical descriptions provide a detailed description of the full range in structure and floristic composition of regional ecosystems (e.g. 11.3.1) and their component vegetation communities (e.g. 11.3.1a, 11.3.1b). See: http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/

The descriptions are compiled using site survey data from the Queensland Herbarium & Biodiversity Science's QBEIS database. Distribution maps, representative images (if available) and the pre-clearing and remnant extent (hectares) of each vegetation community derived from the regional ecosystem mapping data are included. The technical descriptions should be used in conjunction with the fields from the regional ecosystem description database (REDD) for a full description of the regional ecosystem.

Technical descriptions include data on canopy height, canopy cover and native plant species composition of the predominant layer, which are attributes relevant to assessment of the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used for remnant assessment where possible (Neldner et al. 2023 (PDF)* section 3.3 of: https://www.qld.gov.au/__data/assets/pdf_file/0033/459186/methodology-mapping-surveying-v7.pdf

The technical descriptions are subject to review and are updated as additional data becomes available.

When conducting a BioCondition assessment, these technical descriptions should be used in conjunction with BioCondition benchmarks for the specific regional ecosystem, or component vegetation community. http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/

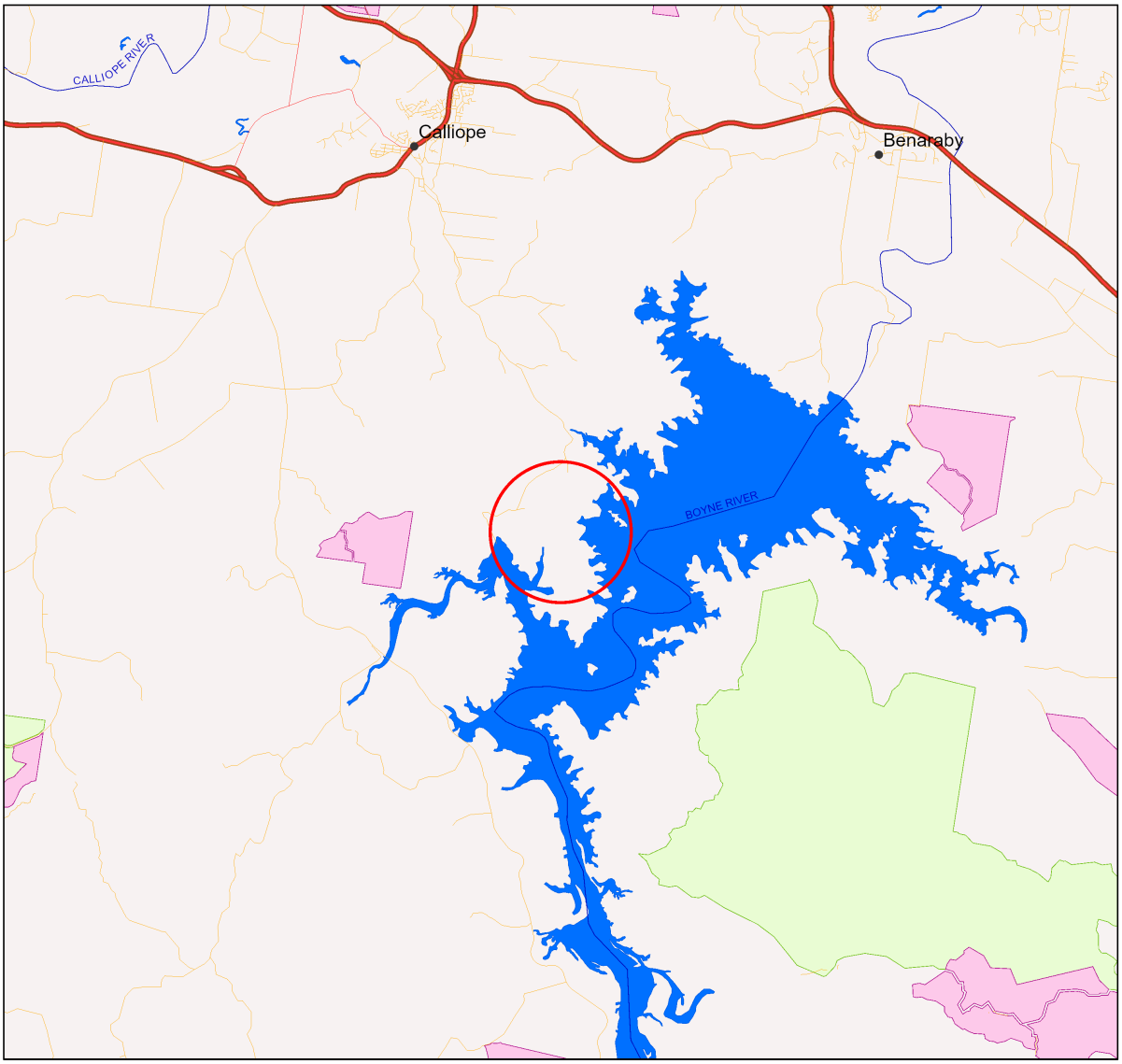
Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance regimes has been considered throughout the geographic extent of the regional ecosystem. Local reference sites should be used for this spatial and temporal (seasonal and annual) variability.

Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available

Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
11.11.15	Available	Available
11.3.25	Available	Available
11.3.4	Available	Available
non-remnant	Not currently available	Not currently available
water	Not currently available	Not currently available

Maps

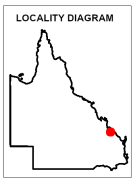
Map 1 - Location



Locality Map

Legend

- Towns
- Freeways/Highways
- Connector
- Street/Local Road
- Lakes and reservoirs
- National Park
- National Park (Scientific)
- National Park (CYPAL)
- National Park (Aboriginal Land)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Coordinated Conservation Areas
- Major rivers/creeks
- Queensland
- 2 kilometre buffer



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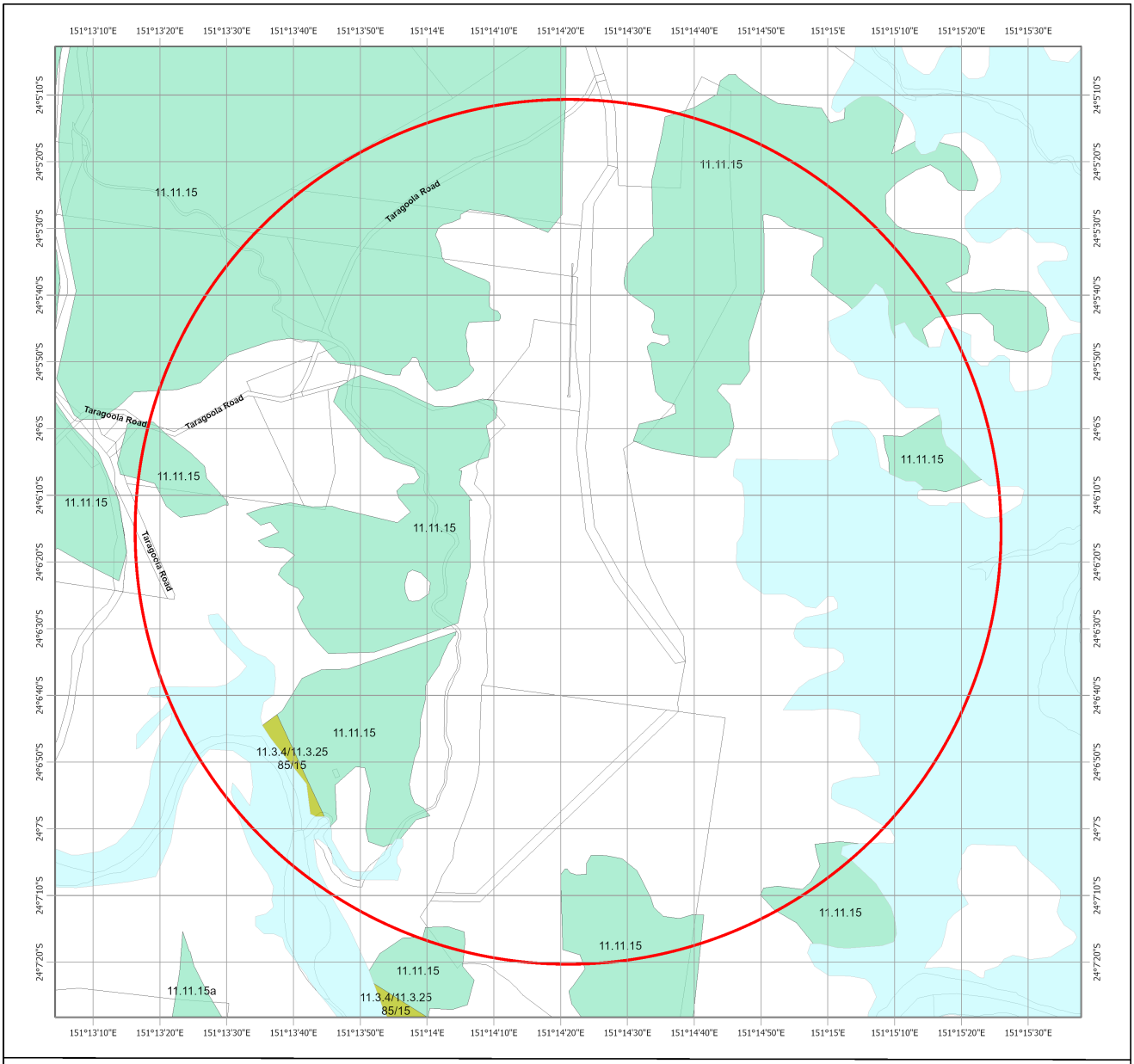
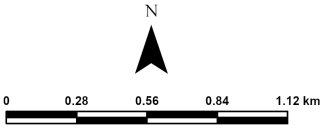
Map 2 - Remnant 2021 regional ecosystems



Remnant 2021 Regional Ecosystems

Biodiversity Status

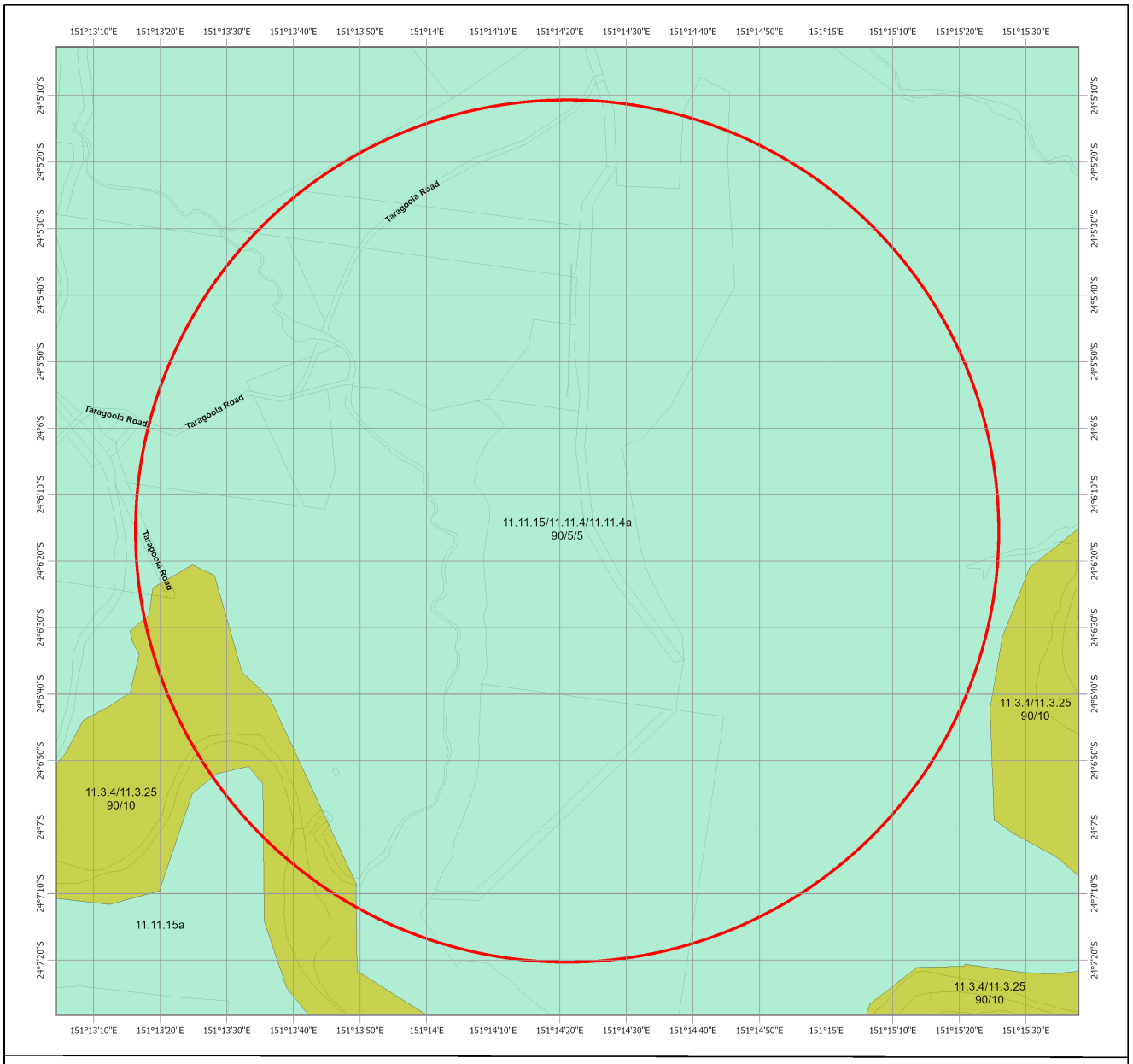
- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment
- Plantation
- Water
- Cadastral Boundaries
- 2 kilometre buffer



This product is projected into GDA2020

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.
Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The polygons are labelled by regional ecosystem (RE); where more than one RE occurs, the percentage of each is labelled. The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Map 3 - Pre-clearing regional ecosystems



Pre-clearing Regional Ecosystems

Biodiversity Status

- Endangered - Dominant vegetation
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Water
- Cadastral Boundaries
- 2 kilometre buffer

N

0 0.28 0.57 0.85 1.14 km

This product is displayed in GDA2020

Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.
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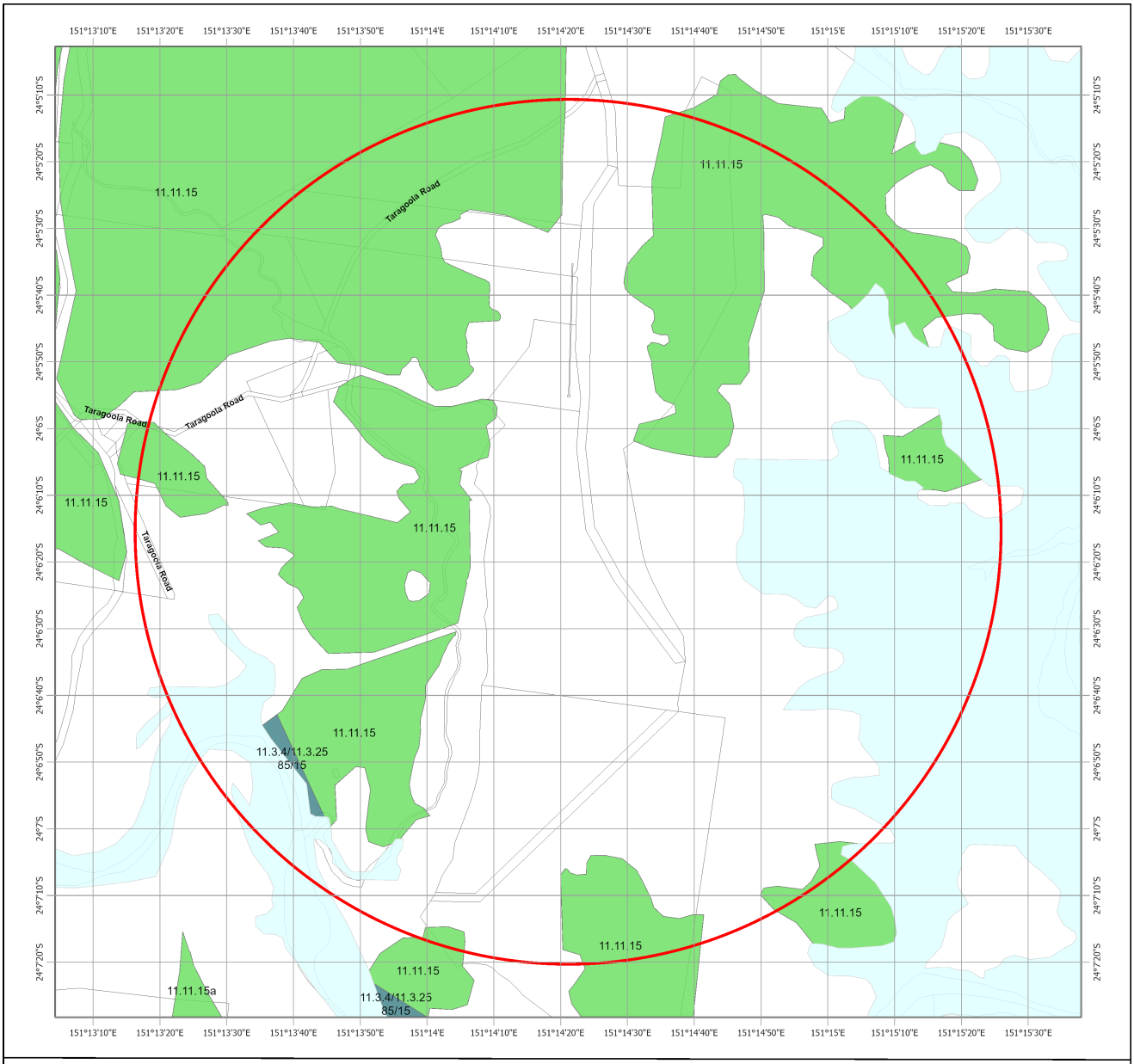
Map 4 - Remnant 2021 regional ecosystems by BVG (5M)



Remnant 2021 Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups
BVG5M Description (BVG1M codes)

- 1. Rainforests and scrubs (1-7b)
- 2. Wet eucalypt open forests (8-8b)
- 3. Eucalypt woodlands to open forests (mainly eastern Qld) (9-15b)
- 4. Eucalypt open forests to woodlands on floodplains (16-16d)
- 5. Eucalypt dry woodlands on inland depositional plains (17-18d)
- 6. Eucalypt low open woodlands usually with spinifex understorey (19-19d)
- 7. Callitris woodland - open forests (20a)
- 8. Melaleuca open woodlands on depositional plains (21-22c)
- 9. Acacia aneura (mulga) dominated open forests, woodlands and shrublands (23-23b)
- 10. Other acacia dominated open forests, woodlands and shrublands (24-26a)
- 11. Mixed species woodlands, open woodland - (inland bioregions) includes wooded downs (27-27c)
- 12. Other coastal communities or heaths (28-29b)
- 13. Tussock grasslands, forblands (30-32b)
- 14. Hummock grasslands (33-33b)
- 15. Wetlands (swamps and lakes) (34-34g)
- 16. Mangroves and saltmarshes (35-35b)
- Non-remnant vegetation, cultivated or built environment
- Water
- Cadastral Boundaries
- 2 kilometre buffer

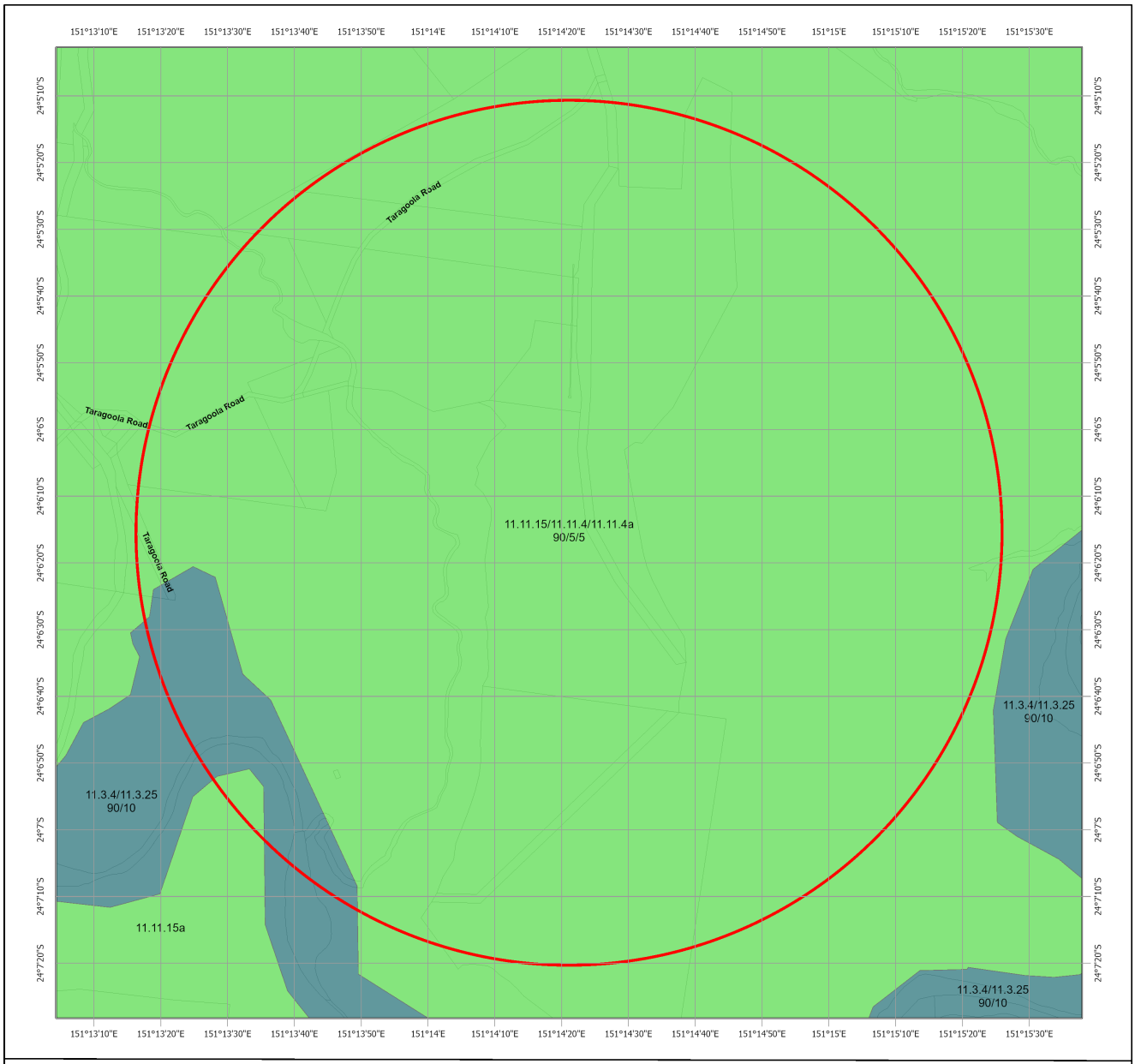
N

0 0.28 0.56 0.84 1.12 km

This product is displayed in GDA2020

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled. Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.
Regional ecosystems are defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.
The label consists of 3 components: bioregion, land zone, and vegetation community – the dominant canopy species. e.g.: RE 12.3.3. Descriptions of REs are found online. Use the search term "Regional Ecosystem Framework".
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.
Remnant woody vegetation is defined as vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has >70% of the height and >50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.
Non-remnant vegetation includes regrowth and disturbed native vegetation.

Map 5 - Pre-clearing regional ecosystems by BVG (5M)



Pre-clearing Regional Ecosystems coloured by Broad Vegetation Groups

Broad Vegetation Groups
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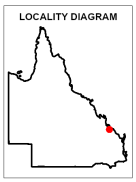
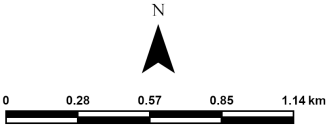
- 16. Mangroves and saltmarshes (35-35b)
- Water
- Cadastral Boundaries
- 2 kilometre buffer





This product is displayed in GDA2020

Broad Vegetation Groups (BVG) of Queensland are applied by look up table to the regional ecosystem vegetation communities. Each polygon is coloured by the dominant BVG5M and the component regional ecosystems labelled. Where more than one regional ecosystem occurs, the percentage of each is labelled.
Regional ecosystem mapping over the majority of Queensland is produced at a scale of 1:100,000. At this scale, the minimum remnant polygon area is 5 hectares or minimum remnant width of 75 metres. Regional ecosystem linework reproduced at a scale greater than 1:100,000, except in designated areas, should be used as a guide only. The precision of polygon boundaries or positional accuracy of linework is 100 metres.
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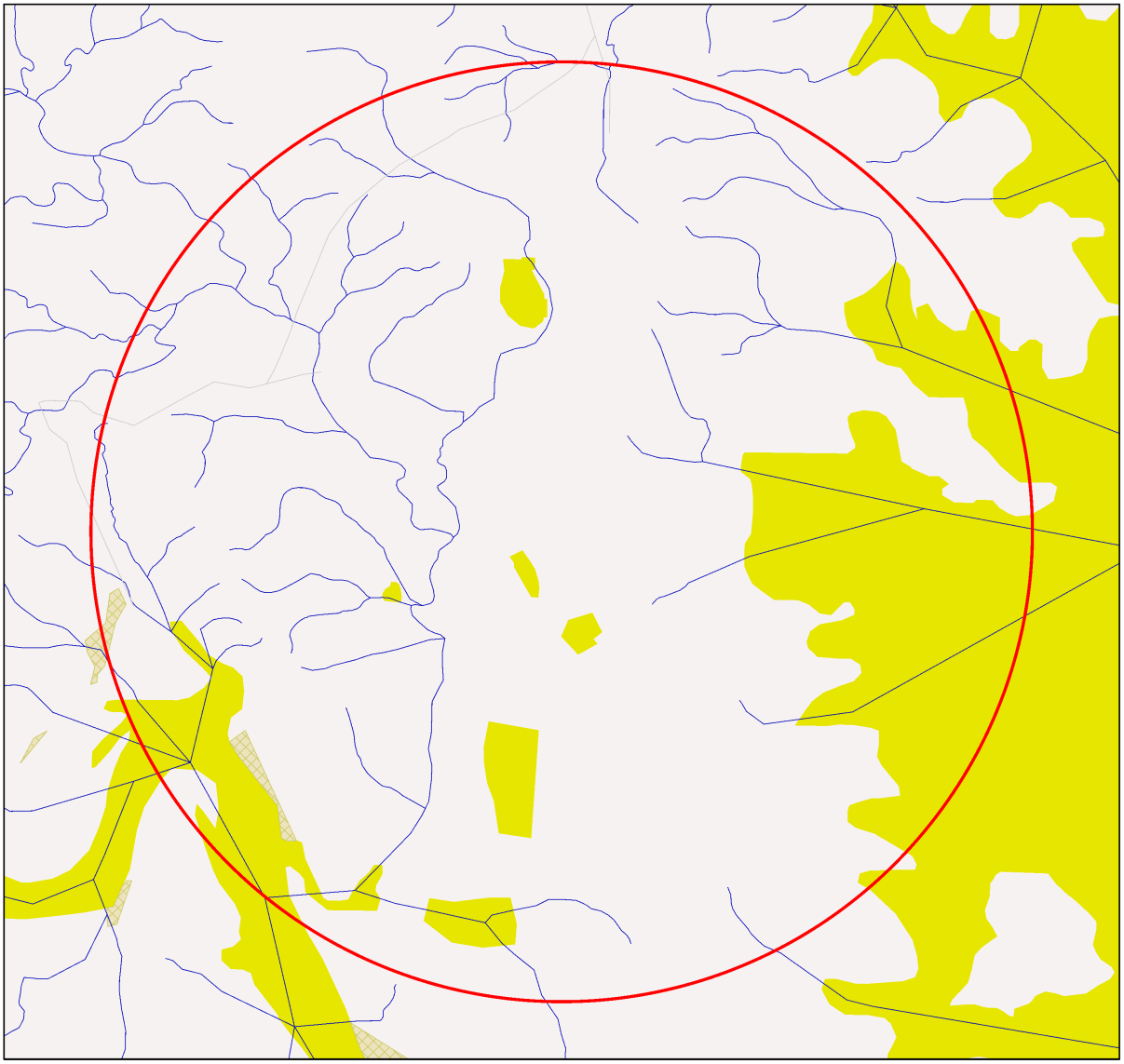
Regional ecosystem mapping at 1:100,000 map scale is derived from the following sources: 1:80,000 B&W 1960's aerial photography, Landsat TM imagery, geology, soils, land systems data, field survey and historical records.

Map 6 - Wetlands and waterways



Wetlands and Waterways

- Towns
- Roads
- Springs
- Rivers/Creeks
- Directory of Important Wetlands
- Ramsar Sites - QLD

Wetland Type

Hydrologically natural Wetlands
- Lacustrine Wetlands (hydrologically natural)
- Palustrine Wetlands (hydrologically natural)
- Riverine Wetlands (hydrologically natural)
- Intertidal Wetlands (hydrologically natural)
- Subtidal Wetlands (hydrologically natural)
- Intertidal/Subtidal Wetlands (hydrologically natural)

Hydrologically Modified and Artificial Wetlands
- Lacustrine Wetlands (hydrologically modified or artificial)
- Palustrine Wetlands (hydrologically modified or artificial)
- Riverine Wetlands (hydrologically modified or artificial)
- Intertidal Wetlands (hydrologically modified or artificial)
- Subtidal Wetlands (hydrologically modified or artificial)
- Intertidal/Subtidal Wetlands (hydrologically modified or artificial)

Subdominant Wetlands
- Subdominant Wetlands (51 - 80%)

Contains Wetlands
- Contains Wetlands (1 - 50%)
- Queensland
- 2 kilometre buffer

LOCALITY DIAGRAM

N

0 250 500 750 1000 1250 m

This product is displayed in GDA2020

DISCLAIMER:
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Links and Other Information Sources

The Department of the Environment, Tourism, Science and Innovation's Website - http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/ provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

Descriptions of the broad vegetation groups of Queensland can be downloaded from: https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/broad-vegetation

The methodology for mapping regional ecosystems can be downloaded from: https://www.qld.gov.au/__data/assets/pdf_file/0033/459186/methodology-mapping-surveying-v7.pdf

Technical descriptions for regional ecosystems can be obtained from: http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/

Benchmarks can be obtained from: http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Spatial Catalogue, Queensland Spatial Catalogue : Queensland Government (information.qld.gov.au)

The Queensland Globe is a mapping and data application. As an interactive online tool, Queensland Globe allows you to view and explore Queensland maps, imagery (including up-to-date satellite images) and other spatial data, including regional ecosystem mapping. To further view and explore regional ecosystems over an area of interest, access the Biota Globe (a component of the Queensland Globe). The Queensland Globe can be accessed via the following link: https://qldglobe.information.qld.gov.au/

References

Neldner, V.J., Niehus, R.E., Wilson, B.A., McDonald, W.J.F., Ford, A.J. and Accad, A. (2023). The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 6.0. Queensland Herbarium, Department of Environment and Science. (https://publications.qld.gov.au/dataset/redd/resource/78209e74-c7f2-4589-90c1-c33188359086)

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F, Richter,D., Addicott, E.P. and Appelman, C.N. (2023) Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0. Updated December 2023. Queensland Herbarium, Queensland Department of Environment, Science and Innovation, Brisbane. (https://www.qld.gov.au/__data/assets/pdf_file/0033/459186/methodology-mapping-surveying-v7.pdf).

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems.* Environmental Protection Agency, Brisbane.

Appendices

Appendix 1 - Source Data

The dataset listed below is available for download from:
http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/download/

- Regional Ecosystem Description Database

The datasets listed below are available for download from:
Queensland Spatial Catalogue : Queensland Government (information.qld.gov.au)

- Biodiversity status of pre-clearing and 2021 remnant regional ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas
- Pre-clearing broad vegetation groups of Queensland
- Remnant 2021 broad vegetation groups of Queensland

Appendix 2 - Acronyms and Abbreviations

AOI - Area of Interest
GIS - Geographic Information System
RE - Regional Ecosystem
REDD - Regional Ecosystem Description Database
VMA - *Vegetation Management Act 1999*

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Queensland status: Rare and threatened species
Records: All
Date: All
Latitude: -24.1043
Longitude: 151.2392
Distance: 25
Email: dcox@epicenvironmental.com.au
Date submitted: Friday 11 Apr 2025 14:22:06
Date extracted: Friday 11 Apr 2025 14:30:04

The number of records retrieved = 45

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Accipitridae	*Erythrotriorchis radiatus*	red goshawk		E	E	1
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	10
animals	birds	Burhinidae	*Esacus magnirostris*	beach stone-curlew		V		19
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		1
animals	birds	Cacatuidae	*Calyptorhynchus lathami erebus*	glossy black-cockatoo (northern)		V		3
animals	birds	Charadriidae	*Charadrius leschenaultii*	greater sand plover		V	V	2
animals	birds	Charadriidae	*Charadrius mongolus*	lesser sand plover		E	E	23
animals	birds	Charadriidae	*Pluvialis squatarola*	grey plover		V	V	1
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	35
animals	birds	Scolopacidae	*Arenaria interpres*	ruddy turnstone		V	V	5
animals	birds	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper		V	V	11
animals	birds	Scolopacidae	*Calidris ferruginea*	curlew sandpiper		CR	CE	5
animals	birds	Scolopacidae	*Calidris tenuirostris*	great knot		V	V	1
animals	birds	Scolopacidae	*Gallinago hardwickii*	Latham's snipe		V	V	1
animals	birds	Scolopacidae	*Limosa lapponica baueri*	Western Alaskan bar-tailed godwit		E	E	36
animals	birds	Scolopacidae	*Numenius madagascariensis*	eastern curlew		CR	CE	110
animals	birds	Scolopacidae	*Tringa nebularia*	common greenshank		E	E	9
animals	birds	Scolopacidae	*Xenus cinereus*	terek sandpiper		V	V	13
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		10
animals	birds	Turnicidae	*Turnix melanogaster*	black-breasted button-quail		V	V	15
animals	insects	Lycaenidae	*Jalmenus eubulus*	pale imperial hairstreak		V		1
animals	mammals	Delphinidae	*Sousa sahulensis*	Australian humpback dolphin		V	V	2
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		V	V	5
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	16
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		E	E	6
animals	reptiles	Chelidae	*Elseya albagula*	white-throated snapping turtle		CR	CE	1
animals	reptiles	Cheloniidae	*Natator depressus*	flatback turtle		V	V	1
plants	land plants	Acanthaceae	*Graptophyllum excelsum*			NT		3/1
plants	land plants	Apocynaceae	*Parsonsia kroombitensis*			V		1/1
plants	land plants	Asteraceae	*Cassinia collina*			V		2/2
plants	land plants	Celastraceae	*Apatophyllum olsenii*			E	V	4/4
plants	land plants	Combretaceae	*Dansiea elliptica*			NT		6/4
plants	land plants	Combretaceae	*Macropteranthes leiocaulis*			NT		3/3
plants	land plants	Cycadaceae	*Cycas megacarpa*			E	E	4/3
plants	land plants	Hernandiaceae	*Hernandia bivalvis*	cudgerie		NT		2/1
plants	land plants	Leguminosae	*Acacia eremophiloides*			V	V	1
plants	land plants	Leguminosae	*Acacia sp. (Castletower N.Gibson TOI345)*			V		1/1
plants	land plants	Myrtaceae	*Eucalyptus decolor*			NT		6/5
plants	land plants	Myrtaceae	*Rhodamnia angustifolia*	narrow-leaved malletwood		CR	CE	16/16
plants	land plants	Myrtaceae	*Rhodamnia dumicola*	rib-fruited malletwood		E		2
plants	land plants	Myrtaceae	*Rhodamnia glabrescens*			CR		5/4
plants	land plants	Myrtaceae	*Rhodamnia spongiosa*			CR		2/1
plants	land plants	Myrtaceae	*Xanthostemon oppositifolius*	southern penda		V	V	1/1
plants	land plants	Proteaceae	*Grevillea venusta*	grevillea		V		7/2
plants	land plants	Rubiaceae	*Scleromitrion gibsonii*			CR		11/11

CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

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

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

APPENDIX B SURVEY DATA

Flora Species List

Common name	Species name	Non-native	Biosecurity	WoNS
Green Wattle	*Acacia deanei*			
Pretty Wattle	*Acacia decora*			
Catkin Wattle	*Acacia julifera*			
Chaff Flower	*Achyranthes aspera*			
Blue Billygoat Weed	*Ageratum houstonianum*	*		
Chain Fruit	*Alyxia ruscifolia*			
Dark Wiregrass	*Aristida calycina*			
White Speargrass	*Aristida leptopoda*			
Queensland Wiregrass	*Aristida queenslandica*			
Reedgrass	*Arundinella nepalensis*			
Slender Bamboo Grass	*Austrostipa verticillata*			
Cobbler's Pegs	*Bidens pilosa*	*		
Forest Bluegrass	*Bothriochloa bladhii*			
Pitted Bluegrass	*Bothriochloa decipiens*			
Desert Bluegrass	*Bothriochloa ewartiana*			
Coffee Bush	*Breynia oblongata*			
Wild Orange	*Capparis canescens*			
Currant Bush	*Carrisa ovata*			
Canadian Fleabane	*Conyza bonariensis*	*		
Red Bloodwood	*Corymbia erythrophloia*			
Moreton Bay Ash	*Corymbia tessellaris*			
Woolly Rattlepod	*Crotalaria incana*	*		
Rubber vine	*Cryptostegia grandiflora*	*	3	*
Tuckeroo	*Cupaniopsis anacardioides*			
Tiger Orchid	*Cymbidium canaliculatum*			
Barbed-wire Grass	*Cymbopogon refractus*			
Slender Sedge	*Cyperus gracilis*			
Queensland Bluegrass	*Dichanthium sericeum*			
Cotton Panic	*Digitaria brownii*			
Nine-awn Grass	*Enneapogon lindleyanus*			
Brown's Lovegrass	*Eragrostis brownii*			
African Lovegrass	*Eragrostis curvula*	*		
Mountain Wanderrie Grass	*Eriachne mucronata*			
Narrow-leaved Ironbark	*Eucalyptus crebra*			
Gum-topped Box	*Eucalyptus moluccana*			
Queensland Bluegum	*Eucalyptus tereticornis*			
Dwarf Poinsettia	*Euphorbia cyathophora*	*		
Asthma Plant	*Euphorbia hirta*			
Creek Sandpaper Fig	*Ficus coronata*			
Moreton Bay Fig	*Ficus macrophylla*			
Maynes pest	*Glandularia aristigera*	*		
Glycine Pea	*Glycine tabacina*			
Woolly Glycine	*Glycine tomentella*			
Balloon Cottonbush	*Gomphocarpus physocarpus*	*		
Dogs Balls	*Grewia retusifolia*			
Dysentery Plant	*Grewia latifolia*			
Black Speargrass	*Heteropogon contortus*			
Australian Indigo	*Indigofera australis*			
Native Indigo	*Indigofera linifolia*			
Common Rush	*Juncus usitatus*			
Lantana	*Lantana camara*	*	3	*
Creeping Lantana	*Lantana montevidensis*	*	3	
Argentine Peppercress	*Lepidium bonariense*	*		
Siratro	*Macroptilium atropurpureum*	*		
White Cedar	*Melia azedarach*			
Red Natal Grass	*Melinis repens*	*		
Common name	**Species name**	**Non-native**	**Biosecurity**	**WoNS**

Murdannia	*Murdannia graminea*			
Prickly Pear	*Opuntia stricta*	*	3	*
Native Millet	*Panicum decompositum*			
Hairy Panic	*Panicum effusum*			
Paspalidium	*Paspalidium sp*			
Water Couch	*Paspalum distichum*			
Corky Passion Flower	*Passiflora suberosa*	*		
Fuzzweed	*Peripleura hispidula*			
Princes Feathers	*Persicaria orientalis*			
Lippia	*Phyla canescens*	*		
Spurge	*Phyllanthus maderaspatensis*			
Cockatoo Apple	*Planchonia careya*			
Applebush	*Pterocaulon sphacelatum*			
Rhynchosia	*Rhynchosia minima*			
Castor Oil Bush	*Ricinus communis*	*		
Senna	*Senna sophora*			
Flannel Weed	*Sida cordifolia*	*		
Spiked Sida	*Sida subspicata*			
High Sida	*Sida trichopoda*			
Fairy Grass	*Sporobolus caroli*			
American Ratstail Grass	*Sporobolus jacquemontii*	*	3	*
Snake Weed	*Stachytarpheta cayennensis*	*		
Shrubby Stylo	*Stylosanthes scabra*	*		
Kangaroo Grass	*Themeda triandra*			
Small Burr Grass	*Tragus australianus*			
Urena Weed	*Urena lobata*	*		
Mimosa Bush	*Vachellia farnesiana*	*	3	
Verbena	*Verbena littoralis*	*		
Noogoora Burr	*Xanthium occidentale*	*		

Tertiary RE Assessments

siteID	RE7	RE8
RE	11.11.15 Cat R	11.11.15
GTRE	11.11.15	11.11.15
Geology	Dark brown reddish clay loam sediment	Grey-brown clay loam
Landform	Gully	Undulating hills
Status	B	B
TEC	No	No
EDL	T1	T1
EDL height range	11-15.5	16.5-17.5
EDL_med_height m	14	17
EDL_cover %	32	20
struc_clas	Open-forest	Woodland
T1_hei	14	17
T1_cover	32	20
T1_sp	*Eucalyptus crebra, Corymbia tessellaris, Corymbia erythrophloia,*	*Eucalyptus crebra, Corymbia tessellaris,*
T2_hei	7.5	8
T2_cover	3	5
T2_sp	*Corymbia erythrophloia, Eucalyptus crebra*	*Eucalyptus crebra*
S1_hei	1.1	1.8
S1_cover	10	20
S1_sp	*Crotalaria incana, Sida subspicata, Grewia latifolia,*	*Sida subspicata, Capparis canescens, Eucalyptus tereticornis, Glycine tabacina, Acacia deanei,*
S2_hei		0.3
S2_cover		2
S2_sp		Glycine tomentella, Grewia latifolia,
G_hei	1.5	1.5
G_cover	80	80
G_sp1	*Austrostipa verticillata, Peripleura hispidula, Glycine tomentella, Heteropogon contortus,*	*Peripleura hispidula, Sida trichopoda, Panicum effusum, Heteropogon contortus, Themeda triandra, Panicum decompositum, Glycine tomentella, Eriachne mucronata*
G_sp2	*Indigofera linifolia, Bothriochloa decipiens, Phyllanthus maderaspatensis, Sida trichopoda , Aristida calycina,*	*Euphorbia hirta*
W_cover	29	45
W_sp	*Euphorbia cyathophora, Passiflora suberosa, Cryptostegia grandiflorum, Macroptilium atropurpureum, Lantana camara, Ageratum houstonianum, Conyza bonariensis, Stylosanthes scabra, Bidens pilosa,*	*Sida cordifolia, Stylosanthes scabra, Sporobolus jacquemontii, Lantana montevidensis,*
Disturbanc		Adjacent road
x	151.2418585	151.2345759
y	-24.10077866	-24.12159939

siteID	RE10	RE3
RE	X	11.11.15
GTRE	11.11.15	11.11.15
Geology	Light brown gravelly clay loam	Ligh brown sediment
Landform	Hillside	Undulating hills
Status	B	C
TEC	No	No
EDL	T1	T1
EDL height range	15-18	Dec-19
EDL_med_height m	16	17
EDL_cover %	24	11
struc_clas	Woodland	Woodland
T1_hei	16	17
T1_cover	24	11
T1_sp	*Eucalyptus crebra, Corymbia tessellaris, Eucalyptus tereticornis*	*Eucalyptus crebra, Eucalyptus tereticornis*
T2_hei	7.5	7
T2_cover	5	5
T2_sp	*Eucalyptus crebra, Eucalyptus tereticornis, Corymbia tessellaris*	*Eucalyptus crebra, Corymbia erythrophloia*
S1_hei		1.2
S1_cover		2
S1_sp		*Acacia julifera, Sida subspicata*
S2_hei		
S2_cover		
S2_sp		
G_hei	0.2	1.1
G_cover	80	95
G_sp1	*Bothriochloa decipiens, Indigofera linnaei, Heteropogon contortus, Sida trichopoda, Euphoria hirta, Glycine tomentella, Peripleura hispidula,*	*Heteropogon contortus, Peripleura hispidula, Austrostipa verticillata, Glycine tomentella, Themeda triandra, Eragrostis sp., Rhynchosia minima*
G_sp2	*Phyllanthus maderaspatensis,*	*Heteropogon contortus, Bothriochloa decipiens, Panicum effusum, Cymbopogon refractus, Aristida queenslandica*
W_cover	30	5
W_sp	*Lantana montevidensis, Stachytarpheta cayennensis*	*Stylosanthes scabra, Conyza bonariensis, Bidens pilosa, Sida cordifolia*
Disturbanc	Regularly slashed	Historical land clearing
x	151.2399746	151.2389132
y	-24.09409076	-24.11959077

siteID	RE5	RE2
RE	11.11.15	11.11.15
GTRE	11.11.15	11.3.25
Geology	Ligh brown sediment	Ligh brown sediment
Landform	Undulating hills	Drainage line
Status	C	B
TEC	No	No
EDL	T1	T1
EDL height range	13.5-18	18-23
EDL_med_height m	17.5	21
EDL_cover %	12	24
struc_clas	Woodland	Woodland
T1_hei	17.5	21
T1_cover	12	24
T1_sp	*Eucalyptus crebra, Eucalyptus tereticornis, Corymbia tessellaris*	*Eucalyptus tereticornis*
T2_hei	6	5
T2_cover	4	1
T2_sp	*Eucalyptus crebra, Eucalyptus tereticornis*	*Eucalyptus tereticornis*
S1_hei	2.4	1.8
S1_cover	20	1
S1_sp	*Sida subspicata,*	*Cupaniopsis anacardioides , Carrisa ovata,*
S2_hei		0.5
S2_cover		1
S2_sp		Breynia oblongata , Crotalaria incana
G_hei	0.7	1.5
G_cover	90	80
G_sp1	*Heteropogon contortus, Peripleura hispidula, Austrostipa verticillata, Glycine tomentella, Themeda triandra, Eragrostis sp., Rhynchosia minima*	*Austrostipa verticillata, Peripleura hispidula, Bothriochloa decipiens, Sida trichopoda*
G_sp2	*Austrostipa verticillata, Crotalaria incana*	*Juncus usitatus, Eragrostis sp, Heteropogon contortus, Sida subspicata, Crotalaria incana*
W_cover	5	10
W_sp	*Gomphocarpus physocarpus, Stylosanthes scabra*	*Stylosanthes scabra, Lantana camara, Conyza bonariensis, Passiflora suberosa, Macroptilium atropurpureum, Bidens pilosa, Stachytarpheta cayennensis,*
Disturbanc	Historical land clearing	Pigs
x	151.2397935	151.238321
y	-24.11675423	-24.12170596

siteID	RE9	RE6
RE	11.11.15 Cat R	11.11.15 Cat R
GTRE	11.3.25	X
Geology	Light brown clay loam	Modified
Landform	Drainage line	Hill crest
Status	B	X
TEC	Yes	No
EDL	T1	G
EDL height range	18-28	0-0.5
EDL_med_height m	20	0.3
EDL_cover %	40	20
struc_clas	Open-forest	Grassland
T1_hei	20	
T1_cover	40	
T1_sp	*Eucalyptus tereticornis, Corymbia tessellaris, Eucalyptus crebra*	
T2_hei	9	
T2_cover	10	
T2_sp	*Eucalyptus tereticornis, Corymbia tessellaris*	
S1_hei	1.2	0.6
S1_cover	1	2
S1_sp	*Breynia oblongata*	*Indigofera australis*
S2_hei		
S2_cover		
S2_sp		
G_hei	0.5	0.3
G_cover	60	20
G_sp1	*Peripleura hispidula, Sida trichopoda, Heteropogon contortus, Verbena littoralis, Bothriochloa decipiens, Arundinella nepalensis, Paspalidium sp.,*	*Bothriochloa decipiens, Heteropogon contortus, Indigofera linifolia, Aristida calycina,*
G_sp2	*Cyperus gracilis*	*Panicum effusum*
W_cover	10	25
W_sp	*Stachytarpheta cayennensis, Macroptilium atropurpureum, Xanthium occidentale, Ricinus communis, Lepidium bonariense*	*Stachytarpheta cayennensis, Stylosanthes scabra , Ageratum houstonianum,*
Disturbanc	Washout	Handstand, modified landform
x	151.2426603	151.2367055
y	-24.10716855	-24.0916857

Quaternary RE Assessments

siteID	Q1	Q2	Q3	Q4	Q5	Q6
RE	12.11.15	X	X	X	X	X
condition	Remnant	non-remnant	non-remnant	non-remnant	non-remnant	non-remnant
EDL	T1	G	S1	G	G	G
EDL_cover	25	100	20	1	1	85
EDL_med_he	17	0.4	2	0.2	0.1	1.5
struc_clas	Woodland	Grassland	Low shrubland	Grassland		Grassland
Landform	Undulating hills	Undulating hills	Waste rock dump	Stockpile	Road	Hill slope
TEC	No	No	No	No	No	No
T1	*Eucalyptus crebra*					
S1			*Melia azedarach*	*Melia azedarach*		
G3		*Austrostipa verticillata*		*Paspalum distichum*	*Paspalum distichum*	*Heteropogon contortus , Austrostipa verticillata*
Weed			*Cryptostegia grandiflora*			
x	151.2391222	151.2391116	151.2359585	151.2324764	151.2324122	151.2349816
y	-24.1196263	-24.1162737	-24.0961502	-24.0972694	-24.0983061	-24.1206321

BioCondition Data

Site	Open woodland	Grassland
# Eucs > 30cm	13	-
Large tree benchmark	34	N/A
# large trees	10	-
Large Euc diameter	39, 38, 37, 31, 31, 45, 30, 36, 39, 41, 35, 41, 36	
Canopy species	Eucalyptus crebra, Corymbia erythrophloia	-
Tree sp rich #	2	N/A
Canopy height range (m)	14-15.5	-
Canopy height (m)	14.5	-
Recruitment%	100	-
Canopy cover%	31	-
Sub-canopy height (m)	7	-
Sub-canopy cover (%)	5	-
Shrub cover%	7.3	-
Shrub species	*Acacia decora, Acacia excelsa, Grewia latifolia, Acacia disparrima, Capparis canescens, Planchonia careya, Alyxia ruscifolia, Melia azedarach*	-
Shrub sp rich	8	-
Grass species	*Aristida queensladicum, Bothriochloa decipiens, Heteropogon contortus, Aristida calycina, Panicum decompositum, Themeda triandra, Eragrostis brownii, Enneapogon mucronata*	*Austrostipa verticillata, Heteropogon contortus, Bothriochloa decipiens, Aristida calycina, Panicum effusum*
Grass speceies rich	8	5
Forbs_other	*Sida subspicata, Cyperus gracilis, Rhynchosia minima, Cyanthillium cinereum, Glycine tomentella, Phyllanthus virgatus, Indigofera pratensis, Euphorbia drummondii, Alternanthera nana*	*Indigofera australis, Indigofera linifolia*
Forbs_other species rich	9	2
Total species rich	27	7
CWD	50	N/A
Weed cover %	5	1

Weeds	*Melinis repens, Opuntia stricta, Ageratum houstonianum, Stachytarpheta cayennensis, Lantana montevidensis, Lantana camara*	
Q1 perrenial grass %	2	
Q1 litter %	20	
Q2 perrenial grass %	75	
Q2 litter %	20	
Q3 perrenial grass %	20	
Q3 litter %	40	
Q4 perrenial grass %	15	
Q4 litter %	5	
Q5 perrenial grass %	90	
Q5 litter %	10	
Mean perrenial grass %	40.4	75
Mean litter %	19	10

Fauna Habitat Assessments

SiteID	Hab01	Hab02	Hab03	Hab04	Hab05	Hab06	Hab07
ng_cover	Dense >40%	Dense >40%	Dense >40%	Sparse <10%	Sparse <10%	Dense >40%	Dense >40%
tree_cover	Moderate	Riparian	Moderate	Not	Not	Moderate	Riparian
hollow_pre	Sparse	Common	Sparse				
hollow_not		Small <200mm	None				
woody_debr	Common	Sparse	Common	Not	Not	Sparse	Common
Mis_presen	yes	no	no	no	no	yes	yes
Mis_cover	Sparse and immature					Abundant	Sparse and immature
rocky_hab	no	no	no	no	yes	no	no
rocky_pres							
rocky_note					Waste rock dump		
water_pres	no	yes	yes	yes	no	yes	yes
water_note		Waterhole	Waterhole	Farm dam with dense aquatic vegetation		Waterhole	Waterhole
fire_evide	no		no		no	no	no
cattle_dis			None		None	None	None
site_note	Macropod	Pigs, macropods	Grey kangaroos		High density agile wallaby		
x	151.2390169	151.2383154	151.2394408	151.2393969	151.2366682	151.2343961	151.2426392
y	-24.1212533	-24.1217193	-24.1198191	-24.1186276	-24.0917038	-24.1215204	-24.1071716

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