



**ECO SOLUTIONS
& MANAGEMENT**

TERRESTRIAL ECOLOGY IMPACT ASSESSMENT REPORT BARALABA SOUTH PROJECT

November 2023

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Document History and Status

Document version:	23015 Rpt01c
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Date issued:	20 November 2023
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Symbols and Abbreviations

*	(Preceding a plant species name) plant species not native to Australia
±	With or without, more or less
BAMM	Biodiversity Assessment and Mapping Methodology
Biosecurity Act	(Queensland) <i>Biosecurity Act 2014</i>
BoM	Bureau of Meteorology
BPA	Biodiversity Planning Assessment
CHPP	Coal Handling and Preparation Plant
DAF	(Queensland) Department of Agriculture and Fisheries
DAWE	(Commonwealth) Department of Agriculture, Water and the Environment
dbh	Diameter at breast height
DES	(Queensland) Department of Environment and Science
DNRM	Former (Queensland) Department of Natural Resources and Mines
DotE	Former (Commonwealth) Department of the Environment
DoEE	Former (Commonwealth) Department of the Environment and Energy
DSITIA	Former (Queensland) Department of Science, Information Technology, Innovation and the Arts
DSITI	(Queensland) Department of Science, Information Technology and Innovation
EA	Environmental Authority
EDL	Ecologically Dominant Layer
EHP	Former (Queensland) Department of Environment and Heritage Protection
EO Act	(Queensland) <i>Environmental Offsets Act 2014</i>
EP Act	(Queensland) <i>Environmental Protection Act 1994</i>
EPBC Act	(Commonwealth) <i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESA	Environmentally Sensitive Area
ETL	Electricity transmission line
GDE	Groundwater dependent ecosystem
GES	General ecological significance
GPS	Global positioning system
ha	Hectares
HES	High ecological significance
km	Kilometres
LFC Tool	Landscape Fragmentation and Connectivity Tool
MLA	Mining Lease Application
MLES	Matters of local environmental significance (EO Act)
MNES	Matters of national environmental significance (EPBC Act)
MSES	Matters of state environmental significance (EO Act)
Mtpa	Million tonnes per annum
NC Act	(Queensland) <i>Nature Conservation Act 1992</i>

QEOP	Queensland Environmental Offsets Policy 2014
RE	Regional Ecosystem as defined under the Queensland Vegetation Management Regulation 2000
REDD	Regional Ecosystem Description Database
ROM	Run of mine
SMP	Species Management Program (NC Act)
SPRAT	Species Profile and Threats Database
SRI Guideline	Queensland Environmental Offsets Policy Significant Residual Impact Guideline
TEC	Threatened Ecological Community
TOR	Terms of Reference
TSSC	Threatened Species Scientific Committee
VM Act	(Queensland) <i>Vegetation Management Act 1999</i>
WoNS	Weeds of National Significance
WPA	Wetland protection area

Glossary

Term	Definition
Additional investigation area	An additional area, including sections of the Dawson River and Banana Creek to the west of the project site, and Mt Ramsay to the east of the project site and shown on Figures 1 and 2, for which additional surveys were undertaken to field-validate vegetation communities, target threatened species and map potential habitat for those species.
Biodiversity Status	<p>This is a DES classification dependent on condition of remnant vegetation <i>in addition</i> to the criteria used to determine class under the <i>Queensland Vegetation Management Act 1999</i>. This classification is used for a range of planning and management applications, i.e. to determine environmentally sensitive areas. A regional ecosystem is listed as 'endangered' if:</p> <ul style="list-style-type: none"> ▪ Less than 10% of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss; or ▪ 10-30% of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 ha; or ▪ It is a rare regional ecosystem subject to a threatening process. <p>A regional ecosystem is listed as 'of concern' if:</p> <ul style="list-style-type: none"> ▪ 10-30% of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss. <p>A regional ecosystem is listed as 'no concern at present' if:</p> <ul style="list-style-type: none"> ▪ The degradation criteria listed above for 'endangered' or 'of concern' regional ecosystems are not met.
Bioregion	A geographically distinct biological region, which is a reporting unit for assessing the status of native ecosystems and their level of protection. Australia is divided into 89 bioregions. Bioregions form part of the regional ecosystem classification code system. The study area is located in the Dawson River Downs subregion of the Brigalow Belt South Bioregion.
Electricity transmission line (ETL) study area	A study area shown on Figures 1 and 2, in which a proposed new electricity transmission line and associated infrastructure will be constructed, connecting the proposed Baralaba South Project with the Baralaba Substation, approximately 6 km east of the Baralaba township.
Endangered	Prescribed to a threatened ecological community, regional ecosystem or species under the <i>Queensland Vegetation Management Act 1999</i> , <i>Nature Conservation Act 1992</i> or <i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i> .
Environmentally Sensitive Area (ESA)	<p>Defined under the Environmental Protection Regulation 2008, a Category A Environmentally Sensitive Area is:</p> <ul style="list-style-type: none"> ▪ a national park, conservation park or forest reserve under the <i>Nature Conservation Act 1992</i> ▪ the wet tropics area under the <i>Wet Tropics World Heritage Protection and Management Act 1992</i> ▪ the Great Barrier Reef Region under the <i>Great Barrier Reef Marine Park Act 1975</i> ▪ a marine park under the <i>Marine Parks Act 2004</i>. <p>A Category B Environmentally Sensitive Area is:</p> <ul style="list-style-type: none"> ▪ a coordinated conservation area, a wilderness area, a World Heritage management area, an international agreement area, an area of critical habitat or major interest identified under a conservation plan or an area subject to an interim conservation order under the <i>Nature Conservation Act 1992</i> ▪ an area subject to the Bonn, Ramsar or Paris Conventions ▪ a zone of a marine park under the <i>Marine Parks Act 2004</i>

Term	Definition
	<ul style="list-style-type: none"> ▪ an area to the seaward side of the highest astronomical tide ▪ a place of cultural heritage significance or a registered place under the <i>Queensland Heritage Act 1992</i> ▪ an area recorded in the Aboriginal Cultural Heritage Register under the <i>Aboriginal Cultural Heritage Act 2003</i> ▪ a feature protection area, State forest park or scientific area under the <i>Forestry Act 1959</i> ▪ a declared fish habitat or place of a marine plant area under the <i>Fisheries Act 1994</i> ▪ an endangered regional ecosystem identified in the database known as the 'Regional ecosystem description database'.
EPBC Act conservation status	<p>The <i>Environment Protection and Biodiversity Conservation Act 1999</i> lists species and communities:</p> <p>Extinct in the wild:</p> <ul style="list-style-type: none"> ▪ It is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or ▪ It has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a timeframe appropriate to its life cycle and form. <p>Critically Endangered:</p> <ul style="list-style-type: none"> ▪ It is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria. <p>Endangered:</p> <ul style="list-style-type: none"> ▪ It is not critically endangered; and it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria. <p>Vulnerable:</p> <ul style="list-style-type: none"> ▪ It is not critically endangered or endangered; and ▪ It is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria. <p>Migratory:</p> <ul style="list-style-type: none"> ▪ Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II); ▪ Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA); ▪ Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).
Least Concern	Prescribed to regional ecosystems listed under the <i>Queensland Vegetation Management Act 1999</i> .
MNES	<p>A matter protected under the EPBC Act, including:</p> <ul style="list-style-type: none"> ▪ World heritage properties ▪ National heritage places ▪ Wetlands of international importance ▪ Listed threatened species and ecological communities ▪ Migratory species ▪ Commonwealth marine areas ▪ The Great Barrier Reef Marine Park

Term	Definition
	<ul style="list-style-type: none"> ▪ Nuclear actions ▪ A water resource, in relation to coal seam gas development and large coal mining development.
MSES	<p>A matter of State environmental significance listed in Schedule 2 of the Queensland Environmental Offsets Regulation 2014 including:</p> <ul style="list-style-type: none"> ▪ Regulated vegetation ▪ Connectivity areas ▪ Wetlands and watercourses ▪ High preservation areas of wild river areas ▪ Protected wildlife habitat ▪ Protected areas ▪ Highly protected zones of State marine parks ▪ Fish habitat areas ▪ Waterways providing for fish passage ▪ Marine plants ▪ Legally secured offset areas.
MLES	<p>A matter described in Section 5(3) of the Queensland Environmental Offset Regulation 2014 as a matter of local environmental significance for which an environmental offset is required under a local planning instrument.</p>
NC Act conservation status	<p>Under the <i>Nature Conservation Act 1992</i>, native wildlife may be prescribed as:</p> <p>Extinct:</p> <ul style="list-style-type: none"> ▪ There is no reasonable doubt the last member of the species had died. <p>Extinct in the wild:</p> <ul style="list-style-type: none"> ▪ The wildlife is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or ▪ The wildlife is not known to survive in its known or expected habitat, in its past range, over a period appropriate for the life cycle or form of the wildlife. <p>Critically endangered:</p> <ul style="list-style-type: none"> ▪ The wildlife has undergone or is suspected to have undergone a very large reduction in numbers; or ▪ It is likely that a very large reduction in the wildlife's numbers is imminent; or ▪ The wildlife's geographic distribution is precarious for the survival of the wildlife and very restricted; or ▪ The estimated total number of mature individuals is very low and it is likely the number will continue to decline at a very high rate, or continue to decline, and its geographic distribution is precarious for the survival of the wildlife; or ▪ The estimated total number of mature individuals is extremely low; or ▪ The probability of the wildlife's extinction in the wild is at least 50% in the immediate future. <p>Endangered:</p> <ul style="list-style-type: none"> ▪ There have not been thorough searches conducted for the wildlife and the wildlife has not been seen in the wild over a period that is appropriate for the life cycle or form of the wildlife; or ▪ The habitat or distribution of the wildlife has been reduced to an extent that the wildlife may be in danger of extinction; or ▪ The population size of the wildlife has declined, or is likely to decline, to an extent that the wildlife may be in danger of extinction; or

Term	Definition
	<ul style="list-style-type: none"> ▪ The survival of the wildlife in the wild is unlikely if a threatening process continues. <p>Vulnerable:</p> <ul style="list-style-type: none"> ▪ The population is decreasing because of threatening processes; or ▪ The population has been seriously depleted and its protection is not secured; or ▪ The population, while abundant, is at risk because of threatening processes; or ▪ The population is low or localised or depends on limited habitat that is at risk because of threatening processes. <p>Near Threatened:</p> <ul style="list-style-type: none"> ▪ The population size or distribution of the wildlife is small and may become smaller; or ▪ The population size of the wildlife has declined, or is likely to decline, at a rate higher than the usual rate for population changes for the wildlife; or ▪ The survival of the wildlife in the wild is affected to an extent that the wildlife is in danger of becoming vulnerable. <p>Least Concern:</p> <ul style="list-style-type: none"> ▪ The Wildlife is common or abundant and is likely to survive in the wild.
Near Threatened	Prescribed to species listed under the Queensland <i>Nature Conservation Act 1992</i> .
Of concern	Prescribed to regional ecosystems listed under the Queensland <i>Vegetation Management Act 1999</i> .
Project area	The project area assessed includes the Project site (MLA 700057), proposed Moura-Baralaba Road realignment, proposed water release/extraction infrastructure and the ETL study area.
Project site	An area defined for the purpose of this impact assessment and shown on Figures 1 and 2 that encompasses Mining Lease Application 700057, in which the proposed coal mine project will be constructed.
Region	The local area surrounding the study area, including the landscape within 25 km of the study area.
Regional ecosystem	A vegetation community within a bioregion that is consistently associated with a particular combination of geology, landform and soils.
Regulated vegetation	Vegetation regulated through the <i>Planning Act 2017</i>
Remnant vegetation	Defined under the Queensland <i>Vegetation Management Act 1999</i> as, woody 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.
Significant species and vegetation	<p>Refers to:</p> <ul style="list-style-type: none"> ▪ Species listed as Critically endangered, Endangered, Vulnerable or Near Threatened under the Queensland <i>Nature Conservation Act 1992</i> or Critically Endangered, Endangered or Vulnerable under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> ▪ Threatened ecological community listed as Critically Endangered, Endangered or Vulnerable under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> ▪ Regional ecosystems with an Endangered or Of concern biodiversity status or <i>Vegetation Management Act 1999</i> status.

Term	Definition
Special least concern	<p>For an animal that is defined under the Queensland Nature Conservation (Animal) Regulation 2020 as:</p> <ul style="list-style-type: none"> a) the echidna (<i>Tachyglossus aculeatus</i>) b) the platypus (<i>Ornithorhynchus anatinus</i>) c) a least concern bird to which any of the following apply – <ul style="list-style-type: none"> i. Agreement Between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA) ii. Agreement Between the Government of Australia and the Government of the People’s Republic of China for the Protection of Migratory Birds and their Environment (CAMBA) iii. Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds and Exchanges of Notes (ROKAMBA) iv. Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). <p>For a plant is defined under the Queensland Nature Conservation (Plants) Regulation 2020, as plants of families listed under Schedule 2.</p>
Study Area	<p>An area defined for the purposes of this impact assessment and which encompasses the project area (project site (MLA 700057), the proposed Moura-Baralaba Road realignment, proposed water extraction/release infrastructure, the ETL study area) and the additional investigation area.</p>
Threatened ecological community	<p>A community listed under the provisions of the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>.</p>
Vegetation management Act status	<p>This is a statutory classification under the Queensland <i>Vegetation Management Act 1999</i>. A regional ecosystem is listed as ‘endangered’ if:</p> <ul style="list-style-type: none"> ▪ Remnant vegetation for the regional ecosystem is less than 10% of its pre-clearing extent across the bioregion; or 10-30% of its pre-clearing extent remains and the remnant vegetation for the regional ecosystem is less than 10,000 ha. <p>A regional ecosystem is listed as ‘of concern’ if:</p> <ul style="list-style-type: none"> ▪ Remnant vegetation for the regional ecosystem is 10-30% of its pre-clearing extent across the bioregion; or more than 30% of its pre-clearing extent remains and the remnant vegetation extent for the regional ecosystem is less than 10,000 ha. <p>A regional ecosystem is listed ‘least concern’ if:</p> <ul style="list-style-type: none"> ▪ Remnant vegetation for the regional ecosystem is over 30% of its pre-clearing extent across the bioregion, and the remnant vegetation area for the regional ecosystem is greater than 10,000 ha.
Vulnerable	<p>Prescribed to a threatened ecological community or species under the Queensland <i>Nature Conservation Act 1992</i> or Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>.</p>

1 Introduction

Eco Solutions & Management was commissioned by Baralaba Coal Company Pty Ltd (the proponent) to undertake the terrestrial ecology assessment for the Baralaba South Project (the project). The project involves a proposed new open cut coal mine. The proposed project would be located approximately 115 km west of Rockhampton and 8 km south of Baralaba in central Queensland (Figure 1).

This ecological impact assessment report forms part of the Environmental Impact Statement for the project.

1.1 Project description

The Project is a greenfield, open-cut metallurgical coal mine which would extract up to 2.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal to produce pulverised coal injection (PCI) coal for international export to the steel production industry over a life of 23 years. Mining activities are to be undertaken within the area of Mining Lease Application (MLA) 700057, which covers a total of 2,214 ha.

Open-cut coal mining activities would target the Baralaba Coal Measures, including the basal sub-unit Kaloola Member, where the structural dip of the Permian geology brings them to or near the surface within MLA 700057. The total resource targeted comprises up to approximately 49 Mt of ROM coal estimated to produce approximately 36 Mt of PCI product coal over the life of the Project. Overburden and interburden will be disposed of in out-of-pit spoil dumps located contiguous with the pit excavation, and in-pit dumps as part of ongoing progressive rehabilitation behind the advancing operations.

The Project will provide a continuation of mining operations within the local area, wherein mining operations decline at the Baralaba North Mine, mining operations will ramp up at the Project.

The main activities associated with the Project include:

- a greenfield open-cut coal mine to be developed within MLA 700057 (referred to as the project site), including:
 - open-cut mining operations using conventional truck and excavator methods.
 - a Coal Handling Preparation Plant (CHPP).
 - a mining infrastructure area, including workshops, administration buildings, fuel and chemical storage facilities, warehouse and hardstand areas.
 - ROM coal and product coal stockpile pads.
 - topsoil stockpiles, laydown areas and borrow areas.
 - haul roads and internal roads.
 - water management infrastructure.
 - backfilling of mine voids with waste rock behind the advancing open-cut mining operations and the placement of waste rock in out-of-pit emplacements adjacent to the pit extents.

- dewatering of CHPP coal rejects and disposal on-site within mine voids behind the advancing open-cut mining operation.
- recovery and recycling of processed wastewater through the CHPP.
- other associated minor infrastructure, plant, equipment, and activities; and
- exploration activities
- water release/extraction pipeline and water pump station (referred to as the water release/extraction infrastructure)
- realignment of approximately 4.5 km section of Moura Baralaba Road to the east of MLA 700057
- product coal road transport approximately 40 km via the existing Baralaba North Mine haul route on public Council-controlled roads to the existing train load-out facility located approximately 2 km east of Moura; and
- Product coal rail transport to the Port of Gladstone for export to international markets.

The Project includes development of an electricity transmission line (ETL) of approximately 8 km in length within a 20 m wide easement. The ETL will link the Project with the Baralaba Substation, located approximately 6 km east-south-east of the Baralaba township. Two ETL alignment options are being considered for the Project and the final ETL alignment will be determined at a later date in consideration of the outcomes of the assessments conducted for the EIS. The ETL will be subject to separate approvals, for which the necessary permitting will be undertaken by Ergon.

1.2 Study objectives

This report assesses the potential impacts of the project on ecology values of the site and surrounding areas and particularly on matters of national environmental significance (MNES) and matters of state environmental significance (MSES). Specifically, this report:

- describes the regulatory requirements relevant to the project
- describes the field work methodologies, which were undertaken in consideration of flora and fauna survey methodologies of the Commonwealth Department of Climate Change, Energy, Environment and Water (DCCEEW) (formerly the Commonwealth Department of Agriculture, Water and the Environment (DAWE) at the time of the referral) and Queensland Department of Environment and Science (DES)
- provides a comprehensive flora and fauna inventory for the project area
- provides field validated regional ecosystem (RE) mapping developed in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Version 4.0 and 5.1* (Neldner et al. 2020; 2017a)
- assesses the likelihood of occurrence, and identifies and maps habitat for MNES and MSES, including species and communities protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act*

1999 (EPBC Act) and Queensland's *Vegetation Management Act 1999* (VM Act), *Nature Conservation Act 1992* (NC Act) and *Environmental Offsets Act 2014* (EO Act)

- assesses the potential impacts of the project on MNES and MSES
- confirms the requirements for any offsets under the EPBC Act and/or EO Act
- provides recommended mitigation measure and monitoring to minimise impacts of the proposal, in line with EP Act objectives.

1.2.1 Additional investigation area

An additional investigation area was assessed as a result of consultation with the Queensland and Commonwealth Governments. The purpose of this additional investigation was to:

- field-validate vegetation communities (to the west and south of the project site) and consider potential indirect impacts of the project to these communities
- assess potential habitat for state and Commonwealth listed species, including; *Xerothamnella herbacea* (no common name) and Koala (*Phascolarctos cinereus*) and consider potential indirect impacts of the project to these habitats
- assess vegetation and potential for Mt Ramsay (to the east of the project site) to provide potential habitat for the Koala and therefore attract movement of the species across the project site between the Dawson River or Banana Creek and Mt Ramsay.

1.3 Regional context

The study area is located within the Bowen Basin in central Queensland within the Dawson River drainage sub-basin of the Fitzroy Basin. It is also located in the Dawson River Downs subregion of the Brigalow Belt South Bioregion. The region experiences sub-tropical conditions with average temperatures ranges recorded between 18.5°C and 33.7°C in the summer months, and 5.7°C and 24.9°C in the winter months (BoM 2018). The region receives an annual average rainfall of approximately 677.8 mm with a pronounced wet season. Approximately 65% of the annual rainfall is typically recorded between November and March (BoM 2018).

Agricultural pursuits, particularly cattle grazing and cultivation, are the predominant land uses within the region. Coal mines are also present in the region, including Dawson (Moura) Mine and Baralaba North Mine located approximately 23 km south and 11 km north of the project area, respectively. No World Heritage Areas or National Parks are located in the region. Blackdown Tableland is the closest National Park, which is located approximately 72 km to the north-west of the MLA. There are however a number of forest reserves in the locality, including the Dawson Range State Forest that is located approximately 13 km west of the MLA.

1.3.1 Description of the study area

The study area for this ecological impact assessment includes (Figures 1 and 2):

- the project site (encompassing MLA 700057 [~2,214 ha]) in which the proposed coal mine will be developed
- the proposed realignment of Moura-Baralaba Road
- the proposed water release/extraction infrastructure
- the ETL study area, in which one of two ETL alignment options will be constructed (impact calculations are presented separately for both alignment options)
- an additional investigation area, to inform the assessment of potential project impacts on the vegetation communities, flora/fauna species and/or their habitats associated with the Dawson River, Banana Creek and flood plain, and Mt Ramsay

The project site is bisected by a decommissioned rail corridor (Dawson Valley Branch Railway), which also functions as secondary stock route (ID 910BANA) that is managed under the *Stock Route Management Act 2002*. The Moura Baralaba Road also traverses the eastern portion of the project site, and will be realigned to the east of MLA 700057 for the project (Figure 2). The Dawson River is located to the west of the project site and Mt Ramsay to the east.

The topography of the study area is relatively flat with ground elevations ranging from 75 m AHD to 110 m AHD. The western portion of the study area is low-lying and encompasses the floodplain of the Dawson River and Banana Creek. The landform gently rises towards higher elevations in the eastern portion of the study area.

The majority of the study area has been cleared in the past to facilitate agricultural pursuits, namely cattle grazing. The eastern portion of the project site has also been subject to some limited clearing and disturbance associated with geological exploration (i.e. tracks and drill pads). As a result of these past land management activities, intact, native vegetation communities have been reduced to small isolated patches, most of which are associated with the drainage lines. There are also areas of regrowth vegetation that are in various stages of recovery following past clearing events.

Property dams are located throughout the study area and a number of farm tracks are present across the study area. There are also a number of residences located in the central and southern portion of the study area and in the north in the vicinity of the ETL study area.

2 Regulatory framework

An environmental authority (EA) is being sought for the project under the Queensland *Environmental Protection Act 1994* (EP Act). The project will be assessed under a number of pieces of state and Commonwealth environmental legislation. These are described in Sections 2.1 to 2.6.

2.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Commonwealth Government's principal piece of environmental legislation and is administered by DAWE. It is designed to protect national environmental assets, known as MNES, including:

- World Heritage properties
- National heritage places
- wetlands of international importance (listed under the Ramsar convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

Any action (which includes a development, project or activity) that is considered likely to have a significant impact on a MNES is subject to assessment under the EPBC Act.

A significant impact is an impact that is important, notable, or of consequence having regard to its context or intensity and can be assessed through application of the DCCEEWs *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (Significant Impact Guidelines) (DotE 2013).

An EPBC Referral (2012/6547) was lodged on behalf of the Project, and declared to be a controlled action on 18 October 2012. The controlling provisions for the Project, with regards to its potential impacts on MNES are:

- listed threatened species and communities (sections 18 and 18A)
- listed migratory species (sections 20 and 20A), and
- water resources (sections 24D and 24E).

2.1.1 EPBC Act Environmental Offsets Policy

The EPBC Act Environmental Offset Policy (EOP) states that offsets under the EPBC Act are required if residual impacts to MNES are 'significant' (DotE 2012; SEWPaC 2012). A calculator is used to determine offset liability, based on habitat quality of the impacted versus proposed offset areas.

Under the EOP, environmental offsets are actions taken to counterbalance significant residual impacts on MNES. Offsets are used as a last resort in instances where an action will give rise to residual impacts, even after the application of management measures.

The EOP provides guidance on the role of offsets in environmental impact assessments and how DCCEEW considers the suitability of a proposed offset package (SEWPaC 2012).

2.1.2 International treaty obligations on migratory species

Australia is signatory to several agreements relating to migratory species. The majority of these species are shorebirds that migrate annually within the East Asian-Australian flyway, which stretches from Siberia and Alaska, southwards through east and south-east Asia to Australia and New Zealand (DCCEEW 2023a). Migratory species listed under the following agreements and conventions are protected in Australia through being listed as MNES (migratory Controlling Provisions) under the EPBC Act:

- China-Australia Migratory Bird Agreement (CAMBA)
- Japan-Australia Migratory Bird Agreement (JAMBA)
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA)
- Convention on the conservation of migratory species of wild animals (Bonn Convention).

The JAMBA, CAMBA and ROKAMBA agreements list terrestrial, water and shorebird species which migrate between Australia and the respective countries. All agreements require the parties to protect migratory birds by:

- limiting the circumstances under which migratory birds are taken or traded
- protecting and conserving important habitats
- exchanging information
- building cooperative relationships.

The JAMBA agreement also includes provisions for cooperation on the conservation of threatened birds. In addition to these bilateral agreements, Australia is also a signatory of the Bonn Convention. This convention aims to conserve terrestrial, aquatic and avian migratory species throughout their range (CMS 2018).

2.2 Queensland Environmental Protection Act 1994

The EP Act is administered by the DES and was established to protect Queensland's environment, while allowing for development that improves the total quality of life, both now and in the future.

The EP Act uses a number of mechanisms to achieve its objectives, including the following that are relevant to this report:

- requirement for mining projects to obtain an EA prior to operation
- requirement for an environmental impact assessment process in support of an EA application.

2.3 Queensland Vegetation Management Act 1999

The VM Act is administered by the Queensland Department of Resources. The VM Act, in conjunction with the Queensland *Planning Act 2016*, regulates the clearing of native vegetation in Queensland. The VM Act's objectives include the preservation of remnant endangered ecosystems and vegetation in areas of high nature conservation or lands vulnerable to land degradation.

The VM Act does not apply to mining activities undertaken within mining leases. However, it is relevant to this assessment as it provides for the classification of remnant vegetation into REs that form the basis of the assessment of vegetation communities. REs are defined by Sattler and Williams (Sattler and Williams 1999) as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The Queensland government maintains RE maps illustrating the distribution of REs throughout Queensland and these are updated periodically to reflect refinements that have been made.

Remnant vegetation is referred to under the VM Act as vegetation where the dominant canopy has >70% of the height and >50% of the cover relative to the height and canopy cover of the undisturbed vegetation community. Remnant vegetation must also be dominated by species characteristic of the vegetation's undisturbed canopy.

Res are assigned one of the following three categories under the VM Act:

- Endangered: Remnant vegetation that has less than 10% of its pre-clearing extent remaining across the bioregion; or 10 – 30% of its pre-clearing extent remains and the remnant area is less than 10,000 ha;
- Of Concern: Remnant vegetation that has 10 – 30% of its pre-clearing extent remaining across the bioregion; or more than 30% of its pre-clearing extent remains and the remnant area is less than 10,000 ha; and
- Least Concern: Remnant vegetation that has over 30% of its pre-clearing extent remaining across the bioregion and the remnant area is greater than 10,000 ha (Sattler and Williams 1999).

The Queensland Government also assigns a biodiversity status to each RE in addition to the status under the VM Act. The biodiversity status has no formal regulatory meaning under the VM Act but is used for a range of planning and management applications including Biodiversity Planning Assessments (BPAs) and to determine environmentally sensitive areas (ESAs) that are used for regulation of the mining industry through provisions in the EP Act.

The Queensland Government has recently released high-value regrowth vegetation mapping (i.e. non-remnant areas that have not been cleared in the last 15 years). New laws regulating the clearing of high-value regrowth were passed by the Queensland Parliament in 2018 and form part of the VM Act. The VM Act, does not apply to mining projects and therefore, for the purposes of this assessment the high-value regrowth mapping has been referred to only in terms of the biodiversity values for the study area and its habitat value for MSES and MNES.

2.4 Queensland Nature Conservation Act 1992

The NC Act is the principal legislation that establishes a framework for the identification, gazettal and management of protected areas (such as National Parks) and the protection of native flora and fauna (protected wildlife) listed under the Queensland Nature Conservation (Animal) Regulation 2020 and the Nature Conservation (Plants) Regulation 2020. The NC Act is administered by the DES.

Where a project is proposed to result in the "taking" of protected wildlife, a permit is required from the DES. 'Take' is defined under the NC Act in relation to fauna as:

- Hunting; shooting; wounding; killing; skinning; poisoning; netting; snaring; spearing; trapping; catching; dredging for; bringing ashore or aboard a boat; pursuing; luring; injuring; or harming the animal or any attempt to do so.

In relation to flora it is defined as:

- Gathering; plucking; cutting; pulling up; destroying; digging up; felling; removing; or injuring the plant or any part of the plant or attempt to do any of these acts.

The NC Act classifies native flora and fauna species into categories of conservation significance including; extinct, extinct in the wild, critically endangered, endangered, vulnerable, near threatened, special least concern and least concern in recognition of the extent to which these species have declined and what action is to be taken to protect these species. All native flora and fauna species are protected under the NC Act.

The following approvals may be relevant for the project:

- Where there is a requirement for the clearing of plants protected under the NC Act (including critically endangered, endangered, vulnerable and near threatened species) a clearing permit under the NC Act may be required
- Where the activities of the proponent may cause disturbance to animal breeding places, the proponent is required to undertake the activities with an approved species management program (SMP)
- Any spotter catcher employed by the project must be in possession of a Rehabilitation Permit (spotter catcher endorsement) for managing fauna during clearing activities
- If it is necessary to remove animals posing a threat to human health or property, a Damage Mitigation Permit is required under the NC WM Regulation.

2.5 Queensland Biosecurity Act 2014

The Biosecurity Act provides the framework and powers for establishing general biosecurity obligations, including the management of biosecurity matters, which includes some pest plants and animals. The Act identifies 'prohibited matters' and 'restricted matters' as follows:

- Prohibited matter – The biosecurity matter is not currently present or known to be present in Queensland and there are reasonable grounds to believe that if it did enter the State, the biosecurity matter may have adverse effects on human health, social amenity, the economy or the environment (being biosecurity considerations)
- Restricted matter – a biosecurity matter currently present in Queensland and there are reasonable grounds to believe that, if restrictions aren't imposed to reduce, control or contain the matter, it may have an adverse effect on human health, social amenity, the economy or the environment.

Under the Act a person is required to take all reasonable precautions not to exacerbate a biosecurity risk posed by a restricted matter and all reasonable actions to minimise a biosecurity threat posed by a restricted matter.

Restricted pests are listed in Schedule 2 of the Biosecurity Act and each is attributed a category of restriction as follows:

- Category 1 and 2 must be reported to the Queensland Department of Agriculture and Fisheries (DAF) within 24 hours of becoming aware of the restricted matter
- Category 3 must not be distributed or disposed of unless in accordance with the Act, including being released into the environment
- Category 4 must not be moved or allow to be moved
- Category 5 must not be kept
- Category 6 must not be fed
- Category 7 must be killed as soon as practicable, in accordance with the Act.

The Act also recognises other invasive species (such as the Cane Toad (**Rhinella marina*)) as species, which fall under a general biosecurity obligation (GBO). A GBO means that while there is no legal requirement for control of these pests, reasonable and practical steps must be undertaken to minimise their spread.

2.6 Queensland Environmental Offsets Act

The EO Act and subordinate legislation and Queensland Environmental Offset Policy (QEOP) (DES 2020) comprise the Queensland Environmental Offsets Framework. According to this framework, an offset condition may be imposed on an authority under another Act where impacts to MNES, MSES or matter of local environmental significance (MLES) constitute a significant residual impact defined under the EO Act. MNES under the EO Act are the same as those defined under the EPBC Act and listed in Section 2.1.

The *Environmental Offsets Regulation 2014* (EO Regulation) prescribes the MSES. Those related to terrestrial ecology include:

- regulated vegetation under the VM Act, that is:
 - endangered REs
 - of concern REs
 - REs that intersect with wetlands identified on the vegetation management wetlands map
 - REs located within a defined distance from the defining banks of a relevant watercourse
 - Habitat that is shown as essential habitat, in accordance with the Queensland VM Act, for protected wildlife
- connectivity areas, comprising remnant REs that contain an area of land that is required for ecosystem functioning (i.e. a connectivity area)
- a wetland or watercourse in high ecological value waters
- a part of a wild river area described as a high preservation area
- highly protected zones of State marine parks
- protected areas
- fish habitat areas
- waterways providing for fish passage
- marine plants
- strategic environmental areas
- legally secured offset areas.

2.6.1 Queensland Environmental Offsets Policy

The QEOP and *Significant Residual Impact Guidelines* (SRI Guideline) (DES 2020) provides direction for determining whether an impact on a MNES, MSES and MLES may be 'significant'. It is specified in the guidelines that the criteria provided are to be considered in the context of the impact and are to be used as 'guidance' only. Supporting information is generally required in determining the significance of an impact against the guideline.

The QEOP also stipulates that to avoid duplication of offset conditions between jurisdictions, State and local governments cannot impose offsets for the same or substantially the same matter being assessed under the EPBC Act. However, this does not apply where an action has been assessed as not a 'controlled action' under the EPBC Act (DES 2020).

3 Methodology

A detailed description of the methodology used to prepare this ecological assessment is provided in Appendix A. The methodology included the following:

- Desktop searches of Commonwealth and State databases and mapping, literature reviews, local previous ecology assessments and aerial photographs. This information formed the basis for the fieldwork program. Database search results are provided in Appendix B.
- Seasonal flora and fauna surveys were undertaken over five days in the 2017 post-wet season (16 to 20 May 2017, inclusive) and five days in the 2017 dry season (16 to 20 December 2017, inclusive), within the project site and proposed road realignment. Further post-wet season targeted surveys were undertaken over 9 days (6 to 14 May 2020, inclusive) in the additional investigation area and water release/extraction infrastructure area and dry season flora and fauna surveys were undertaken over three days (23-25 September 2020, inclusive) within the ETL study area.
- The flora surveys were conducted in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Versions 5.1, 5.0 and 4.0* (Neldner et al. 2019; 2017b) to collect information on listed flora species, vegetation communities, and habitat types. The field work included:
 - 11 detailed secondary sites
 - 68 tertiary sites
 - 53 quaternary sites
 - 102 quaternary photo points
 - 15 habitat quality plots (HQPs)
 - random traverses
 - collection of ancillary information.

The location of each vegetation assessment site is shown in Figure 3.

- The fauna surveys were conducted in accordance with various Commonwealth and State fauna survey guidelines to detect/determine the likelihood of occurrence of various fauna species and determine the extent and quality of fauna habitat within the study area. The field work consisted of systematic and supplementary survey sites and opportunistic observations. Table 1 provides an outline of the survey effort during each seasonal survey. The location of each fauna survey site is shown in Figure 4.

Table 1: Fauna survey effort

Survey Technique	Survey Effort			Total	Target Fauna Species
	2017 Post-wet Season	2017 Dry Season	2020 Surveys*		
Elliot Traps	200 trap nights	200 trap nights	-	400 trap nights	Small mammals, some reptiles

Survey Technique	Survey Effort				Target Fauna Species
	2017 Post-wet Season	2017 Dry Season	2020 Surveys*	Total	
Pitfall Traps	32 trap nights	32 trap nights	-	64 trap nights	Small mammals, reptiles and frogs
Funnel Traps	48 trap nights	48 trap nights	-	96 trap nights	Small mammals, reptiles (including Ornamental Snake) and frogs
Spotlighting	8 person hours on foot	7 person hours on foot	18 person hours on foot	33 person hours on foot	Mammals (including Koala), reptiles (including Ornamental Snake), nocturnal birds
Call Playback	3 sessions	3 sessions	12 sessions	18 sessions	Nocturnal birds and Koala
Infrared Cameras	8 trap nights for cameras at systematic trap sites	8 trap nights for cameras at systematic trap sites	-	16 trap nights	Medium to large mammals (including Koala) and reptiles
Bird Survey	13 person hours	14 person hours	10 person hours	37 person hours	Birds (including Squatter Pigeon, migratory birds)
Active Searching	5 person hours (including 1-person hour at each systematic trap site)	6 person hours (including 1-person hour at each systematic trap site)	9.5 person hours	20.5 person hours	All conservation significant species, including mammals (incl. Koala) reptiles, and birds
Anabat	6 nights	5 nights	8 nights	19 nights	Bats
Koala SAT Surveys	4 sites	n/a	31 sites	35 sites	Koalas

Survey Technique	Survey Effort			Total	Target Fauna Species
	2017 Post-wet Season	2017 Dry Season	2020 Surveys*		
Opportunistic / Incidental Bird Survey	72 diurnal person hours and 24 nocturnal person hours	72 diurnal person hours and 24 nocturnal person hours	138 diurnal person hours and 56 nocturnal person hours	282 diurnal person hours and 104 nocturnal person hours	Birds (including Squatter Pigeon, migratory birds), macropods, medium to large reptiles

* includes post-wet season flora and fauna surveys of additional investigation area (including sections of the Dawson River, Banana Creek and Mt Ramsay) and dry season flora and fauna survey of the ETL study area

- An additional flora survey was carried out on 9 March 2018. This survey was a targeted flora species survey in accordance with the *Flora Survey Guidelines – Protected Plants* (EHP 2016). The survey was restricted to a patch of vegetation (non-remnant RE 11.4.8) where threatened flora species were recorded during the dry season survey.
- Likelihood of occurrence assessments based on the species' known ranges, preferred habitat, and study area characteristics are provided in Appendices C and D. This assessment culminates in ground-truthed vegetation mapping and fauna habitat mapping (Figures 10 to 19).
- Significant impact assessments undertaken in accordance with the DAWE's *EPBC Act Policy Statement 1.1: Significant Impact Guidelines* (Significant Impact Guidelines) (DotE 2013) and the Queensland Government's *Environmental Offsets Policy SRI Guideline* (EHP 2014a) (Section 8).

4 Desktop results

This section describes the desktop information available for the study area, as outlined in Appendix A, Section A2. It provides results of database searches, Government mapping layers and a review of the literature and previous studies relevant to the region. This information identifies the potential for threatened, near threatened and migratory flora and fauna species and endangered and of concern ecosystems to occur within the project area and broader study area.

The desktop review considers an area of approximately 25 km surrounding the project site and therefore incorporates the road realignment, water release/extraction infrastructure, additional investigation area and ETL study area. This search area is considered to be an appropriate scale to represent the region, given the number of surveys that have been conducted in the region.

4.1 Geology

As shown on Figure 5 and listed in Table 2, the surface geology consists of Quaternary alluvium associated with local drainage features, including the Dawson River. Higher ground in the eastern portion of the study area, including the ETL study area, is characterised by colluvial deposits. Equivalent Land Zones (Wilson and Taylor 2012) are listed in Table 2, as these are relevant to assigning field-validated vegetation communities to REs.

Table 2: Surface geology mapping for the project site and ETL study area

Map symbol	Geological unit	Lithology	Dominant rock type	Equivalent land zone
Qa	Quaternary alluvium	Clay, silt, sand and gravel; flood-plain alluvium.	Alluvium	3
Qr	Colluvium	Clay, silt, sand, gravel and soil; colluvial and residual deposits	Colluvium	4 or 5

4.2 Soils

Two primary soil types have been mapped by the *Atlas of Australian Soils* across the project site and ETL study area (Northcote et al. 1960), namely:

- hard pedal mottled-yellow duplex soils that are associated with higher elevations in the south-eastern and northern portions of the project site
- hard pedal brown duplex soils in the far north of the ETL study area near the Baralaba Substation
- grey self-mulching cracking clays through the lower-lying south-western portion of the project site.

4.3 Surface water

The study area is located in the Dawson River drainage sub-basin of the Fitzroy Basin.

The Dawson River to the west of the project site (Figure 1) is a perennial watercourse, subject to seasonal flooding, and is defined as a watercourse under the Water Act 2000. The Dawson River flows relatively consistently throughout the year as it receives inflow from groundwater sources along the length of the river (Engeny Water Management 2021).

Banana Creek, a stream order 5 watercourse is situated to the west and south-west of the project site (Figure 1) and flows in a northerly direction into the Dawson River approximately 120 m west of the project site.

A tributary of the Dawson River comprised of stream order 1, 2, and 3 ephemeral drainage lines traverses the south-central portion of the project site. This waterway drains in a northerly direction before exiting the project site and into the Dawson River (stream order 8) approximately 1 km to the north-west of the project site (Figure 1).

The western portion of the project site encompasses low-lying flood plains associated with the Dawson River and Banana Creek.

The ETL study area traverses a number of stream order 1 drainage lines and a stream order 3 waterway, Benleith Creek, in the far north of the study area, which also ultimately flows into the Dawson River approximately 4.5 km downstream (Figure 6).

A number of farm dams are also located within and adjacent to the project site and ETL study area.

4.4 Queensland Government mapping

4.4.1 Regional ecosystems

The majority of the project site is mapped by the Queensland Government as supporting non-remnant vegetation (Figure 6). Only one area of remnant vegetation has been mapped in the central southern portion of the project site. This area has been identified as supporting a polygon of remnant endangered vegetation (RE 11.4.1) and a polygon of remnant of concern vegetation (RE 11.4.2).

The Queensland Government has also mapped areas of high-value regrowth vegetation supporting of concern RE 11.4.2 and endangered RE 11.3.1 and 11.4.1 flanking drainage lines in the project site (Figure 6). A larger patch of high-value regrowth vegetation supporting endangered RE 11.3.1 is also mapped in the south-western portion of the project site. Another small patch of endangered regrowth RE 11.4.8/11.4.9/11.4.1 is mapped at the far northern end of the ETL study area (Figure 6).

No remnant or regrowth vegetation has been mapped along the proposed road realignment (Figure 6). Remnant RE's 11.3.2 and to a lesser extent 11.3.25/11.3.3 are mapped within the proposed water extraction/release infrastructure area, in the riparian zone of the Dawson River (Figure 6).

Remnant and regrowth vegetation, predominantly of concern, is mapped throughout the additional investigation area as riparian and alluvial vegetation associated with the Dawson River and Banana Creek as well as semi-evergreen vine thicket and *Acacia* woodland on Mt Ramsay (Figure 6).

Details of the REs mapped by the Queensland Government in the study area are provided in Table 3.

Table 3: Queensland Government mapped regional ecosystems in the study area

RE Code	Short Description	Conservation Status ¹		
		VM Act Status	Biodiversity Status	EPBC Act Status ²
Project site				
Regrowth 11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	Endangered	Endangered	Endangered
Remnant and regrowth 11.4.1	Semi-evergreen vine thicket +/- <i>Casuarina cristata</i> on Cainozoic clay plains	Endangered	Endangered	Endangered
Remnant and regrowth 11.4.2	<i>Eucalyptus</i> spp. And/or <i>Corymbia</i> spp. Grassy or shrubby woodland on Cainozoic clay plains	Of Concern	Of Concern	-
Water release/extraction infrastructure				
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of concern	Of concern	Endangered
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. Woodland on alluvial plains	Of concern	Of concern	-
ETL study area				
Regrowth RE 11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains	Endangered	Endangered	Endangered
Regrowth RE 11.4.9	<i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	Endangered	Endangered	Endangered
Additional investigation area				
Remnant and regrowth RE 11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	Endangered	Endangered	Endangered
Remnant and regrowth RE 11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of concern	Of concern	Endangered

RE Code	Short Description	Conservation Status ¹		
		VM Act Status	Biodiversity Status	EPBC Act Status ²
Remnant and regrowth RE 11.3.3	<i>Eucalyptus coolabah</i> woodland on alluvial plains	Of concern	Of concern	Endangered
Remnant RE 11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. Woodland on alluvial plains	Of concern	Of concern	-
Remnant RE 11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least concern	Of concern	-
Remnant and regrowth RE 11.4.1	Semi-evergreen vine thicket +/- <i>Casuarina cristata</i> on Cainozoic clay plains	Endangered	Endangered	Endangered
Remnant and regrowth RE 11.4.8	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> or <i>A. argyrodendron</i> on Cainozoic clay plains	Endangered	Endangered	Endangered
Remnant and regrowth RE 11.4.9	<i>Acacia harpophylla</i> shrubby woodland with <i>Terminalia oblongata</i> on Cainozoic clay plains	Endangered	Endangered	Endangered
Remnant RE 11.7.2	<i>Acacia</i> spp. Woodland on Cainozoic lateritic duricrust. Scarp retreat zone.	Least concern	No concern at present	-
Remnant RE 11.9.4	Semi-evergreen vine thicket of <i>Acacia harpophylla</i> with a semi-evergreen vine thicket understory on fine-grained sedimentary rocks	Of concern	Endangered	Endangered
Remnant RE 11.10.1	<i>Corymbia citriodora</i> woodland on coarse-grained sedimentary rocks	Least concern	No concern at present	-

¹ VM Act and Biodiversity status defined under the Regional Ecosystem Description Database (REDD) (Queensland Herbarium 2019)

² The RE potentially contributes to a nationally listed threatened ecological community.

4.4.2 Vegetation management wetlands and watercourses

The Queensland Government Vegetation Management Supporting Map indicates that there are two vegetation management wetland areas mapped within the south-western portion of the project site (Figure 6).

All of the 1st, 2nd and 3rd order drainage features in the project site and ETL study area are mapped as vegetation management watercourses under the VM Act (Figure 6). Clearing of mapped remnant vegetation within a defined distance of these watercourses is regulated in Queensland.

4.4.3 Groundwater dependent ecosystems

The Australian Groundwater Dependent Ecosystem Toolbox (GDE Toolbox), prepared by the National Water Commission (2011), defines groundwater dependent ecosystems (GDEs) as:

"Ecosystems that require access to groundwater to meet all or some of their water requirements so as to maintain the communities of plants and animals, ecological processes they support, and ecosystem services they provide".

The potential for GDEs to be present within the study area was reviewed, with the review consisting of:

- a search of the Queensland Springs Database
- a search of the Bureau of Meteorology's (BoM) GDE Atlas

A search of the Queensland Springs Database indicated that no spring wetlands are located within the study area or surrounds.

The BoM GDE mapping (Figure 7) does not identify any areas of terrestrial GDEs as likely to occur within the project site, proposed road realignment, or ETL study area. Low potential GDEs are mapped within the water release/extraction infrastructure area at the Dawson River (Figure 7). The BoM GDE Atlas maps areas of 'Low potential terrestrial GDEs – from regional studies' associated with riparian vegetation of the Dawson River, Banana Creek and associated watercourses to the west and south of the project site.

4.4.4 Referable wetlands

Referable Wetlands are identified and mapped by the Queensland Government as wetlands warranting specific protection under the Queensland EP Act. A search of the referable wetlands map shows there is a Great Barrier Reef wetland protection area (WPA) mapped within the project site (Figure 8). This wetland is also identified as being of high ecological significance (HES).

There are two wetlands of general ecological significance (GES) identified within the project site (Figure 8). Additional GES wetlands occur to the west and south associated with the floodplain of the Dawson River and Banana Creek (DES 2021a). GES wetlands are mapped for the purpose of establishing environmental values and are not protected wetlands.

No referable wetlands are located within the proposed road realignment, water extraction/release infrastructure area or ETL study area.

4.4.5 Protected plants high risk areas

The protected plants flora survey trigger map identifies a number of high-risk areas (HRA) within and to the south-west of project site (Figure 6). Details of the species for which these HRAs are mapped are not provided with the trigger mapping and there are no records shown at these locations within the Atlas of Living Australia database. These HRAs are anticipated to be attributable to *Xerothamnella herbacea* (no common name) and *Solanum elaeagnifolium* (no common name), which were both recorded in a patch of non-remnant RE 11.4.8

within the project site in 2017. Voucher specimens of these species were submitted to the Queensland Herbarium in 2018. It should be noted that the centre of the HRA, which would represent the point location of vouchered specimens does not align with the actual location of these species as recorded in 2017. It is anticipated that this is due to the Herbarium's policy of reducing the accuracy of the publicly available latitude and longitude co-ordinates for conservation significant species. No high risk areas for protected plants are mapped within the ETL study area or water release/extraction infrastructure area.

4.4.6 Essential habitat

Remnant and regrowth vegetation located centrally within the project site is mapped as essential habitat for *Bertya pedicellata* (Figure 6). This essential habitat is reportedly based on a record for this species. However, this record is likely to be erroneous, as habitat is not suitable for this species at this location and two other threatened species (discussed in Section 5.3) have since been recorded at this location.

Regrowth vegetation in the north of the ETL study area is mapped as essential habitat for the Ornamental Snake (*Denisonia maculata*). Mapped remnant and regrowth vegetation associated with the adjacent Dawson River and Banana Creek is also identified as essential habitat for the Ornamental Snake (Figure 6). This species is listed as vulnerable under both the EPBC Act and NC Act.

4.5 Matters of national environmental significance

4.5.1 EPBC Act listed TECs

The EPBC Act Protected Matters Report (Appendix B) listed five TECs, as defined under the EPBC Act, as potentially occurring within the database search area, namely:

- Brigalow (*Acacia harpophylla* dominant and codominant) (Brigalow TEC)
- Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions (Coolibah – Black Box Woodlands TEC)
- Poplar Box Grassy Woodland on Alluvial Plains¹ (Poplar Box Woodlands TEC)
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (SEVT TEC)
- Weeping Myall Woodlands.

All of these communities are listed as endangered under the EPBC Act. A number of REs mapped by the Queensland Government within the study area potentially contribute to some of these REs as highlighted in Table 3. The potential for these

¹ At the time of the EPBC Act Controlled Action Decision (EPBC Referral 2012/6547) the Poplar Box Grassy Woodland on Alluvial Plains TEC was not listed as a TEC under the EPBC Act and therefore is not considered a MNES for the Project. The Poplar Box Grassy Woodland on Alluvial Plains TEC is not discussed further within this report.

communities to occur within the study area (with the exception of the Poplar Box Grassy Woodland) are discussed in Section 5.2.1.

4.5.2 EPBC Act listed flora

Threatened flora²

Database searches (Appendix B), undertaken within a 25 km radius of the boundary of the project site, returned seven endangered and four vulnerable flora species listed under the EPBC Act² from the search area, as follows:

- King Bluegrass (*Dichanthium queenslandicum*) – endangered (EPBC Act), vulnerable (NC Act)
- Cossinia (*Cossinia australiana*) – endangered (EPBC Act and NC Act)
- *Cycas megacarpa* – endangered (EPBC Act and NC Act)
- *Solanum dissectum* – endangered (EPBC Act and NC Act)
- *Solanum johnsonianum* – endangered (EPBC Act and NC Act)
- *Xerothamnella herbacea* – endangered (EPBC Act and NC Act)
- Hairy-joint Grass (*Arthraxon hispidus*) – vulnerable (EPBC Act and NC Act)
- *Bertya opposens* – vulnerable (EPBC Act)
- *Dichanthium setosum* (no common name) – vulnerable (EPBC Act)
- Ooline (*Cadellia pentastylis*) – vulnerable (EPBC Act and NC Act).

These species, along with a description of their preferred habitat, and likelihood of occurrence within the project site and ETL study area are outlined in Appendix C. Conservation significant flora recorded or considered likely to occur in the project site and ETL study area are discussed in Section 5.3.

² At the time of the EPBC Act Controlled Action Decision (EPBC Referral 2012/6547) *Solanum dissectum* and *Solanum johnsonianum* were not listed as a threatened flora species under the EPBC Act and therefore are not considered as MNES for the Project. King Bluegrass was listed as vulnerable under the EPBC Act at the time of the Referral Decision, and has since been transferred to the endangered category, as such this species is considered a relevant MNES for the Project.

4.5.3 EPBC Act listed fauna

Threatened fauna³

Database searches (Appendix B), undertaken within a 25 km radius of the boundary of the project site, returned 26 threatened fauna species listed under the EPBC Act from the search area including 12 birds, 9 mammals and 5 reptiles, as follows. Threatened turtle species returned from database searches have been assessed by others and are therefore not assessed as part of this report.

Birds:

- Curlew Sandpiper (*Calidris ferruginea*) – critically endangered (EPBC Act), endangered (NC Act)
- Eastern Curlew (*Numenius madagascariensis*) – critically endangered (EPBC Act), endangered (NC Act)
- Australian Painted Snipe (*Rostratula australis*) – endangered (EPBC Act), and NC Act)
- Star Finch (southern) (*Neochmia ruficauda ruficauda*) – endangered (EPBC Act and NC Act)
- Southern Black-throated Finch (*Poephila cincta cincta*) – endangered (EPBC Act and NC Act)
- Red Goshawk (*Erythrotriorchis radiatus*) – endangered (EPBC Act), and NC Act)
- Black-breasted Button-quail (*Turnix melanogaster*) – vulnerable (EPBC Act and NC Act)
- Painted Honeyeater (*Grantiella picta*) – vulnerable (EPBC Act and NC Act)
- Squatter Pigeon (southern) (*Geophaps scripta scripta*) – vulnerable (EPBC Act and NC Act)
- White-throated Needletail (*Hirundapus caudacutus*) – vulnerable (EPBC Act and NC Act)
- Grey Falcon (*Falco hypoleucos*)- vulnerable (EPBC Act and NC Act)
- Diamond Firetail (*Stagonopleura guttata*) – Vulnerable (EPBC Act and NC Act)

³ At the time of the EPBC Act Controlled Action Decision (EPBC Referral 2012/6547), the Curlew Sandpiper, Eastern Curlew, Painted Honeyeater, White-throated Needletail, Grey Falcon, Ghost Bat, Yellow-bellied Glider and Greater Glider (southern and central) were not listed as threatened fauna under the EPBC Act and therefore are not considered as listed threatened species MNES for the Project. The Curlew Sandpiper, Eastern Curlew, and White-throated Needletail were listed as migratory species at the time of the EPBC Act Controlled Action Decision, as such are still considered MNES in terms of migratory species. The Australian Painted Snipe was listed as vulnerable under the EPBC Act at the time of the Referral Decision, and has since been transferred to the endangered category, as such this species is considered a relevant MNES for the Project.

Mammals:

- Northern Quoll (*Dasyurus hallucatus*) – endangered (EPBC Act)
- Corben’s Long-eared Bat (*Nyctophilus corbeni*) – vulnerable (EPBC Act and NC Act)
- Ghost Bat (*Macroderma gigas*) – vulnerable (EPBC Act and NC Act)
- Greater Glider (southern) (*Petauroides volans*) endangered (EPBC Act and NC Act)
- Greater Glider (*Petauroides volans*) – endangered (EPBC Act and NC Act)
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – vulnerable (EPBC Act)
- Koala (*Phascolarctos cinereus*) – endangered (EPBC Act), vulnerable (NC Act)
- Large-eared Pied Bat (*Chalinolobus dwyeri*) – vulnerable (EPBC Act and NC Act)
- Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*) – vulnerable (EPBC Act and NC Act)

Reptiles:

- Collared Delma (*Delma torquata*) – vulnerable (EPBC Act and NC Act)
- Dunmall’s Snake (*Furina dunmalli*) – vulnerable (EPBC Act and NC Act)
- Grey Snake (*Hemiaspis damelii*) – Endangered (EPBC Act and NC Act)
- Ornamental Snake (*Denisonia maculata*) – vulnerable (EPBC Act and NC Act)
- Yakka Skink (*Egernia rugosa*) – vulnerable (EPBC Act and NC Act)

A description of the preferred habitat of these species and an assessment of the likelihood of occurrence within the project site and ETL study area is outlined in Appendix D. Conservation significant fauna recorded or considered likely to occur in the project site and ETL study area are discussed in Section 6.3.

Migratory fauna

Database searches (Appendix B) returned 14 additional birds listed as migratory under the EPBC Act as potentially occurring in the search area. A description of the preferred habitat of these species and an assessment of the likelihood of occurrence within the project site and ETL study area is outlined in Appendix D.

A number of species listed under the marine provisions of the EPBC Act were also identified in database searches (Appendix B). However, no marine habitats or marine areas occur within 25 km of the project site, therefore, these species have not been considered further.

4.6 Matters of state environmental significance

4.6.1 Regulated vegetation

The majority of vegetation mapped within the project site and ETL study area is identified as non-remnant (i.e. Category X). There is one area of remnant

vegetation in the central portion of the project site that supports remnant endangered (RE 11.4.1) and remnant of concern (RE 11.4.2) vegetation. This polygon is located between two stream order 1 drainage lines as illustrated on Figure 6.

A number of small patches of remnant and regrowth mixed polygons of REs 11.4.8/11.4.9/11.4.1 are also mapped within or adjacent to the ETL study area (Figure 6).

4.6.2 NC Act listed flora

In addition to conservation significant flora listed under the NC Act that are also listed as threatened under the EPBC Act (refer Section 4.5.2), database searches (Appendix B) returned one endangered and one near threatened flora species listed solely under the NC Act from the search area, as follows:

- *Solanum elaeagnifolium* (no common name) – endangered
- *Bertya pedicellata* (no common name) - near threatened

These species, along with a description of their preferred habitat, and likelihood of occurrence within the project area are outlined in Appendix C. Conservation significant flora recorded or considered likely to occur in the project area are discussed in Section 5.3.

4.6.3 NC Act listed fauna

Threatened and near threatened fauna

In addition to conservation significant fauna listed under the NC Act that are also listed as threatened under the EPBC Act (refer Section 4.5.3), database searches (Appendix B) identified one vulnerable fauna species listed under the NC Act as occurring within the search area, Common Death Adder (*Acanthophis antarcticus*) – vulnerable.

A description of the preferred habitat of this species and an assessment of the likelihood of occurrence within the project areas are outlined in Appendix D. Threatened animals recorded or considered likely to occur in the project areas are discussed in Section 6.3.

Special least concern fauna

The Short-beaked Echidna (*Tachyglossus aculeatus*), listed as special least concern, was identified from database searches as occurring in the search area (Appendix B).

In addition, a number of special least concern migratory birds were also identified in database search results as occurring or potentially occurring in the 25 km radial search area, surrounding the project site (Appendix B). Special least concern animals recorded or considered likely to occur are outlined in Appendix D and discussed in Section 6.3.3.

4.7 Critical habitat

The project area is not within an area identified as Critical Habitat under the NC Act.

4.8 Protected areas

The project area does not form part of, or directly adjoin any protected areas (i.e. National Parks, Conservation Reserves, State Forests, etc.). The closest protected area is the Dawson Range State Forest, which is located approximately 14 km to the west. The project area is separated from this reserve by primarily cleared land.

4.9 Biodiversity Planning Assessment mapping

The DES has prepared a Biodiversity Planning Assessment (BPA) for the region. BPA mapping indicates that the majority of the project area does not support any significant biodiversity values (Figure 9). However, the polygon of mapped remnant endangered vegetation in the central portion of the project site is recognised as an area of state biodiversity significance and the mapped remnant RE 11.4.2 centrally within the project site and regrowth RE 11.3.1 in the south-east as well as RE 11.4.8/11.4.9a/11.4.1 in the far north of the ETL study area are mapped as being of regional significance (Queensland Herbarium Science and Technology 2018). No state or regional ecological corridors are mapped within the project area.

In the broader study area, vegetation to the west of the project site is also identified as contributing to state and regional ecological corridors that extends along the Dawson River and associated tributaries such as Banana Creek. Mt Ramsay is identified as being of state and regional biodiversity significance (Figure 9).

4.10 Previous studies in the region

Studies undertaken in association with development of Baralaba North Mine, located approximately 10 km north of the project site have been reviewed. There is no published information for any other projects within 25 km of the project site.

Baralaba North Continued Operation Project

Studies have been undertaken as part of the environmental approval process for the Baralaba North Continued Operations Project between 2011 and 2014. These surveys encompassed the 2,500 ha operational area and surrounding areas including the Dawson River, approximately 10 km north of the study area. The studies identified the following matters of environmental significance, as being present in the region:

- High Ecological Significance wetland
- Brigalow TEC, represented by Res 11.3.1 and 11.4.8
- Coolibah – Black Box woodland TEC, represented by RE 11.3.3
- EPBC Act and/or NC Act listed threatened fauna – Ornamental Snake, Squatter Pigeon (southern), Greater Glider and Short-beaked Echidna

- EPBC Act and/or NC Act listed migratory birds – Satin Flycatcher (*Myiagra cyanoleuca*), Caspian Tern (*Hydroprogne caspia*) and Glossy Ibis (*Plegadis falcinellus*) (Resource Strategies 2014a).

A number of near threatened bird and bat species were also identified during these studies; however, these have since been downgraded to least concern under the Queensland NC Act.

Baralaba Mine Haul Road Upgrade Works

An assessment of the operational Baralaba Mine Haul Road was undertaken in September/October 2014. This haul road extended from the Baralaba North Mine to the Baralaba Mine Train Load Out facility located approximately 30 km south of the project site on the Dawson Highway, approximately 3 km north-east of the township of Moura. The haul road is largely confined to the existing Moura-Baralaba Road reserve (except for a diversion to bypass the town of Baralaba) and dissects the eastern portion of the project site. The flora and fauna studies undertaken for this haul road upgrade project found the following matters to be present, although not within the current project area (Ecological Survey & Management 2014):

- Brigalow TEC, represented by Res 11.3.1 and 11.4.9
- EPBC Act and/or NC Act listed threatened flora – *Solanum dissectum* (no common name), *Solanum elachophyllum* (no common name), *Solanum johnsonianum* (no common name)
- EPBC Act and/or NC Act listed threatened fauna – Ornamental Snake.

The Brigalow Scaly-foot (*Paradelma orientalis*) and Little Bat (*Chalinolobus picatus*), listed as vulnerable and near threatened respectively at the time of the assessment were recorded throughout the haul road study area. However, these species have since been downgraded to least concern under the NC Act (Ecological Survey & Management 2014).

5 Flora Results

5.1 Overview

The majority of the project site was found to support large expanses of heavily cleared and disturbed areas that only support scattered, relic trees. There are also areas of regrowth vegetation in various stages of recovery following historic clearing. Historic clearing for cattle grazing and exploration activities (e.g. access tracks and drill pads) has resulted in fragmentation and isolation of regrowth and remnant vegetation within the study area.

Most communities in the project site are generally in a degraded state owing to ongoing cattle grazing and weed infiltration throughout the ground layer. Two patches of mid-mature woodland communities were found to have sufficient cover, height and area (i.e. greater than 5 ha) to be mapped as remnant vegetation within the project site. Remnant vegetation communities were also confirmed along the Dawson River and Banana Creek and on Mt Ramsay in the additional investigation area. The distribution of field-validated remnant vegetation in the study area is shown in Figure 10.

Three small patches of regrowth Brigalow vegetation were identified within the ETL study area. These are shown on Figure 11.

5.2 Vegetation communities

Ground-truthing surveys were undertaken to accurately assess the RE type, condition and ecological value of the vegetation proposed to be significantly disturbed by the project. The survey methodology was designed to ensure consistency with relevant State and Commonwealth guidelines, and vegetation communities were identified according to the Queensland Government's Regional Ecosystem Description Database (REDD) (Queensland Herbarium 2019).

The DES's information sheet, *How to Address Environmentally Sensitive Areas and Offset Requirements in an Application for an Environmental Authority for Resource Activities*, advises that the ground-truthing of ESAs and MSES, should be utilised over government mapping of these matters (DES 2018a). The remainder of this report, including the impact assessment, therefore discusses ground-truthed RE mapping shown on Figure 10, rather than government RE mapping.

5.2.1 EPBC Act listed TECs

The field-validated vegetation mapping identified communities that were consistent with two TECs listed under the EPBC Act as detailed below. The three other TECs (Poplar Box, Semi-evergreen Vine Thicket, Weeping Myall Woodlands) that were identified during the desktop searches were not present within the study area (based on field validated vegetation mapping).

Brigalow TEC

Areas of Brigalow vegetation were recorded within the project site and many of these patches, although not all necessarily meeting remnant status, exhibit the key diagnostic features and meet the condition thresholds of the EPBC Act listed

endangered Brigalow TEC. These patches are comprised of vegetation representing REs 11.3.1 and 11.4.9a and are shown on Figures 10 and 11. A total of 43.6 ha of Brigalow TEC has been identified in the study area including 0.9 ha within the proposed disturbance footprint of the project and a maximum of 0.45 ha (ETL Option 1 - 0.3 ha, ETL Option 2 - 0.4 ha) in the ETL study area (Figure 11).

Several small patches of vegetation that are characteristic of RE 11.4.8 high-value regrowth was recorded at various locations within or adjacent to the road reserve of the Moura Baralaba Road, within the ETL study area and on the eastern boundary of the project site. However, none of these patches were large enough to be considered a mappable entity under the VM Act (i.e. all <5 ha) and as such no areas of RE 11.4.8 are shown on Figure 10. Furthermore, none of the patches of RE 11.4.8 in the project area satisfy the diagnostic criteria and condition thresholds to be considered a component of the Brigalow TEC as they generally lacked Brigalow as a dominant component of the canopy.

Coolibah – Black Box Woodlands TEC

Three patches of Coolibah (*Eucalyptus coolabah*) dominated woodland vegetation (i.e. RE11.3.3) were found to satisfy the listing criteria for the Coolibah – Black Box Woodlands TEC in the project site (Figure 11). The south-western patch of this TEC has been cleared in the past but currently supports a relatively consistent projected canopy cover (32 to 42%) of mid-mature Coolibah. The ground layer is characterised by primarily hydrophilic flora species, indicating that the area holds water for extended periods of time. Overall weed cover is low and restricted to the groundcover layer, primarily on or in the vicinity of a farm access track that flanks the western edge of the patch. This patch therefore satisfies the condition listing criteria for this TEC. This TEC was observed to extend beyond the boundary of the project site into the additional investigation area, corresponding with the aerial signature (Figure 11).

The north-western patch of this community has also been cleared in the past. The community is a woodland to open woodland characterised by a canopy layer dominated by Coolibah with a cover ranging from 8 to 20%. The extent of weed infiltration is relatively low, but the density of infestation increases at the interface with the adjoining cleared and cultivated land. Overall, this community meets the cover, area and condition listing criteria of the Coolibah – Black Box Woodlands TEC (Figure 11) although fails to have the height and cover requirements to be mapped as remnant vegetation under Queensland's VM Act.

A linear regrowth patch of this TEC also occurs along a small drainage channel in the southern central portion of the project site. This patch is just large enough to meet the diagnostic criteria related to patch size and comprises a tree layer dominated by relatively large Coolibah, with cover of between 15 and 40%. The patch also supports a predominantly native understorey comprising Lignum (*Duma florulenta*), sedges and various aquatic grasses and herbs.

A total of 64.1 ha of Coolibah – Black Box Woodlands TEC has been confirmed and mapped within the project site (Figure 11). Table 4 provides an evaluation of how the patches, which have been mapped as TEC within the project site, meet the

diagnostic criteria and condition thresholds stipulated in the DAWE's listing advice for the TEC (TSSC 2011).

All areas of Coolibah – Black Box Woodlands TEC occur outside both the proposed disturbance footprint of the project and the ETL.

Vegetation represented by RE 11.3.3 that occurs along the Dawson River, Banana Creek and their tributaries was not assessed specifically for its TEC status, although some patches were clearly of a condition that would meet the TEC (i.e. approximately 8.4 ha), while others have the potential to meet the key diagnostic criteria and condition thresholds of the Coolibah – Black Box Woodlands TEC (i.e. approximately 428.7 ha).

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Table 4: Evaluation of key diagnostic criteria and condition thresholds for Coolibah – Black Box Woodlands TEC within the project site

TEC criteria	Evidence/Response for northern patch	Evidence/Response for southern patch	Evidence/Response for regrowth patch
Key diagnostic criteria			
Distribution is limited to the Darling Riverine Plains and the Brigalow Belt South bioregions.	Project site is located in the Brigalow Belt South bioregion		
Typically occurs on grey, self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands and stream levees.	Located on flat, dark brown-grey clays on broad alluvial flood plain of the Dawson River. Some very minor gilgai relief present in places.	Located on flat, dark grey-brown self-mulching clays on broad flood plains associated with the Dawson River to the west. Area under water during the survey undertaken in December 2017.	Located on mid grey-brown self-mulching clays on a narrow drainage corridor that held standing water during the survey undertaken in December 2017.
Tree canopy layer is present that shows: <ul style="list-style-type: none"> ▪ Coolibah (<i>Eucalyptus coolabah</i>) in the tree canopy ▪ Coolibah is typically dominant (i.e. ≥50% tree crown cover) ▪ Where Coolibah and Black Box (<i>Eucalyptus largiflorens</i>) co-occur, and they comprise the dominant canopy (i.e. ≥50% tree crown cover) ▪ Hybrids of Coolibah or Black Box are the dominant tree species. 	The sparse canopy is dominated by Coolibah, with Brigalow suppressed.	Coolibah forms the only species in the canopy of this patch. A low tree layer is present and is dominated by Coolibah, with associated Sally Wattle (<i>Acacia salicina</i>).	Coolibah dominates the low mid-dense tree layer, with Brigalow also present.
The mid or shrub layer, if present, is typically sparse or clumped and is of variable composition.	The shrub layer is comprised of isolated <i>Acacia</i> species, with	A very sparse shrub layer is present and is dominated by Coolibah, with Sesbania Pea	The shrub layer is mid-dense and dominated by Lignum with Scrub Boonaree (<i>Alectryon diversifolius</i>), Umbrella Wattle

TEC criteria	Evidence/Response for northern patch	Evidence/Response for southern patch	Evidence/Response for regrowth patch
	associated juvenile Coolibah also present.	<i>(Sesbania cannabina var. cannabina)</i> and Sally Wattle.	<i>(Acacia oswaldii)</i> and Wild Orange (<i>Capparis mitchellii</i>).
The ground layer is of variable composition and cover ranging from sparse to dense. Lifeforms typically comprise native graminoids, other herbs, chenopods and other low shrubs that are typically under 50 cm tall.	The ground layer is mid-dense (50-80% cover) dominated by Dirty Dora (<i>Cyperus difformis</i>), with associated/co-dominant Native Millet (<i>Panicum decompositum var. decompositum</i>), and associated Native Sensitive Plant (<i>Neptunia gracilis</i>), and associated/suppressed Pale Bog-rush (<i>Eleocharis pallens</i>), with associated exotic South African Pigeon Grass (<i>*Setaria sphacelata</i>) and suppressed Spiked Malvastrum (<i>*Malvastrum americanum var. americanum</i>). The ground cover ranged in height up to 70 cm, but typically 30 cm.	The mid-dense to dense (50-100% cover) ground layer was dominated by Pale Bog-rush and associated Nardoo (<i>Marsilea drummondii</i>) and Native Millet and a range of other native species (refer Appendix F). The ground cover ranged in height up to 40 cm, but typically 30 cm.	The ground layer is densely populated with Pale Spike-sedge, <i>Eleocharis plana</i> (no common name), Lignum and Hairy Nardoo (<i>Marsilea hirsuta</i>) and ranged in height from 10 cm to 40 cm.
Condition thresholds			
<i>Patch size:</i> minimum patch size of 5 ha.	33.2 ha	16.6 ha	6.0 ha
<i>Tree canopy layer:</i> crown cover of trees in the patch must be: <ul style="list-style-type: none"> ▪ ≥8%; and ▪ Coolibah and/or Black Box in the tree canopy must be present in the patch that are either: 	The patch that has been mapped as TEC within the project site has a crown cover of canopy trees ranging between 8 and 20% (averaging 10%). Mature Coolibah was not abundant within this patch, however, many of the mature	This patch comprised a canopy cover ranging between 32 and 42%. Most of the trees within this patch were found to be multi-leadered. Plot-based transects that were conducted within this	The tree canopy of this patch ranged in cover, although was generally above 15%. Coolibah dominated the canopy, which included a number of large trees of ≥55 cm DBH. Plot-based transects recorded

TEC criteria	Evidence/Response for northern patch	Evidence/Response for southern patch	Evidence/Response for regrowth patch
<ul style="list-style-type: none"> ○ Mature trees with a main stem that has a diameter at breast height (dbh) of ≥ 30 cm; or ○ Hollow-bearing trees (live or dead); or ○ Coppiced trees with a main stem that has a dbh of ≥ 20 cm. 	trees that are present in the canopy (i.e. the tree 1 layer), exceeded 30 cm dbh.	community recorded an average of 43 main stems of greater than 20 cm dbh per hectare.	approximately 30 trees/ha with a DBH greater than 30 cm.
<p><i>Ground layer:</i> 10% or more of the ground cover comprises native graminoids, other herbs, chenopods and/or native low shrubs (i.e. woody plants typically less than 50 cm tall).</p>	The ground layer is mid-dense (50-80%) cover, dominated by the graminoid Dirty Dora with associated Native Sensitive Plant (a herb or small shrub). Exotic species only form an associated or suppressed component of the ground layer.	The ground layer is comprised of a mid-dense to dense (65 to >85%) cover of predominantly native species and dominated by the graminoid Pale Bog-rush (50-74%), with associated Nardoo (5-24%), a native aquatic fern.	Approximately 62% of the ground layer is vegetated with native species, comprising a mid-dense cover of sedges, Lignum, Hairy Nardoo and Sesbania Pea.
<p><i>Exotic species:</i> The percentage cover of non-native perennial plants species in the ground layer does not exceed the percentage cover of native plant species (annual or perennial).</p>	The ground layer composition is predominantly comprised of native species and these form either a dominant or associate/co-dominant cover. The two most commonly occurring exotic species, South African Pigeon Grass and Spiked Malvastrum, form only associated or suppressed components of the ground layer and not more than 5% cover within this stratum.	Native species form the dominant composition of the mid-dense to dense ground layer (i.e. 50-100% cover). Whereby, each exotic species generally only occurs as one or two individuals or comprises less than 5% cover of the patch.	Exotic species comprise approximately 12% of the vegetated ground layer, with native species comprising the remainder of the vegetation.

5.2.2 listed regional ecosystems

Queensland Government (Version 11.0) RE mapping identifies two polygons of remnant vegetation within the project site (Figure 6). These polygons adjoin each other with the larger of the two polygons identified as supporting remnant of concern vegetation (RE 11.4.2). The smaller polygon is identified as remnant endangered vegetation (RE 11.4.1).

Field-validated mapping of REs within the project site was found to be inconsistent with the Queensland Government mapping, wherein neither of the two mapped REs were recorded within the project site. Instead, two alternate REs were recorded, REs 11.5.9 and 11.5.15 (Table 5 and Figure 10). The Queensland Government mapped polygon was found to be comprised of mixed complex eucalypt woodland on unconsolidated, deeply weathered sands on the edge of a broad tertiary plateau (RE 11.5.9 - Least Concern). A small, fragmented patch of regrowth comprising vine thicket generalists was identified in the area that has been identified as RE 11.4.1 by the Queensland Government. However, this patch does not occur on deeply weathered clay plains and therefore can not be representative of RE 11.4.1, but instead was more representative of RE 11.5.15.

A patch of Coolibah woodland (RE 11.3.3) was also recorded in the south-western corner of the project site and extended into the additional investigation area. This community is currently mapped as high-value regrowth vegetation on the Queensland Government's vegetation mapping (Section 4.4.1). However, data collected in the field indicates this patch has the height and cover requirements to be mapped as remnant vegetation.

Vegetation that was representative of high-value regrowth RE 11.3.3a was recorded to the south of the patch of remnant eucalypt woodland (RE 11.5.9). This community, which was moderately to highly fragmented by historic clearing and was associated with a drainage basin that holds water for extended periods. As such, species such as Black Tea Tree (*Melaleuca bracteata*) and Lignum were prevalent. Field mapping of high-value regrowth vegetation does not correspond with the extent of Queensland Government mapping in the project site.

A number of additional small patches of regrowth vegetation are scattered throughout the project site and correspond with a number of different RE types, including REs 11.3.1, 11.3.3, 11.4.8, 11.4.9a and 11.5.15. However, these patches are too small to be considered mappable entities in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland V4.0, V5.0 and V5.1* (Neldner et al. 2020; 2019; 2017b). Nonetheless some of these patches may contribute to habitat for significant species or TECs and have been included in mapping for protected matters where relevant.

The extent and type of remnant and high-value regrowth REs occurring within the ETL study area was found to be fairly consistent with Queensland Government mapping, particularly in the general location, regrowth nature and broad vegetation group of REs mapped (Figures 6 and 10).

Remnant and high-value regrowth communities identified within the project site and ETL study area are discussed in the following sections and outlined in Table 5.

Remnant and regrowth vegetation mapping for the additional investigation area is shown on Figure 10. The vegetation associated with the Dawson River and Banana Creek was found to generally align with the Queensland Government remnant mapping, although somewhat less of concern vegetation was found to be present in these areas.

The vegetation on Mt Ramsay was found to be significantly divergent from Queensland Government mapping and included a large area of vegetation that does not currently align with an RE listed in the REDD (Queensland Herbarium 2019).

The REs in the additional investigation area are summarised in Table 5 and descriptions provided in Appendix E. High-value regrowth is not a listed MSES under the EO Act, however, may provide habitat for values for other MSES and MNES.

Table 5: Field-validated remnant and high-value regrowth regional ecosystems in the study area

RE Code	Short Descriptions (Queensland Herbarium 2019)	VM Act Status	Biodiversity Status	EPBC Act Status	Remnant (high-value regrowth) Area (ha)
Project site					
11.3.3/a	<i>Eucalyptus coolabah</i> woodland on alluvial plains	Of concern	Of concern	Endangered – Portions of vegetation within the project site represent the Coolibah – Black Box Woodlands TEC	16.6 (45.9)
11.5.9	<i>Eucalyptus crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains and/or remnant surfaces	Least concern	No concern at present	Not listed	8.7 (5.3)
11.5.15	Semi-evergreen vine thicket on Cainozoic sand plains and/or remnant surfaces	Least concern	Endangered	Not listed - Vegetation within the project site does not represent the SEVT TEC	1.1 (0.0)
Water release/extraction infrastructure					
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least concern	No concern at present	Not listed	0.4 (0.0)
ETL study area					
11.4.9a	<i>Acacia harpophylla</i> , <i>Lysiphyllum carronii</i> +/- <i>Casuarina cristata</i> open forest to woodland	Endangered	Endangered	Endangered – Patches of this RE represent the Brigalow TEC	0.0 (7.6)
Additional investigation area					
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	Endangered	Endangered	Endangered – Patches of this RE represent the Brigalow TEC	23.5 (1.5)
11.3.3	<i>Eucalyptus coolabah</i> woodland on alluvial plains	Of concern	Of concern	Endangered – a number of patches potentially contribute to the Coolibah-Black Box Woodlands TEC	344.6 (71.7)
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains	Of concern	Of concern	Not listed	15.5 (0.0)
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least concern	No concern at present	Not listed	286.5 (0.0)

RE Code	Short Descriptions (Queensland Herbarium 2019)	VM Act Status	Biodiversity Status	EPBC Act Status	Remnant (high-value regrowth) Area (ha)
11.3.27	Freshwater wetlands	Least concern	Of concern	Not listed	7.9 (0.0)
11.7.2x3 [#]	<i>Acacia rhodoxylon</i> tall shrubland to scrub on Cretaceous igneous rocks	Least concern	No concern at present	Not listed	107.0 (0.0)
11.9.1	<i>Eucalyptus cambageana</i> woodland to open forest with <i>Acacia harpophylla</i> on fine-grained sedimentary rocks	Endangered	Endangered	Not listed - Vegetation within the additional investigation area does not represent the Brigalow TEC	5.7 (0.0)
11.12.1	<i>Eucalyptus crebra</i> woodland on igneous rocks	Least concern	No concern at present	Not listed	81.2 (0.0)
11.12.4a	Semi-evergreen vine thicket with open patches of <i>Acacia fasciculifera</i> , <i>Archidendropsis thozetiana</i> , <i>Pleigynium timorensis</i> and various other species	Least concern	No concern at present	Not listed	96.5 (0.0)

[#] This RE does not currently align with a RE listed in the REDD (Queensland Herbarium 2019) and has been recommended by the Brigalow Belt Bioregion mapping co-ordinator (Queensland Herbarium) as an interim descriptor for the corresponding vegetation that was recorded on Mt Ramsay.

The below descriptions pertain to field validated RE's within the study area, ETL and water release/extraction infrastructure footprint. While there are no mapped areas of remnant RE 11.3.1 within these areas, a description is included as three mapped non-remnant entities form a component of the Brigalow TEC within the study area (Figure 11).

RE 11.3.1 - Brigalow woodland

Three small patches of vegetation that are characteristic of RE 11.3.1 were recorded on the eastern edge of the broad floodplain to the east of Banana Creek and the Dawson River, within the project site. None of these patches are large enough to be considered a mappable entity under the VM Act (i.e. all <5 ha) and as such are not shown on Figure 10. However, they have been discussed in this section as each of these three patches satisfy the diagnostic criteria and condition thresholds to be considered a component of the Brigalow TEC (Figure 11).

The canopy layer was primarily comprised of Brigalow with Coolibah occurring sporadically within two of the three patches. The median height of the canopy layer is variable across all three patches but averages at 11 m (range 9 to 13 m) and a cover intercept ranging from 22 to 40%. There were few mature trees in the canopy layer. Species such as Red-flowered Bauhinia (*Lysiphyllum carronii*), Whitewood (*Atalaya hemiglauca*) and/or Umbrella Wattle there were infrequently recorded sub-canopy layer. The understorey was comprised of a very sporadic cover of Scrub Boonaree and, less commonly, juvenile upper strata species (Photo 1).

The composition of the groundcover layer was highly variable across all three patches due to the influence of sustained inundation associated with large gilgai and/or the channels that dissect these patches. Common species included native species typically associated with wetland environments, particularly Bog-rushes (*Eleocharis spp.*), *Cyperus spp.*, Sesbania Pea and Nardoo. Infiltration and/or dominance of introduced species was relatively low with species such as Buffel Grass (**Cenchrus ciliaris*), Awnless Barnyard Grass (**Echinochloa colona*) and Black Pigweed (**Trianthera portulacastrum*) recorded in the ground layer.

The condition of these patches was considered to be low due to their high use by cattle as cattle camps.



Photo 1: Vegetation representing high value regrowth RE 11.3.1 in the project site

RE 11.3.3 - Coolibah woodland

A patch of remnant RE 11.3.3 was recorded on the floodplain between the 1st and 2nd order drainage lines within the south-western portion of the project site and Dawson River to the west (Figure 10). This remnant patch accounts for 16.6 ha within the project site.

The canopy layer was entirely comprised of Coolibah with a median height of 15 m (range 12 to 18 m) and a cover intercept ranging from 25 to 40%. There were few mature trees in the canopy layer and no hollow-bearing specimens were observed. Apart from the occasional Sally Wattle there were no other species in the canopy or sub-canopy layers. The understorey was comprised of regenerating Coolibah and Sally Wattle.

The ground layer was dominated by native species typically associated with wetland environments, particularly Pale Spike-sedge and Nardoo. Infiltration of weed species was relatively low with species such as Budda Pea (**Aeschynomene indica*), *Awnless Barnyard Grass, *South African Pigeon Grass and Blue Panic (**Panicum antidotale*) recorded in the groundcover layer, particularly at the interface with adjoining paddocks and cultivated areas. Native grasses such as Yabilla Grass (*Panicum queenslandicum*), Brown Beetle Grass (*Diplachne fusca* subsp. *fusca*) and Cup Grass (*Eriochloa crebra*) were also recorded throughout the groundcover layer.

Overall, the community appears to have experienced a history of clearing and/or thinning given that many of the trees present are multi-leadered from near the base (Photo 2).



Photo 2: Vegetation representing remnant RE 11.3.3 in the project site

Two patches of high-value regrowth Coolibah woodland to open woodland, totalling 39.2 ha in area, were identified in the north-western and southern portions of the project site. The composition of these patches was highly variable, wherein the north-west patch is located on a broad floodplain with variable topographical relief. This has resulted in a variable composition of the groundcover due to the variation in the level and duration of inundation during the wet season and/or high flow events (Photo 3). Despite this, the composition of the canopy layer is limited to Coolibah and has a median height of 13 m and cover intercept ranging from 15 to 40%.



Photo 3: Vegetation representing high value regrowth RE 11.3.3 in the north-western portion of the project site

The southern patch is associated with a shallowly incised 1st order stream that drains the eastern edge of a broad floodplain. The canopy layer is exclusively comprised of even-aged regrowth Coolibah that has a median height of 14 m and cover intercept ranging from 20 to 45%. The basin of the stream channel was commonly dominated by dense thickets of Lignum and associated native aquatic grasses and herbs (Photo 4). All three of these patches satisfy the diagnostic

criteria and condition thresholds to be considered a component of the Coolibah TEC.



Photo 4: Vegetation representing high value regrowth RE 11.3.3 in the southern portion of the project site

RE 11.3.3a – Black Tea Tree low woodland

A patch of high-value regrowth RE 11.3.3a was mapped within a 1st order stream on the eastern edge of the broad floodplain in the southern portion of the project site (Figure 10). A total of 6.7 ha of this vegetation type occurs within the project site.

The canopy layer was primarily comprised of Black Tea Tree and had a median height of 8.5 m (range 7 to 10 m) and a cover intercept ranging from 30 to 50%. Coolibah was recorded infrequently within the canopy layer, but more commonly as scattered emergent specimens (median height 14 m).

Dense thickets of Lignum were recorded throughout the patch but primarily within deeper sections of the drainage corridor (Photo 5). Woody vegetation was generally limited in these areas (Photo 6). The groundcover layer was primarily composed of native aquatic grasses and herbs, with exotic species mostly limited to the edges of the patch.

Overall, the community appears to have experienced a history of clearing and/or thinning given that many of the trees present are multi-leadered from near the base.



Photo 5: Vegetation representing high-value regrowth RE 11.3.3a in the project site



Photo 6: Vegetation representing high-value regrowth RE 11.3.3a in the project site

RE 11.3.25 – Queensland Blue Gum riparian woodland

This community occurs only within the far western end of the proposed water release/extraction infrastructure area (Figure 10). This area accounts for approximately 0.4 ha of this type of least concern vegetation.

This community was typically comprised of Queensland Blue Gum (*Eucalyptus tereticornis*), Carbeen (*Corymbia tessellaris*) and associated Coolibah in the canopy with an average median height of 25 m and cover ranging from 30 to 50% (Photo 7).

The community has been negatively influenced by weed infiltration into the groundcover layer, primarily by Green Panic (**Megathyrsus maximus var. pubiglumis*).



Photo 7: Vegetation representing remnant RE 11.3.25 along the banks of the Dawson River

RE 11.4.9a – Brigalow woodland

Two patches of vegetation that are characteristic of high-value regrowth RE 11.4.9a occur in the ETL study area and one smaller patch was recorded in the south-eastern portion of the project site. Two of these patches were not large enough to be considered a mappable entity under the VM Act (i.e. both <5 ha) and as such are not shown on Figure 10. However, they have been discussed in this section as all three patches satisfy the diagnostic criteria and condition thresholds to be considered a component of the Brigalow TEC. The largest of these patches located in the far north of the ETL study area is approximately 7.6 ha (Figure 10).

The canopy layer of the two patches within the ETL study area was primarily comprised of Brigalow with Dawson River Gum and/or Red-flowered Bauhinia occurring sporadically. The median height of the canopy layer was typically 13 m (range 11 to 17 m) and a cover intercept ranging from less than 5 to 20%. The canopy layer in the southern patch is representative of the ecologically dominant layer (Photos 10 and 11).

The sub-canopy within these patches had a median height of 9 m and was comprised of Brigalow with associated Red-flowered Bauhinia, Queensland Bottle Tree (*Brachychiton rupestris*) and/or Scaly Bark (*Acacia fasciculifera*). The sub-canopy in the northern patch was representative of the ecologically dominant layer with a cover intercept ranging from 20 to 70% (average 30%).

The understorey of both patches in the ETL study area was variously comprised of a very sporadic cover of Scrub Boonaree, juvenile upper strata species, Yellowwood (*Terminalia oblongata* subsp. *oblongata*), Wild Lime (*Citrus glauca*) and/or (*Ehretia membranifolia*) Peach Bush.

The composition of the groundcover layer was also highly variable across both patches due to the influence of large gilgai and/or braided channels that dissect these patches. Native species were prevalent within the denser stands and gilgai in the northern patch, whereas exotic grasses were prevalent in the southern patch.



Photo 8: Vegetation representing high-value regrowth RE 11.4.9a in the ETL study area (northern patch)



Photo 9: Vegetation representing high-value regrowth RE 11.4.9a in the ETL study area (southern patch)

The patch of vegetation within the project site represented an even-aged regrowth cohort associated with a broad depression within a 1st order stream. The vegetation appears to have been cleared historically but allowed to regenerate. The patch is used as a cattle camp.

The canopy layer was comprised entirely of Brigalow with a median height of 10 m and cover intercept ranging from 50 to 60%. A sub-canopy was primarily lacking, while the very sparse shrub layer was limited isolated specimens of Klunkerberry and Nipan (*Capparis lasiantha*) (Photo 12). The groundcover was primarily comprised of exotic grasses, including *Green Panic, *Buffel Grass and Sabi Grass (**Urochloa mosambicensis*).



Photo 10: Vegetation representing high-value regrowth RE 11.4.9a in the project site

RE 11.5.9 – Mixed complex woodland

One polygon of remnant and one polygon of regrowth mixed complex woodland (RE 11.5.9) on deeply weathered sands occurs in the project site, comprising an area of approximately 8.7 ha and 5.3 ha respectively (Figure 10).

The remnant community supports a canopy layer consisting of Long-fruited Bloodwood (*Corymbia clarksoniana*), Carbeen and Poplar Box (*Eucalyptus populnea*) with a median height of 16 m (range 13 to 21 m) and a cover intercept ranging from 20 to 30% (Photo 13). The sub-canopy layer was primarily comprised of juvenile canopy species.

The shrub layer was typically comprised of Quinine Bush (*Petalostigma pubescens*), Red Ash (*Alphitonia excelsa*), Bitterbark, Wilga and Klunkerberry. Vine thicket generalists were more frequently encountered in the north-western extent of the patch near the ecotone with a small patch of RE 11.5.15.

The ground layer was primarily comprised of a mixture of exotic and native grasses (Figure 10) including *Buffel Grass, *Green Panic, Red Natal Grass (**Melinis repens*), Dark Wiregrass (*Aristida calycina* subsp. *calycina*) and Black Speargrass (*Heteropogon contortus*).

This remnant vegetation community was found to be moderately intact although the prevalence of stumps indicates that specific species have been selectively harvested and removed from the patch. This community is currently heavily grazed by cattle and as a result, exotic grasses and environmental weeds occur throughout the ground layer.

The regrowth community, which is located to the west of the remnant patch, has been markedly fragmented by historic clearing and thinning and failed to satisfy the cover requirements to be mapped as remnant vegetation and has been mapped as high-value regrowth vegetation (Photo 14 and Figure 10).



Photo 11: Vegetation representing remnant RE 11.5.9 in the project site



Photo 12: Vegetation representing high-value regrowth RE 11.5.9 in the project site

RE 11.5.15 – Semi-evergreen vine thicket

A small patch of moderately to markedly fragmented semi-evergreen vine thicket was recorded on the north-western edge of the mixed complex woodland in the southern portion of the project site. The patch, which is less than one hectare in area, subsists on deeply weathered sands and has been impacted by historical clearing and weed infiltration.

The canopy layer is limited to a very sparse distribution of Queensland Bottle Tree and associated Pegunny (*Lysiphyllum hookeri*) and has a median height of 10 m and canopy cover of less than 10%. The sub-canopy is the ecologically dominant layer and was commonly comprised of Lemon Aspen (*Planchonella cotinifolia* subsp. *pubescens*), Pegunny, Axebreaker (*Coatesia paniculata*), Narrow-leaved Backhousia (*Backhousia angustifolia*), Bird's Eye (*Alectryon connatus*), Small-leaved Scrub Ironbark (*Bridelia leichhardtii*), Stiff Denhamia (*Denhamia oleaster*) and Small-leaved Ebony (*Diospyros humilis*) (Photo 15). The sub-canopy layer had a median height of 5.5 m and cover intercept ranging from 30 to 80%.

The shrub layer was commonly comprised of Klunkerberry, *Acalypha eremorum* (no common name), Mock Orange (*Murraya ovatifoliata*), Scrub Hovea (*Hovea longipes*), Narrow-leaved Bumble (*Capparis loranthifolia*) and sub-canopy species.

The groundcover layer was primarily dominated by *Green Panic.

This RE contributes to the EPBC Act listed SEVT TEC, however, the vegetation within the project site was found to be small and fragmented (<1 ha) and does not represent the TEC.



Photo 13: Vegetation representing remnant RE 11.5.15 in the project site

Wetland vegetation communities

RE 11.3.3 is recognised as a floodplain wetland in the REDD. Two patches of this community are mapped as vegetation management wetlands in the project site. These communities are associated with the floodplain to the east of the Dawson River. The predominance of hydrophilic species, namely Pale Spike-sedge and Nardoo, indicates that this community holds water for extended periods of time. The largest patch of this community in the project site has also been mapped by the Queensland Government as vegetation management wetland and a HES wetland (Figure 8). The Queensland Government mapped boundaries of each of these types of wetlands differs slightly and also differs slightly with the on-ground field-validated remnant RE mapping, which are shown in Plate 1.

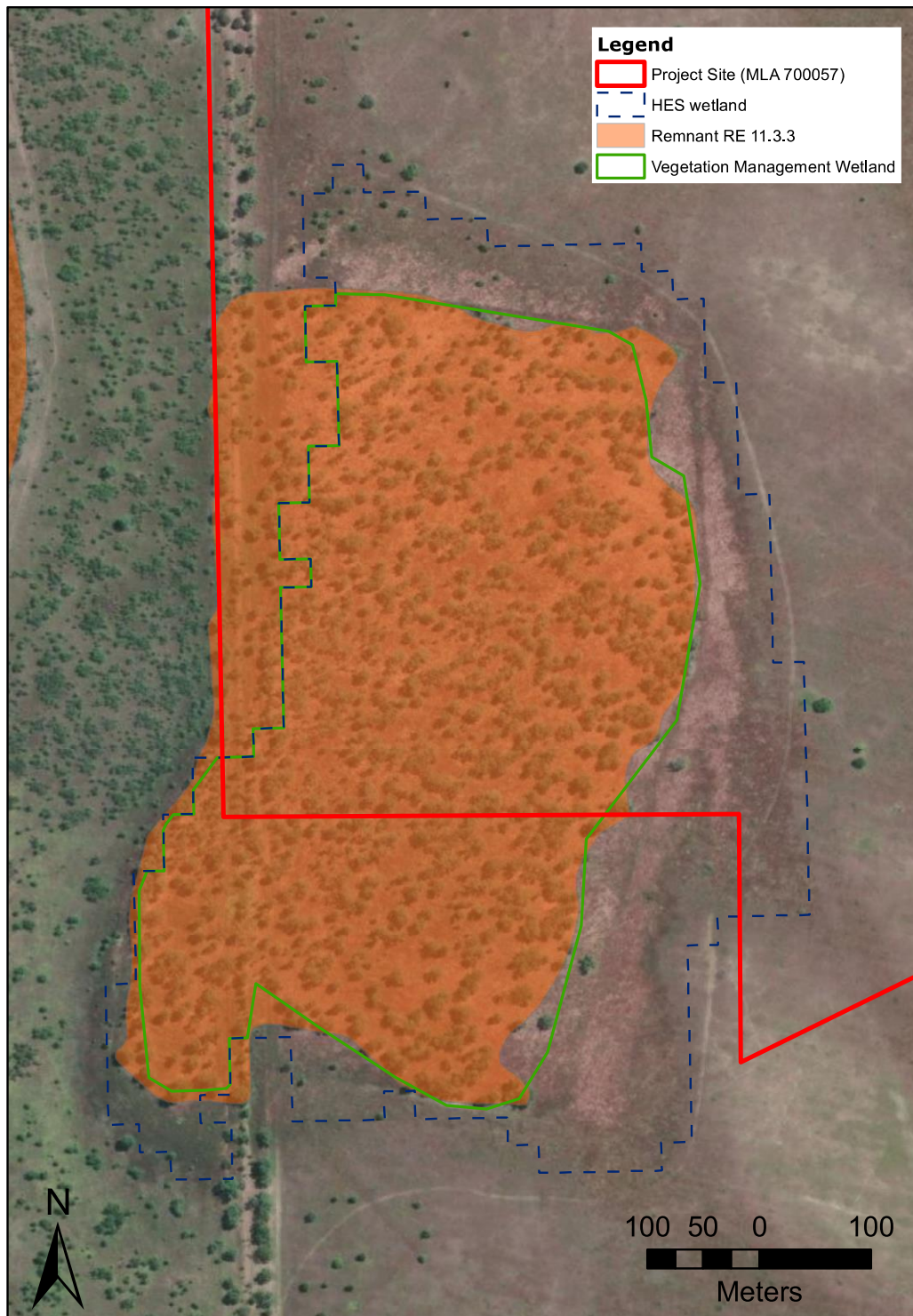


Plate 1: Remnant RE 11.3.3 and MSES wetland mapping in the south-west of the project site

5.3 Flora species

A total of 362 flora species were recorded in the project area (comprising the project site, proposed road realignment, water extraction/release infrastructure corridor and ETL study area) during the field surveys, representing 87 families and 234 genera. The species inventory included 56 introduced species, which account for 15.5% of the total number of flora species recorded. A list of the flora species recorded during the field surveys is presented in Appendix F.

Two threatened flora species were recorded in the study area:

- *Xerothamnella herbacea*, listed as endangered under the EPBC Act and NC Act
- *Solanum elaeagnifolium*, listed as endangered under the NC Act.

Records of these species and potential habitat within the study area are discussed further in the following sections.

Based on review of database search results and habitat identified within the study area, an assessment of the likelihood of other Commonwealth or State listed threatened species occurring has been undertaken, and is provided in Appendix C. This assessment identified that it is unlikely that any other significant flora species occur within the study area.

5.3.1 *Xerothamnella herbacea*

Species overview

Xerothamnella herbacea is listed as endangered under both the EPBC Act and the NC Act.

The listing advice for this species indicates that it is known from two sites north east of Chinchilla, a single record from near Theodore and a record near Yelarbon east of Goondiwindi, Queensland (TSSC 2008b). However, large populations of this species have been recorded within the Moura and Biloela regions in recent years (pers comms, Chris Hansen, February 2019). This species occurs in Brigalow dominated communities in shaded situations, often in leaf litter and is often associated with gilgais (shallow ground depressions). Soils are generally heavy, grey to dark brown clays (TSSC 2008a).

Presence and habitat in the project area

PRESENT (Figure 12; Appendix F)

This species was recorded in 10 locations within a fragmented and considerably degraded patch of non-remnant Dawson River Gum scrubby open woodland (RE 11.4.8) in the central eastern portion of the project site (Figure 12). This species was recorded during the late dry season survey (December 2017) following moderate rainfall totals delivered during spring storms prior to the survey.

The number of individuals present at each location was low and ranged from one individual to around 20 individuals (Photo 1; Figure 12). In some instances, it was difficult to discern discrete individuals due to the entwining nature of the species, but approximately 90 specimens were recorded overall. The woodland community was markedly fragmented with dead stags common throughout the canopy layer. The shrub layer was comprised of vine thicket species such as Scrub Boonaree, Stiff-leaved Denhamia, Wild Lime and Wallaby Apple (*Pittosporum spinescens*). Cattle grazing was prevalent and an ongoing disturbance throughout the area, which has led to the fragmentation of the shrub layer and weed infiltration throughout much of the ground layer. Some of the *X. herbacea* individuals recorded in the field had been grazed by cattle but appeared to be regenerating (Photo 17).

There is potential for a mixed community of RE 11.3.1/11.3.3 along Banana Creek in the south of the additional investigation area to support this species (Figure 10). However, this species was not recorded in this habitat despite extensive searches in this area and this area is located outside of the disturbance footprint.



Photo 14: *Xerothamnella herbacea* recorded in the project site



Photo 15: Grazed *Xerothamnella herbacea* plants recorded in the project site

5.3.2 *Solanum elachophyllum*

Species overview

Solanum elachophyllum is listed as endangered under the NC Act. It is not listed under the EPBC Act.

Solanum elachophyllum is a perennial sub-shrub with underground rhizomes that can send up more or less shoots depending on seasonal conditions (Fensham et al. 2017).

The species grows on fertile cracking-clay soils primarily in Brigalow habitats but has also been known to occur in vegetation types which include Napunyah (*Eucalyptus thozetiana*) woodland, Brigalow woodland to open forest with an understorey of Wilga and Belah (*Casuarina cristata*), Southern Bonewood (*Macropteranthes leichhardtii*) thicket, Dawson River Gum woodland with Narrow-leaved Ironbark (*Eucalyptus crebra*) and *Eucalyptus tenuipes* (Bean 2004; CSIRO 2016).

A recent unpublished study by Fensham et al. proposes the species has undergone a 96.5% decline in all remnant Brigalow habitat in Queensland. This study estimates that the current population within all remnant Brigalow habitats is approximately 3,049,000 individuals (and 2,378,000 in remnant Brigalow habitat with >50% cover, i.e. viable long term habitat) occupying an area of 44,200 ha at an average density of 68.98 individuals per hectare (Fensham et al. 2017).

Presence and habitat in the project area

PRESENT (Figure 12; Appendix F)

Two discreet populations of *Solanum elachophyllum* were recorded from within the project area, one within the central-east portion of the study area and the other in the northern portion of the ETL study area.

Three sub-populations were recorded from the central-east study area population in the same patch of non-remnant Dawson River Gum woodland (RE 11.4.8) as *Xerothamnella herbacea* in the project site (Photo 3; Figure 12). This population was recorded during the dry season surveys where the unseasonably high rainfall in the region prior to the surveys was sufficient to encourage growth of this seasonal resprouter. The number of individuals within each sub-population was 26, 17 and 46. During the additional survey carried out in March 2018, an increase in the number of individuals present within each population to 37, 23 and 57 was recorded respectively.

As noted in Section 5.3.2, the woodland community where this species was recorded was markedly fragmented, has been at least partially cleared or trees selectively poisoned or ring-barked in the past and is exposed to ongoing cattle grazing. The *Solanum elachophyllum* specimens were recorded as growing in a patch of native groundcover species within the patch (Photo 17), but amongst *Buffel Grass near the base of native shrubs in the population at the edge of the patch (Photo 18). While the habitat this species was recorded within is considered

to be of poor quality due to the extent of historic disturbance, cattle grazing and exotic ground cover (Photo 4), the plants were found to be good vigour.

The ETL study area population was recorded in regrowth Brigalow woodland (RE 11.4.9a). Approximately 42 individuals were counted across three sub-populations at this location, each occupying very small areas of between 1 and 10 m². This community was characterised by a moderately fragmented even-aged cohort of regenerating Brigalow, with Red-flowered Bauhinia, Yellowwood and very occasional Dawson River Gum. *Buffel Grass was common in the groundcover layer, although native grasses, herbs, sedges and aquatic species were also observed and given the small size of the patch the community was considered to have reasonable species richness. Meandering braided channels in cracking clay soils, were present throughout with some large gilgai, which corresponded to gaps in the canopy. *S. elachophyllum* plants were found to be in poor vigour at the time of the survey in October 2020. This was most likely due to the dry conditions preceding the survey, and trampling by cattle. Nonetheless, the population was persisting and would rejuvenate during better conditions.

This species was not recorded within other areas of similar habitat within the study area despite targeted surveys within these areas.



Photo 16: *Solanum elachophyllum* recorded in the project site



Photo 17: *Solanum elaeagnifolium* recorded at the edge of the patch in the project site

5.3.3 Introduced species

A total of 56 introduced flora species were recorded in the project area during the field surveys. Exotic grasses *Buffel Grass, *Green Panic, *Red Natal Grass and Sabi Grass were abundant throughout most vegetation communities (Appendix F). Spiny Sida (**Sida spinosa*), *South African Pigeon Grass and Black Pigweed were common throughout paddocks and in regrowth REs 11.3.1 and 11.3.3.

Seven of the recorded introduced species are recognised at the Commonwealth or State level as presenting an economic, social or environmental risk as outlined in the following sections.

Nationally declared species

Weeds of national significance (WoNS) are assessed based on the weed's invasiveness, economic, social and environmental impacts, the potential for spread and socio-economic impacts (such as impacts on health, fire risk, and recreational values of an area) and environmental values. There is no legislated requirement for the control of WoNS.

Four species recorded are recognised as WoNS:

- Tiger Pear (**Opuntia aurantiaca*)
- Prickly Pear (**Opuntia stricta*)
- Velvet Prickly Pear (**Opuntia tomentosa*)
- Parthenium (**Parthenium hysterophorus*).

State declared species

At a State level, the Biosecurity Act provides the framework and powers for improved management of pest plants, under which control of pest plants by landowners is enforceable. Six State restricted exotic flora species were recorded

(Table 6). Four of these species are also listed as WoNS as discussed above. All species were recorded infrequently and in small numbers.

Restricted Invasive plants must not be given away, sold, or released into the environment without a permit. The Biosecurity Act also requires everyone to take all reasonable and practical steps to minimise the risks associated with all invasive plants under their control. This is called a general biosecurity obligation (GBO).

Table 6: State declared exotic flora recorded

Species	Common Name	WoNS	Biosecurity Act	Presence in in the study area
<i>Harrisia martinii</i>	Harissia Cactus	-	Category 3	Uncommon in high-value regrowth RE 11.4.9a
<i>Opuntia aurantiaca</i>	Tiger Pear	✓	Category 3	Low abundance in cleared paddocks
<i>Opuntia stricta</i>	Common Prickly Pear	✓	Category 3	Low abundance in remnant RE 11.5.9
<i>Opuntia tomentosa</i>	Velvet Prickly Pear	✓	Category 3	Low abundance in regrowth REs 11.4.8 and 11.4.9a, and remnant REs 11.5.9 and 11.5.15
<i>Parthenium hysterophorus</i>	Parthenium	✓	Category 3	Low abundance in cleared paddocks and regrowth RE 11.3.1
<i>Psittacanthus stratiotes</i>	Water Lettuce	-	Category 3	In a farm dam to north of RE 11.5.9
<i>Vachellia farnesiana</i>	Mimiosa Bush	-	GBO	Uncommon in paddocks and regrowth RE 11.3.3
<i>Xanthium pungens</i>	Noogoora Burr	-	GBO	Uncommon in regrowth REs 11.3.1, 11.3.3, 11.4.9a and paddocks

6 Fauna results

6.1 Habitat and landscape connectivity

Fauna habitats throughout the project area (comprising the project site, proposed road realignment, water extraction/release infrastructure corridor and ETL study area) are typically in a poor to moderate condition, with poorer quality habitat associated with areas of historic clearing, cultivation and cattle grazing. The following broad habitat types are present:

- Remnant and regrowth vegetation communities comprising:
 - Riparian woodland (RE 11.3.25) on alluvium, which flanks the Dawson River at the far western end of the water release/extraction infrastructure area. This habitat comprised a number of large hollow-bearing trees and dense grassy ground layer and forms better quality habitat within the project area.
 - Mixed complex woodland on deeply weathered plains (RE 11.5.9/11.5.15). This habitat is in a moderate condition with a sparse coverage of mature hollow-bearing trees, moderate levels of fallen timber and some areas of deep leaf litter present.
 - Coolibah woodland (RE 11.3.3), which is in a moderate condition. The canopy layer of this community is relatively intact, but as a result of historic clearing there is only a sparse coverage of mature hollow-bearing trees. A moderate level of fallen timber was observed, but areas of deep leaf litter were absent. The ground layer was very dense and the community holds water for extended periods of time, providing good habitat for amphibians and wetland bird species.
 - Brigalow woodland on cracking clays (REs 11.4.8 and 11.4.9a). This habitat is in moderate condition, although subject to cattle grazing, with Dawson River Gum and Brigalow generally dominating the canopy. The understory varied from open to mid-dense and the ground layer was generally dominated by exotic grasses, primarily Buffel Grass. There was a moderately deep leaf litter in some patches and sparse to moderate abundance of fallen timber. Tree hollows were sparse in most patches. The northern-most patch within the ETL study area supported gilgai formations throughout.
- Non-remnant areas of woodland communities associated with drainage lines throughout the project site (i.e. RE 11.3.1, RE 11.3.3 and RE 11.3.3a). Given the primarily cleared nature of the project site, these patches of historically cleared woodlands provide poor to moderate stepping-stone habitat for fauna moving throughout the area. As these woodlands are associated with drainage lines and elongated gilgai that hold water during wetter conditions, they provide water resources and habitat for amphibians.
- Cleared and disturbed areas supporting gilgai, provide specific habitat features for the Ornamental Snake in particular. These areas are highly degraded and dominated by exotic pasture species. However, they do provide the waterlogged gilgai habitat (during wetter conditions) for frog species, that are the primary prey of the Ornamental Snake.

- Cleared and disturbed areas include low shrubby regrowth, improved pasture, with scattered native trees. These areas are generally considered to be of low habitat value for fauna as they lack many habitat elements such as fallen timber, deep leaf litter or hollow bearing trees. These areas provide suitable habitat for generalist species that are able to adapt to such highly modified environments, and may occasionally be occupied by other more mobile species.

The extent of historic clearing across the study area has significantly reduced the connectivity values of the fauna habitats present away from the Dawson River and Banana Creek. The remnant and regrowth woodland communities present are fragments of the pre-clearing extent of vegetation and currently occur as isolated patches. There is some tenuous connectivity along drainage lines within the project site, although there are many areas where clearing has left expanses of the drainage lines devoid of vegetation. There is also some connectivity in the form of regrowth vegetation, between the remnant Coolibah woodland (RE 11.3.3) and the Dawson River to the west.

The decommissioned railway line corridor with its shrubby regrowth also provides some fauna movement opportunities in a north-south direction. Large patches of contiguous remnant vegetation are generally absent from the broader locality and primarily restricted to remnant alluvial woodlands associated with the Dawson River and Banana Creek in the additional investigation area and the Dawson Range, which is at least 10 km to the west of the study area.

6.2 Fauna diversity

A total of 193 species of terrestrial vertebrate fauna were recorded during the field surveys, including 6 introduced species. Native species included 13 amphibians, 129 birds, 10 mammals, 18 micro-bats and 17 reptiles. A complete list of fauna species recorded during the seasonal surveys is provided in Appendix G.

6.3 Threatened and migratory fauna species

6.3.1 EPBC Act listed threatened fauna

Three fauna species listed under the EPBC Act at the time of the controlled action decision were identified in the study area during the field surveys, namely the Ornamental Snake, Koala and Squatter Pigeon, all listed as vulnerable. Of these species, the Ornamental Snake was identified within the project site during the seasonal surveys and the Squatter Pigeon was identified within the ETL study area, while the Koala was identified in the additional investigation area during the 2020 post-wet season survey (Figures 13 to 16).

Based on review of database search results and habitat identified in the study area, an assessment of the likelihood of EPBC Act listed threatened species to occur in the project area has been undertaken and is provided in Appendix D. This assessment identified the Koala and the Australian Painted Snipe, as having a moderate likelihood of occurrence within the project site, water release/extraction infrastructure area and/or ETL study area.

The four species, either recorded or assessed as having a moderate likelihood of occurrence in the project area, are discussed further in the following sections.

At the time of the EPBC Act Controlled Action Decision (EPBC Referral 2012/6547), a number of fauna species were not listed as threatened fauna under the EPBC Act and therefore are not considered as listed threatened species MNES for the Project. However, three of these species that are considered to potentially occur in the project area are discussed as listed threatened species MSES, i.e. Greater Glider, Yellow-bellied Glider and White-throated Needle-tail, in Section 6.3.3.

Ornamental Snake

Species overview

The Ornamental Snake is listed as vulnerable under the EPBC Act and Queensland NC Act. The Ornamental Snake is found in close association with frogs, which form the majority of its prey. It is known to prefer woodlands and open forests associated with moist areas, particularly gilgai (melon-hole) mounds and depressions with clay soils but is also known from lake margins, wetlands and waterways (DCCEE 2023b).

The Species Profile and Threat (SPRAT) Profile and Draft Referral Guidelines for the nationally listed Brigalow Belt reptiles specifically describe 'pure grassland associated with gilgais' and 'cleared areas formerly mapped as open-forests to woodlands associated with gilgai formations and wetlands i.e. REs 11.3.3, 11.4.3, 11.4.6, 11.4.8, 11.4.9 and 11.5.16' as suitable habitat for this species (DCCEE 2023b; SEWPaC 2011).

The Ornamental Snake requires microhabitat features such as cracking clay soils, rotting logs or stumps, coarse woody debris, leaf litter or surface rock. These features are required because they either support the prey food of this species (i.e. frogs) or provide refuge habitat for the Ornamental Snake (DCCEE 2023b).

Presence and habitat in the project area

PRESENT (Figure 13; Appendix D)

Two individuals of this species were detected during spotlighting sessions in non-remnant Coolibah with Brigalow woodland (RE 11.3.3) associated with a stream order 1 drainage line in the south-western portion of the project site. One individual was recorded at supplementary site 5 (Figures 4 and 13) during the post-wet season surveys. The other individual was recorded along the same drainage line at supplementary site 12 (Figures 4 and 13), during the dry season surveys.

Habitat associated with the drainage line where the Ornamental Snake was recorded does not clearly align with the Draft Referral Guidelines for the nationally listed Brigalow Belt reptiles, whereby there was no gilgai and very little fallen timber present (SEWPaC 2011). Therefore, for the purposes of this assessment, small drainage lines on land zones 3 or 4 with fringing vegetation and some fallen timber has been mapped as habitat for the Ornamental Snake (Figure 13).

Gilgai formations were identified in both Brigalow regrowth in the north of the ETL study area and in cleared and grazed paddocks in the south of project site (Figure 13). Gilgai are known habitat for the Ornamental Snake and this species

is known to persist in heavily modified environments where gilgais remain. While the cleared gilgai to the east of the Moura Baralaba Road were holding water at the time of the post-wet season survey, they predominantly support grasses not aquatic flora species, indicating they do not hold water for extended periods of time. However, during the dry season surveys, aquatic flora species were more prevalent in these gilgai indicating they do hold water for some time providing there has been sufficient rainfall. These gilgai are likely to support populations of frogs, the preferred prey of the Ornamental Snake. While this area of gilgai is in a degraded state and the Ornamental Snake was not recorded in this area during spotlighting surveys, it has been mapped as habitat for this species as it has been previously recorded in the region from similar habitat.

Other areas of marginal gilgai were recorded in the south-western portion of the project site on the broad floodplain associated with the Dawson River (Figure 13). These areas seem to have been previously cultivated or blade ploughed and are used for cattle grazing. As a result these gilgai are shallow, in a highly degraded state and are dominated by terrestrial grasses. Spotlighting surveys failed to detect the Ornamental Snake in these areas and the prevalence of grasses during both seasonal surveys indicates that these gilgais do not hold water for extended periods of time. However, they are considered to provide some marginal habitat for the Ornamental Snake during periods of extended rainfall when frog species may use the gilgai.

Similar gilgai formations occur on alluvial areas flanking the Dawson River and Banana Creeks in the additional investigation area and these have also been mapped as potential Ornamental Snake habitat. Riparian habitat along Banana Creek and reaches of the Dawson River have been mapped as essential habitat for this species by the Queensland Government. Although this essential habitat mapping does not appear to be specimen based, instead based on predictive modelling.

There is no potential habitat for this species within the proposed road realignment or water extraction/release infrastructure area.

Overall, approximately 170.7 ha of Ornamental Snake habitat has been identified within the study area with 92 ha occurring within the project site, as follows and shown on Figure 13:

- drainage lines with fringing vegetation and some fallen timber – 65.3 ha (study area), 23.5 ha (project site)
- gilgai and wetland habitat (with or without vegetation or fallen timber) – 54.9 ha (study area), 34.0 ha (project site)
- marginal gilgai habitat (without vegetation or fallen timber) – 50.5 ha (study area), 34.6 ha (project site)

Of this area, 34.9 ha is within the proposed disturbance footprint of the project (including 0.7 ha within the ETL study area - 0.3 ha ETL Option 1, 0.4 ha ETL Option 2). As outlined in Section 8.1.4, all habitat would be considered 'important habitat' in line with the EPBC Act Draft referral guidelines for the nationally listed Brigalow Belt reptiles (SEWPaC 2011).

Koala

Species overview

The Koala is listed as endangered under the EPBC Act and Queensland NC Act. It is widespread in sclerophyll forest and woodland on foothills and plains on both sides of the Great Dividing Range from about Chillagoe, Queensland to Mt Lofty Ranges in South Australia (Menkhorst and Knight 2011a).

At the time of the controlled action decision, Koala habitat was defined as 'Any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees provides potential Koala habitat. Koalas are known to occur in modified or regenerating native vegetation communities, and are not restricted to remnant vegetation (DAWE 2020)'. The *EPBC Act referral guidelines for the vulnerable Koala* defined Koala food trees as those of the following genus: *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Melaleuca*. The guideline also notes that 'primary' and 'secondary' food trees may be referred to in other state or Commonwealth guidelines or policies, however, all are considered to be food trees for the purposes of the *EPBC Act referral guidelines for the vulnerable Koala* (DotE 2014).

In 2022 the EPBC Act status of the Koala was elevated to endangered and subsequently, revised conservation advice was released by the DCCEEW in 2022, to reflect the updated status. The updated conservation advice provided the following description of habitat that is considered critical to the survival of the species;

- whether the habitat is used during periods of stress (examples: flood, drought or fire);
- whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes);
- the extent to which the habitat is used by important populations;
- whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development;
- whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements;
- whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation;
- any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.

Likelihood of occurrence in the project area

MODERATE (Appendix D)

Evidence of the Koala, in the form of scratches was recorded at four locations on specimens of Queensland Blue Gum. These Queensland Blue Gum were limited to the channel within Coolibah woodland (RE 11.3.3) along Banana Creek in the additional investigation area (Figure 14). Extensive areas of riparian habitat occur

throughout this riverine system and this system would provide important refuge habitat for this species.

No evidence of the Koala was detected in the project area during the seasonal fauna surveys. The likelihood of occurrence assessment indicates that based on the habitat present in the project site and connectivity of this habitat with known habitats along the Dawson River and Banana Creek, there is a moderate potential for Koalas to disperse into the project site (Appendix D). However, the project site would not provide connectivity of habitats between the Dawson River riparian corridor and habitats further east such as on Mt Ramsay. No evidence of Koala usage of vegetation on Mt Ramsay was identified during the targeted surveys of the additional investigation area. Vegetation on Mt Ramsay is dominated by vine thicket and *Acacia* spp. Assemblages with some areas of Narrow-leaved Ironbark woodland observed on the lower slopes of this mountain as a component of RE 11.12.1 (Figure 10). However, evidence of regular burning of this vegetation was observed and this area is more than 2 km from any nearby Koala habitat areas. The extent of clearing surrounding Mt Ramsay in combination with the history of fire disturbance and limited Koala food trees on this isolated remnant reduces its suitability as habitat and it would not provide refuge for this species. Therefore, dispersal by Koalas across the project site from the Dawson River corridor to Mt Ramsay is considered highly unlikely.

A very small area of RE 11.3.25 (i.e. 0.4 ha) will be traversed by the proposed water release/extraction infrastructure area adjacent to the Dawson River. This RE forms habitat for the Koala along the Dawson River.

There is no potential habitat for the Koala within the proposed road realignment. Habitat and connectivity is limited within the ETL study area with Koala food trees only present as sparsely distributed individual trees and small isolated stands (<1 ha) that are at least 2 km from any large patches of suitable habitat. The EPBC Act Koala referral guidelines indicate that treeless areas of more than 2 km are likely to present a barrier to movement for Koalas (DotE 2014). Therefore, due to the limited number of Koala food trees present and sparse distribution of these trees within a predominantly cleared landscape, the species is considered unlikely to occur within the ETL study area. Consequently, no Koala habitat has been mapped within the ETL study area (Figure 14).

Habitat mapping for the Koala within the study area has been undertaken in accordance with information provided in the EPBC Act Koala referral guidelines, Listing Advice and Approved Conservation Advice for the Koala (DotE 2014; TSSC 2012a; b) for the species that were current at the time of the time of the controlled action decision and the experience of our ecologists in detecting the species in habitats throughout central Queensland. Koala habitat has therefore been categorised as:

- any forest or woodland containing species that are Koala food trees, or any shrubland with emergent food trees. Food trees are defined according to the *EPBC Act referral guidelines for the vulnerable Koala* as those of the following genus: *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Melaleuca* (DotE 2014).

The majority of remnant REs and some areas of non-remnant regrowth woodlands in the project site and water release/extraction infrastructure area are considered to provide habitat for the Koala due to the presence and moderate to abundant cover of Koala food trees, namely:

- remnant and regrowth RE 11.3.3 – Coolibah
- remnant RE 11.3.25 – Queensland Blue Gum, Coolibah
- non-remnant RE 11.4.8 – Dawson River Gum, Carbeen (isolated) and Poplar Box (isolated)
- remnant and regrowth RE 11.5.9 - Queensland Blue Gum, Poplar Box, Carbeen and Long-fruited Bloodwood
- regrowth RE 11.4.9a – Poplar Box.

Figure 14 shows areas that have been mapped as suitable habitat for the Koala in the study area. There are 887.1 ha of Koala habitat in the study area, with 112 ha occurring within the project site including 26.5 ha within the proposed disturbance footprint of the project and approximately 0.4 ha that would be traversed by the water release/extraction infrastructure.

The habitat within the project site and water release/extraction infrastructure area has been assessed using the Koala Habitat Assessment Tool in the *EPBC Act referral guidelines for the vulnerable Koala* (DotE 2014) (Appendix H). As outlined in Appendix H, it has been determined that the potential habitat does not constitute critical habitat for the Koala given the following:

- This species was recorded (via scratches) along Banana Creek in the additional investigation area immediately adjacent to the project site. There are also historic WildNet records of Koalas within 7 km north and south of the project site along the Dawson River and associated floodplains (CSIRO 2021). However, no direct or indirect evidence of Koalas was detected in the project site or anywhere else in the project area during the field surveys for the project.
- The potential habitat in the project site lacks connectivity with a contiguous area of >1,000 ha of remnant vegetation in the landscape. There is some tenuous connectivity through regrowth vegetation to the remnant vegetation fringing the Dawson River and Banana Creek to the west of the project site, however the extent of clearing within and to the west of the project site would inhibit dispersal of this species throughout that landscape.
- There is no Koala refuge habitat in the project site and the small area (i.e. 0.1 ha) of refuge habitat in the water release/extraction infrastructure area is so small that it is unlikely that small area of habitat is important for achieving the interim recovery objectives for the Koala.

Squatter Pigeon

Species overview

The Squatter Pigeon (southern) is listed as vulnerable under the EPBC Act and Queensland NC Act. This species is known to inhabit tropical dry, open sclerophyll

woodlands and occasionally open savannah. It appears to favour sandy soil dissected with low gravelly ridges and is less common on heavy soils with dense grass cover. It is nearly always found in close association with permanent water (Higgins and Davies 1996). This species is also often recorded from areas that do not support remnant vegetation, but in these areas it seems to be associated with clear, disturbed sites such as tracks and stockyards (DCCEE 2023c); S. Marston Pers. obs.). These habitat areas are likely to provide breeding, foraging and dispersal habitat.

Likelihood of occurrence in the project area

PRESENT (Appendix D)

This species was recorded at one location within the project site, a number of locations in the ETL study area, on the edge of the project site and in the additional investigation area during the seasonal surveys. Suitable habitat for the Squatter Pigeon has been identified in the project site and water release/extraction infrastructure area (Figure 15 and Appendix D).

Habitat mapping for the Squatter Pigeon (Figure 15) within the study area has been undertaken in consideration of the SPRAT profile for the species and most recent advice from the DAWE⁴. Squatter Pigeon habitat is categorised as:

- foraging habitat – grassy woodlands dominated by Eucalyptus, Corymbia, Acacia or Callitris tree species, on sandy or gravelly soils (including but not limited to areas mapped as Queensland land zones 3, 5 or 7) within 3 km of a waterbody
- breeding habitat – foraging habitat within 1 km of a waterbody.

Waterbodies that are suitable for the Squatter pigeon are described in the SPRAT profile for the species as 'permanent or seasonal rivers, creeks, lakes, ponds and waterholes, and artificial dams' (DCCEE 2023c). Given this definition, first and second order watercourses or drainage channels are generally not considered to be suitable for this species because of their highly ephemeral nature and tendency to drain quickly and would not include cattle troughs or plastic lined dams.

The SPRAT profile also emphasises the importance of woodland trees, which provide protection from predatory birds. Where scattered trees still occur, and the distance of cleared land between remnant trees or patches of habitat does not exceed 100 m, individuals may be found foraging in, or moving across modified or degraded environments (DCCEE 2023c).

Based on the above habitat requirements, approximately 976.1 ha of foraging habitat suitable for the Squatter Pigeon has been mapped within the study area. This includes 863.4 ha that may be suitable for breeding. Of this, 84.7 ha of foraging habitat and 83.1 ha of breeding habitat occurs within the project site.

⁴ The Moranbah North Extension Project EPBC Act approval (EPBC 2018/8338) dated 18 September 2020 defines Squatter Pigeon habitat and this has been used as part of this current assessment.

Within the proposed disturbance area of the project site and water release/extraction infrastructure area, 21.9 ha of habitat that is both breeding and foraging habitat has been mapped for the Squatter Pigeon.

Suitable habitat in the project site and water release/extraction infrastructure area consists of the polygons of REs 11.3.25, 11.5.9, 11.5.15, 11.3.3 and 11.3.3a. This woodland vegetation supports a grassy ground layer and is associated with sandy soils. There are two constructed dams to the north and east that are not separated from this vegetation by more than 100 m of cleared land.

There is no suitable habitat mapped for this species within the proposed road realignment or the ETL study area. This species was recorded within the ETL study area in small sparsely vegetated pockets and cleared areas on land zone 4. This land zone is characterised by heavy cracking clay soils and more susceptible to ponding. The Conservation Advice and SPRAT profile for the Squatter Pigeon advises that in Queensland this species prefers sandy soils or gravelly ridges that are well-draining (DCCEEW 2023c; TSSC 2008b). Squatter Pigeons are less commonly found on heavier soils with dense grass (TSSC 2008b). Furthermore, this species is relatively common in the broader region and birds are often recorded in cleared disturbed areas. Therefore, in line with the EPBC Act Conservation Advice and DCCEEW SPRAT Profile for this species, no areas of suitable habitat have been mapped within the ETL study area.

All other areas of remnant and non-remnant woodland vegetation within the study area, have not been included in habitat mapping for the Squatter Pigeon given they:

- are located on heavier clay soils; and/or
- are separated from other patches of habitat or water sources by than 100 m of cleared land; and/or
- were found to have a dense cover of grasses and/or sedges in the ground layer.

Australian Painted Snipe

Species overview

The Australian Painted Snipe (*Rostratula australis*) is listed as endangered under the EPBC Act and vulnerable under the NC Act. This secretive, cryptic, crepuscular (active at dawn, dusk and during the night) species occurs in terrestrial shallow wetlands, both ephemeral and permanent, usually freshwater but occasionally brackish. They also use inundated grasslands, salt-marsh, dams, rice crops, sewage farms and bore drains with rank emergent tussocks of grass, sedges, rushes or reeds or samphire, and often with scattered clumps of Lignum, canegrass or sometimes tea trees. This species has been known to use wetland areas lined with trees, or that have some scattered fallen or washed-up timber (DCCEEW 2023d).

Wetland habitat suitable for breeding is noted as being critical to the survival of the Australian Painted Snipe in the listing advice for the species. Breeding habitat is described in the advice as:

“continuous reed beds, stand of reed-like vegetation, rice fields and areas with no surrounding low cover... Nests are made among tall rank tussocks, frequently on small, muddy islands or mounds surrounded by shallow fresh water, sometimes on shores of swamps or on banks of channels. Nesting typically occurs in ephemeral wetlands that are drying out after an influx of water, provided they have complex shorelines and a combination of very shallow water, exposed mud and dense low cover” (TSSC 2013a).

The SPRAT Profile for the species also recognises dense low cover and sometimes some tall dense cover is also present in breeding habitat (DCCEEW 2023d).

This species has been recorded approximately 45 km north-north-west of the study area adjacent to the Dawson Range State Forest (CSIRO 2023).

Likelihood of occurrence in the project area

MODERATE (Appendix D)

This species was not recorded within the study area during the seasonal surveys. However, the species has been recorded in the broader area and the vegetated sections of the broad drainage lines in the south of the project site that support Lignum, and Brigalow with gilgai in the north of the ETL provide areas of suitable habitat for this species.

The gilgai areas in the project site appear to have been blade ploughed in the past and support a low abundance of sedges indicating that they do not hold water for prolonged periods. Nonetheless, these gilgai are likely to provide some wetland features and this species is known to use heavily disturbed areas that exhibit wetland characteristics, including cleared gilgai. Although these cleared gilgai provide seasonal foraging habitat for this species this species is likely to use these disturbed habitats opportunistically during the wet season when gilgai are holding water. Cleared gilgai generally lack canopy cover that forms part of the breeding habitat requirements for this species (DCCEEW 2023d). Therefore, cleared gilgai habitat is considered to comprise marginal foraging habitat for this species in the study area.

Similarly, gilgai and wetland habitats in the additional investigation area may provide foraging habitat for this species (Figure 16).

Two broad habitat types are considered to occur in the study area for the Australian Painted Snipe and differ in their naturalness and presence of fringing vegetation that provides cover for this species:

- wetland and drainage lines with fringing vegetation
- cleared gilgai that forms marginal habitat for this species.

Approximately 86.2 ha of potential habitat formed by wetlands and drainage lines with fringing vegetation is mapped in the in the study area for the Australian Painted Snipe. Another 84.4 ha is mapped as marginal gilgai habitat (Figure 16). Of this, 23.4 ha of wetland habitat and 68.5 ha of marginal habitat occurs within the project site.

Of these areas of identified potential habitat, 1.0 ha of wetland and drainage line habitat is located within the proposed disturbance footprint of the project site (0.5 ha) and ETL study area (0.3 ha ETL Option 1, 0.4 ha ETL Option 2) as well as a further 33.9 ha of marginal gilgai habitat.

There is no potential habitat for this species within the proposed road realignment or water release/extraction infrastructure area. The Coolibah wetland (RE 11.3.3) in the south-western portion of the project site does not support expanses of mud or bare ground that typically form part of the required habitat for this species, therefore it has not been mapped as potential habitat for this species.

6.3.2 EPBC Act listed migratory fauna

No species listed as migratory under the EPBC Act were identified in the study area during the seasonal field surveys. Based on a review of database search results and habitat identified in the study area, an assessment of the likelihood of other EPBC Act listed migratory species to occur in the project area has been undertaken, and is provided in Appendix D. This assessment determined that there are two migratory species that have a moderate potential to occur based on the habitat types present. Each of these species are discussed below.

Glossy Ibis

Species overview

This species utilises the shallows of swamps, floodwaters, sewage ponds and flooded, moist irrigated pasture (Morcombe and Stewart 2013). The species also occasionally feeds in sheltered marine habitats (Morcombe and Stewart 2013).

The nearest record of this species is approximately 7 km north of the study area (CSIRO 2023).

Likelihood of occurrence in the project area

MODERATE (Appendix D)

This species was not recorded in the study area during the seasonal fauna surveys. However, this species has been recorded in the region and may use dams, wetland habitats and cleared gilgai in the project site and ETL study area, when inundated. These types of habitat do not occur in the proposed road realignment or water release/extraction infrastructure area and therefore this species is not considered likely to occur in these areas.

Latham's Snipe

Species overview

This migratory species prefers soft wet ground or shallow water with tussocks, wet paddocks, seepage below dams, irrigated areas, scrub or open woodland (Pizzey et al. 2012).

The nearest record of this species is approximately 20 km north of the study area near an anabranch of the Dawson River (CSIRO 2023).

Likelihood of occurrence in the project area

MODERATE (Appendix D)

This species was not recorded in the study area during the fauna surveys. However, the species has been recorded in the broader area and it may occupy similar habitats as the Australian Painted Snipe described in Section 6.3.1. The marginal gilgai areas in the project site and additional investigation area may also provide seasonal opportunistic foraging habitat for this species. There is no potential habitat for this species within the proposed road realignment or water release/infrastructure area and therefore this species is not considered likely to occur in these areas.

6.3.3 NC Act listed fauna

Two vulnerable fauna species listed under the NC Act were recorded in the project site, namely the Ornamental Snake and the Squatter Pigeon, which was also recorded in the ETL study area and additional investigation area. An additional three vulnerable species, the Koala, Greater Glider and Yellow-bellied Glider, and one special least concern species, the Short-beaked Echidna, were identified in the additional investigation area.

An assessment of the likelihood for other NC Act protected fauna to occur in the project area has been undertaken and is provided in Appendix D.

The Ornamental Snake, Australian Painted Snipe, Koala and Squatter Pigeon were also listed under the EPBC Act at the time of the EPBC Act Controlled Action decision, and an overview of these species and suitable habitat within the project area is discussed in Section 6.3.1.

An additional three species considered to potentially occur in the project area, the Greater Glider, Yellow-bellied Glider and White-throated Needletail, were not listed at the time of the EPBC Act Controlled Action decision, and although currently listed under the EPBC Act, have not been considered previously in the MNES Section 6.3.1. Therefore, these species will be assessed as MSES for this project in this section.

Greater Glider or Yellow-bellied Glider habitat is not present within the ETL study area or road realignment. Potentially suitable woodland habitat for these species is present within the project site, however this habitat is fragmented and disconnected by more than 100 m from the higher quality habitat along the Dawson River. A small area of potential riparian habitat is traversed by the western end of the water release/extraction infrastructure on the Dawson River.

Potential overfly habitat for the White-throated Needletail occurs throughout the study area. These species are discussed further below.

The Short-beaked Echidna (*Tachyglossus aculeatus*), listed as special least concern under the NC Act, was assessed as having a high likelihood of occurrence. This species is discussed further below.

In addition, two special least concern bird species were assessed as having a moderate likelihood of occurring in the study area, namely the Glossy Ibis and Latham's Snipe. These species are also listed as migratory under the EPBC Act,

and an overview of these species and suitable habitat within the study area are discussed in Section 6.3.2. Special least concern migratory bird species that are not listed under the migratory provisions of the EPBC Act, are not MSES or MNES as defined under the EO Act and are therefore not discussed further.

Greater Glider

Species overview

The taxonomy of the Greater Glider is currently unresolved, with recent molecular evidence suggesting that the one species (*Petauroides volans*) may in fact be three, namely the southern (*P. volans*), central (*P. armillatus*) and northern (*P. minor*) Greater Gliders (McGregor et al. 2020a). This work has not yet been formally recognised across all jurisdictions, professional societies or in recent publications that deal with the taxonomic classification of Australian mammals. The Greater Glider most likely to occur within the study area is the central species or form which is listed as endangered under both the EPBC Act and NC Act. In the interests of taxonomic stability *P. volans* is retained as a single species in this report recognising that this may change at some stage in the future.

The Greater Glider is a nocturnal species and uses tree hollows during the day to rest (van Dyck and Strahan 2008). It may glide over distances of up to 100 m, however, it appears to have low dispersal ability and typically small home ranges of 1-4 ha. The species has an almost exclusive diet of eucalypt leaves and occasionally flowers or buds (DCCEEW 2023e; TSSC 2016a; van Dyck and Strahan 2008). Although the species is known to feed on a range of eucalypt species, in any particular area it is likely to only forage on one or two species (van Dyck and Strahan 2008).

The Greater Glider occurs in a range of eucalypt-dominated habitats, including low open forests on the coast to tall forests in the ranges and low woodland westwards of the Dividing Range. It does not use rainforest habitats (van Dyck et al. 2013; van Dyck and Strahan 2008). This species favours taller, montane, moist eucalypt forests with relatively old trees and abundant hollows and a diversity of eucalypt species (TSSC 2016a). The Greater Glider has an almost exclusive diet of eucalypt leaves and occasionally flowers or buds (DCCEEW 2023e; TSSC 2016a; van Dyck and Strahan 2008).

Likelihood of occurrence in the project area

MODERATE (Appendix D)

No evidence of the Greater Glider was detected in the project area during the seasonal fauna surveys.

The Greater Glider was recorded within remnant riparian vegetation (RE 11.3.25) along the Dawson River Anabranche west of the project site (Figure 17). Extensive areas of riparian vegetation occur throughout this riverine system and provide habitat (767.5 ha) for the Greater Glider. A small area of this habitat (i.e. approximately 0.4 ha) on the edge of RE 11.3.25 on the Dawson River will be traversed by the proposed water extraction/release infrastructure (Figure 17).

The project site, road realignment corridor and ETL study area do not provide habitat for this species as they lack tall, moist or mature vegetation communities that support abundant hollow bearing trees and stags. These portions of the project area support small, fragmented patches of vegetation with low numbers of tree hollows within a largely cleared landscape. No evidence of the Greater Glider occurring in these areas was found during the seasonal fauna surveys.

Furthermore, there is limited potential for Greater Gliders to disperse into vegetation within the project site, road realignment corridor or the ETL study area as vegetation is fragmented and separated from larger tracts of more suitable habitat, i.e. riparian habitat associated with the Dawson River and its tributaries, by cleared areas of greater than 100 m. Therefore, this in combination with the low dispersal ability and typically small home ranges of Greater Gliders, suggests this species is unlikely to use vegetation within the project site, road realignment corridor or ETL study area.

Yellow-bellied Glider (south-eastern)

Species overview

The distribution of the Yellow-bellied Glider in Queensland is primarily coastal, extending southward along the eastern seaboard from north of Mackay and continuing through the NSW-Qld border. However, isolated subpopulations are found inland in the Blackdown and Canarvon Ranges of central Qld (Eyre 2004).

The Yellow-bellied Glider occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests (Kavanagh et al. 1995). The Yellow-bellied Glider is nocturnal and shelters in hollows found in large, old trees, usually more than one meter in diameter (TSSC 2022a). Hollow-bearing trees are a critical habitat feature for the species (TSSC 2022a). The diet of the Yellow-bellied Glider comprises of sap drawn from incisions in the trunks of a limited number of trees typically of the genus *Eucalyptus* or *Corymbia*. The species also feeds on insects, spiders, eucalypt nectar and pollen, insect exudates and manna (TSSC 2022a). Smooth-barked eucalypts are important due to the range of foraging substrates (and therefore food resources) they provide, as loose bark hanging in strips from these trees provides shelter for insect prey (Eyre and Smith 1997). Yellow-bellied gliders (south-eastern) also require some level of floristic diversity to provide a year-round food supply, and they are unlikely to persist in forests dominated by only one or two tree species (TSSC 2022a).

The species shows a preference for large patches of mature old growth forest that provide suitable trees for foraging and shelter with foraging (TSSC 2022a). The species has very low dispersal capabilities over spaces larger than its gliding distance (TSSC 2022a). The Conservation Advice indicates that management should be guided by the average gliding performance, which was reported as being on average 25 m (TSSC 2022a).

Likelihood of occurrence in the project area

MODERATE (Appendix D)

No evidence of the Yellow-bellied Glider was detected in the project area during the seasonal fauna surveys.

The Yellow-bellied Glider was recorded within remnant riparian vegetation (RE 11.3.3) along Banana Creek (Figure 18). Extensive areas of riparian vegetation dominated by eucalyptus species occur throughout the Banana Creek and Dawson River systems and provide potential habitat (767.5 ha) for the Yellow-bellied Glider. A small area of this habitat (i.e. approximately 0.4 ha) on the edge of RE 11.3.25 on the Dawson River will be traversed by the proposed water extraction/release infrastructure (Figure 18).

There is limited potential for the species to disperse into vegetation within the project site, road realignment corridor or the ETL study area as this vegetation is separated from larger tracts of more suitable habitat, i.e. riparian habitat associated with the Dawson River and its tributaries, by cleared areas of greater than 100 m. Given low dispersal capability of the Yellow-bellied Glider and the highly fragmented and small areas of vegetation within the project area, it is considered unlikely that the species utilises vegetation within the project area. Additionally, vegetation within the project area typically lacks many of the habitat attributes that are considered important for the species such as large hollow-bearing trees and a diversity of eucalypt species. This suggests that this species is unlikely to use vegetation within the project site, road realignment corridor or ETL study area.

White-throated Needle-tail

Species overview

The White-throated Needle-tail is listed as vulnerable and migratory under the EPBC Act and NC Act. This species is widespread in eastern and south-eastern Australia where it spends the non-breeding season (DCCEEW 2023f). The islands of the Torres Strait are known to be the major point of entry for the White-throated Needle-tail into Australia (DCCEEW 2023f).

This species is almost exclusively aerial, which means it rarely alights on the ground or on vertical substrates, as such conventional habitat descriptions are not useful (DCCEEW 2023f). Nonetheless, it tends to fly over preferred habitat types, including above mainly wooded areas, and larger tracts of vegetation, particularly forest, although they have also been recorded foraging above disturbed areas, i.e. above bushfires or slashed paddocks. Their diet consists of flying insects, which they forage aerially for (DCCEEW 2023f; DotE 2015a). The species roosts in tree hollows in tall trees on ridge-tops, on bark or rock faces and it is thought to have traditional roost sites (DotE 2015a). However, roosting on terrestrial features is probably uncommon and it is thought to roost aerially (DCCEEW 2023f). Large tracts of native vegetation, particularly forest, may be important for this species in Australia (DotE 2015a).

Likelihood of occurrence in the project area

MODERATE (Appendix D)

This species was not recorded in the study area during seasonal surveys; however, it is widespread and it has been recorded in the region. The White-throated Needle-tail has the potential to overfly all types of habitats within the study area as part of wider foraging movements, although forested and treed areas are likely to be preferred. There is no evidence of traditional roost sites within the study

area. Potential overfly habitat in the study area equates to approximately 1,135 ha and potential overfly habitat within the project area accounts for approximately 16.7 ha of forested areas (Figure 19).

Short-beaked Echidna

Species overview

The Short-beaked Echidna occurs in almost all terrestrial habitats except intensively management farmland. It shelters in logs, crevices, burrows or piles of litter and feeds on ants, termites and other soil invertebrates, particularly beetle larvae (Menkhorst and Knight 2011a).

Likelihood of occurrence in the project area

HIGH (Appendix D)

This species was recorded at five locations in the additional investigation area during the fauna surveys (Figure 19). This is a relatively commonly occurring species that is known from the broader area and uses a range of habitats, including disturbed or cleared areas. All areas of the study area provide potential habitat for this species, however, remnant areas are considered to be more important for this species (Figures 10 and 20). Remnant habitat accounts for 996.1 ha in the study area and 10.1 ha in the project site, and water release/extraction infrastructure area.

6.4 Introduced species

Six introduced species listed under the Queensland Biosecurity Act were recorded in the study area during the field surveys (Appendix G). Table 7 provides a description of the presence of introduced animals recorded during the surveys.

Table 7: Introduced species in the study area

Species	Biosecurity Act 2014	Abundance and occurrence in the study area
Cane Toad (* <i>Rhinella marina</i>)	General biosecurity obligation	The Cane Toad was recorded at systematic trap sites T1 and T2. It was also recorded in 12 of the 33 supplementary survey sites as well as incidentally throughout the study area. This species was recorded in remnant and regrowth REs 11.3.1, 11.3.3/a, 11.3.25, 11.5.9 and 11.4.9a as well as cleared pasture supporting gilgai (Figures 4 and 10).
Common Myna (* <i>Sturnus tristis</i>)	General biosecurity obligation	The Common Myna was recorded incidentally during the 2020 survey within the study area.
Dog (* <i>Canis lupus</i>)	Categories 3, 4 and 6	This species was not recorded at any of the fauna survey sites. However, characteristic tracks were recorded incidentally in the project site.
European Rabbit (* <i>Oryctolagus cuniculus</i>)	Categories 3, 4, 5 and 6	The European Rabbit was recorded in spotlighting at trap site T3 and during an active search at supplementary sites S14 and S33. These survey sites were located in non-remnant patches of Brigalow (Figures 4 and 10). This species was also recorded while spotlighting from a vehicle in the project site.

Species	<i>Biosecurity Act 2014</i>	Abundance and occurrence in the study area
Feral Cat (* <i>Felis catus</i>)	Categories 3, 4 and 6	This species was recorded during spotlighting surveys at supplementary survey sites S8, S15 and S23. Survey sites S8 and S15 were located in cleared pasture with gilgai, where as survey site S23 was in riparian woodland along Banana Creek (Figures 4 and 10).
Feral Pig (* <i>Sus scrofa</i>)	Categories 3, 4 and 6	Feral Pig tracks were recorded at supplementary survey site S6, S16, S18 and S20 in remnant REs 11.3.3 and 11.3.25 on alluvial plains associated with the Dawson River (Figures 4 and 10). This species was also recorded incidentally throughout the study area.

7 Impacts and mitigation

7.1 Introduction

This section presents an assessment of the potential impacts of the project on terrestrial ecology. The assessment includes consideration of impacts associated with the construction and operation of the open cut mining operation and associated infrastructure within MLA 700057, as well as infrastructure proposed to be developed outside of MLA 700057 including water release/extraction infrastructure, the Moura Baralaba road realignment and construction of electricity infrastructure to supply power to the mine.

The final ETL alignment has not been determined at this stage of the assessment process, although two options are being considered within the ETL study area (Figure 2). The likely extent of impacts of construction of an ETL within the ETL study area has been considered as part of this impact assessment by assuming the potential maximum extent of impacts presented by each of the alignment options, using an easement clearing width of 20 m. This approach is considered to provide an indication of the maximum scale of likely impacts of this component of the project without having a final alignment design.

The following potential impacts were identified and considered as part of this assessment:

- direct impacts from vegetation/habitat clearing (Section 7.2)
- indirect impacts such as changes to groundwater, surface water, flood levels and duration of inundation, noise and vibration, vehicle strike, lighting, dust, erosion and sedimentation, and the introduction or spread of invasive species (Section 7.3)
- facilitated impacts – there is not considered to be any facilitated impacts associated with the Project; and
- cumulative impacts, including those associated with other nearby developments including the Baralaba North Mine and Dawson Mine (Section 7.4).

In areas where impacts to vegetation communities and flora and fauna habitat cannot be avoided, control measures have been designed to minimise these impacts as far as practical. These measures are discussed in Sections 7.2.2, 7.3, 7.5 and 7.6.

Table 8 provides a summary of the MSES and MNES occurring or likely to occur in the project site and associated ancillary infrastructure. Significance assessments of these impacts is provided in Section 8.

Table 8: Summary of MSES and MNES occurring or likely to occur in the project area and anticipated impacts

Protected matter	NC Act/VM Act Status ¹	EPBC Act Status ²	Likelihood of occurrence	Total area in the project site, road realignment and water release/extraction infrastructure area (ha/no.)	Impacted area in the project site, road realignment and water release/extraction infrastructure area (ha/no.)	Total area in the ETL study area (ha/no.)	Impacted area in the ETL study area (ha/no.)
EPBC Act TECs							
Brigalow	E	E	Present	4.1	0.9	9.9	0.5
EPBC Act & NC Act threatened and special least concern species							
<i>Xerothamnella herbacea</i> (no common name)	E	E	Present	~90 individuals	~90 individuals	0	0
<i>Solanum elaeagnifolium</i> (no common name)	E	NL	Present	~117 individuals	~117 individuals	~42 individuals	~42 individuals
Ornamental Snake (<i>Denisonia maculata</i>)	V	V	Present	92.0	34.4	7.6	0.3 (Option 1) 0.4 (Option 2)
Koala (<i>Phascolarctos cinereus</i>)	V	V	Moderate	111.0	26.5	0.0	0.0
Squatter pigeon (<i>Geophaps scripta scripta</i>)	V	V	Moderate	167.8	21.9	0.0	0.0
Australian Painted Snipe (<i>Rostratula australis</i>)	E	E	Moderate	23.4 (+ 68.5 marginal)	0.4 (+ 33.9 marginal)	7.6	0.3 (Option 1) 0.4 (Option 2)

Protected matter	NC Act/VM Act Status ¹	EPBC Act Status ²	Likelihood of occurrence	Total area in the project site, road realignment and water release/extraction infrastructure area (ha/no.)	Impacted area in the project site, road realignment and water release/extraction infrastructure area (ha/no.)	Total area in the ETL study area (ha/no.)	Impacted area in the ETL study area (ha/no.)
Greater Glider (<i>Petauroides volans</i>)	V	V ³	Moderate	0.0	*0.4	0.0	0.0
Yellow-bellied Glider (<i>Petaurus australis australis</i>)	V	V	Moderate	0.0	*0.4	0.0	0.0
White-throated Needletail (<i>Hirundapus caudacutus</i>)	V	V ³	Moderate	81.5	16.1 overfly habitat	11.8	0.5 (Option 1) 0.5 (Option 2) overfly habitat
Short-beaked Echidna (<i>Tachyglossus aculeatus</i>)	SLC	NL	High	26.2	10.1	0.0	0.0
EPBC Act migratory birds							
Glossy Ibis (<i>Plegadis falcinellus</i>)	SLC(M)	M	Moderate	Areas of temporary ponding	unknown	unknown	unknown
Latham's Snipe (<i>Gallinago hardwickii</i>)	SLC(M)	M	Moderate	23.4 (+ 68.5 marginal)	0.4 (+ 33.9 marginal)	7.6	0.3 (Option 1) 0.4 (Option 2)
Regulated vegetation							

Protected matter	NC Act/VM Act Status ¹	EPBC Act Status ²	Likelihood of occurrence	Total area in the project site, road realignment and water release/extraction infrastructure area (ha/no.)	Impacted area in the project site, road realignment and water release/extraction infrastructure area (ha/no.)	Total area in the ETL study area (ha/no.)	Impacted area in the ETL study area (ha/no.)
Watercourse vegetation	OC	E	Present		1.1	0.0	
Connectivity	Various	NL	Present		10.1	0.0	

* A portion of the water release/extraction infrastructure extends beyond the project site boundary in the west into mapped habitat for Greater Glider and Yellow-bellied Glider.

¹ E = Endangered, V = Vulnerable, SLC(M) – Special least concern (migratory) under the NC Act; OC = Of concern under the VM Act

² E = Endangered, V = Vulnerable, M = Migratory, NL = Not listed under the EPBC Act

³ At the time of the EPBC Act Controlled Action Decision (EPBC Referral 2012/6547), the Greater Glider, Yellow-bellied Glider and White-throated Needle-tail were not listed as threatened fauna under the EPBC Act and therefore are not considered as MNES' for the Project

7.2 Direct impacts

The Project layout is shown on Figure 2. The project will commence with site clearance works in preparation for construction of necessary infrastructure, including the ETL, access roads, dams, product and ROM stockpile areas, haul roads, the CHPP, and MIA. Site clearance involves vegetation clearing, soil removal and storage, earthworks and drainage works. Site clearance will be staged on an as needs basis.

Linear infrastructure will include:

- water release/extraction pipeline and pump station – pipeline corridor width of approximately 10 m and pump station footprint of approximately 50 m²
- Moura Baralaba Road realignment – width of 12 m
- ETL easement - maximum width of 20 m, and associated infrastructure (e.g. substation within the 20 m easement).

A two year construction period is expected to commence in 2030, followed by an operational mining life of approximately 23 years. It is anticipated that there will be overlap between construction and mining operations in the initial phases with rehabilitation commencing in a staged manner over the life of the mine, and for a period post mining. Mining operations will commence in the north-west of the project site and progress in a south-easterly direction. Rehabilitation will use topsoils and subsoils stripped and stored during the site preparation and progressive vegetation clearing phases of the project. Disturbed areas will be rehabilitated to a stable landform with a self-sustaining vegetation cover.

7.2.1 *Vegetation clearing*

Vegetation and habitats will be progressively cleared for the project. Figure 10 shows the distribution of remnant and regrowth vegetation communities. Remnant and regrowth of concern and least concern communities under the VM Act will be impacted within the project site and water release/extraction infrastructure area. The ETL is anticipated to require the removal of regrowth endangered vegetation.

Clearing will cause a direct impact by removing vegetation that also provides suitable habitat for a range of flora and fauna species. Fauna habitat resources for foraging, sheltering and breeding within the disturbance footprint that may be impacted by the project include the following:

- understorey and groundcover - shelter and forage habitat for amphibians, reptiles, small birds and ground-dwelling mammals
- fallen logs, coarse woody debris and leaf litter - shelter habitat for amphibians, reptiles and ground-dwelling mammals
- hollow-bearing trees and stags - shelter and breeding habitat for reptiles, birds and arboreal mammals and microbats
- food trees, shrubs, grass and herbs - forage resources for small birds, Koalas and other herbivorous mammals

- nectar producing trees and shrubs - foraging habitat for insects, blossom-dependent birds, arboreal mammals and megachiropteran bats (i.e. flying-foxes)
- gilgai and constructed dams - water resources and aquatic habitat for a range of amphibians, mammals, birds and reptiles.

Approximately 10.1 ha of remnant and up to 5.5 ha of high-value regrowth vegetation will potentially be cleared or disturbed for the project, some of which provides suitable habitat for threatened species. Table 9 provides a summary of the areas of each remnant vegetation community that will be impacted in the project area. Impacts within the ETL study area have been estimated based on a maximum impact scenario using the two alignment options presented in Figure 2. There is potential for this maximum area of impact to be reduced during the detailed design of the ETL.

Additional areas of non-remnant vegetation that do not represent high-value regrowth will also require clearing, some of which represents TECs and provides suitable habitat for threatened species. These areas have been factored into habitat mapping and impact assessments discussed in Section 8.

Table 9: Summary of remnant and high-value regrowth vegetation impacts

Vegetation community	Conservation status ¹		Total remnant (high-value regrowth) area within study area (ha)	Total remnant (regrowth) area to be impacted (ha)		
	VM Act	Bio-diversity		Project site and water release/extraction infrastructure area	ETL study area	Total impact
RE 11.3.3/a	OC	OC	362.0 (117.6)	0.0 (0.1)	0.0 (0.0)	0.0 (0.1)
RE 11.3.25	LC	OC	287.1 (0.0)	0.4* (0.0)	0.0 (0.0)	0.4* (0.0)
RE 11.4.9a	E	E	0.0 (7.6)	0.0 (0.0)	0.0 (0.3 Option 1, 0.4 Option 2)	0.0 (0.3 Option 1, 0.4 Option 2)
RE 11.5.9	LC	NCP	8.7 (5.3)	8.7 (4.6)	0.0 (0.0)	8.7 (4.6)
RE 11.5.15	LC	E	1.1 (0.0)	1.1 (0.0)	0.0 (0.0)	1.1 (0.0)
Total						10.2 (5.1)

* No clearing of canopy trees is proposed for the placement of the water release/extraction infrastructure outside MLA 700057. Impacts will be limited to the ground and shrub layers.

¹ E = Endangered, OC = Of concern, LC = Least concern, NCP = No concern at present

7.2.2 Vegetation clearing protocols

A number of controls on the clearing methods are proposed in order to minimise impacts to habitat and areas of vegetation to be retained within the project site. These controls include:

- Clearing would be undertaken sequentially and in accordance with the 'Permit to Disturb' process, whereby any and all disturbance that involves individual trees (dead or alive), vegetation and soil disturbance requires approval from the Environmental Officer. This would confirm the area of vegetation and habitat to be cleared is that which is required for the safe construction and operation of the project and delineating the approved clearing area on the ground.
- Particular care would be taken in relation to any work in or adjacent to drainage features, particularly in high flow or prolonged rainfall periods. Any necessary sediment control works would be implemented, particularly if remnant pools are located adjacent to construction activities. Any necessary rehabilitation of drainage features and watercourses would be undertaken using native flora species. A pre-clearing inspection would be undertaken ahead of construction of powerlines, roads or other linear infrastructure

across drainage features and watercourses to determine if individual trees can be retained during construction works.

- Minimising impacts to animal breeding places, whereby a species management program (SMP) would be developed and implemented for all vegetation clearing and earthworks during construction and mining operations. This program will outline the requirements for pre-clearance inspections and spotter/catcher activities during clearance works to detect and safely protect or remove animals and animal breeding places.

Pre-clearing inspections

Inspection of areas to be cleared will be undertaken prior to clearing to confirm whether any animal breeding places for threatened or near threatened species are present or likely to be present. If breeding places for threatened or near threatened species are present or likely to be present, the proponent will engage a spotter/catcher to manage the potential impacts to fauna during the clearing activities.

Species management program

The purpose of a SMP is to manage and minimise the risk of impacts to animals and animal breeding places protected under the Nature Conservation (Wildlife Management) Regulation. A SMP sets out the protocols that are required to be implemented prior to and during vegetation clearing activities and defines measures to be undertaken prior to clearing, such as;

- pre-clearance survey(s)
- protocols for handling various species encountered prior to or during clearing activities
- approaches to specific clearing techniques to minimise disturbance
- relocation or substitution of nesting features, such as hollows and logs
- treating and rehabilitation of injured wildlife, including emergency euthanasia
- monitoring relocated animals and nests.

The role of the spotter/catcher will also be defined within the SMP. As part of this project the spotter/catcher will operate in accordance with the SMP and will:

- be appropriately qualified and experienced in wildlife management and will hold the necessary Rehabilitation Permit (under the Nature Conservation (Animals) Regulation 2020) to allow the removal of fauna from the area to be cleared, if necessary
- undertake an inspection of the area proposed to be cleared immediately before clearing and relocate fauna, as necessary, during the inspection
- be present during clearing activities to provide advice in the event of native fauna being injured during clearing
- provide advice in relation to the direction in which trees should be felled and how trees with hollows are to be handled (e.g. whether there is a need for any felled trees to be left in situ to allow fauna to relocate).

7.3 Indirect impacts

The potential for indirect impacts to vegetation and flora, fauna and their habitats, which may occur as a result of the project includes:

- potential impacts on surface water quality/quantity and changes to flooding adjacent to, upstream and downstream of the project
- potential impacts on groundwater dependent ecosystems as a result of changes to groundwater, including groundwater drawdown
- habitat fragmentation and edge effects due to progressive vegetation clearing
- potential spread of weeds and pest animals
- noise and vibration from various sources, such as mining equipment, excavators, and blasting activities
- generation of dust during construction and mining activities
- potential impacts from lighting
- potential for vehicle strike
- potential for erosion of disturbed areas and sedimentation of waterways.

7.3.1 Changes to surface water and flooding

Surface water

A surface water impact assessment has been undertaken for the project (Engeny 2023a). This assessment found that the mean annual streamflow to the Dawson River at the Project location is expected to be reduced by 0.08%, which is considered to have minor impacts to flow duration and negligible impact to the Dawson River base flow, medium and high flow regimes. Water quality impacts associated with the project will be managed by the proposed mine water containment storages, sediment dams and mine water release conditions (Engeny 2023a).

Seepage generated in the out-of-pit and in-pit dumps is expected to be of low salinity and neutral to alkaline pH (Terrenus Earth Sciences 2023) so is not expected to negatively influence water quality in the receiving environment or impact terrestrial ecosystems. Uncontrolled seepage from the mine operations is not expected to occur, as all potential seepage flows will be managed through the mine water management system (Engeny 2023a).

Flooding

The project will modify the local landforms through the creation of stockpiles, pits and a final landform bund. Hydrological and hydraulic modelling has been undertaken to assess these types of impacts on local flooding regimes associated with the Dawson River and its tributaries, including Banana Creek (Engeny 2023b). The outcomes of this assessment are discussed in this section.

The Dawson River flows relatively consistently throughout the year as a result of inflow from groundwater sources along its length. Banana Creek is an ephemeral

5th order tributary of the Dawson River, and which lies parallel with the western boundary of the project, joining the Dawson River approximately 1 km west of the project site (Engeny 2023b). There are also a number of smaller ephemeral unnamed tributaries and wetlands within and adjacent to the project site and ETL study area.

The Dawson River experiences significant seasonal variations in high flows with flooding typically occurring during the wet season, between October and April. The baseline flood modelling for the Dawson River, associated tributaries and floodplains indicates that:

- flows typically overtop the Dawson River and Banana Creek channel only in events greater than the 10% AEP flood event
- the project becomes inundated only at the 2% AEP flood event and at the 1% AEP flood event 50% of the project becomes inundated however inundates less than 16% of the proposed Project disturbance area.
- the Dawson River floodplain has a flow width of approximately 5.5 km in events greater than the 2% AEP flood event adjacent to the project site
- peak flow velocities in the 1% AEP flood event within the Dawson River channel adjacent to the project site are generally between 1.0 m/s and 3.0 m/s and peak flood velocities on the floodplain are generally below 1.0 m/s (Engeny 2023b).

The modelling (Engeny 2023b) for the project has demonstrated that:

- the project restricts the extent of flooding on the eastern Dawson River floodplain resulting in additional flood flows on the western floodplain
- there will be no change in flood depth in the 20% AEP or 10% AEP flood events.
- an increase of 200 mm is predicted for the 2% AEP and 1% AEP flood events primarily limited to the area between the project site and the Dawson River and an increase of 20 mm is predicted on the floodplains to the west of the project site
- an increase of 10 mm to 20 mm is predicted in the Dawson River channel beyond the project site for the 2% AEP and 1% AEP flood events
- there will be a slight reduction in peak water levels in the main Dawson River channel and on the eastern floodplain downstream of the project site during events rarer than the 10% AEP (e.g. 2% AEP and 1% AEP flood events) due to flood waters being directed to the western floodplain and anabranch
- no change in flow velocities greater than 0.1 m/s are predicted up to and including the 10% AEP flood event and these changes in flow will be experienced mostly in channel
- areas with changes in peak flood velocity greater than 0.1m/s are limited to very localised areas immediately adjacent to the Project within the Project MLA for the 2% AEP and 1% AEP flood events for all AEP flood events assessed, flood velocity changes greater than 0.1 m/s are not expected to occur outside of the Project MLA boundary

- inundation duration is unchanged for flood events up to and including the 1% AEP (Engeny 2023b)
- with regard to the MSES wetland in the south-western corner of the project site, flooding of this wetland occurs in greater than 10% AEP flood events, with no change in flooding conditions in the 2% AEP and only 0.02 m increases for the 1% AEP flood event. These increases are expected to have a negligible impact to the wetland condition. Peak flow velocity is likely to generally remain unchanged as a result of the project (Engeny 2023b).

Flow regimes are recognised as being a key determinant of floodplain plant community composition and structure. Alteration of flow regimes beyond their natural patterns is recognised as a threat to ecological sustainability of rivers and their associated floodplain wetlands (Bunn and Arthington 2002; Casanova 2015).

Overall, the modelling indicates peak flow velocities will remain similar to the current peak flow velocities across the Dawson River floodplain for all modelled events. Impact to flood timing and travel times as a result of the project relative to the magnitude of the flood events is also expected to be very minor (Engeny 2023b).

Flood modelling indicates little or no change in water levels, flow velocity and duration of inundation for more frequent flood events (i.e. 10% and 20% AEP)

For larger events, i.e. >10% AEP flood events, minor changes to flood level, velocity and duration are also predicted and many of these changes will be localised. As a result, it is considered unlikely that the ecology of the Dawson River floodplain will be significantly impacted by changes in the flow regime. This is because modelled changes are unlikely to result in major shifts in the structure and composition of riparian and floodplain vegetation communities. Such changes in vegetation would be more likely to occur as a result of significant and sustained or permanent alterations to the flood regime, which are not predicted. Similarly, the brief and minor changes to depth and velocity during flood events that overtop the Dawson River and Banana Creek banks that have been modelled for the project are unlikely to significantly increase levels of erosion and sedimentation of the floodplain and mechanical damage to plants during higher flows is unlikely to occur as a result of the project.

While the 0.1% AEP flood event (i.e. 1 in 1,000 year event) was modelled for comparative purposes, very large floods of this magnitude have catchment-wide influences on hydrology (and geomorphology), and thus have little relevance at the scale of the project area. Up to 1% AEP flood events are more relevant for this project.

7.3.2 Groundwater dependent ecosystems

Site-specific groundwater mapping for the project has identified that depths to groundwater is typically 10-15 metres below ground level (mbgl) in the north of the project site, 15-20 mbgl in the west of the project site and greater than 20 mbgl in the east of the project site (Watershed HydroGeo 2023).

The GDE assessment for the project found only one area of potential groundwater interaction with vegetation within the project area based on leaf water potential

(LWP), soil moisture potential and isotopic analysis. This area is characterised by high-value regrowth RE 11.3.3 along a small 2nd order stream in the south-west of the project site. Vegetation along the Dawson River and Banana Creek and their tributaries also have high potential for groundwater interaction, with some small areas supporting known or likely GDE areas (3D Environmental 2023).

However, due to the depth and salinity of the alluvial groundwater across the flood plain, in combination with heavy clay soils that are difficult for tap root penetration, it is considered unlikely that Coolibah communities, which are common on the Dawson River floodplain, would use the regional alluvial aquifer.

The GDE study concluded that groundwater dependence within MLA 700057 and adjacent areas associated with the Dawson River flood plain is controlled by small discrete and disconnected perched sandy lenses distributed sporadically throughout the area, including within the project area, that sit within the clay alluvium. These sandy lenses provide seasonal groundwater resources that have the potential to support some interaction between this shallow groundwater and vegetation, but these are disconnected from the regional groundwater aquifer, i.e. there is no evidence of hydraulic connectivity between the sandy lenses and the groundwater table. These sandy lenses are regulated by surface flows (3D Environmental 2023).

The GDE assessment also found that the wetland community in the south-west of the project site does not represent a GDE (3D Environmental 2023).

The GDE assessment found that:

- clearing of one potential GDE is proposed in the south-west of the project site
- there is no risk of draw down related impacts to GDEs associated with the Dawson River or Banana Creek channels as the potential drawdown area does not extend to areas identified as 'known or likely GDEs' (3D Environmental 2023).

The GDE assessment found that in consideration of the potential GDE mapping, and surface water and flood modelling undertaken by Engeny (Engeny 2023a; b), impacts to GDEs as a result of changes to the flood regime and surface water flows are likely to be minimal because:

- changes to the flood regime are unlikely to be detrimental to the health of GDEs occurring on the Dawson River floodplain due to the minor changes predicted to flood duration and depth in these areas
- the risk of contamination of fresh groundwater is negligible
- based on low salinity of runoff and seepage from the mining areas, and the management of mine affected water storages and sediment dams as part of the mine Water management Plan, there is low risk of impact to water quality of alluvial aquifers that potentially support GDEs (3D Environmental 2023).

In addition to the site Water Management Plan and Erosion and Sediment Control Plan for the project, a comprehensive groundwater monitoring network will be implemented for the duration of the project.

7.3.3 Fragmentation and edge effects

Vegetation clearing can result in the fragmentation of habitat that can impact flora and fauna species. The clearing for the project is unlikely to significantly fragment habitat due to the highly disturbed and largely cleared landscape in which the proposed project is located. However, there is potential for the project to create minor local barriers or impairment to movement of some fauna species, between Mt Ramsay and the Dawson River and Banana Creek. However, the almost exclusively cleared nature of the area between Mt Ramsay and the Dawson River and Banana Creek mean that faunal movements between these landscape features is likely to be minimal and limited to species of high mobility (such as birds) and species tolerant of cleared disturbed areas.

A further consequence of clearing vegetation is that it can produce “edge effects”. Edge effects are impacts that can occur at the interface between natural habitats and cleared areas or developed land. Edge effects may cause modifications to the local environment in terms of altered species and structural composition due to increased light, wind shear, and weed invasion.

Clearing for the project will primarily occur across the project site. However, historic clearing and thinning has been undertaken throughout the project area and surrounding areas already, leaving no areas that are not already subject to edge effects. Given the open structure of the woodland habitat that remains within the project area, edge effects to remaining patches are not likely to be significant.

In accordance with the DES’s SRI Guideline, DES’s Landscape Fragmentation and Connectivity (LFC) Tool was used to assist in identifying and quantifying any significant impact as a result of the project on habitat connectivity. The LFC Tool determined that the project would result in a significant residual impact on local connectivity, whereby the analysis showed a significant impact in the reduction of core remnant areas at the local scale. The LOGFILE output of this spatial analysis tool is provided in Appendix I

7.3.4 Invasive species

The project and associated infrastructure is located within a highly modified landscape of primarily historic grazing activities where weeds, introduced plants and some feral predators are already present. Weeds have infiltrated all vegetation and habitats, including remnant vegetation and TECs.

Given the extent of disturbance and presence of weeds, the proposed project is unlikely to increase weed populations any more than existing activities on the site.

Pest animals that were identified in the study area during field surveys included the Cane Toad, Wild Dog, Common Myna, Feral Cat, European Rabbit and Feral Pig (refer Section 6.4). It is likely that other species such as the Fox (*Vulpes vulpes*) is also present. Therefore, feral animals are already present and able to move freely throughout the landscape and/or readily colonise new areas. The project is unlikely to introduce new pest animals to the area. Vegetation clearing activities may temporarily attract some predatory native and feral animals.

A Weed and Pest Management Plan will be developed and implemented for the project that describes the measures that will be implemented to manage weeds and feral animals as per the requirements of the Biosecurity Act and in consideration of existing Threat Abatement Plans for the applicable Listed Key Threatening Process as defined within the EPBC Act. The management plan will be developed in consideration of the Banana Shire Council's existing and planned management programs. The management plan will include:

- delivering education and awareness training about weeds and pest animals to staff and contractors through site inductions
- implementing the following prevention measures:
 - maintenance of roads and tracks to minimise weeds on tracks and to reduce the spread of weeds by vehicle movements
 - monitoring topsoil stockpiles to ensure that they do not become infested with weeds
- designing and implementing appropriate treatment control programs to contain and reduce the extent of restricted pest weed species at the site and to prevent the introduction of new species. This may involve chemical and mechanical methods, depending on the sensitivity of the receiving environment
- monitoring of weed infestations and presence of pests.

The proponent will liaise with neighbours and local land managers to contribute, where practical, to a broader pest animal management program aimed at reducing the Feral Cat, Wild Dog and Red Fox populations in the region.

7.3.5 Noise and vibration

Noise and vibration emissions associated with the project will be generated from various sources, such as mining equipment and blasting activities.

Most fauna species exhibit a high degree of adaptability to the noise from machinery. Noise from mining activities may cause some behavioural modification by birds, potentially altering feeding activity, and sudden loud noises may also startle bird and mammal species. Consequently, depending on the magnitude of construction and mining noise, some species may move in response to noise, and forego utilisation of habitat within the noise disturbance zones. The size of the zone would likely be different for individual species and depend on the intensity and nature of the noise sources. It is not possible to quantify the proportion of the local fauna community that would be adversely affected by noise impacts, but it is expected to be a minority of species, and noise impacts to fauna are unlikely to occur over a significant distance from the noise source.

In the case of noise associated with construction or vegetation clearing activities that are of shorter duration, native fauna are likely to return to affected habitat areas within a short period of time once the noise emissions cease.

Temporary or intermittent noise and vibration emissions will occur from blasting in the open cut pit. Impacts on fauna from ground vibration (e.g. from blasting) would be similar to noise disturbance. It is possible that some species would forego

the utilisation of areas close to the vibration source, where the intensity of the vibration exceeds the tolerance of the species. However, these are intermittent activities and most fauna will also likely return to nearby areas after a short period of time once the noise or vibration emissions cease.

Specific noise and vibration mitigation measures will be implemented for the project and are discussed in the noise and vibration assessment for the project.

7.3.6 Dust

Construction and mining activities have the ability to generate dust, which has the potential to impact vegetation and fauna. Increased levels of dust could reduce the health of vegetation along the edge of mined areas and haul roads, impact potential foraging resources for wildlife, and influence faunal abundance. However, recent studies on the impacts of dust from unsealed roads, including haul roads, on vegetation and fauna, have found no evidence that dust has any detrimental impacts on vegetation or fauna abundance (Cumberland Ecology 2015; Jones et al. 2016). Standard dust minimisation and suppression strategies, such as watering haul roads, will be implemented for the project to minimise dust generation (refer Air assessment for the project). Mined areas, particularly waste rock dumps, will also be progressively rehabilitated and vegetated following mining, which will also reduce the potential for dust generation. Dust is therefore not likely to cause a significant impact on the ecological values of the areas surrounding the project.

7.3.7 Lighting

The project will increase the level of artificial light, and light spill has the potential to disturb some species. Lighting impacts may include some animals being attracted to the artificial light source and other species avoiding the light source due to increased risk of visibility and predation. It is likely however, that most fauna species would habituate to the levels of artificial light or temporarily move away from areas of night lighting. The extent of impact will vary between species and habitat types as light shed will be greater in more open habitat types. The types of common and adaptable species identified in the study area that are more likely to persist in areas close to infrastructure areas, are generally able to adapt to environmental conditions over small areas. Lighting is not likely to significantly impact fauna.

7.3.8 Vehicle strike

The movement of haul trucks on haul roads within the site has the potential to result in injury or mortality of fauna. Ground-dwelling fauna are most susceptible to this impact, although birds and micro-bats may also be impacted.

The mining operations will operate 24 hours per day, 7 days per week. All trafficable areas will be subject to enforced speed limits that would reduce the risk of animal strikes. Relevant signage, safe driving procedures and staff inductions addressing this risk would increase awareness and contribute to reducing the risk of this impact.

The vibration of approaching haul trucks may also provide animals with warning and prompt fauna to move away from the path of approaching vehicles.

7.3.9 Erosion and sedimentation

The project has the potential to result in erosion of disturbed areas and sedimentation of waterways downstream through the clearing of vegetation for the development of open cut pits, and construction of haul roads and other infrastructure.

An Erosion and Sediment Control Plan will be developed and implemented for the project. The plan will describe methods and strategies to control soil erosion and minimise sediment transport. Sediment dams will be used to capture and manage sediment runoff from disturbed areas.

A Site Water Management Plan will also be implemented for the project and is outlined in the surface water impact assessment for the project. The Site Water Management Plan includes diverting runoff from undisturbed areas away from areas disturbed by mining activities, collecting drainage from disturbed areas and directing it to sediment dams for the control of suspended sediment. The sediment dams have been designed to provide sufficient storage for settlement of suspended solids so that water quality during overtopping events has negligible impact on the water quality in the receiving waterway.

7.4 Cumulative impacts

The Brigalow Belt bioregion has a long history of clearing and landform modification associated with agricultural pursuits, forestry, mining, gas production and the development of townships. The construction of the roads, rail lines and pipeline easements required to facilitate development of the region has further reduced and fragmented the extent of remnant vegetation persisting in the landscape present. The current extent of remnant vegetation in the bioregion has been estimated by the Queensland Herbarium as being at 15,038,111 ha or 41.2% of the pre-clearing cover (Accad et al. 2019). This is higher than the estimated extent of remnant vegetation within the Dawson River Downs subregion, which is 93,330.4 ha or 9.5% of the pre-clearing extent (Accad et al. 2019).

The project will result in impacts to 10.0 ha of remnant vegetation, which represents approximately 0.01% of the current extent of remnant vegetation in the subregion. The area of remnant vegetation proposed to be impacted is comprised of 0.1 ha of concern RE (RE 11.3.3) and 9.9 ha of least concern REs (REs 11.3.25, 11.5.9 and 11.5.15).

The Baralaba North Continued Operations Project, located approximately 12 km north of the project, was approved in 2014. The EIS estimated a total of 277 ha of remnant vegetation would be cleared for the expansion of the existing mine (Resource Strategies 2014b). The Dawson Mine is located approximately 25 km to the south of the project, however, the extent of approved vegetation clearance is not publicly available.

Cumulatively, direct impacts on native vegetation from developments including other mining projects in the region will result in incremental losses or modification

of remnant vegetation, including TECs and habitat for species of conservation significance. In addition, clearing for mining and infrastructure projects can interrupt connectivity between areas of habitat, leading to reduced opportunities for fauna to successfully forage, breed and colonise new territories. Fragmentation of habitat can also affect genetic diversity through limiting opportunities for breeding individuals to interact, as well as pollination and dispersal of plant propagules.

The provision of environmental offsets in line with Commonwealth and/or State Government policies provide an opportunity to mitigate cumulative impacts. Offsets were required for the Baralaba North Continued Operations Project and will also be provided for the Baralaba South Project to provide adequate compensation for significant residual impacts to matters of environmental significance and to yield no net conservation loss.

Cumulative impacts have been considered by the other EIS studies, including the surface water impact assessment (Engeny 2023a), flood impact assessment (Engeny 2023b), and groundwater modelling and impact assessment (Watershed HydroGeo 2023) and GDE assessment (3D Environmental 2023).

7.5 Duration and timing of impacts

The duration and timing of the project's impacts affects the magnitude of the overall impacts of the project. Vegetation clearing for pit and infrastructure development is the principal direct impact from this project to vegetation communities and fauna habitat. The project is proposed to have a mine life of up to 23 years. However, external factors may influence production schedules, resulting in a shorter mine life. Clearing and subsequent rehabilitation will take place progressively as pit and mineral waste disposal progresses. Rehabilitation of the infrastructure areas will be undertaken at completion of the mine operations.

7.6 Rehabilitation

Rehabilitation of disturbed areas will occur progressively throughout the life of the mine and will continue after mining has ceased until rehabilitation objectives have been met.

Suitable topsoils and subsoils will be stripped from construction and mining areas, and where viable stored to maintain soil quality and used in rehabilitation to promote native vegetation from the soil seed bank. Revegetation will be also undertaken where required across the site.

At completion of mining activities, the site will be rehabilitated to a safe, stable and self-sustaining condition. Review and audit of rehabilitation activities will be undertaken during operation of the project. Rehabilitation is discussed further in the EIS for the project.

7.7 Management and monitoring

A range of plans and procedures will be implemented during mine construction, operation and rehabilitation, which will manage and monitor impacts to terrestrial

ecology. In particular, the following protocols and plans will be developed to manage terrestrial ecology:

- vegetation clearing protocols, including a 'Permit to Disturb' procedure, pre-clearance surveys and a SMP
- Weed and Pest Animal Management Plan
- Erosion and Sediment Control Plan
- Site Water Management Plan
- Receiving Environment Monitoring Program
- Air Quality Management Plan.

In addition to the management plans listed above a comprehensive groundwater monitoring network is proposed for the duration of the project to allow early identification of changes in groundwater conditions.

These plans, procedures and monitoring programs will be reviewed and revised, as necessary or stipulated, throughout the life of the project to ensure they remain relevant and effective.

8 Significance of impacts

Assessments of the impacts of the project on MNES and MSES have been undertaken. These impact assessments consider impact mitigation and management measures described in Section 7. The assessments consider the direct, indirect and cumulative impacts of the project, and were undertaken in accordance with the Commonwealth *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (Significant Impact Guideline) (DotE 2013) and the *Queensland Environmental Offsets Policy SRI Guideline* (SRI Guideline) (EHP 2014b), where relevant to Commonwealth or State listed matters.

Assessments of significance have been undertaken for each species as per the criteria presented in Table A8 of Appendix A and these are provided in Sections 8.1 and 8.2. Guidelines and policies produced by the Queensland and Commonwealth Governments have been referred to, to assist with determining the significance of impacts.

As outlined in Section 2.6, the EO Act does not apply to impacts on EPBC Act MNES that are being assessed by the Commonwealth Government. Therefore, to avoid duplication of assessments for matters listed as both MSES and MNES, dual listed species and communities will be assessed using the EPBC Act Significant Impact Guideline and residual MSES will be assessed using the SRI Guideline.

Table 10 provides a summary of where MNES and MSES were identified or considered to potentially occur in each component of the project area and is based on information provided in Sections 5 and 6. Table 11 provides a list of the MNES and MSES that have been assessed in accordance with Queensland and Commonwealth significance guidelines and a summary of the maximum potential direct impacts, in the form of vegetation or habitat clearing proposed.

Table 10: MNES and MSES identified or considered to potentially occur in each component of the project area

Matter	Occurrence in each component of the project area?			
	Project Site	Road realignment corridor	Water release/ extraction infrastructure area	ETL study area
MNES				
Brigalow TEC	Present	Unlikely	Unlikely	Present
Coolibah – Black Box Woodlands TEC*	Present	Unlikely	Unlikely	Unlikely
<i>Xerothamnella herbacea</i> *	Present	Unlikely	Unlikely	Unlikely
Ornamental Snake*	Present	Unlikely	Unlikely	Potentially
Australian Painted Snipe*	Potentially	Unlikely	Unlikely	Potentially
Koala*	Potentially	Unlikely	Potentially	Unlikely
Squatter Pigeon*	Potentially	Unlikely	Potentially	Present
Glossy Ibis	Potentially	Unlikely	Unlikely	Potentially
Latham’s Snipe	Potentially	Unlikely	Unlikely	Potentially
MSES				

Matter	Occurrence in each component of the project area?			
	Project Site	Road realignment corridor	Water release/ extraction infrastructure area	ETL study area
Landscape connectivity	Present	Unlikely	Unlikely	Unlikely
Of concern RE 11.3.3	Present	Unlikely	Unlikely	Unlikely
Watercourse RE	Present	Unlikely	Present	Unlikely
Wetland RE	Present	Unlikely	Unlikely	Unlikely
Prescribed wetland (HES wetland (in a WPA))	Present	Unlikely	Unlikely	Unlikely
<i>Solanum elaeagnifolium</i>	Present	Unlikely	Unlikely	Present
Greater Glider [#]	Potentially	Unlikely	Potentially	Unlikely
Yellow-bellied Glider	Potentially	Unlikely	Potentially	Unlikely
White-throated Needletail [#]	Potentially	Unlikely	Potentially	Potentially
Short-beaked Echidna	Potentially	Unlikely	Potentially	Unlikely

* Species and communities listed as MNES and MSES and significance of impacts assessed under the Commonwealth Significant Impact Guidelines

[#] Species only assessed as a MSES, due to EPBC Act listing occurring after EPBC Referral Decision.

Table 11: Summary of impacts

Protected matter	EPBC Act Status ¹	NC Act /VM Act Status ²	Likelihood of occurrence in the project area	Total area in study area (including additional investigation area) (ha)/no. of individuals	Total area in project site (ha)/no. of individuals	Total maximum area(ha)/individuals to be impacted	Potential for significant impact? ³
MNES							
Brigalow TEC	E	NL	Present	43.6	14.0	1.4 [^]	No
Coolibah – Black Box Woodlands TEC	E	OC	Present	64.2 (+ potential 428.7)	55.7	0.0	No
<i>Xerothermella herbacea</i> *	E	E	Present	~90 individuals	~90 individuals	~90 individuals	Yes
Ornamental Snake*	V	V	Present	120.2 (+ 50.5 marginal)	65.0 (+ 34.6 marginal)	34.9 [^]	Yes
Australian Painted Snipe*	E	V	Moderate	86.2 (+ 84.4 marginal)	31.1 (+ 68.4 marginal)	1.0 [^] (+33.9 marginal)	No
Koala*	V	V	Moderate	887.1	111.1	26.5	No, only 0.4 ha of critical habitat
Squatter Pigeon*	V	V	Present	974.9	84.7	21.9	No
Glossy Ibis	M	SLC (M)	Moderate	86.2 (+ 84.4 marginal)	31.1 (+ 68.4 marginal)	1.0 [^] (+33.9 marginal)	No
Latham’s Snipe	M	SLC (M)	Moderate	86.2 (+ 84.4 marginal)	31.1 (+ 68.4 marginal)	1.0 [^] (+33.9 marginal)	No
MSES							
Landscape connectivity	NL	NL	-	994.7		10.1	Yes
Of concern RE 11.3.3	E	OC	Present	361.1		0.0	No
Watercourse RE 11.5.15	NL	LC	Present	Not applicable		1.1	No

Protected matter	EPBC Act Status ¹	NC Act /VM Act Status ²	Likelihood of occurrence in the project area	Total area in study area (including additional investigation area) (ha)/no. of individuals	Total area in project site (ha)/no. of individuals	Total maximum area(ha)/individuals to be impacted	Potential for significant impact? ³
Watercourse RE 11.3.25	NL	LC	Present	Not applicable		0.4	No
Wetland RE 11.3.3	NL	OC	Present	21.1		0.0	No
Prescribed wetland (HES wetland (in a WPA))	NL	Various	Present	33.6		0.0	No
<i>Solanum elaeagnifolium</i>	NL	E	Present	~159 individuals		~159 individuals	No
Greater Glider [#]	V	V	Moderate	767.4		0.4	No, no clearing of habitat trees
Yellow-bellied Glider	V	V	Moderate	767.4		0.4	No, no clearing of habitat trees
White-throated Needle-tail [#]	V	V	Moderate - overfly	1,136.5		16.7	No
Short-beaked Echidna	NL	SLC	High	996.1		10.1	No

¹ E = endangered, V = vulnerable, M = migratory, NL = not listed under the EPBC Act

² E = endangered, V = vulnerable, SLC = special least concern, M = migratory, NL = not listed under the NC Act or OC = of concern under the VM Act

³ Assessed under either the Commonwealth Significant Impact Guidelines or the Queensland SRI Guideline

* Species and communities listed as MNES and MSES and significance of impacts assessed under the Commonwealth Significant Impact Guidelines

Species only assessed as a MSES, due to EPBC Act listing occurring after EPBC Referral Decision.

^ Maximum value derived using ETL Option 2 impact area (higher of the two options).

8.1 Matters of national environmental significance

8.1.1 Brigalow TEC

Status: Endangered (EPBC Act)

Description

The Brigalow TEC, is characterised by a range of open forests and woodland, which are dominated by Brigalow (*Acacia harpophylla*) trees and shrubs. The community ranges in structure although usually occurs on acidic and salty clay soils (DoE 2013). This TEC comprises both remnant and regrowth vegetation in Queensland and New South Wales and in Queensland is represented by a number of REs in the Brigalow Belt, South-east Queensland bioregions, but primarily occurs in the Brigalow Belt Bioregion (Environment Australia 2001).

Current threats

The main threats to the Brigalow TEC are those activities that reduce its extent, cause a decline in the condition of the vegetation or impede its recovery, including:

- clearing particularly for mining and agricultural activities
- fire, particularly where exotic grasses are present within or adjacent to the remnant
- plant and animal pests, particularly by exotic pastures and in combination with clearing. Other pest plants include *Opuntia sp.*, Mother-of-millions (**Bryophyllum delagoense*) and Asparagus Fern (**Asparagus spp.*) species, as well as grazing by cattle and native herbivores
- lack of knowledge about climate change and how to restore degraded communities (DCCEEW 2023g).

Management Plans

The following plans and advice are in place for the Brigalow TEC:

- Conservation Advice: Approved Conservation Advice has been prepared for the Brigalow TEC, which outlines key diagnostic criteria and condition thresholds for the communities as well as threats and priority conservation actions required for the TEC. The Conservation Advice is an important consideration in the assessment of impacts to the Brigalow TEC and defines all patches of Brigalow vegetation that meet the key diagnostic criteria and condition thresholds as being considered critical to the survival of the Brigalow TEC.
- Threat Abatement Plan: Threat abatement plans are listed for the Cane Toad in relation to this TEC.
- Recovery Plan: There is currently no recovery plan for the Brigalow TEC.
- Referral Guideline: There are no referral guidelines for the Brigalow TEC. There is an information sheet, for Queensland purposes only, regarding clearing of Brigalow regrowth under the EPBC Act.

Survey effort

Seasonal field flora surveys were undertaken over 23 days and carried out in compliance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Versions 5.1, 5.0 and 4.0*, current at the time of the field surveys (Neldner et al. 2020; 2019; 2017b). Assessment sites were performed throughout the study area so as to thoroughly assess vegetation present.

The validation and mapping of remnant vegetation was undertaken at a total of 132 vegetation assessment sites and 102 quaternary photo points across all flora surveys (Figure 3). Of the 132 vegetation assessment sites, 11 were detailed secondary sites, 68 tertiary sites and 53 quaternary sites (Figure 3).

The flora surveys were designed to assess the structural and floristic characteristics of Brigalow communities within the study area against the relevant DAWE TEC condition thresholds and diagnostic criteria. The secondary and tertiary sites completed within these vegetation types were considered sufficient to assess whether the communities satisfy the condition criteria.

Further details about the field methods, survey timing, climatic conditions and limitations used to assess the project area are provided in Section 3 and Appendix A.

Habitat assessment

Presence within the project area: PRESENT (refer Section 5.2.1)

Areas of Brigalow vegetation were recorded within the project site and many of these patches, although not all necessarily meeting remnant status, exhibit the key diagnostic features and meet the condition thresholds of the EPBC Act listed endangered Brigalow TEC. These patches are comprised of vegetation representing REs 11.3.1 and 11.4.9a and are shown on Figures 10 and 11. A total of 43.6 ha of Brigalow TEC has been identified in the study area, including 4.1 ha within the project site and 9.9 ha in the ETL study area (Figure 11). This TEC does not occur in the water release/extraction infrastructure area or road realignment.

Impact assessment

The project would result in clearing of a maximum of 1.4 ha of Brigalow TEC.

Indirect impacts to this TEC are considered unlikely. As outlined in Section 7.3, indirect impacts related to noise and vibration, dust, lighting, erosion and sedimentation will be temporary, and reasonably simply managed and therefore minimal. Due to the already fragmented nature of the patches of this TEC in the landscape, edge effects and fragmentation are not expected to be significant and remaining patches of TEC in the project area are not proposed to be impacted by changes in surface water or flooding regimes as described in Section 7.3.

There will be no facilitated impacts as a result of the project.

Based on Queensland Government remnant RE mapping, there is approximately 14,687.9 ha of REs that potentially represent the Brigalow TEC in the Dawson

River Downs subregion, in which the project area is located (Accad et al. 2019). This is likely to be an underestimation of the extent of Brigalow TEC given the mapping doesn't capture all regrowth vegetation, remnants of <5 ha or <75 m in width (Neldner et al. 2017a). The proposed impact of 1.4 ha accounts for approximately 0.01% of Brigalow TEC in the subregion in which the project area is located and this is considered unlikely to significantly contribute to cumulative impacts to this TEC in the subregion.

Patches of Brigalow vegetation that meet the key diagnostic characteristics and condition thresholds for the TEC are considered to represent habitat critical to the survival of the Brigalow TEC in accordance with the definition within the approved Conservation Advice (TSSC 2013b). However, for the purposes of impact assessment, the Significant Impact Guidelines (DotE 2013) define habitat critical to the survival of a species or ecological community as follows:

'Habitat that is critical to the survival of a species or ecological community' refers to areas that are necessary:

- *for activities such as foraging, breeding, roosting or dispersal*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *to maintain genetic diversity and long term evolutionary development, or*
- *for the reintroduction of population or recovery of the species or ecological community.*

Such habitat may be, but not limited to; habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act (DotE 2013).

Avoidance, mitigation and management measures

Impacts to some areas of Brigalow TEC cannot be avoided due to the location of the coal seam, however, impacts to Brigalow patches along the ETL study area will be avoided where possible as part of the detailed design and siting of the proposed ETL.

A range of plans and procedures will be implemented during mine construction, operation and rehabilitation, which will manage and monitor impacts to terrestrial ecology. In particular, the following protocols and plans will be developed to manage clearing in and near retained Brigalow TEC:

- vegetation clearing protocols, including a 'Permit to Disturb' procedure
- Weed and Pest Animal Management Plan
- Erosion and Sediment Control Plan.

Rehabilitation requirements

Rehabilitation of disturbed areas will occur progressively throughout the life of the mine and will continue after mining has ceased until rehabilitation objectives have been met.

Suitable topsoils and subsoils will be stripped from construction and mining areas, and where viable stored to maintain soil quality and used in rehabilitation to promote native vegetation from the soil seed bank. Revegetation will be also undertaken where required across the mine site.

Significance of residual impacts

Table 12 provides an assessment of the significance of impacts to the Brigalow TEC against the Commonwealth Significant Impact Guidelines.

Table 12: Assessment of significance of residual impacts for the Brigalow TEC

Significance criteria	Assessment of significance
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
reduce the extent of an ecological community	The project will result in the clearing of 1.4 ha of Brigalow TEC (Figure 11). Based on Queensland Government remnant RE mapping, there is approximately 14,687.9 ha of REs that potentially represent the Brigalow TEC in the Dawson River Downs sub-region, in which the study area is located (Accad et al. 2019). This is likely to be an underestimation of the extent of Brigalow TEC given the mapping doesn't capture all regrowth vegetation, remnants of <5 ha or <75 m in width (Neldner et al. 2017a). As a result of the history of clearance in the Brigalow Belt, many remaining Brigalow TEC remnants are formed by narrow linear strips within road reserves and are therefore often not captured in the Queensland Government mapping. Overall, this proposed impact of 1.4 ha accounts for approximately 0.03% of Brigalow TEC in the region in which the project area is located.
fragment or increase fragmentation of an ecological community, for example by clearing vegetation for road or transmission lines	Patches of Brigalow TEC within the project site are small and isolated and would be totally removed as a result of the project (Figure 11). There is potential for the ETL to fragment TEC patches, whereby a 20 m wide easement may traverse one or both patches within the ETL study area. However, this is unlikely to significantly increase fragmentation of this TEC given the already highly fragmented nature of these isolated patches.
adversely affect habitat critical to the survival of an ecological community	The Brigalow TEC within the project area is considered unlikely to represent habitat critical to the survival of the community as it is unlikely to be necessary for activities such as breeding or dispersal, long-term maintenance of the community, maintaining genetic diversity or recovery of the community.
modify or destroy abiotic (non-living) factors (such as water, nutrients, or soils) necessary for an ecological community's survival,	Impacts to this TEC will be confined to the project site and ETL study area. There are limited patches of this TEC immediately downstream or adjacent to the project area. A number of controls will be put in place to maintain environmental surface water flows

Significance criteria	Assessment of significance
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	downstream and prevent erosion and sedimentation of surface waters. As outlined in Section 7.3.1, changes to the flooding regime are predicted to be minor and are unlikely to affect floodplain communities. Additionally, as per Section 7.3.2, Brigalow TEC in the project area is unlikely to be groundwater dependent. Therefore, the project is not predicted to give rise to impacts on surface water or groundwater that would impact Brigalow TECs that will remain in or adjacent to the project area.
cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	Impacts proposed to the Brigalow TEC as a result of the project are in the form of clearing rather than modification.
cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: <ul style="list-style-type: none"> - assisting invasive species, that are harmful to the listed ecological community, to become established, or - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community 	The project area is located within a highly modified rural landscape where introduced plants, e.g. *Buffel Grass and pest animals, e.g. *European Rabbit, are already present and were identified as part of the field surveys. The project is considered unlikely to increase the threat of these already established invasive species in the landscape. Additionally, the project is unlikely to result in mobilisation of pollutants of any kind into this TEC within or adjacent to the project area. A Pest and Weed Management Plan will be developed and implemented for the Project to manage weeds and feral animals. The plan will identify appropriate treatment control programs that are selected in consideration of the sensitivity of the environment in which they are to be applied. A Site Water Management Plan, Erosion and Sediment Control Plan and Receiving Environment Monitoring Program will also be implemented to maintain surface water quality.
interfere with the recovery of an ecological community.	Approximately 1.4 ha of Brigalow TEC is proposed to be cleared for the project. There is currently no recovery plan for the Brigalow TEC.
<i>Conclusion</i>	<i>The proposed clearing of 1.4 ha of Brigalow TEC for the project is not considered to have a significant residual impact on the TEC due to the small amount of clearing that is proposed and the small and isolated nature of the patches in the landscape context.</i>

8.1.2 *Xerothamnella herbacea*

Status: Endangered (EPBC Act and NC Act)

Description

The listing advice for this species indicates that it is known from two sites north east of Chinchilla, a single record from near Theodore and a record near Yelarbon east of Goondiwindi, Queensland (TSSC 2008b). However, large populations of this species have been recorded within the Moura and Biloela regions in recent years (pers comms, Chris Hansen, February 2019). This species occurs in Brigalow dominated communities in shaded situations, often in leaf litter and is often associated with gilgais (shallow ground depressions). Soils are generally heavy, grey to dark brown clays (TSSC 2008a).

Current threats

Current known threats to *X. herbacea* include competition by invasive plants, particularly *Green Panic and *Buffel Grass, which occupy similar habitats and locations. These plants can outcompete *X. herbacea* and increase fire fuel loads and alter fire regimes in habits in which this species occurs (TSSC 2008c).

Potential threats have also been identified as road widening, surface erosion, grazing and trampling by cattle and native macropods (TSSC 2008c).

Management plans

There are no management plans or recovery plans in place for this species. The Commonwealth Government provides the following plans and advice for *X. herbacea*:

- Conservation Advice: approved conservation advice has been prepared for *X. herbacea*, which provides priority research and management actions for the species, as well as specifying key threats.

Survey effort

Seasonal field flora surveys were undertaken over 23 days and carried out in compliance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Versions 5.1, 5.0 and 4.0*, current at the time of the field surveys (Neldner et al. 2020; 2019; 2017b). Assessment sites were performed throughout the study area to thoroughly assess Queensland Government mapped remnant vegetation. An additional day of field survey was focused on assessing population distribution and abundance of threatened flora previously identified within the project site, including *X. herbacea*.

Detailed flora species lists were collated at all secondary sites (Figure 3) and traverse lists were compiled to account for additional species that were recorded outside of the secondary site plots. Large portions of the study area were traversed on foot and the random meander technique applied (Cropper 1993). This method is essential for the detection of cryptic, pest and other significant species. This method was supplemented with 'educated walks' (Garrard et al. 2008) in habitat areas that possessed a higher likelihood of supporting threatened flora species.

Significant flora species listed under the EPBC Act and NC Act that were recorded or predicted to occur from database searches (Appendix B) were reviewed and, where relevant, formed the focus of targeted flora species surveys. Detailed traverses of habitat that was considered suitable for significant flora species were undertaken.

Areas identified as high risk for the presence of significant plants on the Protected Plants Flora Survey Trigger Map were assessed using the Queensland *Flora Survey Guidelines - Protected Plants Versions 2.01 and 2.0*, current at the time of the field surveys (DES 2019; EHP 2016). This guideline requires the timed meander method to be employed in areas of high risk.

Further details about the field methods, survey timing, climatic conditions and limitations used to assess the project area are provided in Section 3 and Appendix A.

Habitat assessment

Presence within the project area: PRESENT (refer Section 5.3.1)

A population of approximately 90 individuals of this species was recorded in 10 locations within a fragmented and considerably degraded patch of non-remnant Dawson River Gum scrubby open woodland (RE 11.4.8) in the central eastern portion of the project site (Figure 12). This species was recorded during the late dry season survey (December 2017) following moderate rainfall totals delivered during spring storms prior to the survey.

The number of individuals present at each location was low and ranged from one individual to around 20 individuals (Photo 1; Figure 12).

The woodland community was markedly fragmented with dead stags common throughout the canopy layer. The shrub layer was comprised of vine thicket species such as Scrub Boonaree, Stiff-leaved Denhamia, Wild Lime and Wallaby Apple (*Pittosporum spinescens*). Cattle grazing was prevalent and an ongoing disturbance throughout the area, which has led to the fragmentation of the shrub layer and weed infiltration throughout much of the ground layer.

There is potential for a mixed community of RE 11.3.1/11.3.3 along Banana Creek in the south of the additional investigation area to support this species (Figure 10). However, this species was not recorded in this habitat despite extensive searches in this area.

Populations of this species are not known from projects within the region (i.e. within 25 km of the project site) and the population within the project site is near the northern limit of this species distribution. Eco Solutions & Management knows of this species occurring east of Moura in the vicinity of the Baralaba Mine Train Load Out facility approximately 30 km south of the project area, as well as a very large population of more than 78,000 individuals at a location approximately 40 km south-east of the project area.

Impact assessment

The project is likely to result in the removal of all individuals of this species within the population identified in the project site.

Indirect impacts to the population within the project site are not relevant given the population will be removed. Indirect impacts to any other populations in the region related to noise and vibration, dust, lighting, erosion and sedimentation are unlikely as these will be temporary, and reasonably simply managed and any surrounding populations would be separated by greater than 200 m from project activities. No populations or potential habitat is proposed to be fragmented. Potential surface water, flooding and groundwater impacts are unlikely to significantly affect the Dawson River or Banana Creek as described in Sections 7.3.1 and 7.3.2.

There will be no facilitated impacts as a result of the project.

There is no publically available information about impacts to this species as a result of other projects in the region.

The Significant Impact Guidelines (DotE 2013) define habitat critical to the survival of a species or ecological community as follows:

'Habitat that is critical to the survival of a species or ecological community' refers to areas that are necessary:

- *for activities such as foraging, breeding, roosting or dispersal*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators*
- *to maintain genetic diversity and long term evolutionary development, or*
- *for the reintroduction of population or recovery of the species or ecological community.*

Such habitat may be, but not limited to; habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act (DotE 2013).

Avoidance, mitigation and management measures

Impacts to the population of *X. herbacea* within the project site cannot be avoided due to the location of the coal seam.

A comprehensive groundwater monitoring network is proposed for the duration of the project to allow early identification of changes in vegetation condition outside of the project area that may have resulted from project activities, e.g. changes in groundwater conditions, surface water flows or the flooding regime. This will be relevant to vegetation along the Dawson River and Banana Creek that although unlikely, have the potential to support populations of this species.

Rehabilitation requirements

Rehabilitation of disturbed areas will occur progressively throughout the life of the mine and will continue after mining has ceased until rehabilitation objectives have been met.

Suitable topsoils and subsoils will be stripped from construction and mining areas, and where viable stored to maintain soil quality and used in rehabilitation to promote native vegetation from the soil seed bank. Revegetation will be also undertaken where required across the mine site.

Significance of residual impacts

Table 13 provides an assessment of the significance of impacts to *X. herbacea* against the Commonwealth Significant Impact Guidelines.

Table 13: Assessment of significance of impacts for *Xerothamnella herbacea*

Significance criteria	Assessment of significance
<i>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</i>	
Lead to a long-term decrease in the size of a population	The project will result in clearing of all individuals within the population of <i>X. herbacea</i> identified in the project site.
Reduce the area of occupancy of the species	This species has a restricted distribution in central Queensland and there are very few published records of this species. Eco Solutions & Management is aware of a number of other records within the larger locality, including a very large population of more than 78,000 individuals approximately 40 km south-east of the project area. However, the population within the project site is nearing the northern limit of this species' known distribution and removing this population has the potential to reduce the area of occupancy of the species.
Fragment an existing population into two or more populations	There is only one population within or adjacent to the project area, although other populations are known within 30 km south of the project area along the Dawson River (C. Hansen pers. comm.). The clearing of this population will not result in fragmentation of a population.
Adversely affect habitat critical to the survival of a species	There is no information about critical habitat for this species. There is currently no habitat for <i>X. herbacea</i> listed on the Register of Critical Habitat (DCCEEW 2023h). While the occurrence of this population in the project site is near the northern limit of this species known distribution, there are other records and potential habitat for this species in the region. The population within the MLA is not considered critical to the survival of the species as it is unlikely to be necessary for activities such as breeding or dispersal, long-term maintenance of the species, maintaining genetic diversity or recovery of the species.
Disrupt the breeding cycle of a population	This population would be cleared in its entirety.
Modify, destroy, remove, isolate or decrease the	There is limited habitat available for this species in the broader study area due to historic clearing of potentially

Significance criteria	Assessment of significance
availability or quality of habitat to the extent that the species is likely to decline	<p>suitable habitats and the extent of invasive grass species that dominant the ground layer throughout vegetated and non-vegetated areas of the study area. A small stretch of approximately 22.9 ha of RE 11.3.1/11.3.3 along Banana Creek is recognised as potential habitat for this species. However, this area was intensively searched during surveys and the species was not detected. No direct impacts to this additional potential habitat are proposed.</p> <p>As outlined in Section 7.3.1, changes to the flooding regime are predicted to be minor and are unlikely to affect floodplain communities.</p> <p>Therefore, the project is not expected to affect availability or quality of potential habitat areas along the Dawson River and Banana Creek.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	<p>The project area is located within a modified rural landscape where introduced plants and feral animals are already present. Invasive species and feral animals such as *Buffel Grass, *Green Panic and Feral Pigs have been identified as part of field surveys in the study area. These invasive species already pose a threat to <i>X. herbacea</i> habitat within the study area and in the surrounding landscape and the project is unlikely to increase this threat. Similarly, the project is unlikely to introduce new invasive weed species that are not already present and established in the study area as standard and industry recognised controls will be put in place as part of the Weed and Pest Animal Management Plan and which are referred to in Section 7.3.3.</p>
Introduce disease that may cause the species to decline, or	<p>Disease is not a known threat to <i>X. herbacea</i>. The project is unlikely to introduce disease that may cause the species to decline.</p>
Interfere with the recovery of the species	<p>There is currently no recovery plan for <i>X. herbacea</i>.</p>
<i>Conclusion</i>	<p><i>The project is considered likely to have a significant impact on X. herbacea due to the clearing of a population that is near the northern limit of its known distribution.</i></p>

8.1.3 Ornamental Snake

Status: Vulnerable (EPBC Act and NC Act)

Description

The Ornamental Snake is found in close association with frogs, which form the majority of its prey. It is known to prefer woodlands and open forests associated with moist areas, particularly gilgai (melon-hole) mounds and depressions with clay soils but is also known from lake margins, wetlands and waterways (DCCEEW 2023b).

The SPRAT Profile and Draft Referral Guidelines for the nationally listed Brigalow Belt reptiles specifically describe 'pure grassland associated with gilgais' and 'cleared areas formerly mapped as open-forests to woodlands associated with gilgai formations and wetlands i.e. REs 11.3.3, 11.4.3, 11.4.6, 11.4.8, 11.4.9 and 11.5.16' as suitable habitat for this species (DCCEEW 2023b; SEWPaC 2011).

The Ornamental Snake requires microhabitat features such as cracking clay soils, rotting logs or stumps, coarse woody debris, leaf litter or surface rock. These features are required because they either support the prey food of this species (i.e. frogs) or provide refuge habitat for the Ornamental Snake (DCCEEW 2023b).

Current known threats

Current known threats to the Ornamental Snake include:

- habitat loss and fragmentation through clearing (roads, ploughing, railways, mining-related activities, pipeline constructions)
- habitat degradation by overgrazing by stock, especially cattle, or grazing of gilgai during the wet season leads to soil compaction and compromising of soil structure
- alteration of landscape hydrology in and around gilgai environments
- alteration of water quality through chemical and sediment pollution of wet areas
- contact with the Cane Toad
- predation by feral species
- invasive weeds (DCCEEW 2023b).

Management plans

The following plans and advice are in place for the Ornamental Snake:

- Conservation Advice: Approved Conservation Advice has been prepared for the Ornamental Snake, which provides priority research and management actions for the species, as well as specifying key threats (TSSC 2014)
- Recovery Plan: There is currently no Commonwealth recovery plan in place for this species. The DAWE SPRAT Profile identifies that a Recovery Plan is not required, as approved Conservation Advice provides sufficient direct for recovery of the species (DCCEEW 2023b).

- Referral Guideline: The Draft Referral guidelines for the national listed Brigalow Belt reptiles outline important habitat for the Ornamental Snake. The guideline also enables the proponent to undertake an initial assessment to determine whether a significant impact is likely on the species (SEWPaC 2011).
- Draft Recovery plan for the Queensland Brigalow Belt Reptiles (Richardson 2006), which provides which provides priority research and management actions for the species, as well as specifying key threats for Ornamental Snake.
- Fitzroy Natural Resource Management Region Back on Track Actions for Biodiversity (DERM 2010).

Survey effort

Seasonal fauna surveys were undertaken over 22 days and carried out in consideration of relevant Commonwealth and Queensland surveys guidelines. Survey methods and effort included, but was not limited to:

- 4 systematic trap sites
- 33 person hours spotlighting
- 20.5 person hours active searching
- 282 diurnal and 104 nocturnal person hours of opportunistic observations.

Spotlighting, active searching, pitfall and funnel traps and incidental/opportunistic observations are methods most relevant for the detection of the Ornamental Snake and these were undertaken in preferred habitat in the project area. However, the duration of active searching and spotlighting required for the Ornamental Snake under the DCCEEW survey guidelines for Brigalow Belt reptiles was not achieved. The DCCEEW Draft Referral guidelines for the nationally listed Brigalow Belt reptiles require 1.5 person hours diurnally and nocturnally per hectare over at least 3 days and nights (SEWPaC 2011). This equates to more than 148 hours of active searching and another 148 hours of spotlighting, which would require several weeks of survey in preferred habitat in the project area.

Despite not meeting the DCCEEW survey guidelines, the Ornamental Snake was confirmed within the project site during the surveys with the survey effort applied to the project area.

Further details about the field methods, survey timing, climatic conditions and limitations used to assess the project area provided in Section 3 and Appendix A.

Habitat assessment

Presence within the project area: PRESENT (refer Section 6.3.1)

Two individuals of Ornamental Snake were detected during spotlighting sessions in non-remnant Coolibah with Brigalow woodland (RE 11.3.3) associated with a stream order 1 drainage line in the south-western portion of the project site during seasonal surveys (Figure 13).

Approximately 99.7 ha of Ornamental Snake habitat has been identified within the project site and ETL study area, including 34.6 ha of marginal foraging habitat in the form of highly degraded gilgai formations (Figure 13).

There is no potential habitat for this species within the proposed road realignment or water extraction/release infrastructure area.

Importance of the population

The Draft Referral guidelines for the nationally listed Brigalow Belt reptiles identify important habitat for this species as being 'habitat where the species has been identified during a survey' (SEWPaC 2011). As this species was recorded in habitat within the project area, the habitat in the project area is considered to be important habitat in accordance with the Draft referral guidelines.

The Draft referral guidelines also outline that because Brigalow Belt reptiles can be difficult to detect, important habitat should be considered a surrogate for important populations. Therefore, the population within the project area should be considered an important population in line with the Draft referral Guidelines.

Impact assessment

Of the better quality habitat, 34.9 ha is proposed to be cleared for the project. No clearing of marginal habitat is proposed.

Indirect impacts to Ornamental Snake are considered unlikely. As outlined in Section 7, indirect impacts related to noise and vibration, dust, lighting, vehicle strike, erosion and sedimentation will be temporary, and reasonably simply managed and therefore minimal. Due to the already fragmented nature of the patches of this habitat in the landscape, edge effects and fragmentation are not expected to be significant and remaining areas of habitat in the study area are not proposed to be impacted by changes in surface water or flooding regimes as described in Sections 7.3.1 and 7.3.2.

There will be no facilitated impacts as a result of the project.

Incremental impacts to Ornamental Snake habitat are likely as a result of mine projects in the region, for which authorisation to clear vegetation and habitat has been granted. These projects are approved with conditions and in accordance with the EO Act and EPBC Act, where significant impacts are likely, offsets will form part of those conditions. Similarly, as outlined in Section 9, where significant impacts are proposed as part of this project, offsets will be provided. Therefore, in line with the offset legislation, the project will provide adequate compensation for significant residual impacts to the Ornamental Snake and should not contribute significantly to cumulative impacts.

The Significant Impact Guidelines (DotE 2013) define habitat critical to the survival of a species or ecological community as follows:

'Habitat that is critical to the survival of a species or ecological community' refers to areas that are necessary:

- *for activities such as foraging, breeding, roosting or dispersal*

- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators*
- *to maintain genetic diversity and long term evolutionary development, or*
- *for the reintroduction of population or recovery of the species or ecological community.*

Such habitat may be, but not limited to; habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act (DotE 2013).

Avoidance, mitigation and management measures

Impacts to some areas of Ornamental Snake habitat cannot be avoided due to the location of the coal seam. However, impacts to habitat along the ETL study area will be avoided where possible as part of the detailed design and siting of the proposed ETL.

A range of plans and procedures will be implemented during mine construction, operation and rehabilitation, which will manage and monitor impacts to terrestrial ecology. In particular, the following protocols and plans will be developed to manage clearing in and near Ornamental Snake habitat to minimise harm to individuals and protect habitat to be retained, including:

- vegetation clearing protocols, including a 'Permit to Disturb' procedure
- Species Management Program
- Weed and Pest Animal Management Plan
- Erosion and Sediment Control Plan.

Rehabilitation requirements

Rehabilitation of disturbed areas will occur progressively throughout the life of the mine and will continue after mining has ceased until rehabilitation objectives have been met.

Suitable topsoils and subsoils will be stripped from construction and mining areas, and where viable stored to maintain soil quality and used in rehabilitation to promote native vegetation from the soil seed bank. Revegetation will be also undertaken where required across the mine site.

Significance of residual impacts

Table 14 provides an assessment of the significance of impacts to the Ornamental Snake against the Commonwealth Significant Impact Guidelines.

Table 14: Assessment of significance of impacts for Ornamental Snake

Significance criteria	Assessment of significance
<i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i>	
Lead to a long-term decrease in the size of an important population of a species	The population of Ornamental Snake in the project area is considered to be an important population. The project will involve clearing of approximately 34.9 ha of habitat. Therefore, the project may lead to a decrease in the size of an important population.
Reduce the area of occupancy of an important population	The project will result in removal of a total of 34.9 ha of habitat for an important population. However, potential gilgai habitat is widespread in the region, including in the vicinity of Banana Creek within the additional investigation area, and there are a number of records south of the project area, in the vicinity of Banana and Moura (CSIRO 2019). Therefore, removal of the habitat in the project area is unlikely to reduce the area of occupancy of this species.
Fragment an existing important population into two or more populations	The population of Ornamental Snake that uses the project area is considered to be an important population. It is proposed that all patches of habitat within the project site will be cleared for the project, therefore, fragmentation of these habitat patches will not occur. However, fragmentation of the patch in the north of the ETL study area is likely as a result of clearing for a 20 m wide ETL easement. However, this is unlikely to significantly impact this habitat given the already highly fragmented nature of this patch. Furthermore, this species is able and known to move across cleared paddocks during foraging and dispersal activities. Additionally, aerial photographs indicate large patches of potential gilgai habitat is present to the north, north-east, east and south-east, within 5 km of the project area. The project does not sever connectivity between habitats in those surrounding areas, e.g. between the Dawson River or Banana Creeks and those gilgai habitats.
Adversely affect habitat critical to the survival of a species	Habitat critical to the survival of the species is not defined in the guidelines for this species. Habitat in which the Ornamental Snake was observed does not align with important habitats defined in the <i>Draft Referral Guidelines for the nationally listed Brigalow Belt reptiles</i> or the primary vegetation types, microhabitats or refuge habitats described in the DCCEE SPRAT Profile for the species (DCCEE 2023b; SEWPac 2011). Therefore, these habitats along creek lines are not considered to be critical to the survival of the species. The habitat within the project site and ETL study area is considered unlikely represent habitat critical to the survival of the species in terms of the definition within the Significant Impact Guidelines. The habitat is used for foraging and potentially breeding for the local population of the species but the habitat is unlikely to be necessary for foraging or breeding for the species as

Significance criteria	Assessment of significance
	a whole. The habitat is considered unlikely to be necessary for the long-term maintenance of the species, maintaining genetic diversity or recovery of the species.
Disrupt the breeding cycle of an important population	The population of Ornamental Snake that uses the project area is considered to be an important population. Standard industry recognised measures will be employed during the vegetation clearing stages of the project to minimise harm and disruption to animals and breeding places in accordance with the requirements of the Queensland Nature Conservation (Animals) Regulation 2020. This will reduce the risk and extent of disruption to the breeding cycle of Ornamental Snake that occur in the project area.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Approximately 34.9 ha of Ornamental Snake wetland and gilgai habitat will be impacted by the project. Although gilgai habitat will remain in the local area, the clearing of habitat has the potential to cause the species to decline in the local area. Indirect impacts associated with the project will be managed to the extent that they are unlikely to degrade retained habitat within the project area to the extent this species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The project area is located within a modified rural landscape where introduced plants and feral animals are already present. Invasive species and feral animals such as Buffel Grass, Green Panic, Feral Pigs and Wild Dogs have been identified as part of field surveys in the study area. These invasive species already pose a threat to Ornamental Snake within the project area and in the surrounding landscape, through predation and degradation of habitat, and the project is unlikely to increase this threat. Similarly, the project is unlikely to introduce new invasive species that are not already present and established in the project area as standard and industry recognised controls will be put in place as part of the Weed and Pest Animal Management Plan and which are referred to in Section 7.3.3.
Introduce disease that may cause the species to decline, or	There are few diseases and viruses known to affect snakes in Australia and these are predominantly related to Pythons. The diseases are often (but not always) related to captive snakes, have been known to be introduced by exotic species and usually spread by other affected snakes. It is considered unlikely that the project will introduce a disease that may cause the Ornamental Snake to decline.
Interfere substantially with the recovery of the species	Although the Project will result in the removal of potential and known habitat for the species, the proponent will implement mitigation strategies to assist in minimising impacts to the species. As such, the Project is considered unlikely to interfere substantially with the recovery of the species as a whole.
<i>Conclusion</i>	<i>The area of habitat proposed to be cleared and the importance of the habitat present indicate the project is likely to have a significant residual impact on the Ornamental Snake.</i>

8.1.4 Koala

Status: Vulnerable (EPBC Act and NC Act) (at the time of the controlled action decision)

As detailed in section 6.3.1, at the time of the controlled action decision (2012) the Koala was listed under the EPBC Act as vulnerable. While the impacts to habitat and potential habitat for this species have been assessed under the significant impact criteria for a vulnerable species, consideration has also been given to the most recent listing advice for the species.

Description

The Koala is widespread in sclerophyll forest and woodland on foothills and plains on both sides of the Great Dividing Range from about Chillagoe, Queensland to Mt Lofty Ranges in South Australia (Menkhorst and Knight 2011a).

Any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees provides potential Koala habitat. Koalas are known to occur in modified or regenerating native vegetation communities, and are not restricted to remnant vegetation (TSSC 2022b). The *EPBC Act referral guidelines for the vulnerable Koala* defines Koala food trees as those of the following genus: *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* and *Melaleuca*. The guideline also notes that 'primary' and 'secondary' food trees may be referred to in other state or Commonwealth guidelines or policies, however, all are considered to be food trees for the purposes of the *EPBC Act referral guidelines for the vulnerable Koala* (DotE 2014). The abundance of primary food trees is thought to influence the density of Koalas in a population (Phillips and Callaghan 2011).

Importance of the population

The population of Koala that may use the project area is considered unlikely to be an important population for the following reasons:

- key source populations either for breeding or dispersal
 - the project area is considered likely to support only a low density of Koalas. The suitable open woodland habitat within the project site is fragmented and more widespread throughout the broader region. Therefore, dispersal and breeding is likely to occur throughout the larger region rather than in the project site itself. It is therefore unlikely to support be a key source population for breeding or dispersal.
- populations that are necessary for maintaining genetic diversity
 - individual Koalas that may use the project area would likely belong to a larger meta-population of Koalas that would occur within areas of suitable habitat throughout the broader region. Any population of Koalas using the project area would not necessarily be unique, large, isolated or genetically disjunct from any other Koalas occurring in the region. Therefore, any individuals using the project area would not be considered necessary for maintaining genetic diversity.

- populations that are near the limit of the species range
 - the project area is not at or near the limit of this species' range. The Koala occurs throughout coastal and inland areas of eastern Australia and the project area is located more or less centrally within the known distribution of this species (DotE 2014).

Current known threats

Current known threats to the Koala include:

- habitat loss and fragmentation mainly through urban development
- predation by the domestic dog and vehicle strikes primarily associated with urban expansion but also present in rural environments
- disease and mortality caused by the Koala Retrovirus and Chlamydia
- climate change altering temperatures, rainfall patterns and frequency of severe weather events such as drought

Management plans

The following plans and advice are in place for the Koala:

- Conservation Advice: Approved Conservation Advice has been prepared for the Koala, which provides priority research and management actions for the species, as well as specifying key threats (TSSC 2012).
- Threat Abatement Plan: There is no threat abatement plan in place for the Koala
- Recovery Plan: There is currently no recovery plan in place for the Koala, however, the DAWE SPRAT Profile identifies that a Recovery Plan is required (DAWE 2020).
- Referral Guideline: The *EPBC Act Referral Guidelines for the Vulnerable Koala* outline important habitat for the Koala, and a habitat assessment tool is provided to assess if the habitat within the impact area is critical to the survival of the species. The guidelines also enable the proponent to undertake an initial assessment to determine whether a significant impact is likely on the species (DotE 2014).

Survey effort

Seasonal fauna surveys were undertaken over 22 days and carried out in consideration of relevant Commonwealth and Queensland surveys guidelines. Survey methods and effort included, but was not limited to:

- 33 person hours spotlighting
- 18 call playback sessions
- 16 infrared cameras nights
- 35 Koala SAT survey sites
- 282 diurnal and 104 nocturnal person hours of opportunistic observations.

Spotlighting, call playback, SAT survey sites and opportunistic methods are most relevant for detecting the Koala and these methods were undertaken in preferred

habitat in the project area. The survey generally complies with Koala survey guidelines and this species was recorded in the study area along Banana Creek.

Further details about the field methods, survey timing, climatic conditions and limitations used to assess the project area provided in Section 3 and Appendix A.

Habitat assessment

Presence within the project area: MODERATE LIKELIHOOD TO OCCUR (refer Section 6.3.1 and Appendix D)

No evidence of the Koala was detected in the project area during the seasonal fauna surveys. However, scratches of this species were identified on Queensland Blue Gum along Banana Creek in the additional investigation area during the post-wet season survey in 2020. All remnant REs and some areas of non-remnant regrowth woodlands in the study area are considered to provide habitat for the Koala due to the presence and moderate to abundant cover of Koala food trees. There are 111.1 ha within the project site and another 0.4 ha in the water release/extraction infrastructure area (Figure 14). It has been determined that the habitat within the project site does not constitute critical habitat for the Koala (i.e. a habitat quality score of 4), primarily due to the fragmented nature of this habitat, limited connectivity outside the Dawson River corridor and lack of refuge habitat within the project site. The project site is unlikely to provide dispersal opportunities for the Koala outside the Dawson River corridor.

Riparian and alluvial habitat in the additional investigation area, associated with the Dawson River and Banana Creek, is likely to provide refuge habitat and is likely to be critical for the survival of the species. The water release/extraction infrastructure area sits on the edge of this habitat.

Impact assessment

A total of 26.5 ha of potential habitat for the Koala in the project site is proposed to be cleared for the project. However, as noted above this habitat is not considered to constitute critical habitat for the Koala and is therefore marginal quality habitat for this species. Impacts to an additional 0.4 ha is required for the water release/extraction infrastructure on the edge of the Dawson River. However, this impact will involve understory vegetation only. No Koala food trees are proposed to be cleared within this area.

The *EPBC Act referral guidelines for the vulnerable Koala* (DotE 2014) were consulted in preparing this assessment to assist with determining whether the impact is considered to be significant. It is noted in Section 7 of these guidelines that the higher the score of critical habitat for the Koala the greater risk of significant impact. An example is provided in Section 7, whereby clearing of 100 ha of habitat with a score of 5 (critical habitat) is considered likely to result in a significant impact. In this regard, a similar area of clearing impact with a lower score (not critical) is less likely to be significant to the Koala.

Indirect impacts to Koalas are considered unlikely. As outlined in Section 7, indirect impacts related to noise and vibration, dust, lighting, vehicle strike, erosion and sedimentation will be temporary, and reasonably simply managed and

therefore minimal. There will be minimal impacts to retained habitat in the project site and due to the open structure of the community in the south-west corner of the project site, edge effects and fragmentation are not expected to be significant. Remaining areas of habitat in the study area are not proposed to be impacted by changes in surface water or flooding regimes as described in Sections 7.3.1 and 7.3.2.

There will be no facilitated impacts as a result of the project.

Incremental impacts to Koala habitat are likely as a result of mine projects in the region, for which authorisation to clear vegetation and habitat has been granted. These projects are approved with conditions and in accordance with the EO Act and EPBC Act, where significant impacts are likely, offsets will form part of those conditions. Similarly, as outlined in Section 9, where significant impacts are proposed as part of this project, offsets will be provided. Therefore, in line with the offset legislation, the project will provide adequate compensation for significant residual impacts to the Koala and should not contribute significantly to cumulative impacts.

Avoidance, mitigation and management measures

Impacts to Koala habitat within the project site cannot be avoided due to the location of the coal seam. However, impacts to Koala food trees along the Dawson River will be avoided. Clearing of trees is not required to site the water release/extraction infrastructure in this riparian habitat.

A range of plans and procedures will be implemented during mine construction, operation and rehabilitation, which will manage and monitor impacts to terrestrial ecology. In particular, the following protocols and plans will be developed to manage clearing in and near Koala habitat to minimise harm to individuals and protect habitat to be retained, including:

- vegetation clearing protocols, including a 'Permit to Disturb' procedure
- Species Management Program
- Weed and Pest Animal Management Plan
- Erosion and Sediment Control Plan.

Rehabilitation requirements

Rehabilitation of disturbed areas will occur progressively throughout the life of the mine and will continue after mining has ceased until rehabilitation objectives have been met.

Suitable topsoils and subsoils will be stripped from construction and mining areas, and where viable stored to maintain soil quality and used in rehabilitation to promote native vegetation from the soil seed bank. Revegetation will be also undertaken where required across the mine site.

Significance of residual impacts

Table 15 provides an assessment of the significance of impacts to the Koala against the Commonwealth Significant Impact Guidelines.

Table 15: Assessment of significance of impacts for Koala

Significance criteria	Assessment of significance
<i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i>	
Lead to a long-term decrease in the size of an important population of a species	The population of Koala that potentially occurs within the project site is not considered to be an important population. The extent of clearing is unlikely to decrease the size of the population present given the extent of better quality and refuge habitat available elsewhere in the region.
Reduce the area of occupancy of an important population	The population of Koala that potentially occurs within the project site is not considered to be an important population. The vegetation within the project site is commonly found throughout the surrounding region and is not considered to be unique or particularly significant for the Koala. Due to the availability of better quality and refuge habitat associated with the Dawson River and Banana Creek to the west of the project site, which will facilitate the continued occupancy and dispersal of Koalas in the local region, the project is considered unlikely to reduce the area of occupancy of this species. Koala food trees are not proposed to be cleared in the Dawson River riparian habitat as part of construction of the water release/extraction infrastructure.
Fragment an existing important population into two or more populations	The population of Koalas that potentially occur within the project site is not considered to be an important population. The habitat areas present within the project site are generally small patches within a highly fragmented landscape. Connectivity of habitat will not be compromised as a result of the project to the extent that the local Koala population would become fragmented. This is because dispersal across the project site to the east from better quality habitat associated with the Dawson River is unlikely due to the lack of habitat east of the project site, including on Mount Ramsay. Dispersal of this species is most likely within habitats along the Dawson River corridor and less likely out into the smaller and fragmented patches that occur within the largely cleared project site. Koala food trees will not be impacted in the water release/extraction infrastructure area on the edge of Dawson River riparian habitat.
Adversely affect habitat critical to the survival of a species	It has been determined through the Referral guidelines' critical habitat assessment tool that the potential marginal habitat within the project site is not considered to be habitat critical to the survival of the Koala primarily due to its fragmented state and lack of refuge habitat. Additionally, Koala food trees within potential refuge habitat along the Dawson River will not be cleared as part of construction of the water release/extraction infrastructure. Impacts will be limited to understory vegetation.

Significance criteria	Assessment of significance
	Therefore, no critical habitat is proposed to be impacted.
Disrupt the breeding cycle of an important population	The population of Koalas that potentially occur within the project site is not considered to be an important population. Standard industry recognised measures will be employed during the vegetation clearing stages of the project to minimise harm and disruption to animals and breeding places in accordance with the requirements of the Queensland NC Act. This will reduce the risk and extent of disruption to the breeding cycle of Koalas should they occur in the project site. Further, indirect impacts associated with the project such as noise and light, will be managed (Section 7.3) to the extent that they are unlikely to disrupt the breeding cycle of the Koala.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The project is considered unlikely to isolate habitats or degrade remaining habitats to the extent that the species is likely to decline. Connectivity of habitats within the landscape will be maintained in the broader region. Indirect impacts associated with the project such as noise, dust, light, weeds and pest animals will be managed to the extent that they are unlikely to degrade retained habitat within the study area to the extent this species is likely to decline. It is also noted that none of these indirect impacts are recognised as threats to the Koala. As outlined in Section 7.3.1, changes to the flooding regime are predicted to be minor and are unlikely to affect floodplain communities and therefore unlikely to affect availability of Koala habitat in this area. As per Section 7.3.2, potential drawdown outside the project area would be limited and groundwater dependence of riparian vegetation along the Dawson River and Banana Creek, is unlikely. Therefore, the project is not predicted to give rise to impacts on surface water or groundwater that would impact Koala habitat outside the project area.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The project area is located within a modified rural landscape where introduced plants and feral predators are present. Invasive and predatory species, including feral animals such as the Feral Cat and Wild Dog have been identified as part of recent field surveys in the study area. Other species such as Foxes are likely to occur in the broader landscape and the study area is accessible to such species. These predatory species already pose a risk to the Koala in the potential habitat areas present and the project is unlikely to increase this threat. Similarly, the project is unlikely to introduce new invasive or predatory species that are not already present and established in the project area as standard and industry recognised controls will be put in place as part of the Weed and Pest Animal Management Plan and which are referred to in Section 7.3.3.
Introduce disease that may cause the species to decline, or	Three viruses are known to affect Koalas in the wild, Chlamydia and Koala Regrovirus (KoRV-A and KoRV-B).

Significance criteria	Assessment of significance
	<p>It is known that Chlamydia is a sexually transmitted disease in Koalas, however, how the Retrovirus is spread is unknown. Studies have shown that 100% of Koalas in the wild have the Retrovirus, and the majority of Queensland and New South Wales populations are infected with Chlamydia (Hanger and Loader 2009). Stress has been suggested to exacerbate the effects of disease on Koala populations in more population areas. However, clearing associated with the project is not considered to introduce or increase the prevalence of these diseases in the local Koala population. This is because of the retention of refuge habitat associated with the Dawson River and connectivity of this riparian corridor provides with extensive areas of habitat in the broader region.</p>
Interfere substantially with the recovery of the species	<p>The project will result in clearing of 26.5 ha of Koala habitat. This habitat is not considered to be critical to the survival of the Koala. An additional 0.4 ha of habitat that is likely to provide refuge habitat for this species along the Dawson River will be impacted through understory and ground layer clearing. No Koala food trees will be impacted in this refuge habitat. Therefore, in accordance with the <i>EPBC Act Referral Guidelines for the Vulnerable Koala</i> the project is unlikely to have a significant impact on the Koala.</p> <p>Further, the Dawson River corridor will continue to facilitate Koala movement opportunities throughout the region as well as providing refuge habitat for this species.</p> <p>Indirect impacts associated with the project will be managed to the extent they are unlikely to interfere with the recovery this species.</p> <p>Therefore, it is considered unlikely the project will interfere substantially with the recovery of the Koala.</p>
<i>Conclusion</i>	<p><i>The clearing of 26.5 ha of habitat that is not considered critical to the survival of the Koala is unlikely to result in a significant residual impact to the Koala.</i></p>

8.1.5 Squatter Pigeon

Status: Vulnerable (EPBC Act and NC Act)

Description

The Squatter Pigeon (southern) is listed as vulnerable under the EPBC Act and Queensland NC Act. This species is known to inhabit tropical dry, open sclerophyll woodlands and occasionally open savannah. It appears to favour sandy soil dissected with low gravelly ridges and is less common on heavy soils with dense grass cover. It is nearly always found in close association with permanent water (Higgins and Davies 1996). This species is also often recorded from areas that do not support remnant vegetation, but in these areas it seems to be associated with clear, disturbed sites such as tracks and stockyards (DCCEEW 2023c); S. Marston

Pers. obs.). These habitat areas are likely to provide breeding, foraging and dispersal habitat.

The SPRAT profile emphasises the importance of woodland trees, which provide protection from predatory birds. Where scattered trees still occur, and the distance of cleared land between remnant trees or patches of habitat does not exceed 100 m, individuals may be found foraging in, or moving across modified or degraded environments (DCCEEW 2023c).

Current known threats

The main threats to the Squatter Pigeon (southern) are as follows:

- loss of habitat due to clearing for agricultural or industrial purposes
- degradation of habitat, trampling of nests, by grazing herbivores (i.e. sheep, cattle, rabbits)
- predation by feral cats and foxes
- degradation of habitat through infestation by Buffel Grass and other improved pasture species and weeds
- thickening of understory vegetation (DCCEEW 2023c).

Management plans

- Conservation Advice: Approved Conservation Advice has been prepared for the Squatter Pigeon, which nominates conservation and management actions for the species. Conservation actions include survey and monitoring priorities, as well as research priorities (TSSC 2008b).
- Threat Abatement Plan: Threat abatement plans are in place for the Squatter Pigeon for the threat of feral cats, rabbits and the European Red Fox (DEWHA 2008a; DoEE 2016; DoE 2015b).
- Recovery Plan: A recovery plan has not been prepared for the Squatter Pigeon, and the DAWE SPRAT Profile explains that one is not required as the Approved Conservation Advice provides sufficient direction to implement priority actions and mitigate against key threats (DCCEEW 2023c).
- Referral Guidelines: The Squatter Pigeon is addressed in the Survey Guidelines for Australia's Threatened Birds EPBC Act Survey Guidelines 6.2 (DEWHA 2010). No specific referral guidelines are available for the Squatter Pigeon.

Survey effort

Seasonal fauna surveys were undertaken over 22 days and carried out in consideration of relevant Commonwealth and Queensland surveys guidelines. Survey methods and effort included, but was not limited to:

- 20.5 person hours active searching
- 37 person hours bird surveying
- 282 diurnal and 104 nocturnal person hours of opportunistic observations.

Bird survey, active searching and opportunistic methods are most relevant for detecting the Squatter Pigeon and these methods were undertaken in preferred habitat in the project area. The survey generally complies with Squatter Pigeon survey guidelines, although flushing surveys are recommended by the DAWE, and these were not undertaken. Previous experience in this area has shown that this technique is often not required as the species is typically recorded incidentally during surveys. The survey methods that were employed resulted in detection of this species at multiple locations within the study area and therefore flushing surveys were not considered necessary.

Further details about the field methods, survey timing, climatic conditions and limitations used to assess the project area provided in Section 3 and Appendix A.

Habitat assessment

Presence within the project area: PRESENT (refer Section 6.3.1 and Appendix D)

This species was recorded at a number of locations in the ETL study area, on the edge of the project site and in the additional investigation area during the seasonal surveys. Suitable habitat for the Squatter Pigeon has been identified in the project site and in the water release/extraction infrastructure area (Figure 15).

Habitat mapping for the Squatter Pigeon (Figure 15) within the study area has been undertaken in consideration of the SPRAT profile for the species and most recent advice from the DCCEE⁵. Squatter Pigeon habitat is categorised as:

- foraging habitat – grassy woodlands dominated by Eucalyptus, Corymbia, Acacia or Callitris tree species, on sandy or gravelly soils (including but not limited to areas mapped as Queensland land zones 3, 5 or 7) within 3 km of a waterbody
- breeding habitat – foraging habitat within 1 km of a waterbody.

Waterbodies that are suitable for the Squatter Pigeon are described in the SPRAT profile for the species as 'permanent or seasonal rivers, creeks, lakes, ponds and waterholes, and artificial dams' (DCCEE 2023c). Given this definition, first and second order watercourses or drainage channels are generally not considered to be suitable for this species because of their highly ephemeral nature and tendency to drain quickly and would not include cattle troughs or plastic lined dams.

Suitable habitat in the project site and water release/extraction infrastructure area consists of the polygons of REs 11.3.25, 11.5.9, 11.5.15, 11.3.3 and 11.3.3a. This woodland vegetation supports a grassy ground layer and is associated with sandy soils. There are two constructed dams to the north and east that are not separated from this vegetation by more than 100 m of cleared land (Figure 15).

Importance of the population

⁵ The Moranbah North Extension Project EPBC Act approval (EPBC 2018/8338) dated 18 September 2020 defines Squatter Pigeon habitat and this has been used as part of this current assessment.

The population of Squatter Pigeon that uses the study area is considered unlikely to be an important population for the following reasons:

- key source populations either for breeding or dispersal
 - This species is regularly recorded in the central Queensland region and remains common north of the Carnarvon Ranges. All sub-populations of this species occurring south of the Carnarvon Ranges in central Queensland are considered to be important sub-populations (DCCEEW 2023c). The habitat within the study area remains reasonably common throughout the region and habitat present is considered unlikely to be of particular significance for breeding or dispersal.
- populations that are necessary for maintaining genetic diversity
 - The population of the Squatter Pigeon within the region is considered unlikely to be important in maintaining genetic diversity within the species. The inherent mobility of a bird species is likely to increase genetic exchange between individuals in comparison to less mobile species whose access to potential mates may be limited. Because of the relatively high rates of genetic exchange in more mobile species, it is less likely that any single population represents an important population for maintaining genetic diversity. The species is noted as being likely to comprise a single contiguous breeding population (DCCEEW 2023c). It is therefore considered unlikely that the population in the study area, would be particularly important in maintaining genetic diversity of the species.
- populations that are near the limit of the species range.
 - The range of the Squatter Pigeon (southern) extends north to the Burdekin region (approximately 550 km north of the study area). The species once occurred in southern New South Wales, although it has not been recorded in New South Wales for some time (DCCEEW 2023c). The current extent of the Squatter Pigeon ranges to the Border Rivers region of northern New South Wales. The study area is well within the known distribution of this species.

Impact assessment

Approximately 21.9 ha of habitat considered both breeding and foraging habitat for the Squatter Pigeon is proposed to be cleared for the project.

Indirect impacts to the Squatter Pigeon are considered unlikely. As outlined in Section 7, indirect impacts related to noise and vibration, dust, lighting, vehicle strike, erosion and sedimentation will be temporary, and reasonably simply managed and therefore minimal. There will be minimal impacts to retained habitat in the project site and due to the open structure of the community in the south-west of the project site, edge effects and fragmentation are not expected to be significant. Remaining areas of habitat in the study area are not proposed to be impacted by changes in surface water or flooding regimes as described in Sections 7.3.1 and 7.3.2.

There will be no facilitated impacts as a result of the project.

Incremental impacts to Squatter Pigeon habitat are likely as a result of mine projects in the region, for which authorisation to clear vegetation and habitat has been granted. These projects are approved with conditions and in accordance with the EO Act and EPBC Act, where significant impacts are likely, offsets will form part of those conditions. Where impacts are unlikely to be significant, the contribution to the cumulative impact is also considered unlikely to be significant.

The Significant Impact Guidelines (DotE 2013) define habitat critical to the survival of a species or ecological community as follows:

'Habitat that is critical to the survival of a species or ecological community' refers to areas that are necessary:

- *for activities such as foraging, breeding, roosting or dispersal*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators*
- *to maintain genetic diversity and long term evolutionary development, or*
- *for the reintroduction of population or recovery of the species or ecological community.*

Such habitat may be, but not limited to; habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act (DotE 2013).

Avoidance, mitigation and management measures

Impacts to some areas of Squatter Pigeon habitat cannot be avoided due to the location of the coal seam, however, impacts to Squatter Pigeon habitat along the Dawson River will be minimised where possible as part of the detailed design and siting of the proposed water release/extraction infrastructure. In this area the infrastructure will traverse the narrowest section of riparian vegetation where possible and disturbance will be selective and limited to the understory and ground layer to minimise overall disturbance to the riparian community.

A range of plans and procedures will be implemented during mine construction, operation and rehabilitation, which will manage and monitor impacts to terrestrial ecology. In particular, the following protocols and plans will be developed to manage clearing in and near Squatter Pigeon habitat to minimise harm to individuals and protect habitat to be retained, including:

- vegetation clearing protocols, including a 'Permit to Disturb' procedure
- Species Management Program
- Weed and Pest Animal Management Plan
- Erosion and Sediment Control Plan.

Rehabilitation requirements

Rehabilitation of disturbed areas will occur progressively throughout the life of the mine and will continue after mining has ceased until rehabilitation objectives have been met.

Suitable topsoils and subsoils will be stripped from construction and mining areas, and where viable stored to maintain soil quality and used in rehabilitation to promote native vegetation from the soil seed bank. Revegetation will be also undertaken where required across the mine site.

Significance of residual impacts

Table 17 provides an assessment of the Significance of impacts to the Squatter Pigeon against the Commonwealth Significant Impact Guidelines.

Table 16: Assessment of significance of impacts for Squatter Pigeon

Significance criteria	Assessment of significance
<i>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</i>	
Lead to a long-term decrease in the size of an important population of a species	The population of Squatter Pigeon that occurs within the project area is not considered to be an important population. The clearing of 21.9 ha of habitat is unlikely to decrease the size of the population present given the extent of similar habitat available in the region.
Reduce the area of occupancy of an important population	The population of Squatter Pigeon that occurs within the project area is not considered to be an important population. The vegetation within the project area is commonly found throughout the surrounding region and is not considered to be unique or particularly significant for the Squatter Pigeon. The Squatter Pigeon is also known to commonly occur in disturbed habitats. Therefore, due to the availability of similar habitat within the broader region and the mobility of this avian species, the project is considered unlikely to affect the Squatter Pigeon’s area of occupancy.
Fragment an existing important population into two or more populations	The population of Squatter Pigeon that occurs within the project area is not considered to be an important population. The habitats proposed to be cleared are already fragmented and isolated from other vegetated habitats and the proposed clearing will remove the entirety of each patch rather than fragment them further. The Squatter Pigeon is a highly mobile species and is known to disperse across cleared and degraded landscapes between preferred habitat areas. The removal of these patches of habitat is considered unlikely to present a significant barrier to this species from moving throughout the landscape. Connectivity of habitat will not be affected by the project and will remain along the Dawson River and Banana Creek. Therefore, the project is unlikely to fragment the population of Squatter Pigeon occurring in the local area into two or more populations.
Adversely affect habitat critical to the survival of a species	Squatter Pigeon habitat is relatively broad by definition. Therefore, very few areas, including the habitats in the

Significance criteria	Assessment of significance
	<p>project area, would be described as habitat critical to the survival of the species.</p> <p>The potential habitat that is to be disturbed within the project site and water release/extraction infrastructure area is not regarded as particularly significant or indicative of critical habitat due to its relatively small and isolated nature. It is considered unlikely to be necessary for foraging, breeding, roosting or dispersal, the long-term maintenance of the species, maintaining genetic diversity or recovery of the species.</p> <p>Given the mobility of avian species the project is considered unlikely to affect habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of an important population	<p>The population of Squatter Pigeon that occurs within the project area is not considered to be an important population. It is possible the Squatter Pigeon breeds within the broader study area. Standard industry recognised measures will be employed during the vegetation clearing stages of the project to minimise harm and disruption to animals and breeding places in accordance with the requirements of the Queensland NC Act. This will reduce the risk and extent of disruption to the breeding cycle of Squatter Pigeons that occur in the project area.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>Sub-populations in this region have not been identified as being of particular importance for the long-term survival or recovery of this species. The proposed impacts to 21.9 ha of habitat for the Squatter Pigeon will not remove habitats, isolate habitats or degrade remaining habitats to the extent that the species is likely to decline. This is because the habitat in the project area is not considered to be critical for this species and expansive areas of similar habitat occur throughout the Brigalow Belt region.</p> <p>Indirect impacts associated with the project, such as noise, dust, light, weeds and pest animals will be managed to the extent that they are unlikely to degrade retained habitat to the extent this species is likely to decline.</p> <p>As outlined in Section 7.3.1, changes to the flooding regime are predicted to be minor and are unlikely to affect floodplain communities and therefore unlikely to affect availability of Squatter Pigeon habitat in this area.</p> <p>As per Section 7.3.2, potential drawdown outside the project area would be limited and groundwater dependence of riparian vegetation along the Dawson River and Banana Creek, is unlikely. Therefore, the project is not predicted to give rise to impacts on surface water or groundwater that would impact Squatter Pigeon habitat outside the project area.</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>The study area is located within a modified rural landscape where introduced plants and feral predators are present. Invasive and predatory species, including feral animals such as the Feral Cat and Wild Dog have been identified as part of recent field surveys in the</p>

Significance criteria	Assessment of significance
	study area. Other species such as Foxes are likely to occur in the broader landscape and the study area is accessible to such species. These predatory species already pose a risk to the Squatter Pigeon in the potential habitat areas present and the project is unlikely to increase this threat. Similarly, the project is unlikely to introduce new invasive or predatory species that are not already present and established in the study area as standard and industry recognised controls will be put in place as part of the Weed and Pest Animal Management Plan and which are referred to in Section 7.3.3.
Introduce disease that may cause the species to decline, or	Disease is not a known threat to this species. Therefore, the project is unlikely to introduce any disease that may cause the Squatter Pigeon to decline.
Interfere substantially with the recovery of the species	This species is noted as 'remaining common north of the Carnarvon Ranges in central Queensland' (DCCEEW 2023c). There is no recovery plan for this species. The Squatter Pigeon is known to occur in disturbed areas and potential for this species to occupy adjacent areas in the landscape will remain during and after the proposed project. The project will not remove habitat critical to the survival of the species and the population is unlikely to be important. The proposed clearing is relatively small in relation to the extent of habitat that persists within the region. Therefore, it is considered unlikely the project will interfere substantially with the recovery of the species.
<i>Conclusion</i>	<i>The project is considered unlikely to result in a significant residual impact to the Squatter Pigeon as the species remains common in its northern distribution and the project area is unlikely to support an important population or critical habitat for the species.</i>

8.1.6 Australian Painted Snipe

Status: Endangered (EPBC Act), Vulnerable (NC Act)

Description

The Australian Painted Snipe (*Rostratula australis*) is listed as endangered under the EPBC Act and vulnerable under the NC Act. This secretive, cryptic, crepuscular (active at dawn, dusk and during the night) species occurs in terrestrial shallow wetlands, both ephemeral and permanent, usually freshwater but occasionally brackish. They also use inundated grasslands, salt-marsh, dams, rice crops, sewage farms and bore drains with rank emergent tussocks of grass, sedges, rushes or reeds or samphire, and often with scattered clumps of Lignum, canegrass or sometimes tea trees. This species has been known to use wetland areas lined with trees, or that have some scattered fallen or washed-up timber (DCCEEW 2023d).

Wetland habitat suitable for breeding is noted as being critical for the Australian Painted Snipe in the listing advice for the species. Breeding habitat is described in the advice as:

“continuous reed beds, stand of reed-like vegetation, rice fields and areas with no surrounding low cover... Nests are made among tall rank tussocks, frequently on small, muddy islands or mounds surrounded by shallow fresh water, sometimes on shores of swamps or on banks of channels. Nesting typically occurs in ephemeral wetlands that are drying out after an influx of water, provided they have complex shorelines and a combination of very shallow water, exposed mud and dense low cover” (TSSC 2013a).

The SPRAT Profile for the species also recognises dense low cover and sometimes some tall dense cover is also present in breeding habitat (DCCEEW 2023d).

Current known threats

The primary threat to the Australian Painted Snipe is loss and degradation of wetland habitats, through:

- alteration of drainage, reduced flooding and the diversion of water for irrigation and reservoirs
- changes in vegetation assemblages from cropping and possibly altered fire regimes
- grazing causing trampling and altered nutrient levels (TSSC 2013c).

Potential future threats include:

- changes in hydrological regimes due to climate change
- predation by feral species
- invasion by exotic plants (TSSC 2013c).

Management plans

The following plans and advice are in place for the Australian Painted Snipe:

- Conservation Advice: Approved Conservation Advice has been prepared for the Australian Painted Snipe, which provides priority research and management actions for the species, as well as specifying key threats (TSSC 2013c).
- Recovery Plan: There is currently no Commonwealth recovery plan in place for this species. However, The Action Plan for Australian Birds 2000 provides a brief recovery outline for this species (Garnett and Crowley 2000).
- Information sheet: An information sheet has been prepared for this species that provides details about the habitat of this species, why its threatened and implications of the EPBC At (DEH 2003).

Survey effort

Seasonal fauna surveys were undertaken over 22 days and carried out in consideration of relevant Commonwealth and Queensland surveys guidelines. Survey methods and effort included, but was not limited to:

- 4 systematic trap sites
- 33 person hours spotlighting

- 16 infrared cameras nights
- 20.5 person hours active searching
- 37 person hours bird surveying
- 282 diurnal and 104 nocturnal person hours of opportunistic observations.

Spotlighting, infrared cameras, active searching, bird survey and incidental/opportunistic observations are methods most relevant for the detection of the Australian Painted Snipe and these were undertaken in preferred habitat in the project area. The survey effort for the project generally complied with survey guidelines. However, this is a very cryptic bird that is known to inconsistently use habitats and there is no guarantee that it would be recorded even during favourable conditions.

Further details about the field methods, survey timing, climatic conditions and limitations used to assess the project area provided in Section 3 and Appendix A.

Habitat assessment

Presence within the project area: MODERATE LIKELIHOOD TO OCCUR (refer Section 6.3.1 and Appendix D)

The Australian Painted Snipe was not recorded in the study area during the seasonal surveys, however, vegetated sections of wetlands and broad drainage lines in the west and south-west of the study area that support Lignum, provide some areas of suitable habitat for this species.

The gilgai areas in the project site appear to have been blade ploughed in the past and support a low abundance of sedges indicating that they do not hold water for prolonged periods. Nonetheless, these gilgai are likely to provide some wetland features and this species is known to use heavily disturbed areas that exhibit wetland characteristics, including cleared gilgai. Although these cleared gilgai provide seasonal foraging habitat for this species this species is likely to use these disturbed habitats opportunistically during the wet season when gilgai are holding water. Cleared gilgai generally lack canopy cover that forms part of the breeding habitat requirements for this species (DCCEEW 2023d). Therefore, cleared gilgai habitat is considered to comprise marginal foraging habitat for this species in the study area.

Similarly, gilgai and wetland habitats in the additional investigation area may provide foraging habitat for this species (Figure 16).

Two broad habitat types are considered to occur in the study area for the Australian Painted Snipe and differ in their naturalness and presence of fringing vegetation that provides cover for this species:

- wetland and drainage lines with fringing vegetation
- cleared gilgai that forms marginal habitat for this species.

Approximately 86.2 ha of potential wetland and drainage line habitat for the Australian Painted Snipe has been mapped within the project site and ETL study

area as well as an additional 84.4 ha of marginal habitat in the form of cleared gilgai habitat (Figure 16).

Impact assessment

Approximately 1.0 ha of wetland and drainage line habitat is proposed to be cleared for the project as well as an additional 33.9 ha of marginal gilgai habitat (Figure 16).

Indirect impacts to Australian Painted Snipe are considered unlikely. As outlined in Section 7, indirect impacts related to noise and vibration, dust, lighting, vehicle strike, erosion and sedimentation will be temporary, and reasonably simply managed and therefore minimal. Due to the already fragmented nature of the patches of this habitat in the landscape, edge effects and fragmentation are not expected to be significant and remaining areas of habitat in the study area are not proposed to be impacted by changes in surface water or flooding regimes as described in Sections 7.3.1 and 7.3.2.

There will be no facilitated impacts as a result of the project.

There is no publicly available information about impacts to this species as a result of other projects in the region. However, there is potential for incremental impacts to Australian Painted Snipe habitat as a result of mine projects in the region, for which authorisation to clear vegetation and habitat has been granted. These projects are approved with conditions and in accordance with the EO Act and EPBC Act, where significant impacts are likely, offsets will form part of those conditions. Where impacts are unlikely to be significant, the contribution to the cumulative impact is also unlikely to be significant.

The Significant Impact Guidelines (DotE 2013) define habitat critical to the survival of a species or ecological community as follows:

'Habitat that is critical to the survival of a species or ecological community' refers to areas that are necessary:

- *for activities such as foraging, breeding, roosting or dispersal*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *to maintain genetic diversity and long term evolutionary development, or*
- *for the reintroduction of population or recovery of the species or ecological community.*

Such habitat may be, but not limited to; habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act (DotE 2013).

Avoidance, mitigation and management measures

Impacts to some areas of Australian Painted Snipe habitat cannot be avoided due to the location of the coal seam, however, impacts to habitat along the ETL study

area will be avoided where possible as part of the detailed design and siting of the proposed ETL.

A range of plans and procedures will be implemented during mine construction, operation and rehabilitation, which will manage and monitor impacts to terrestrial ecology. In particular, the following protocols and plans will be developed to manage clearing in and near Australian Painted Snipe habitat to minimise harm to individuals and protect habitat to be retained, including:

- vegetation clearing protocols, including a 'Permit to Disturb' procedure
- Species Management Program
- Weed and Pest Animal Management Plan
- Erosion and Sediment Control Plan.

Rehabilitation requirements

Rehabilitation of disturbed areas will occur progressively throughout the life of the mine and will continue after mining has ceased until rehabilitation objectives have been met.

Suitable topsoils and subsoils will be stripped from construction and mining areas, and where viable stored to maintain soil quality and used in rehabilitation to promote native vegetation from the soil seed bank. Revegetation will be also undertaken where required across the mine site.

Significance of residual impacts

Table 17 provides an assessment of the significance of impacts to the Australian Painted Snipe against the Commonwealth Significant Impact Guidelines.

Table 17: Assessment of significance of impacts for Australian Painted Snipe

Significance criteria	Assessment of significance
<i>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</i>	
Lead to a long-term decrease in the size of a population	The project will involve clearing approximately 1.0 ha of potentially suitable habitat and another 33.9 ha of marginal habitat in the project site and ETL study area. However, this species was not recorded in the study area during surveys and the potential habitats present are ephemeral. The species is considered in Australia to be a single contiguous breeding population (Garnett et al. 2011) and is often a solitary breeder. In addition, the species is thought to possibly be migratory or dispersive. Therefore, the presence of this species, should it occur in the study area, is unlikely to be permanent. Considering this, the project is considered unlikely to decrease the size of a population of this species.
Reduce the area of occupancy of the species	Removal of potential habitats in the project site and ETL study area is unlikely to affect this species' use of the area given flood plain habitats are present elsewhere in the region in association with the Dawson River and

Significance criteria	Assessment of significance
	Banana Creek. Therefore, the area of occupancy of this species should not be impacted by the project.
Fragment an existing population into two or more populations	The Australian Painted Snipe is thought to be migratory or dispersive and is widely distributed across the majority of eastern Australia. Therefore, any population of Australian Painted Snipe that may use suitable habitat in the study area is unlikely to be fragmented into two or more populations. The presence of a population in the project area is likely to be periodical in response to seasonal conditions. The ability of this species to move between remaining habitats will not be compromised as a result of the project.
Adversely affect habitat critical to the survival of a species	Wetland habitat suitable for breeding is noted as being critical for the Australian Painted Snipe in the listing advice for the species (TSSC 2013a). The potential habitat proposed to be cleared is not regarded as particularly significant or indicative of habitat critical to the survival of the species, as the habitat consists of shallow water at times, it does not provide continuous reed beds, muddy islands or mounds and shorelines or banks are limited. It is considered unlikely to be necessary for foraging, breeding, roosting or dispersal, the long-term maintenance of the species, maintaining genetic diversity or recovery of the species.
Disrupt the breeding cycle of a population	It is not known if the species breeds in the project site or ETL study area, although potential habitat present does not exhibit particularly suitable characteristics for breeding. Nonetheless, the project will employ standard industry recognised measures during the vegetation clearing stages of the project to minimise harm and disruption to animals and breeding places in accordance with the requirements of the Queensland NC (Wildlife Management) Regulation. This will reduce the risk and extent of disruption to the breeding cycle of Australian Painted Snipe that may be present.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>Approximately 1.0 ha of potentially suitable Australian Painted Snipe habitat will be impacted by the project as well as an additional 33.9 ha of marginal habitat. However, this is unlikely to cause the species to decline as it is unlikely to be permanently used.</p> <p>Indirect impacts associated with the project, such as noise, dust, light, weeds and pest animals will be managed to the extent that they are unlikely to degrade retained habitat within the study area to the extent this species is likely to decline.</p> <p>As outlined in Section 7.3.1, changes to the flooding regime are predicted to be minor and are unlikely to affect floodplain communities and therefore unlikely to affect availability of Australian Painted Snipe habitat in this area.</p> <p>As per Section 7.3.2, potential drawdown outside the project area would be limited and groundwater dependence of riparian vegetation along the Dawson River and Banana Creek, is unlikely. Therefore, the project is not predicted to give rise to impacts on surface</p>

Significance criteria	Assessment of significance
	water or groundwater that would impact Australian Painted Snipe habitat outside the project area.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The project area is located within a modified rural landscape where introduced plants and feral animals are already present. Invasive species and feral animals such as *Buffel Grass, *Green Panic, Feral Pigs and Wild Dogs have been identified as part of field surveys in the study area. These invasive species and likely others, such as the Red Fox, already pose a threat to the Australian Painted Snipe and its potential habitat within the project area and in the surrounding landscape and the project is unlikely to increase this threat. Similarly, the project is unlikely to introduce new invasive species that are not already present and established in the study area as controls will be put in place as standard and industry recognised controls will be put in place as part of the Weed and Pest Animal Management Plan and which are referred to in Section 7.3.3.
Introduce disease that may cause the species to decline, or	Disease is not a known threat to this species. Therefore, the project is considered unlikely to introduce disease that may cause the Australian Painted Snipe to decline.
Interfere with the recovery of the species	There is currently no Commonwealth recovery plan in place for this species. The project area is unlikely to support a permanent population of the Australian Painted Snipe and the area proposed to be impacted is unlikely to provide suitable breeding habitat for this species. Therefore, clearing of 0.9 ha of potentially suitable habitat and an additional 33.9 ha of marginal habitat, is considered unlikely to interfere with the recovery of the species.
<i>Conclusion</i>	<i>The project is unlikely to significantly impact the Australian Painted Snipe as it is unlikely to breed in the project site or ETL study area or use the project area permanently.</i>

8.1.7 Migratory birds

Status: Migratory (EPBC Act and NC Act)

Description

Two migratory birds are considered to have a moderate potential to occur in the project area based on the habitat types present. Each of these species are discussed below.

Glossy Ibis

This species utilises the shallows of swamps, floodwaters, sewage ponds and flooded, moist irrigated pasture (Morcombe and Stewart 2013). The species also occasionally feeds in sheltered marine habitats (Morcombe and Stewart 2013)

Latham's Snipe

This migratory species prefers soft wet ground or shallow water with tussocks, wet paddocks, seepage below dams, irrigated areas, scrub or open woodland (Pizzey et al. 2012).

Current known threats

The main threats listed for the Glossy Ibis and the Latham's Snipe is the loss and degradation of wetland habitat (DCCEEW 2023i; j). This is most likely through changes in the drainage or hydrological regimes of wetlands, altered fire regimes, grazing, increased salinity, clearing, groundwater extraction and invasion by exotic plants (DCCEEW 2023i; j).

Hunting is also a listed threat for the Latham's Snipe (DCCEEW 2023j).

Management plans

There are no specific management plans in place for the Glossy Ibis or Latham's Snipe.

There is no published conservation advice, listed relevant threat abatement plans or recovery plans for the Glossy Ibis although the threat abatement plan for the European Red Fox is listed in relation to the Latham's Snipe. There is also a Wildlife Conservation Plan for Migratory Shorebirds in relation to the Latham's Snipe (DotE 2015c).

Survey effort

Seasonal fauna surveys were undertaken over 22 days and carried out in consideration of relevant Commonwealth and Queensland surveys guidelines. Survey methods and effort included, but was not limited to:

- 4 systematic trap sites
- 33 person hours spotlighting
- 16 infrared cameras nights
- 20.5 person hours active searching
- 37 person hours bird surveying
- 282 diurnal and 104 nocturnal person hours of opportunistic observations.

Spotlighting, infrared cameras, active searching, bird survey and incidental/opportunistic observations are methods most relevant for the detection of the migratory birds potentially occurring and these were undertaken in preferred habitat in the project area. The survey effort for the project generally complied with survey guidelines. However, these are cryptic birds that are known to inconsistently use habitats and there is no guarantee that they would be recorded even during favourable conditions.

Further details about the field methods, survey timing, climatic conditions and limitations used to assess the project area provided in Section 3 and Appendix A.

Habitat assessment

Presence within the project area: MODERATE LIKELIHOOD TO OCCUR (refer Section 6.3.2 and Appendix D)

Habitat occurs in the study area for the two migratory birds considered to potentially occur. The study area provides foraging habitat but is less likely to provide breeding habitat for any migratory species.

Dams and paddocks in the study area, when inundated, potentially provide habitat for the Glossy Ibis, while vegetated drainage lines potentially provide habitat for Latham's Snipe similar to the Australian Painted Snipe (refer Sections 6.3.1 and 8.1.7).

Potentially suitable habitat within the project area is not simply estimated for the Glossy Ibis, as its habitat preferences are varied. It may use cleared gilgai, dams, or wetlands along the Dawson River and this occupancy is likely to be temporary and opportunistic. Habitat for the Latham's Snipe is considered to closely correspond with Australian Painted Snipe habitat and it also is likely to use this habitat temporarily and opportunistically. Approximately 31.1 ha of potential wetland and drainage line habitat for the Australian Painted Snipe has been mapped within the project site and ETL study area as well as an additional 68.5 ha of marginal habitat in the form of cleared gilgai habitat (refer also Australian Painted Snipe habitat mapping on Figure 16).

Potential habitat for these species does not occur in the proposed road realignment or water release/extraction infrastructure area.

Two key concepts are important in assessing the significance of impacts against the EPBC Act Significant Impact Guidelines. They are defined below.

Important habitat

Determining if an area of 'important habitat' for a migratory species listed under the EPBC Act occurs within the project site and ETL study area is necessary in addressing the significant impact criteria for migratory species. Important habitat for a migratory species is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecological significant proportion of the population of the species, and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or
- habitat utilised by a migratory species which is at the limit of the species range, and/or
- habitat within an area where the species is declining (DotE 2013).

It is considered unlikely that the project site and ETL study area provides important habitat for any migratory species as:

- no migratory species were observed in the study area during the seasonal surveys

- there are large tracts of similarly disturbed areas on floodplains adjacent to the Dawson River and Banana Creek in the study area and broader region
- the project site and ETL study area is not at the limit of the distribution of either of the species considered to potentially occur
- the area in which the project is proposed is not a specific area in which either the Glossy Ibis or Latham's Snipe is known to be declining. The extent of occurrence of the Latham's Snipe is considered to be stable at present (DCCEEW 2023j).

Ecologically significant proportion

An ecologically significant proportion of a migratory species will differ between species, however, the species' population status, genetic distinctiveness and species specific behavioural patterns (for example, site fidelity and dispersal rates) should be considered in evaluating this (DotE 2013).

The broader study area is unlikely to provide important habitat for any migratory species. It is also unlikely to support an ecologically significant proportion of the population of a migratory species, as this would have been evident during the seasonal surveys. There was no evidence of important habitat areas, roost sites or other features that could be used by large numbers of these birds.

Impact assessment

The project will result in the clearing of potential habitat for these species, in the order of 1.0 ha of potential wetland and drainage line habitat and another 33.9 ha of marginal cleared gilgai habitat. Despite this clearing and disturbance, areas of potential habitat will remain within the broader region as habitats within the project area are not particularly rare or unique in the region.

Indirect impacts to these migratory birds are considered unlikely. As outlined in Section 7, indirect impacts related to noise and vibration, dust, lighting, vehicle strike, erosion and sedimentation will be temporary, and reasonably simply managed and therefore minimal. Due to the already fragmented nature of the patches of these habitats in the landscape, edge effects and fragmentation are not expected to be significant and remaining areas of habitat in the study area are not proposed to be impacted by changes in surface water or flooding regimes as described in Sections 7.3.1 and 7.3.2.

There will be no facilitated impacts as a result of the project.

There is no publicly available information about impacts to this species as a result of other projects in the region. However, there is potential for incremental impacts migratory bird habitat as a result of mine projects in the region, for which authorisation to clear vegetation and habitat has been granted. These projects are approved with conditions and in accordance with the EO Act and EPBC Act, where significant impacts are likely, offsets will form part of those conditions. Where impacts are unlikely to be significant, the contribution to the cumulative impact is also unlikely to be significant.

Avoidance, mitigation and management measures

The proposed disturbance footprint has been significantly reduced and avoids the majority of wetland habitat. Nevertheless impacts to some areas of potential Glossy Ibis and Latham’s Snipe habitat cannot be avoided due to the location of the coal seam, however, impacts to habitat along the ETL study area will be avoided where possible as part of the detailed design and siting of the proposed ETL.

A range of plans and procedures will be implemented during mine construction, operation and rehabilitation, which will manage and monitor impacts to terrestrial ecology. In particular, the following protocols and plans will be developed to manage clearing in and near potential habitat to minimise harm to individuals and protect habitat to be retained, including:

- vegetation clearing protocols, including a ‘Permit to Disturb’ procedure
- Species Management Program
- Weed and Pest Animal Management Plan
- Erosion and Sediment Control Plan.

Rehabilitation requirements

Rehabilitation of disturbed areas will occur progressively throughout the life of the mine and will continue after mining has ceased until rehabilitation objectives have been met.

Suitable topsoils and subsoils will be stripped from construction and mining areas, and where viable stored to maintain soil quality and used in rehabilitation to promote native vegetation from the soil seed bank. Revegetation will be also undertaken where required across the mine site.

Significance of residual impacts

Table 18 provides an assessment of the significance of impacts to migratory birds against the Commonwealth Significant Impact Guidelines.

Table 18: Assessment of significance of impacts for migratory birds

Significance criteria	Assessment of significance
<i>An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:</i>	
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;	The habitats proposed to be impacted are unlikely to provide important habitat for a migratory species, therefore, important habitat will not be substantially modified, destroyed or isolated by the project.
Result in an invasive species that is harmful to the migratory species becoming	The habitats proposed to be impacted are unlikely to provide important habitat for a migratory species. The project area is located within a modified rural landscape

Significance criteria	Assessment of significance
established in an area of important habitat for the migratory species, or	where introduced plants and feral predators are present. Invasive and predatory species, including feral animals such as the Feral Cat and Wild Dog have been identified as part of recent field surveys in the study area. Other species such as Foxes are likely to occur in the broader landscape and the study area is accessible to such species. These predatory species already pose a risk to the Glossy Ibis and Latham's Snipe in the potential habitat areas present and the project is unlikely to increase this threat. Similarly, the project is unlikely to introduce new invasive or predatory species that are not already present and established in the study area as standard and industry recognised controls will be put in place as part of the Weed and Pest Animal Management Plan and which are referred to in Section 7.3.3.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the migratory species.	An ecologically significant proportion of the population of a migratory species is considered unlikely to occur in the potential habitats proposed to be impacted as this would have been recognisable during the seasonal surveys or evidence of such use identifiable. Therefore, the project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.
<i>Conclusion</i>	<i>The project will not result in a significant residual impact to migratory species listed under the EPBC Act.</i>

8.2 Matters of state environmental significance

An assessment of the impacts of the project have been undertaken for the following additional MSES, not already assessed in Section 8.1, in accordance with the Environmental Offsets Policy SRI Guideline:

- regulated vegetation communities (Section 8.2.1)
- wetland protection areas (Section 8.2.2)
- landscape connectivity (Section 8.2.3)
- *Solanum elaeagnifolium* (Section 8.2.4)
- Greater Glider (Section 8.2.4)
- Yellow-bellied Glider (Section 8.2.4)
- White-throated Needletail (Section 8.2.4)
- Short-beaked Echidna habitat (Section 8.2.4).

These impact assessments consider the avoidance, impact mitigation and management measures described in Section 7.

8.2.1 Regulated vegetation

Section 8 of the report details the vegetation communities identified within the study area that are considered regulated vegetation under the VM Act. Of the regulated vegetation communities identified within the broader study area, only remnant watercourse vegetation occurs within the proposed disturbance footprint of the project (Figure 10), which as assessed in the following section.

Vegetation within the defined distance of a watercourse

In accordance with the Queensland Offsets Regulation 2014, remnant REs that occur within certain distances of watercourses are classified as MSES. Clearing within the defined distance of these watercourse REs can trigger a significant impact under the SRI Guideline.

A number of vegetation management watercourses are mapped by the Queensland Government within the project area, including 1st, 2nd and 3rd order streams.

Two criteria in the Queensland SRI Guideline need to be triggered for a project to have a significant impact on a vegetation management watercourse:

- i. the clearing is required to be greater than a minimum threshold for the relevant RE structural category (e.g. at least 0.5 ha for dense to mid-dense REs)
- ii. the clearing is to occur within 5 m of the defining bank of the watercourse.

Small areas of remnant watercourse vegetation are proposed to be cleared within the defining distance of a 1st order stream. Appendix 3 of QEOP, lists the defined distance of REs for measuring significance of impacts to watercourse vegetation. For 1st and 2nd order streams the defined distance is 25 m from the defining banks. For 3rd and 4th order streams the defined distance is 50 m from the defining banks.

The area of proposed clearing equates to 0.04 ha of remnant RE 11.5.15.

Approximately 0.4 ha of remnant RE 11.3.25 on the edge of the Dawson River riparian corridor will also be impacted to construct the water release/extraction infrastructure. However, canopy clearing will not take place in this area and disturbance will be restricted to the ground layer and understory. Therefore, there will be no clearing of the remnant community in the riparian corridor.

Neither of these proposed impact areas trigger the significant residual impact test for regulated vegetation in the SRI Guideline. Additionally, neither of these areas of clearing or impact occur within 5 m of the (estimated) bank of the watercourse. Therefore, there will not be a significant impact to vegetation management watercourses.

8.2.2 Landscape connectivity

In accordance with the Queensland SRI Guideline, DES's LFC Tool was used to assist in identifying and quantifying any significant impact as a result of the project on habitat connectivity. This assessment uses the field-validated remnant vegetation mapping layer overlaid with the proposed project disturbance area. DES's LFC Tool determined that the project would result in a significant residual impact on local connectivity.

8.2.3 Protected wildlife habitat

Essential habitat is a MSES as prescribed under the EO Regulation. Essential habitat is mapped within the study area along the Dawson River for Ornamental Snake, in close proximity to the project area. The Ornamental Snake was identified in the project site during seasonal surveys. This species is listed as both a MNES and MSES and impacts to this species are addressed in Section 8.1.4 under the Commonwealth Significant Impact Guidelines.

The significance of impacts of the project to the *Xerothamnella herbacea*, Australian Painted Snipe, Koala, Squatter Pigeon, and migratory birds, which are all both MNES and MSES, are addressed in Section 8.1.

Three threatened species (listed under both the EPBC Act and NC Act) will be assessed as MSES only for the purposes of this project, as they were listed under the EPBC Act after the EPBC Act Referral Decision for the project. The Greater Glider and Yellow-bellied Glider were identified within the additional study area and the White-throated Needletail is considered to have a moderate likelihood of overflying the study area. These species are assessed in the following sections.

Another two NC Act listed species, which were identified in the study area; *Solanum elaeagnifolium* and Short-beaked Echidna, and which are listed as MSES only, are assessed in the following sections. The area mapped by the Queensland Government as essential habitat for *Bertya pedicellata* within the project site was found not to support this species or any other significant plant species. In accordance with the DES's information sheet the ground-truthing of suitable habitat for species, should be utilised over government mapping of habitat, given government mapping "does not have clear boundaries" for REs or essential habitat, nor does it "verify the 'true' extent and value" of the mapped vegetation

as essential habitat for a species. Detailed ecological field surveys were undertaken for this project, and areas of suitable habitat were identified for the threatened species observed and considered likely to occur. This ground-truthed data therefore takes precedence over the government mapping of essential habitat.

Solanum elachophyllum

Status: Endangered (NC Act)

Presence within the project area: PRESENT (refer Section 5.3.2)

A population of approximately 117 individuals of this species were identified within the project site and another 42 individuals within the ETL study area. The project is likely to result in the removal of all individuals of the population within the project site and the ETL study area (Figure 12).

Current known threats

Current known threats to *S. elachophyllum* include:

- habitat clearing or reduced habitat availability, including clearing populations in small remnants in rural areas
- weeds, particularly introduced pasture grasses such as Buffel Grass
- chance events causing a reduction in population sizes or loss of populations altogether, e.g. fire, drought, trampling by cattle
- grazing by native and exotic animals
- genetic inbreeding depression due to small population sizes (DES 2018b; Fensham et al. 2017).

Management plans

There are no management plans or recovery plans in place for this species.

Table 19 provides an assessment of the significance of impact to *S. elachophyllum* against the Queensland SRI Guideline for protected wildlife habitat.

Table 19: Assessment of significance of impacts for *Solanum elachophyllum*

Significance criteria	Assessment of significance
An action is likely to have a significant impact on endangered and vulnerable wildlife if the impact on the habitat is likely to:	
lead to a long-term decrease in the size of a local population; or	It is proposed that approximately 159 individuals of <i>S. elachophyllum</i> will be cleared as part of the project. The largest population is located where mining activities are proposed, therefore, there are no opportunities to avoid this population. There is potential to avoid some individuals at the northern end of the ETL study area depending on the exact ETL alignment, however, up to 24 individuals may be disturbed in this area. This species is relatively commonly occurring in the region, with in excess of 10, 000 individuals identified as part of the impact assessment for the Baralaba Coal Mine Train Load Facility in 2014. These populations were located within and adjacent to the Dawson Highway, approximately

Significance criteria	Assessment of significance
	30 km south of the project area. Another population of more than 64,000 individuals was also identified by Eco Solutions & Management at another location in the vicinity of the train load out facility for another project in 2018. The project will decrease the size of the population within the project area, however, it is unlikely to affect the population in the local region.
reduce the extent of occurrence of the species; or	The species is known to occur over a relatively broad range between Nebo in the north-east, Emerald in the west, Rolleston in the south-west, Rockhampton in the east and Theodore in the south (CSIRO 2019; Fensham et al. 2017). The population within the project area occurs towards the southern end of its known occurrence. However, it is not nearing the limit of this species' distribution. As there are large numbers of this species known to occur in its southern distribution the overall extent of occurrence of the species is unlikely to be reduced by the project.
fragment an existing population; or	The clearing proposed within the project site will result in removal of the population in its entirety. The impacts to the population in the ETL study area will likely fragment habitat through clearing of the 20 m ETL easement, however, not to the extent that the population would be fragmented or remaining sub-populations isolated. All sub-populations will remain within 200 m of the other.
result in genetically distinct populations forming as a result of habitat isolation; or	The populations proposed to be impacted are already separate from each other and other populations in the region. The proposed clearing of these populations will not affect the genetic structure or flow of any individuals that remain in the region, nor will it isolate any populations.
result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat; or	The project area is located within a modified rural landscape where introduced plants and feral animals are already present. Invasive species and feral animals such as Buffel Grass, Green Panic, Feral Pigs and European Rabbit, have been identified as part of field surveys in the study area. These invasive species already pose a threat to <i>S. elachophyllum</i> habitat within the project area and in the surrounding landscape and the project is unlikely to increase this threat. Buffel Grass is considered a key threat to this species and was recorded in the ground layer in which the population was identified. Similarly, the project is unlikely to introduce new invasive weed species that are not already present and established in the project area as controls will be put in place as standard and industry recognised controls will be put in place as part of the Weed and Pest Animal Management Plan and which are referred to in Section 7.3.3.
introduce disease that may cause the population to decline; or	Disease is not a known threat to <i>S. elachophyllum</i> . The project is unlikely to introduce disease that may cause the species to decline.
interfere with the recovery of the species; or	The populations within the project area are small and isolated and therefore, probably don't contribute significantly to the national population of <i>S. elachophyllum</i> , e.g. through genetic diversity or

Significance criteria	Assessment of significance
	population size. It has been recognised that large populations within viable Brigalow habitat should be targeted for conservation and are key to the long term stabilisation and recovery of the species (Fensham et al. 2017). Therefore, clearing of these populations in the project area is unlikely to interfere with the recovery of the species.
cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species.	The populations located in the project area are unlikely to be ecologically significant for this species as they are not at the limit of the species occurrence or particularly large populations. The species has been recorded elsewhere in the region in significantly larger populations.
<i>Conclusion</i>	<i>The project is considered unlikely to significantly impact S. elachophyllum as the populations in the project area are small, isolated, and are not considered to represent ecologically significant locations of this species.</i>

Greater Glider (*Petauroides volans*) – (southern and central)

Status: Endangered (EPBC Act & NC Act)

At the time of the EPBC Act Controlled Action Decision (EPBC Referral 2012/6547), the Greater Glider (southern and central) was not listed as threatened under the EPBC Act or NC Act.

Presence within the project area: MODERATE (refer Section 6.3.3)

No evidence of the Greater Glider was detected in the project area during the seasonal fauna surveys. The Greater Glider was recorded within remnant riparian vegetation (i.e. RE 11.3.25) that occurs along an anabranch of the Dawson River, north of the project site during surveys conducted within the additional investigation area. All remnant alluvial REs dominated by eucalypt species mapped within the additional investigation area, associated with the Dawson River, its anabranch and Banana Creek, are considered habitat for the Greater Glider. This habitat accounts for approximately 767.5 ha within the study area (Figure 17).

This habitat includes a narrow strip of Greater Glider habitat in the form of RE 11.3.25 that will be traversed by the proposed water extraction/release infrastructure to the Dawson River. This area accounts for 0.4 ha; however, no clearing of canopy habitat trees is proposed in this area. Only understorey and ground layer vegetation clearing will be undertaken to construct the infrastructure at this location.

Current known threats

Current known threats to the Greater Glider include:

- habitat loss and fragmentation (through clearing and logging and timber production), and the destruction of senescent trees, causing loss of connectivity and large hollow-bearing habitat trees
- climate change affecting habitat suitability and resulting in a range contraction

- high intensity/frequency of fires causing population loss or declines
- barbed wire fencing resulting in entanglement and occasional losses of individuals
- hyper-predation by owl species
- loss of hollow-bearing trees resulting in increased competition with Sulphur-crested Cockatoos
- *Phytophthora* (*Phytophthora cinnamomi*) root fungus, which is known to impact the health of Eucalypts (TSSC 2016a).

Management plans

The following plans and advice are in place for the Greater Glider:

- **Conservation Advice:** Approved Conservation Advice has been prepared for the Greater Glider, which recommends conservation and management actions for the species. The conservation advice also details threats to the species and assigns consequence ratings to the threat (DCCEEW 2023e) .
- **Threat Abatement Plan:** No threat abatement plans have been identified as being relevant for this species by the DAWE. However, a Threat Abatement Plan for disease in natural ecosystems caused by *Phytophthora cinnamomi* has been prepared (Department of the Environment 2014)
- **Recovery Plan:** There is currently no recovery plan in place for the Greater Glider, however, the DAWE SPRAT Profile identifies that a Recovery Plan is required (DCCEEW 2023e).

Table 20 provides an assessment of the significance of impact to the Greater Glider against the Queensland SRI Guideline for protected wildlife habitat.

Table 20: Assessment of significance of impacts for the Greater Glider

Significance criteria	Assessment of significance
An action is likely to have a significant impact on endangered wildlife if the impact on the habitat is likely to:	
Lead to a long-term decrease in the size of a local population; or	The extent of impacts to understory vegetation within 0.4 ha of potential habitat for this species along the Dawson River, in RE 11.3.25, is unlikely to decrease the size of the population that occurs along the Dawson River and associated tributaries.
reduced extent of occurrence of the species; or	The project will not result in impacts to habitat for this species and extensive habitat occurs within the riparian corridor associated with the Dawson River. Therefore, the local extent of occurrence by this species will not be reduced.
fragmentation of an existing population; or	Greater Glider habitat is not proposed to be cleared for the project. The project will not affect the genetic structure or flow of any populations in the region, nor will it isolate any populations.
result in genetically distinct populations forming as a result of habitat isolation; or	As the local population is unlikely to be fragmented or become isolated, the gene flow within the local population is unlikely to be affected by the project.
result in invasive species that are harmful to an endangered or vulnerable	The study area is located within a modified rural landscape where introduced plants and feral predators are present. Invasive and predatory species, including

Significance criteria	Assessment of significance
species becoming established in the endangered or vulnerable species' habitat; or	feral animals such as the Feral Cat and Wild Dog have been identified as part of recent field surveys in the study area. Other species such as Foxes are likely to occur in the broader landscape and the study area is accessible to such species. The project is unlikely to introduce new invasive or predatory species that are not already present and established in the study area as standard and industry recognised controls will be put in place as part of the Weed and Pest Animal Management Plan and which are referred to in Section 7.3.3.
introduce disease that may cause the population to decline, or	Diseases or viruses are not listed as a key threat to the Greater Glider in the current conservation advice (DCCEEW 2023e). However, the Phytophthora root fungus is known to impact the health of eucalypt species, which the Greater Glider is reliant upon. Phytophthora is known to occur in all states of Australia and is likely to be present in the landscape in which the study area is located, it is considered unlikely that the project will introduce disease that may cause this species to decline.
interfere with the recovery of the species; or	Greater Glider habitat is not proposed to be cleared for the project and extensive riparian habitat occurs along the Dawson River and its tributaries in the region. The project is considered unlikely to interfere with the recovery of the species.
disruption to ecologically significant locations (breeding, feeding or nesting sites) of a species.	Greater Glider habitat is not proposed to be cleared for the project. Additionally, indirect impacts from the project are not predicted to impact riparian or floodplain communities. Therefore, ecologically significant locations for the Greater Glider will not be impacted.
<i>Conclusion</i>	<i>The project will not result in a significant residual impact on the Greater Glider.</i>

Yellow-bellied Glider (Petaurus australis australis) - (south-eastern)

Status: Vulnerable (EPBC Act & NC Act)

At the time of the EPBC Act Controlled Action Decision (EPBC Referral 2012/6547), the Yellow-bellied Glider (south eastern) was not listed as threatened under the EPBC Act or NC Act.

Presence within the project area: MODERATE (refer Section 6.3.4)

No evidence of the Yellow-bellied Glider was detected in the project area during the seasonal fauna surveys. The Yellow-bellied Glider was recorded within remnant riparian vegetation (i.e. RE 11.3.3) along Banana Creek, south-west of the project site during surveys within the additional investigation area. All remnant alluvial REs dominated by eucalypt species mapped within the additional investigation area, associated with the Dawson River, its anabranch and Banana Creek, are considered habitat for the Yellow-Bellied Glider. This habitat accounts for approximately 767.4 ha within the study area (Figure 17).

This habitat includes a narrow strip of Yellow-bellied Glider habitat in the form of RE 11.3.25 that will be traversed by the proposed water extraction/release infrastructure to the Dawson River. This area accounts for 0.4 ha; however, no clearing of canopy habitat trees is proposed in this area. Only understorey and ground layer vegetation clearing will be undertaken to construct the infrastructure at this location.

Current known threats

Current known threats to the Yellow-bellied Glider include:

- habitat loss, disturbance and modification through clearing, severe burning and timber harvesting
- climate change affecting habitat suitability and resulting in a range contraction through increased temperatures and changes to precipitation patterns
- introduced species resulting in increased predation by Red Foxes (*Vulpes vulpes*) and feral cats (*Felis catus*) and habitat degradation by feral deer
- barbed wire fencing resulting in entanglement and occasional losses of individuals

Management plans

The following plans and advice are in place for the Yellow-bellied Glider:

- Conservation Advice: Approved Conservation Advice has been prepared for the Yellow-bellied Glider, which recommends conservation and management actions for the species. The conservation advice also details threats to the species and assigns consequence ratings to the threat (DCCEE 2023k)
- Recovery Plan: There is currently no recovery plan in place for Yellow-bellied Glider

Table 21 provides an assessment of the significance of impact to the Greater Glider against the Queensland SRI Guideline for protected wildlife habitat.

Table 21: Assessment of significance of impacts for the Yellow-bellied Glider

Significance criteria	Assessment of significance
An action is likely to have a significant impact on vulnerable wildlife if the impact on the habitat is likely to:	
Lead to a long-term decrease in the size of a local population; or	The extent of impacts to understorey vegetation within 0.4 ha of potential habitat for this species along the Dawson River, in RE 11.3.25, is unlikely to decrease the size of the population that occurs along the Dawson River and associated tributaries.
reduced extent of occurrence of the species; or	The project will not result in impacts to habitat for this species and extensive habitat occurs within the riparian corridor associated with the Dawson River. Therefore, the local extent of occurrence by this species will not be reduced.

Significance criteria	Assessment of significance
fragmentation of an existing population; or	Yellow-bellied Glider habitat is not proposed to be cleared for the project. The project will not affect the genetic structure or flow of any populations in the region, nor will it isolate any populations.
result in genetically distinct populations forming as a result of habitat isolation; or	As the local population is unlikely to be fragmented or become isolated, the gene flow within the local population is unlikely to be affected by the project.
result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat; or	The study area is located within a modified rural landscape where introduced plants and feral predators are present. Invasive and predatory species, including feral animals such as the Feral Cat and Wild Dog have been identified as part of recent field surveys in the study area. Other species such as Foxes are likely to occur in the broader landscape and the study area is accessible to such species. The project is unlikely to introduce new invasive or predatory species that are not already present and established in the study area as standard and industry recognised controls will be put in place as part of the Weed and Pest Animal Management Plan and which are referred to in Section 7.3.3.
introduce disease that may cause the population to decline, or	Diseases or viruses are not listed as a key threat to the Yellow-bellied Glider in the current conservation advice (DCCEEW 2023k). However, the Phytophthora root fungus is known to impact the health of eucalypt species, which the Yellow-bellied Glider is reliant upon. As Phytophthora is known to occur in all states of Australia and is likely to be present in the landscape in which the study area is located, it is considered unlikely that the project will introduce disease that may cause this species to decline.
interfere with the recovery of the species; or	Yellow-bellied Glider habitat is not proposed to be cleared for the project and extensive riparian habitat occurs along the Dawson River and its tributaries in the region. The project is considered unlikely to interfere with the recovery of the species.
disruption to ecologically significant locations (breeding, feeding or nesting sites) of a species.	Yellow-bellied Glider habitat is not proposed to be cleared for the project. Additionally, indirect impacts from the project are not predicted to impact riparian or floodplain communities. Therefore, ecologically significant locations for the Yellow-bellied Glider will not be impacted.
<i>Conclusion</i>	<i>The project will not result in a significant residual impact on the Yellow-bellied Glider.</i>

White-throated Needletail

Status: Vulnerable/Migratory (EPBC Act) Vulnerable/Special least concern (Migratory) (NC Act)

Presence within the project area: MODERATE LIKELIHOOD OF OCCURRENCE (refer Section 6.3.3 and Appendix D)

The White-throated Needletail was not recorded in the study area during seasonal surveys; however, it is widespread and it has been recorded in the region. The

White-throated Needletail has the potential to overfly all types of habitats within the study area as part of wider foraging movements, although forested and treed areas are likely to be preferred. There is no evidence of traditional roost sites within the study area. Potential overfly habitat in the study area equates to approximately 1,136.0 ha and potential overfly habitat (Figure 19).

The project would result in the clearing of approximately 16.7 ha of potential overfly habitat only.

Current known threats

Known threats to the White-throated Needletail in Australia are limited to collision with overhead wires, windows and lighthouses (TSSC 2019a).

Management plans

The following plans and advice are available for the White-throated Needletail:

- Conservation Advice: Approved Conservation Advice has been prepared for the White-throated Needletail, which recommends conservation and management actions, stakeholder engagement, survey, monitoring and research priorities for the species (TSSC 2019a).
- Threat Abatement Plan: No threaten abatement plans have been identified as relevant to this species.
- Recovery Plan: There is no recovery plan in place for this species. The Conservation Advice recommends that a recovery plan is not required for the species as the Conservation Advice provides "sufficient direction to implement priority actions and mitigate against key threats" (TSSC 2019a).

Table 22 provides an assessment of the significance of impact to the White-throated Needletail against the Queensland SRI Guideline for protected wildlife habitat.

Table 22: Assessment of significance of impacts for the White-throated Needletail

Significance criteria	Assessment of significance
An action is likely to have a significant impact on vulnerable wildlife if the impact on the habitat is likely to:	
Lead to a long-term decrease in the size of a local population; or	Approximately 16.7 ha of potential overfly habitat will be impacted or removed for the project. However, this species is unlikely to use the vegetation within the project area specifically for foraging or roosting, as it is an almost exclusively aerial species. This species is known to forage above vegetation and disturbed areas. Therefore, the proposed impacts are unlikely to lead to a long-term decrease in the size of a local population.
reduced extent of occurrence of the species; or	The project is considered unlikely to impact foraging or movement behaviour of the White-throated Needletail that may occur in the region and therefore will not reduce the extent of occurrence of this species.
fragmentation of an existing population; or	This is a highly mobile and an almost exclusively aerial species. The project will not fragment a population of this species that may forage in the region.

Significance criteria	Assessment of significance
result in genetically distinct populations forming as a result of habitat isolation; or	The project will not affect genetic flow of any populations that may forage within the region.
result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat; or	This is an almost exclusively aerial species. Therefore, the invasive terrestrial plants and feral animals known to occur in the study area are unlikely to pose a threat to this species. It is highly unlikely that the project would result in invasive species becoming established in White-throated Needletail habitat.
introduce disease that may cause the population to decline, or	Disease is not a known threat to this species. Therefore, the project is unlikely to introduce any disease that may cause the population to decline.
interfere with the recovery of the species; or	The project is considered unlikely to interfere with the foraging or movement behaviour of White-throated Needletail that may occur in the region as it will not impact the aerial habitat for this species. Therefore, the project will not interfere with the recovery of the species.
disruption to ecologically significant locations (breeding, feeding or nesting sites) of a species.	The study area is not likely to present an ecologically significant location for this species as no breeding, feeding or nesting sites were observed for this species. The species is unlikely to use the vegetation and habitats in the study area due to its aerial feeding and roosting behaviour. Therefore, such ecological significant locations will not be impacted by the project.
<i>Conclusion</i>	<i>The project will not result in a significant residual impact on the White-throated Needletail.</i>

Short-beaked Echidna

Status: Special least concern (NC Act)

Presence within the project area: HIGH LIKELIHOOD OF OCCURRENCE (refer Section 6.3.3 and Appendix D)

The Short-beaked Echidna was recorded in the study area during seasonal surveys, and remnant habitats (i.e. 10.1 ha) would be preferred by this species in the project area (Section 6.3.3, Figure 20).

The project would result in the clearing of approximately 10.1 ha of habitat for this species. However, the Short-beaked Echidna is a mobile species and is known to use cleared and disturbed habitats.

Current known threats

The likely predators of the Short-beaked Echidna are Feral Cats, European Red Fox, Wild Dogs and Goannas (NPWS 1999).

Management plans

There are no threat abatement plans or recovery plans for this species and it is not considered a threatened or at-risk species.

Table 24 provides an assessment of the significance of impact to the Short-beaked Echidna against the Queensland SRI Guideline for protected wildlife habitat.

Table 23: Assessment of significance of impacts for the Short-beaked Echidna

Significance criteria	Assessment of significance
An action is likely to have a significant impact on a special least concern (non-migratory) animal wildlife habitat if it is likely that it will result in:	
a long-term decrease in the size of a local population; or	Approximately 10.1 ha of suitable habitat formed by remnant vegetation is proposed to be cleared as part of the project. Short-beaked Echidna habitat is widespread in the region and this species occupies a broad range of habitats of varying quality, therefore, this clearing is unlikely to lead to a long-term decrease in the local population.
a reduced extent of occurrence of the species; or	Short-beaked Echidna habitat is proposed to be cleared as part of the project. However, the reduction by 10.0 ha of habitat is considered unlikely to affect the ability of the species to persist in the local area because of the extent of habitat that will remain along the Dawson River, Banana Creek and Mount Ramsay. Therefore, the extent of occurrence of this species will not be reduced as a result of the project.
fragmentation of an existing population; or	Connectivity of habitat will not be compromised as a result of the project as this species is known to use disturbed and cleared areas. Additionally, connective remnant habitats along the Dawson River and its tributaries will remain in the region. As the Short-beaked Echidna is a mobile species the local population is unlikely to be fragmented due to the proposed habitat clearing.
result in genetically distinct populations forming as a result of habitat isolation; or	As the local population is unlikely to be fragmented or become isolated, the gene flow within the local population is unlikely to be affected by the project.
disruption to ecologically significant locations (breeding, feeding or nesting sites) of a species.	Standard industry recognised measures will be employed during the vegetation clearing stages of the project to minimise harm and disruption to animals and breeding places in accordance with the requirements of the Queensland NC (Wildlife Management) Regulation. This will reduce the risk and extent of disruption to the breeding cycle of Short-beaked Echidnas in the study area. Additionally, connectivity of habitat will not be severed and the Short-beaked Echidna will be able to continue to move through the landscape and forage in extensive surrounding habitat areas.
<i>Conclusion</i>	<i>Given the relatively small area of habitat proposed to be cleared, the prevalence of this species in the region, the overall maintenance of connectivity of habitat in the region, and the mobility of the species, it is considered unlikely that the project will have a significant residual impact on the Short-beaked Echidna.</i>

9 Residual impacts and offset liability

Offsets are required to compensate for significant residual impacts to MNES and MSES.

Offsets are required under the EPBC Act if an action is likely to have a significant residual impact on MNES. The EPBC Act Environmental Offsets Policy details requirements under the EPBC Act in relation to biodiversity offsets (SEWPaC 2012). The Significant Impact Guidelines provide guidance to assist with determining whether an impact is considered significant. For some species, there are also species-specific guidelines available to assist with determining significance of impacts (e.g. EPBC Act referral guidelines for the vulnerable Koala (DotE 2014)).

In Queensland, offsets are required under the EO Act for activities likely to cause a significant residual impact on MSES, as defined in Schedule 2 of the EO Regulation. The SRI Guideline is used to assess the potential for significant residual impact to occur.

In the case of matters that are prescribed as being both MNES and MSES, offsets are not required under the Queensland EO Act, if the same, or substantially the same, impact to the prescribed matter has been assessed under the EPBC Act.

Sections 9.1 and 9.2 summarise the significance of residual impacts to MNES and MSES, respectively. The area of impact to each MNES or MSES is outlined in Table 11 of Section 8. It should be noted that in many cases area calculations may overlap where an area supports more than one MNES or MSES. The areas quoted in Table 11 cannot, therefore, be added. Matters, which are dual listed as both MNES and MSES are only discussed in Section 9.1, given, that offsets under the EPBC Act take precedence.

9.1 Matters of national environmental significance

The assessments of significance provided in Section 8, demonstrate that for the Australian Painted Snipe, Koala, Squatter Pigeon, migratory birds and Brigalow TEC, it is unlikely that the project will result in a significant impact. This is because it is unlikely that the populations proposed to be impacted for the project are important and similar habitats are available throughout the region. However, significance assessments found that the clearing of vegetation and habitats for the project has the potential to have a significant impact on the:

- *Xerothamnella herbacea* – due to the clearing of a population that is near the northern limit of its known distribution
- Ornamental Snake – as the habitat proposed to be cleared is relatively large and considered important habitat for the species.

9.2 Matters of state environmental significance

The assessments of significance are provided in Section 8 and describe and assess the project's potential impacts on residual MSES. These assessments concluded that there is unlikely to be a significant impact on *Solanum elaeagnifolium*, the Greater Glider, Yellow-bellied Glider, White-throated Needletail or Short-beaked

Echidna as the impact is considered small and the species are widespread in the region. Furthermore, as a relatively small area of remnant vegetation is proposed to be cleared, the regulated vegetation (of concern, waterway, and wetland vegetation) significant impact thresholds will not be triggered by the project either through direct or indirect impacts. With regard to the prescribed wetland in the south-west of the project site, it is unlikely the project will have a significant direct or indirect impact to this wetland as the area of clearing is well removed from the wetland and as such, hydrological changes are not likely to be substantial.

It was determined however, that the project presents potential for significant impacts to landscape connectivity. The LFC Tool determined there would be significant local impact to connectivity. Therefore, impacts to 10.1 ha of remnant vegetation within the project area will require offsets in accordance with the EO Act and Environmental Offsets Policy. In accordance with the Environmental Offsets Policy for connectivity impacts, the offset site must be; a non-remnant ecosystem and in the same subregion as the impact area. Under this policy the offset multiplier for connectivity impacts is '1' (DES 2020).

A Biodiversity Offset Strategy (BOS) has been prepared for the project under the EPBC Act. The BOS presents habitat quality information for the MNES for which this assessment has identified a likely significant impact, as well as habitat quality information for a number of potential offset sites that are proposed to adequately compensate for significant residual impacts to MNES. The BOS will also be used in support of the mining lease application and environmental authority (EA) applications under the Queensland EP Act.

The BOS identifies a number of properties comprising large areas of regrowth and regenerating Brigalow woodland (REs 11.3.1, 11.4.9a and 11.9.1) and Silver-leaved Ironbark (*Eucalyptus melanophloia*) woodland (RE 11.5.5c), within which an offset site(s) is proposed to be established to offset impacts to Ornamental Snake habitat (Eco Solutions & Management 2021). These areas account for approximately 263 ha and it is proposed the offset site located within these non-remnant regenerating areas will also provide offsets for project impacts to 10.0 ha of connectivity areas under the EO Act.

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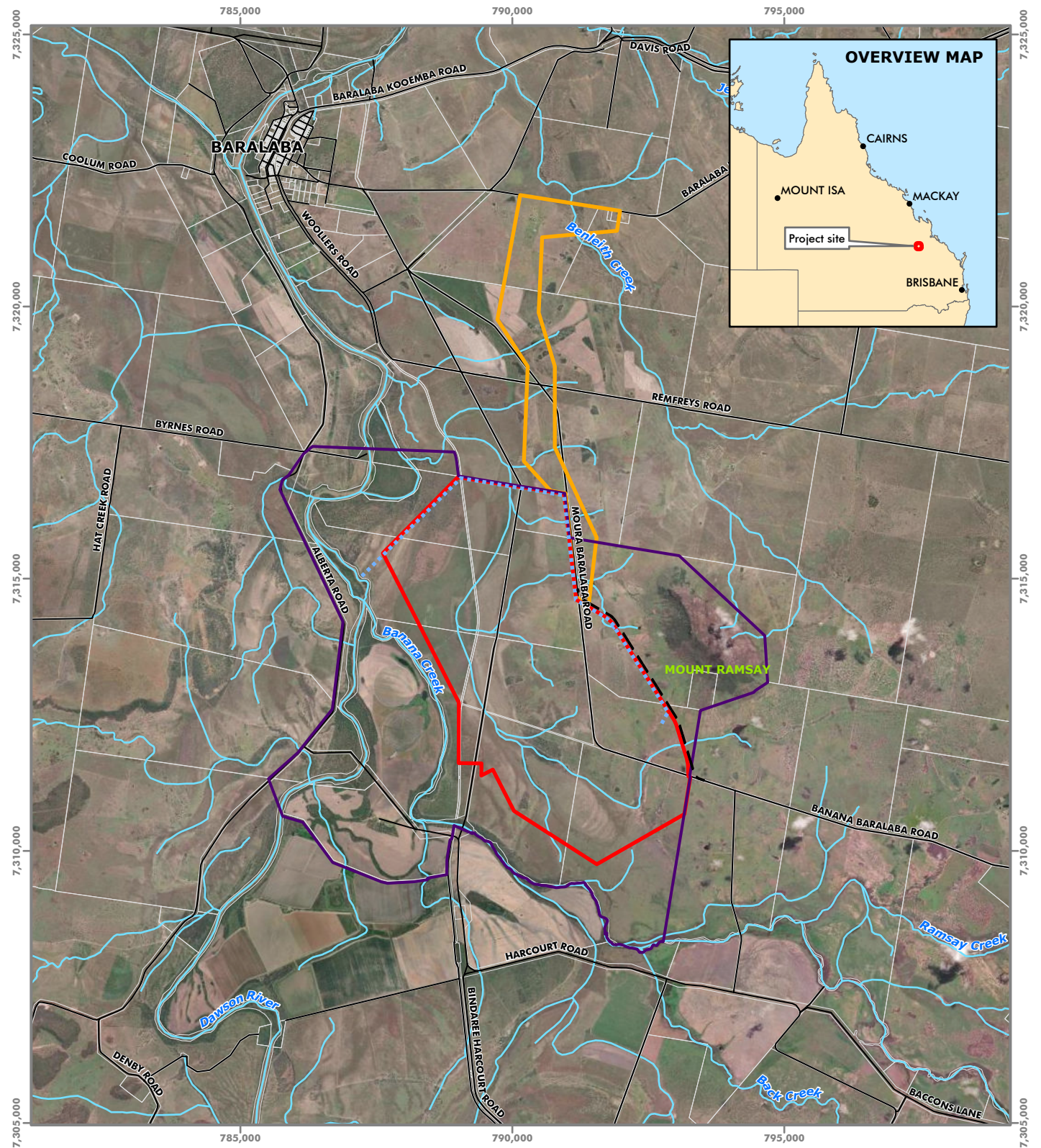
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Figures



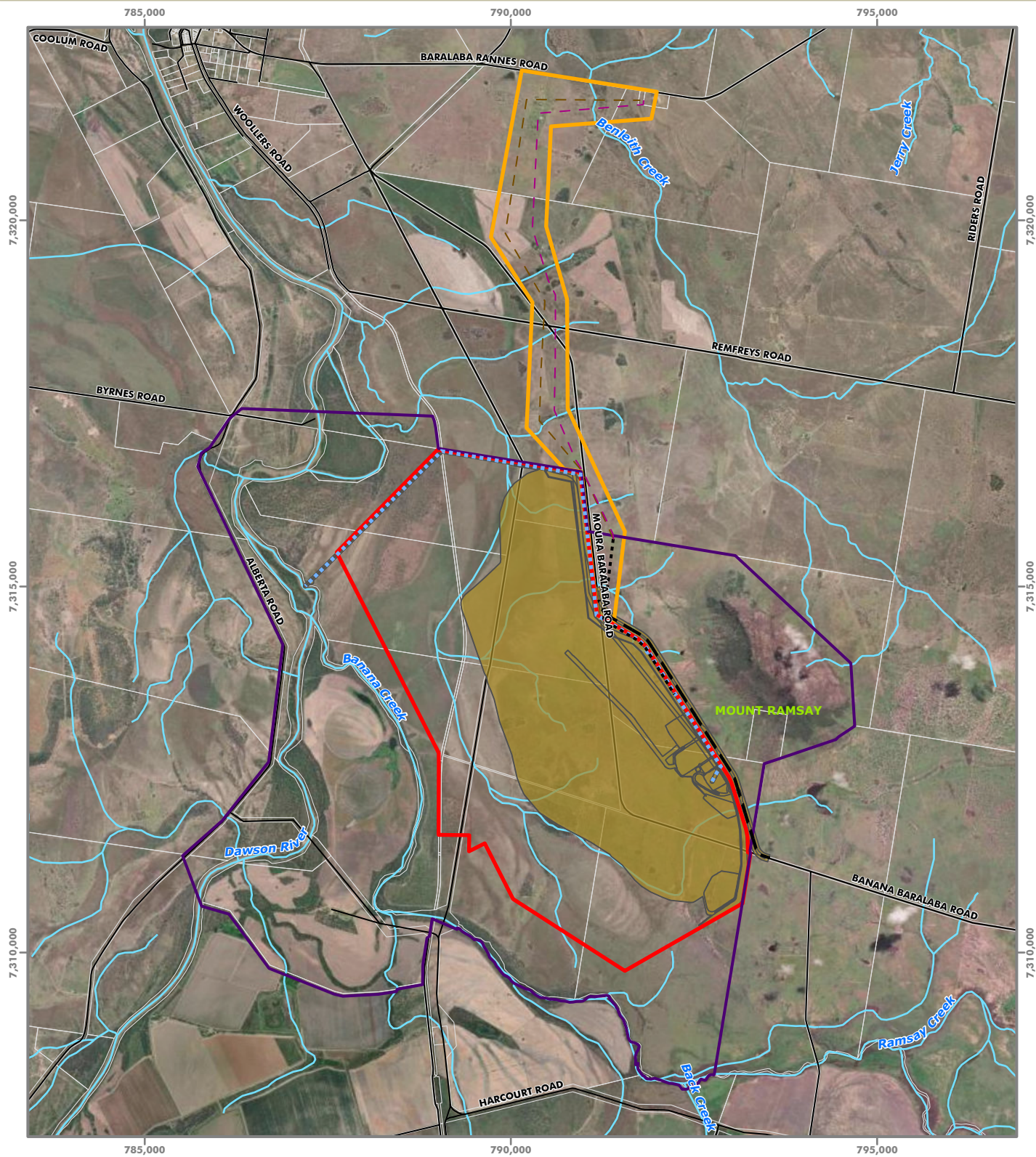
Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Water release/extraction infrastructure
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Figure 1 : Project location
 Baralaba South Project
 Terrestrial Ecology Assessment

Map Number: 23015_TEA_01_A
 Date: 07 August 2023
 Map Projection: GDA2020 MGA Zone 55
 Imagery: (c) Digital Globe
 Data: Roads, Watercourse, DCDB - (c)DNRM 2023





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Project layout

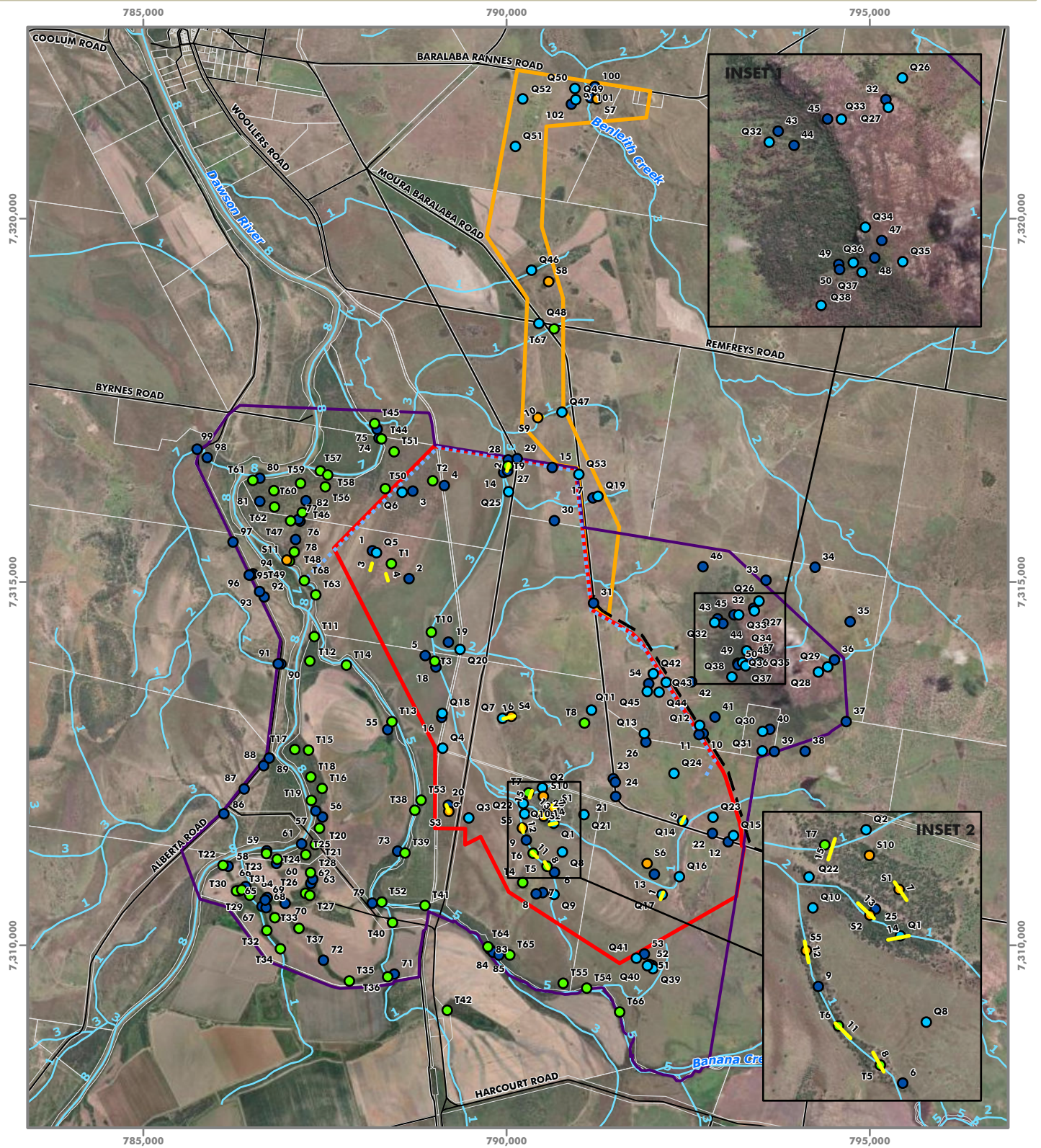
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Infrastructure layout
- Mine footprint

Figure 2 : Project layout

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_02_B
Date: 13 October 2023
Map Projection: GDA 1994 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2023





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Water release/extraction infrastructure
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Vegetation assessment sites

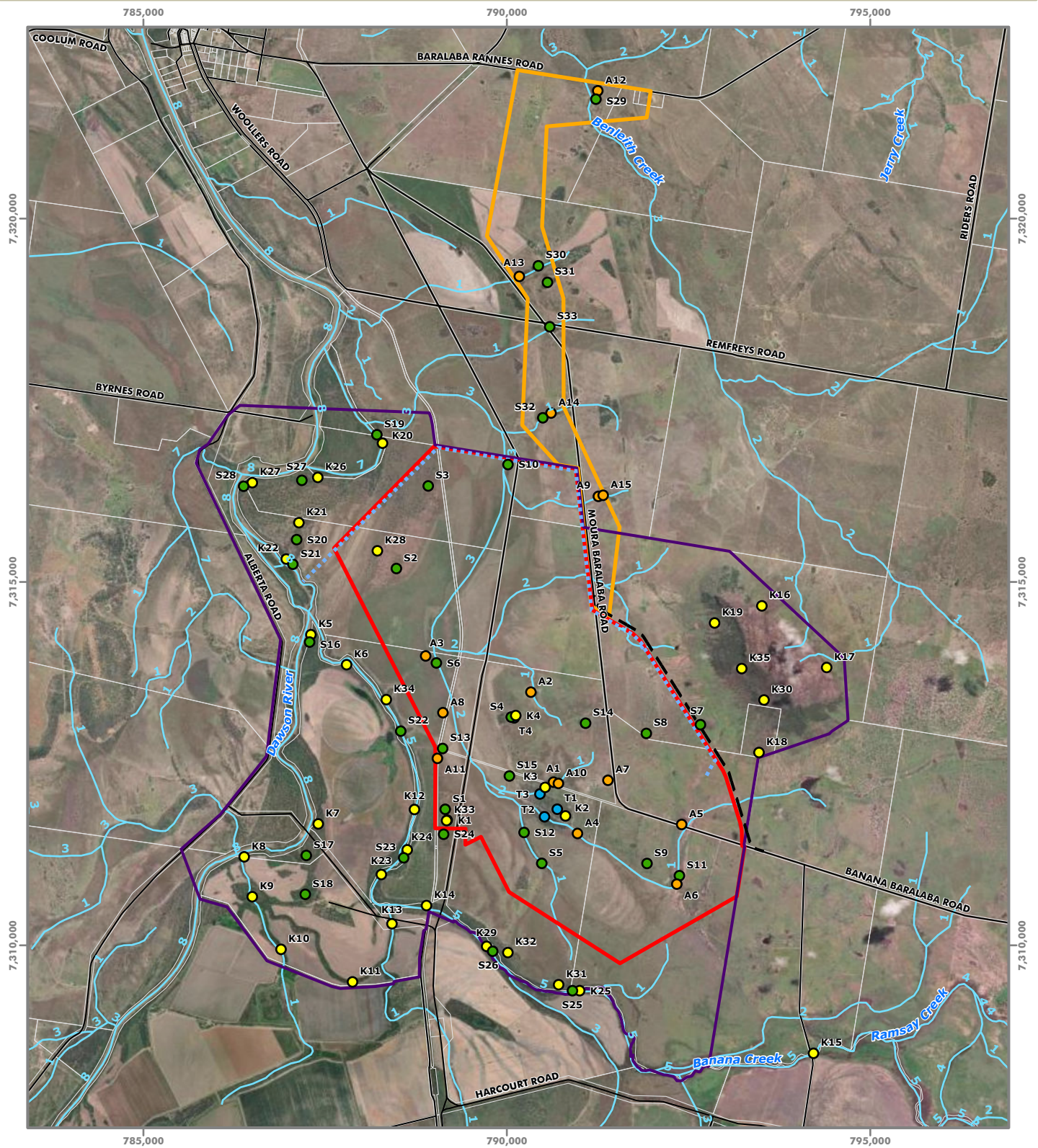
- Secondary site
- Tertiary site
- Quarternary site
- Quarternary photo point
- Habitat quality plot

Figure 3 : Flora survey sites

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_03_A
Date: 09 August 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Water release/extraction infrastructure
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Fauna survey sites

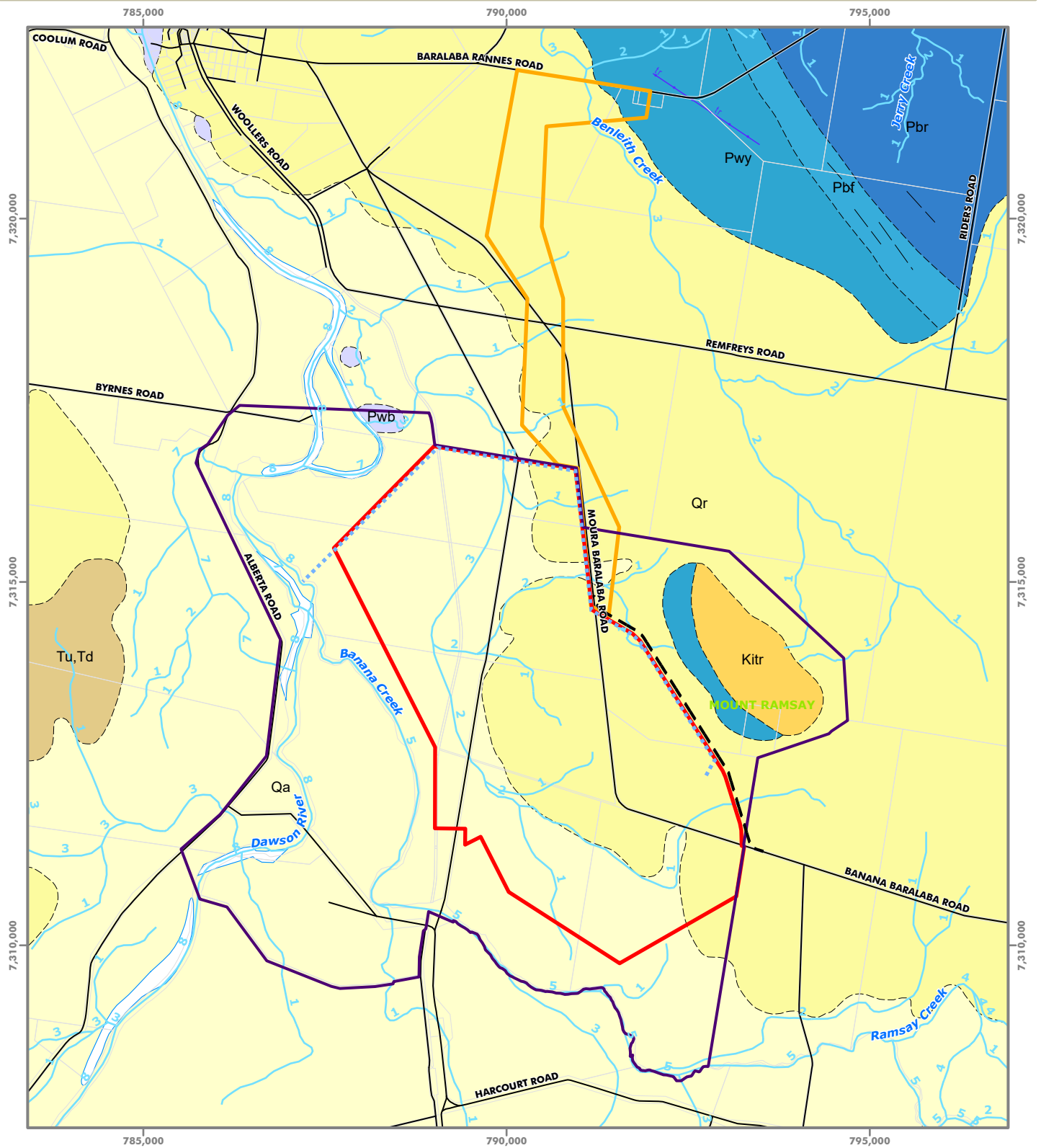
- Anabat site
- Koala SAT site
- Supplementary site
- Trap site

Figure 4 : Fauna survey sites

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_04_A
Date: 09 August 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Water release/extraction infrastructure
- Proposed Maura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

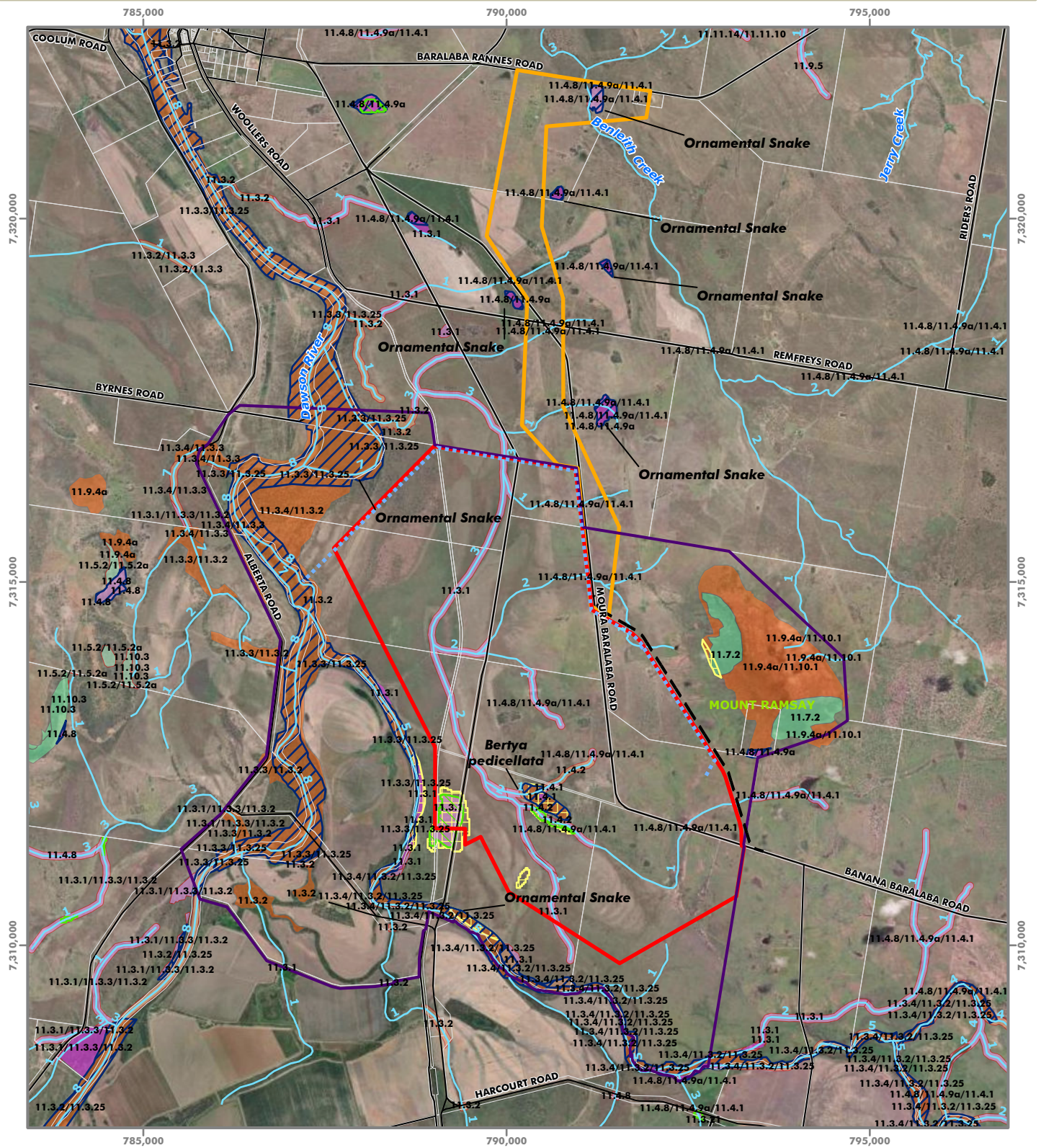
Figure 5 : Geology mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Symbol	Rock Unit Name	Lithological Summary	Dominant Rock	Age
	Pwb Baralaba Coal Measures	Calcareous mudstone and shale, coal and feldspatholithic sandstone; minor lithic sublittoral sandstone, tuff, bands of calcareous sandstone nodules and concretionary ironstone	SEDIMENTARY ROCK	LATE PERMIAN
	Pbr Barfield Formation	Green to dark blue, locally calcareous mudstone with local calcareous to phosphatic concretions and glendonites; lithic and feldspathic sandstone and minor conglomerate; minor lapilli tuff and volcanilithic pebble conglomerate; rare andesite	SEDIMENTARY ROCK	LATE PERMIAN
	Tu,Td Duaringa Formation,Td-QLD	Mudstone, sandstone, conglomerate, siltstone, oil shale, lignite, basalt	SEDIMENTARY ROCK	EOCENE - OLIGOCENE
	Pbf Flat Top Formation	Siltstone, lithic sandstone, mudstone, conglomerate and minor coquinitic sandy limestone and tuff	SEDIMENTARY ROCK	LATE PERMIAN
	Pwy Gyranada Subgroup	Siltstone and shale with minor tuff and volcanilithic sandstone and rare coal (lower part - Banana Formation); calcareous sandstone, mudstone and siltstone (upper part - Wiseman Formation)	SEDIMENTARY ROCK	LATE PERMIAN
	Kitr Mount Ramsay Trachyte	Alkali trachyte	FELSITES (LAVAS, CLASTICS & HIGH-LEVEL INTRUSIVES)	LATE CRETACEOUS
	Qa Qa-QLD	Clay, silt, sand and gravel; flood-plain alluvium	ALLUVIUM	QUATERNARY
	Qr Qr-QLD	Clay, silt, sand, gravel and soil; colluvial and residual deposits	COLLUVIUM	QUATERNARY

Map Number: 23015_TEA_05_A
Date: 09 August 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Water release/extraction infrastructure
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary
- Vegetation Management Wetlands Map - V8.04
- Vegetation Management Essential Habitat - V11.04
- High Risk Area - Protected Plants Mapping

Vegetation Management Regional Ecosystem Map - V12.02

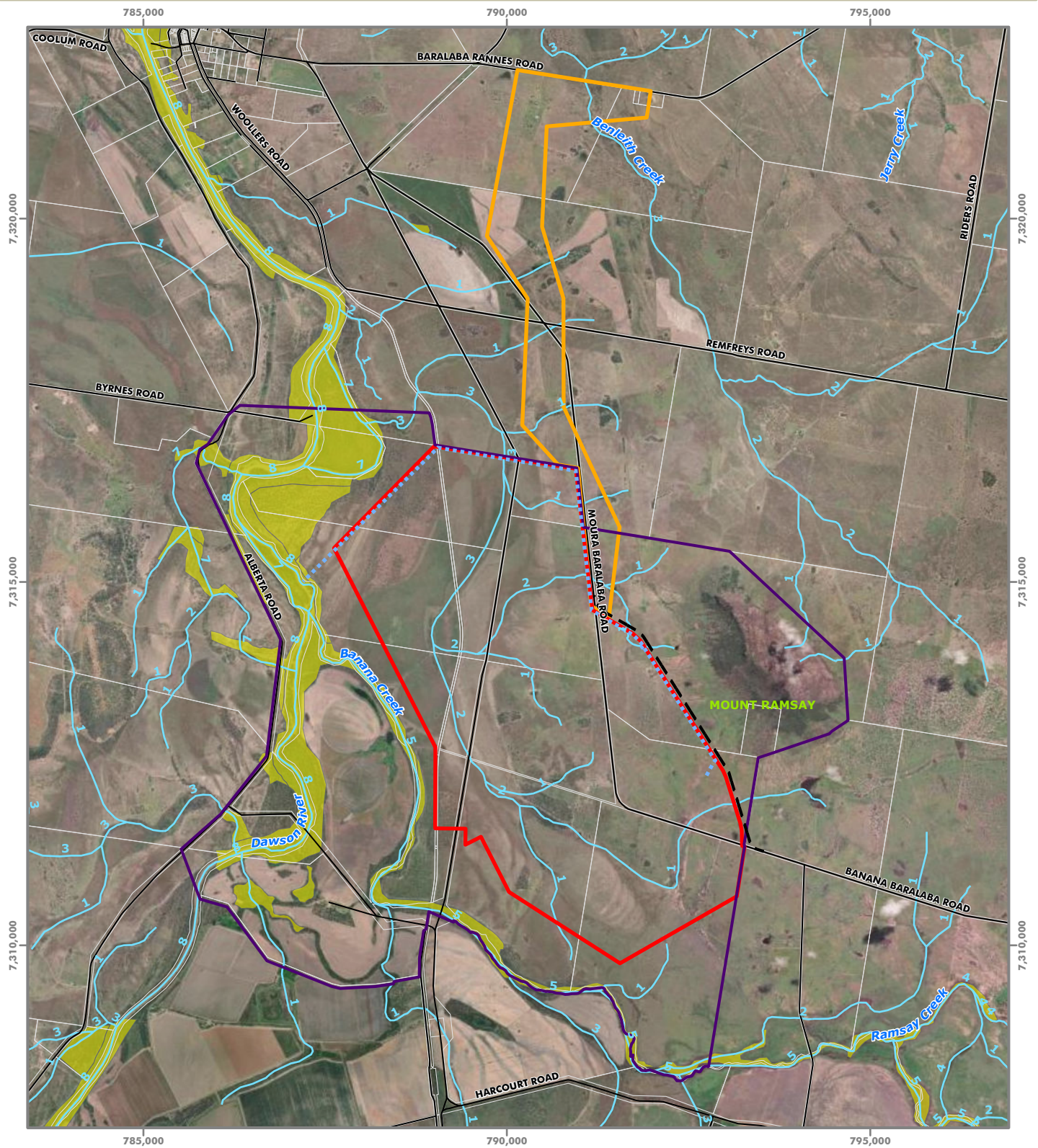
- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern

Figure 6 : Queensland Government regional ecosystem mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_06_A
Date: 09 August 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

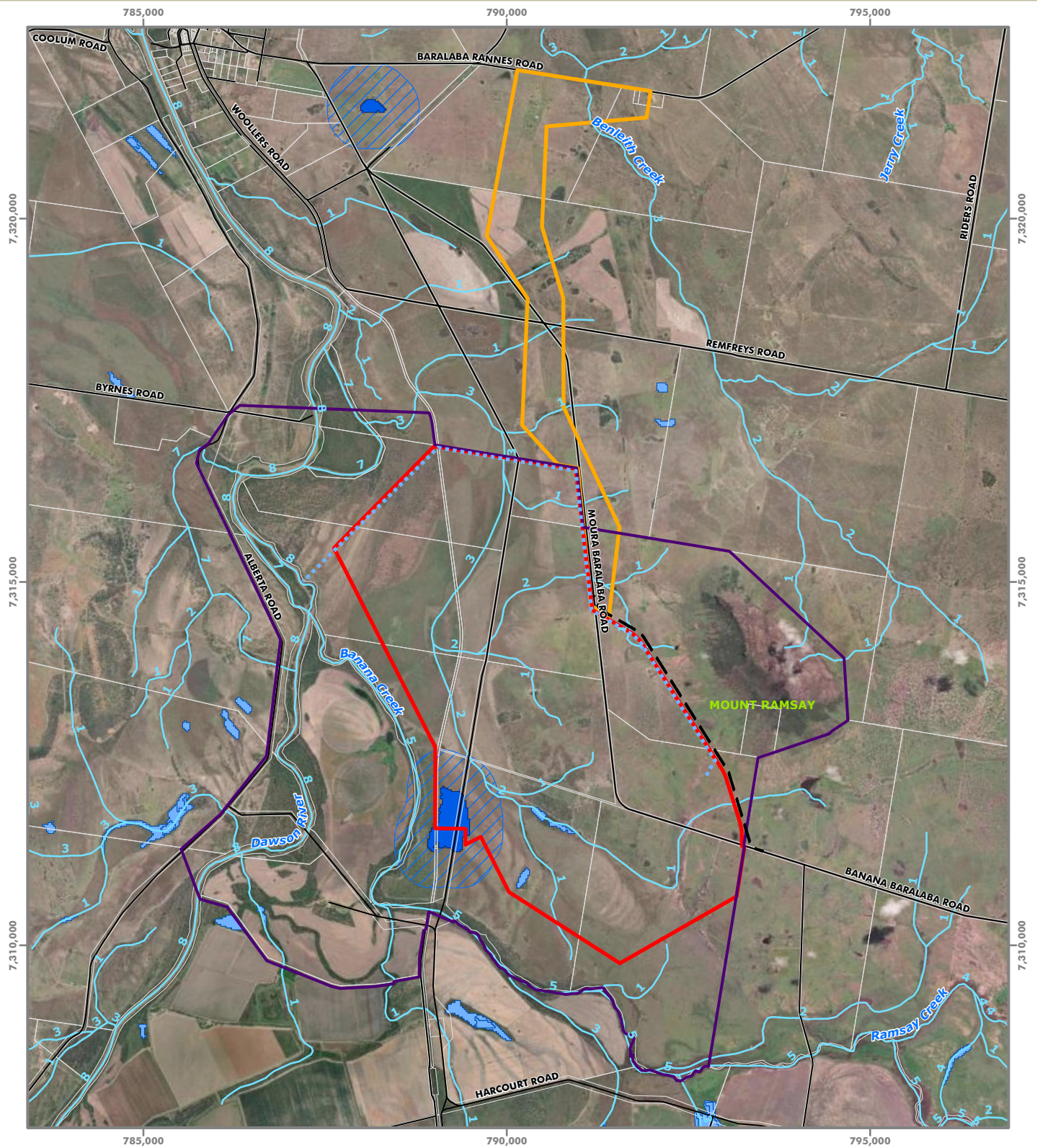
- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Water release/extraction infrastructure
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary
- Terrestrial GDE**
- Low potential GDE - from regional studies

Figure 7 : Groundwater Dependent Ecosystem Atlas mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_07_A
Date: 09 August 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

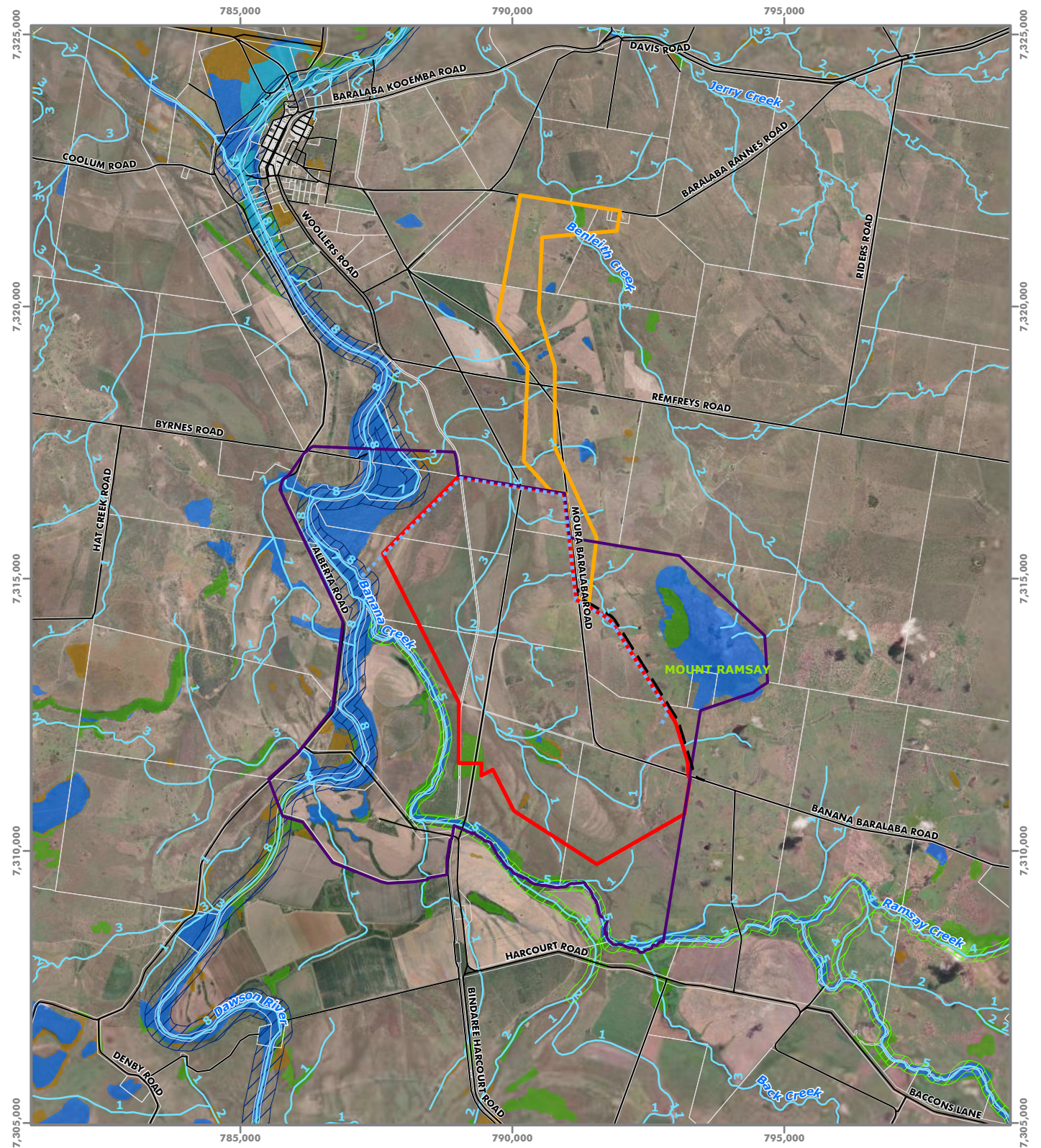
- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Water release/extraction infrastructure
- Proposed MOURA BARALABA ROAD realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary
- Wetland protection area**
- HES wetland
- GES wetland
- Trigger area

Figure 8 : Referable wetland mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_08_A
Date: 09 August 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





- Legend**
- Project Site (MLA 700057)
 - ETL (electricity transmission line) study area
 - Additional investigation area
 - Water release/extraction infrastructure
 - Proposed Moura Baralaba road realignment
 - Road
 - Vegetation Management Act watercourse
 - Cadastral boundary
- Biodiversity Significance**
- State Habitat for EVNT taxa
 - State
 - Regional
 - Local or Other Values

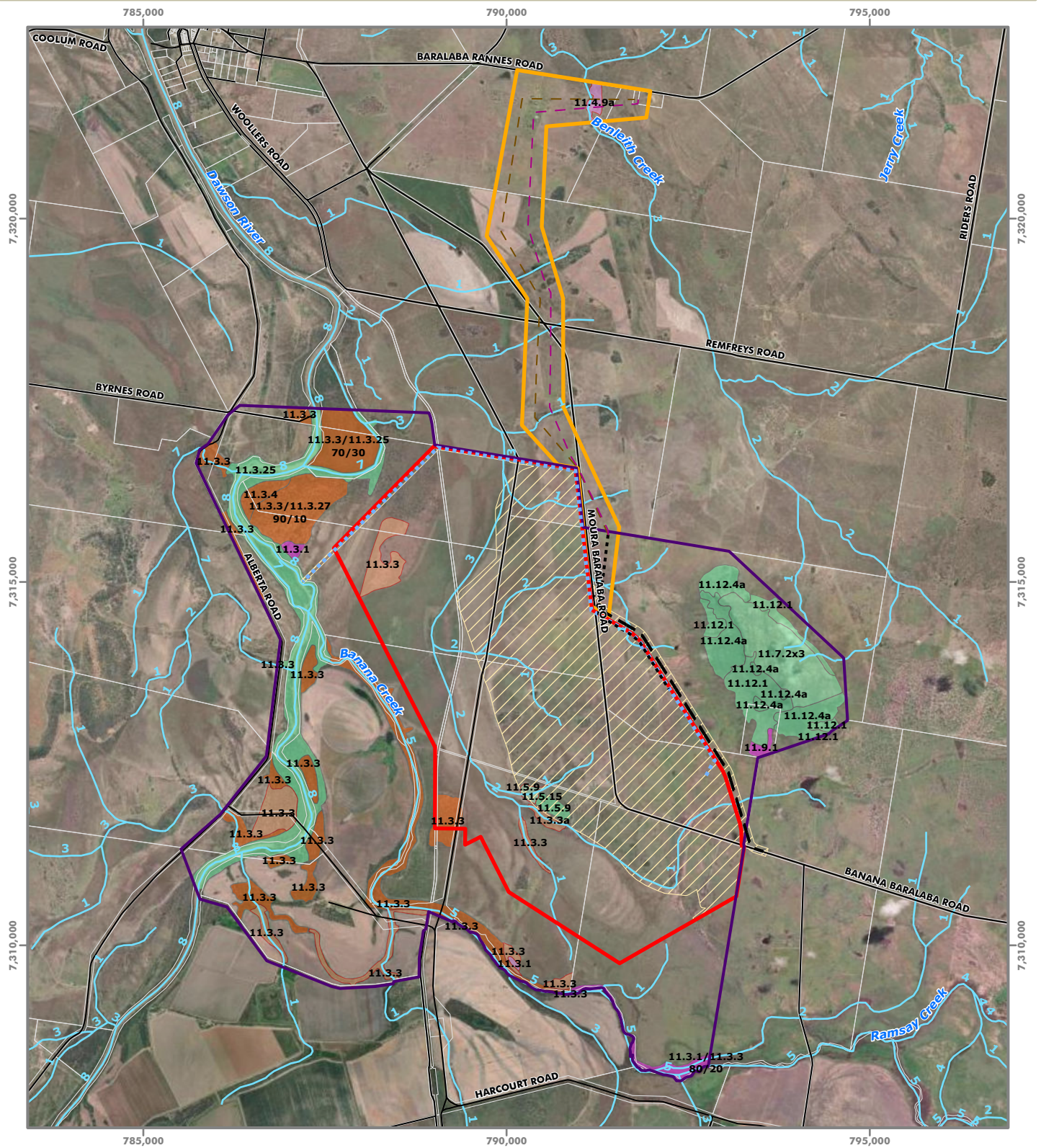
- Ecological Corridors**
- State
 - Regional

Figure 9 : Biodiversity Planning Assessment mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_09_A
Date: 09 August 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Vegetation Management Act status

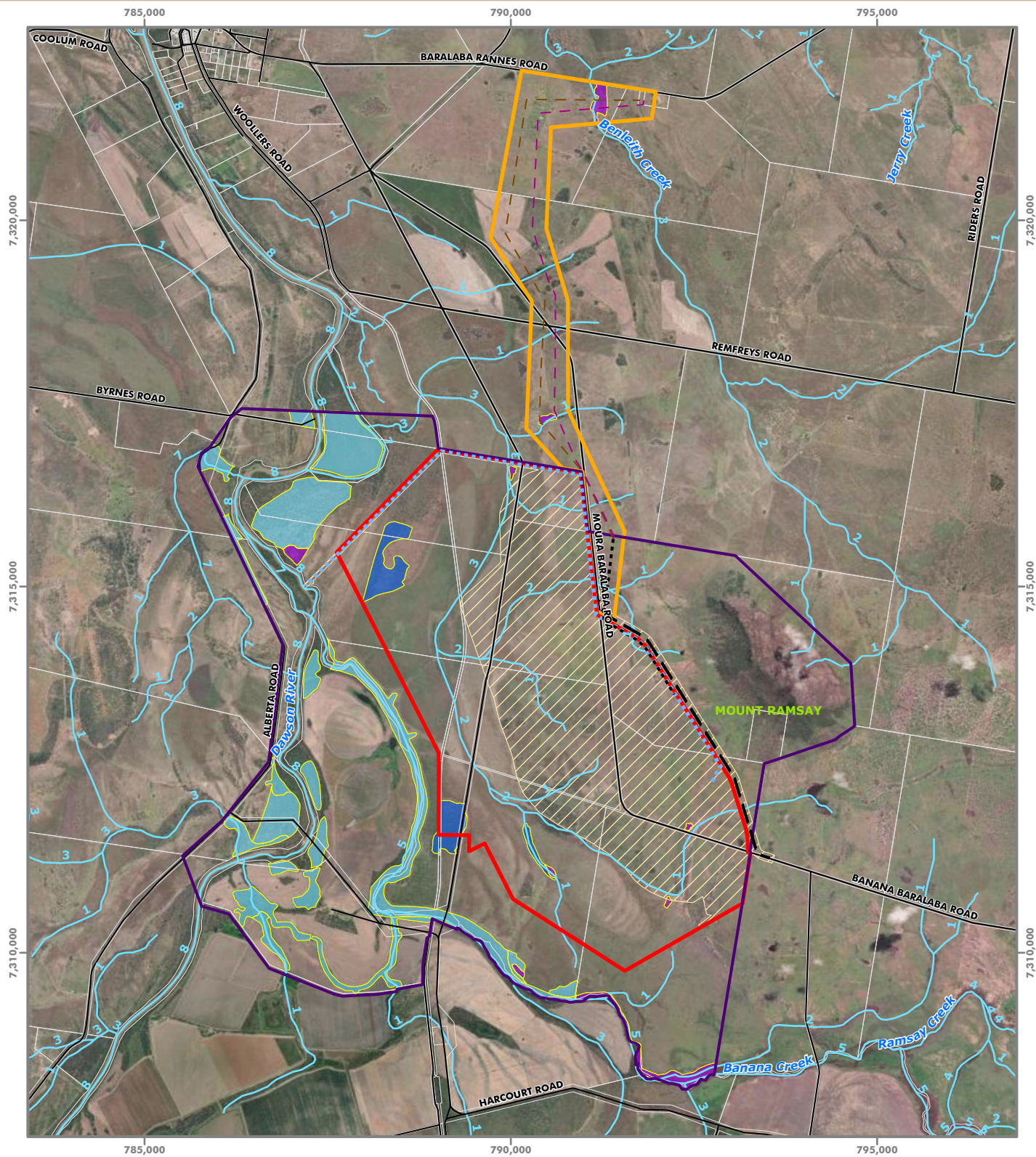
- Remnant vegetation**
- Endangered
 - Of concern
 - Least concern
- High value regrowth**
- Endangered
 - Of concern
 - Least concern

Figure 10 : Field-validated regional ecosystem mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_10_C
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Proposed Maura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Threatened ecological communities

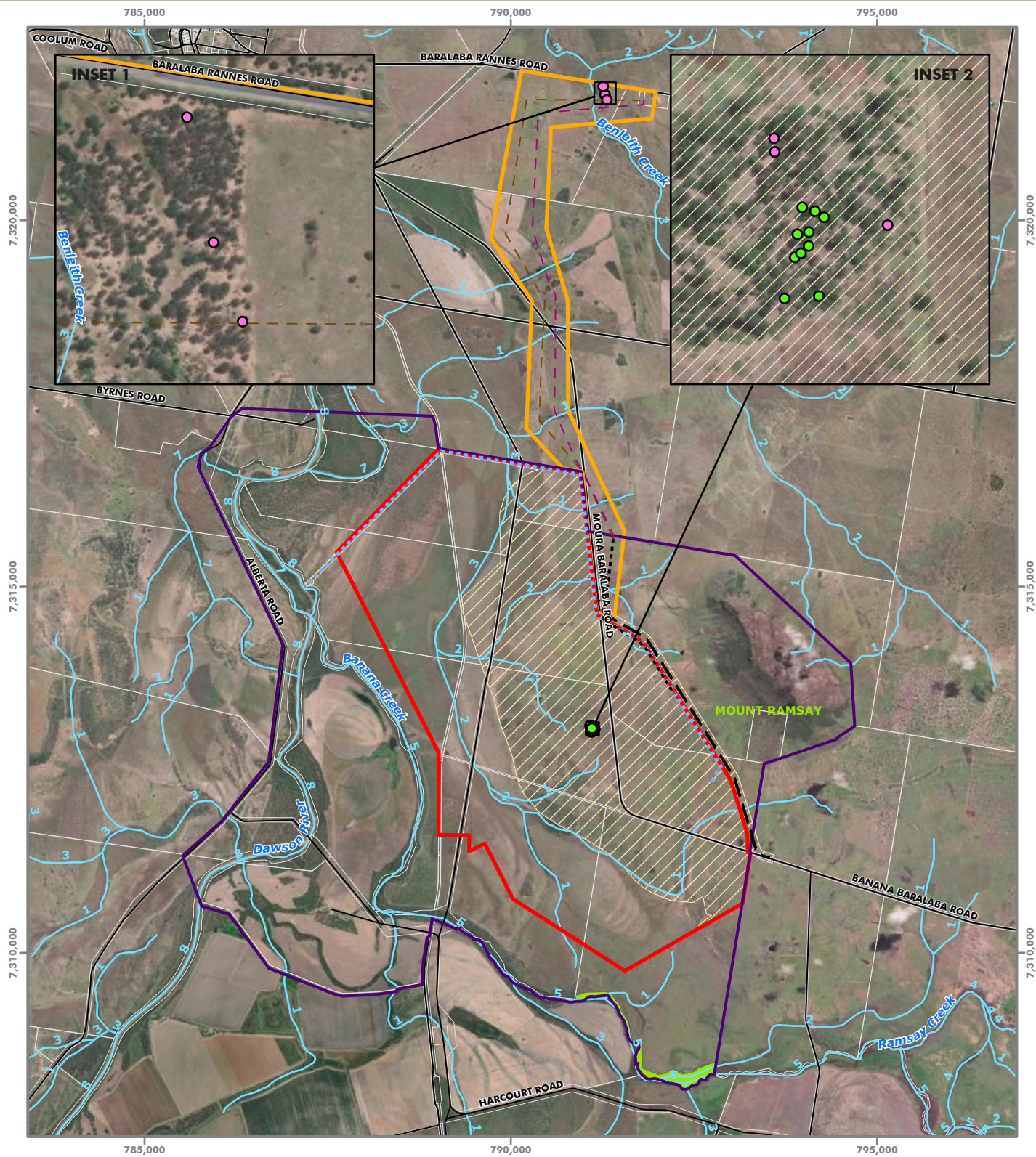
- Brigalow (Acacia harpophylla dominant and co-dominant)
- Coolibah – Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions
- Potential to contribute to the Coolibah - Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions

Figure 11 : Threatened ecological community mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_11_C
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Recorded locations

- Solanum elachophyllum* (no common name) - Endangered (NC Act)
- Xerothamnella herbacea* (no common name) - Endangered (EPBC Act and NC Act)

Potential habitat mapping

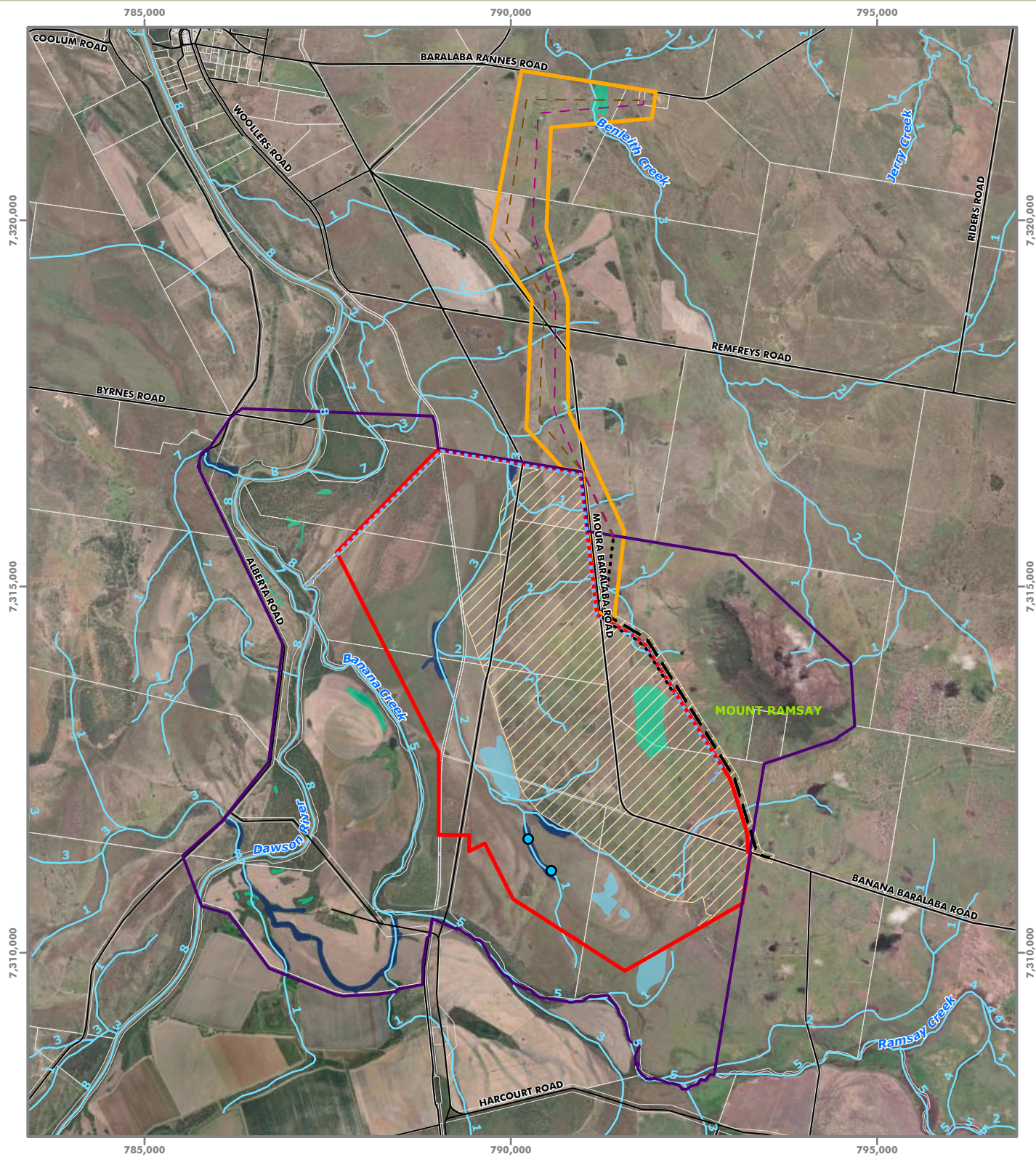
- Xerothamnella herbacea* (no common name) - Endangered (EPBC Act and NC Act)

Figure 12 : Threatened flora records

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_12_C
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Recorded location

- Ornamental Snake (*Denisonia maculata*) – Vulnerable (EPBC Act and NC Act)

Habitat mapping

Ornamental Snake (*Denisonia maculata*) – Vulnerable (EPBC Act and NC Act)

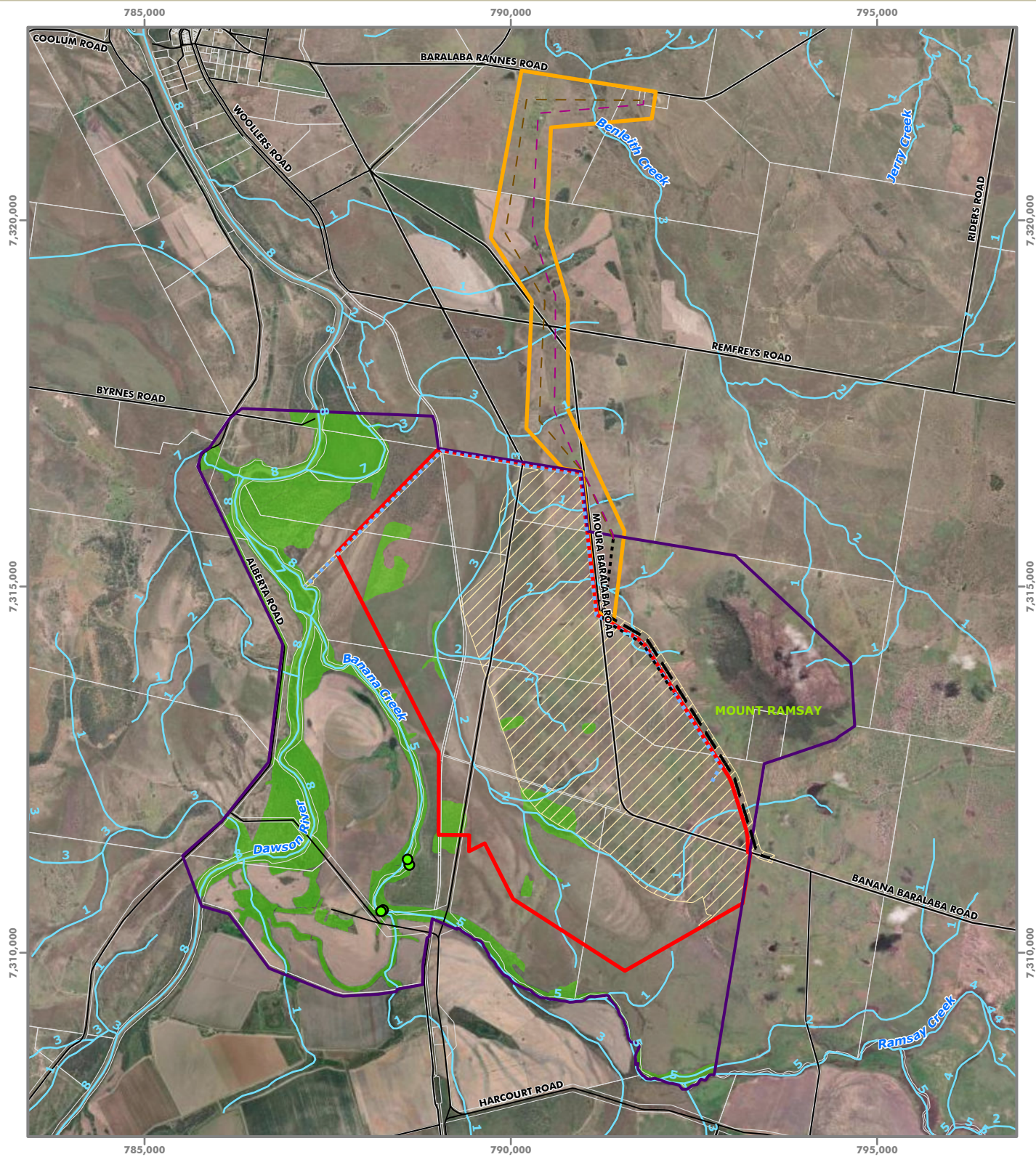
- Drainage lines with fringing vegetation and some fallen timber
- Gilgai and wetland habitat (with or without vegetation or fallen timber)
- Marginal gilgai habitat (without vegetation or fallen timber)

Figure 13 : Ornamental Snake records and habitat mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_13_C
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Recorded locations

- Scratches - Koala (*Phascolarctos cinereus*) – Endangered (EPBC Act and NC Act)

Habitat mapping

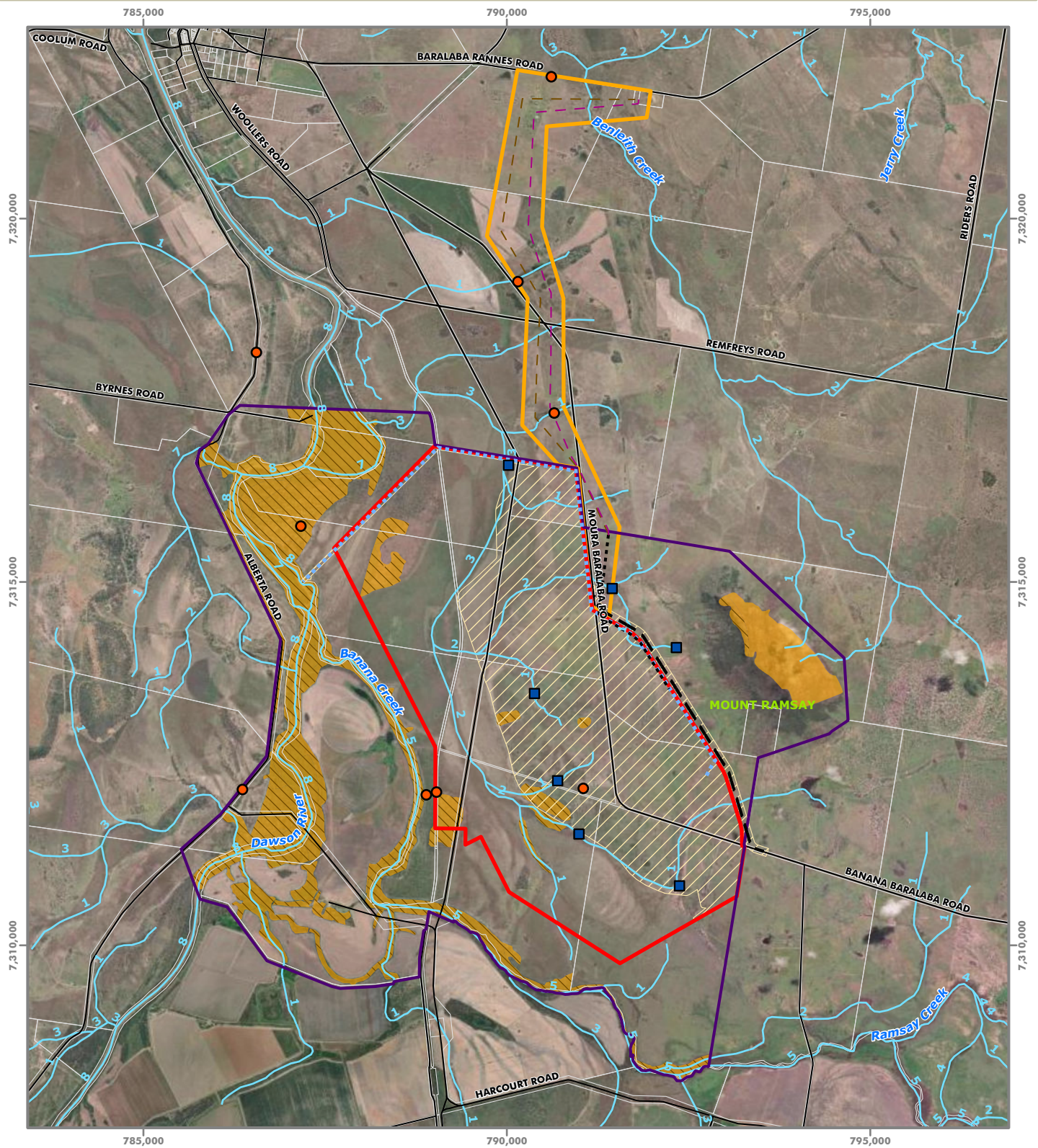
- Koala (*Phascolarctos cinereus*) – Endangered (EPBC Act and NC Act)

Figure 14 : Koala records and habitat mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_14_C
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary
- Permanent Water Source

Recorded locations

- Squatter Pigeon (southern) (*Geophaps scripta scripta*) – Vulnerable (EPBC Act and NC Act)

Habitat mapping

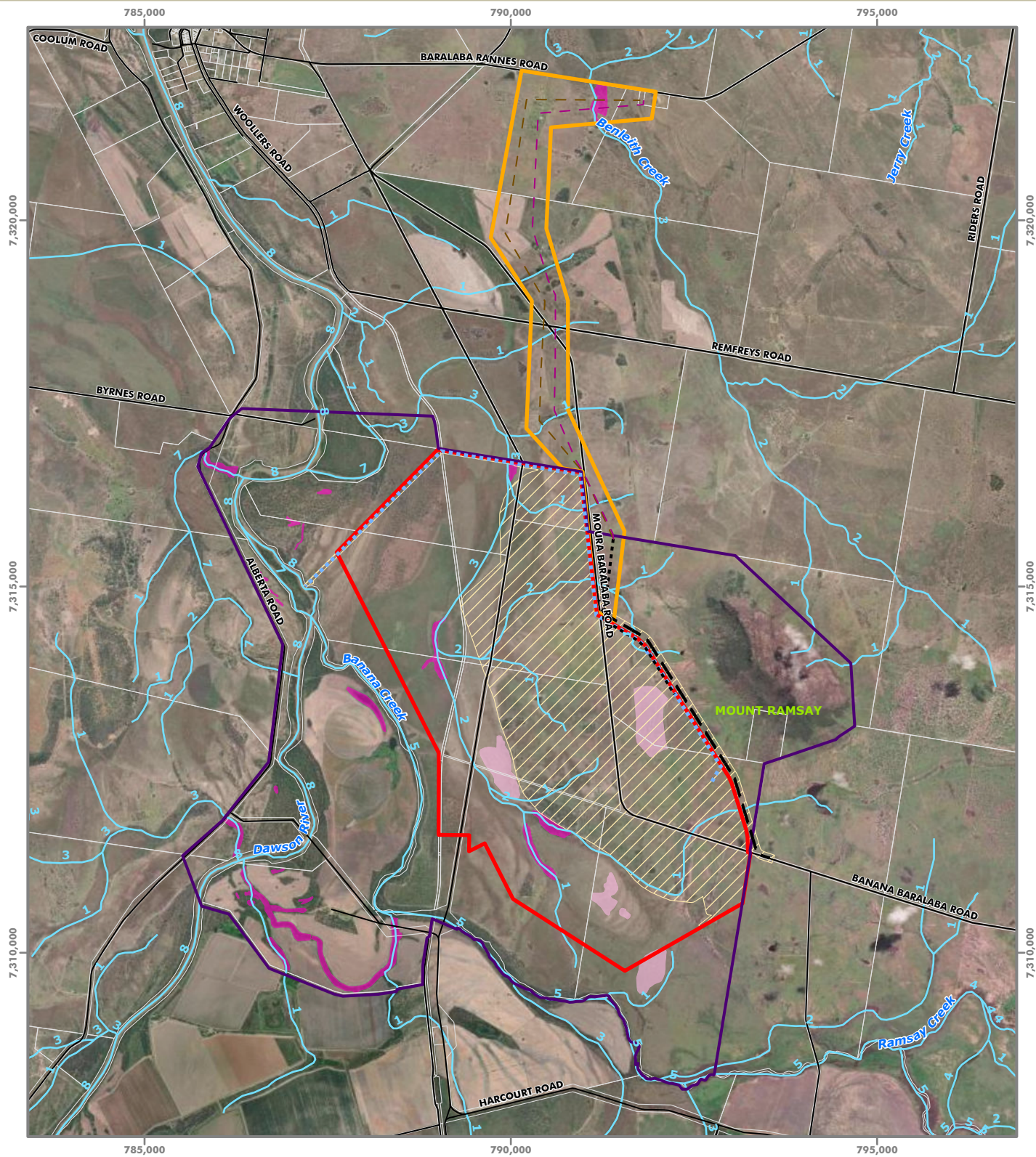
- Squatter Pigeon (southern) (*Geophaps scripta scripta*) – Vulnerable (EPBC Act and NC Act)
- Breeding
- Foraging

Figure 15 : Squatter Pigeon (southern) records and habitat mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_15_D
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Proposed Maura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Habitat mapping

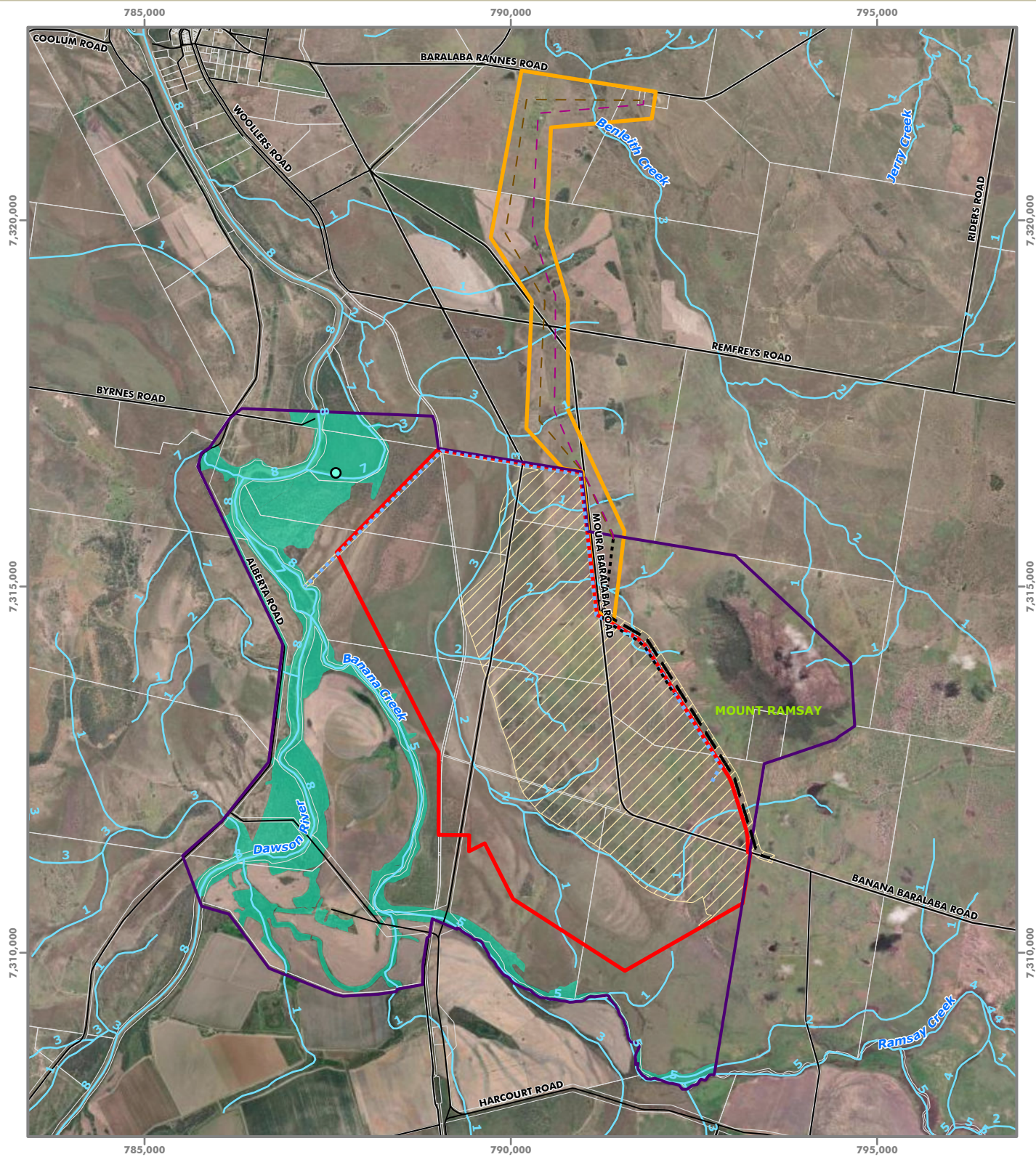
- Australian Painted Snipe (*Rostratula australis*) - Endangered (EPBC Act and NC Act)
- Wetlands and drainage lines with fringing vegetation
 - Gilgai habitat (marginal)

Figure 16 : Potential Australian Painted Snipe habitat mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_16_C
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Water release/extraction infrastructure
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Recorded locations

- Greater Glider (central) (*Petauroides volans*) – Endangered (EPBC Act and NC Act)

Habitat mapping

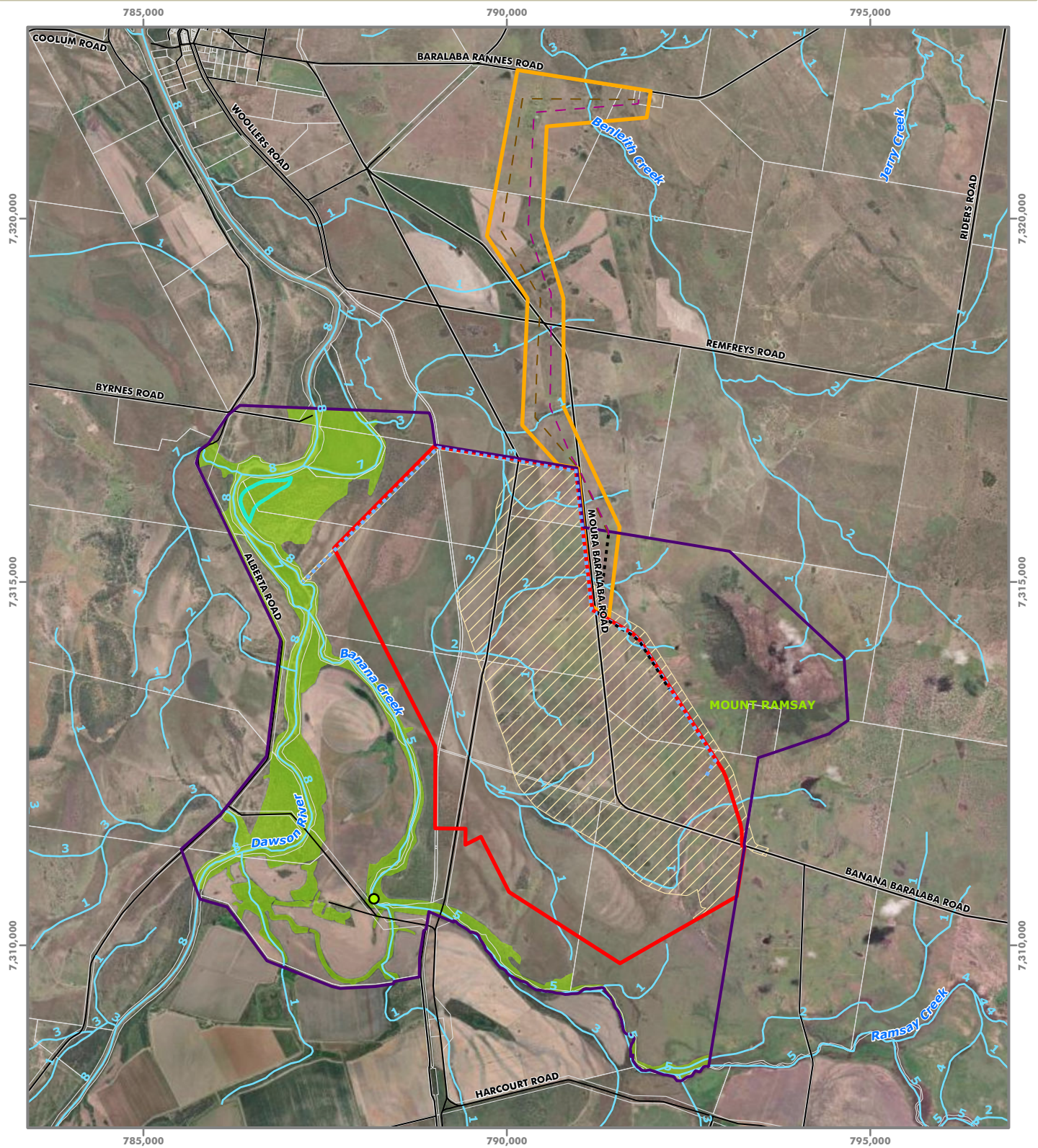
- Greater Glider (central) (*Petauroides volans*) – Endangered (EPBC Act and NC Act)

Figure 17 : Greater Glider (central) records and habitat mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_17_C
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Water release/extraction infrastructure
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Recorded locations

- Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*) - Vulnerable (EPBC Act and NC Act)

Habitat mapping

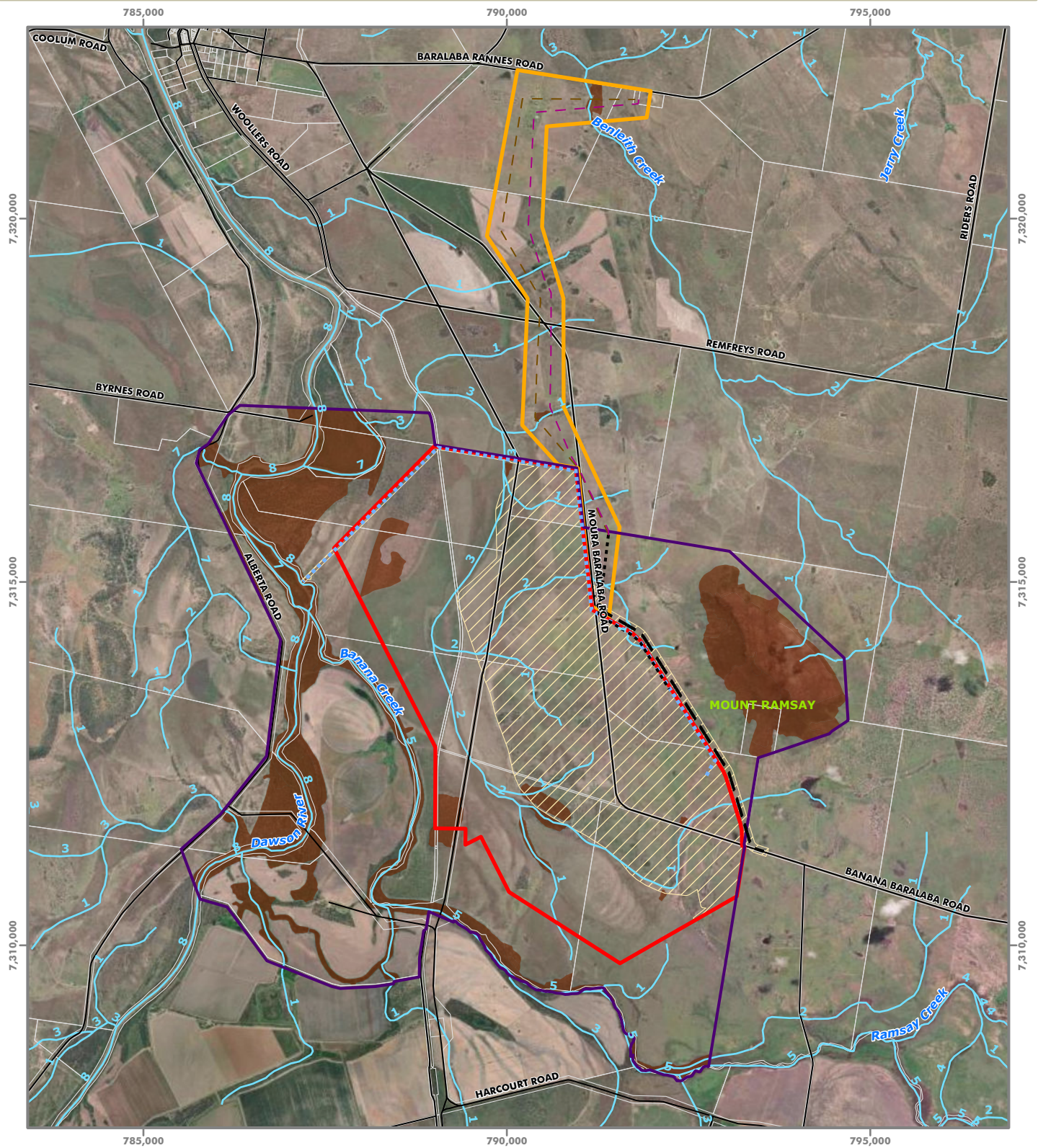
- Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*) - Vulnerable (EPBC Act and NC Act)

Figure 18 : Yellow-bellied Glider (south-eastern) records and habitat mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_18_E
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Habitat mapping

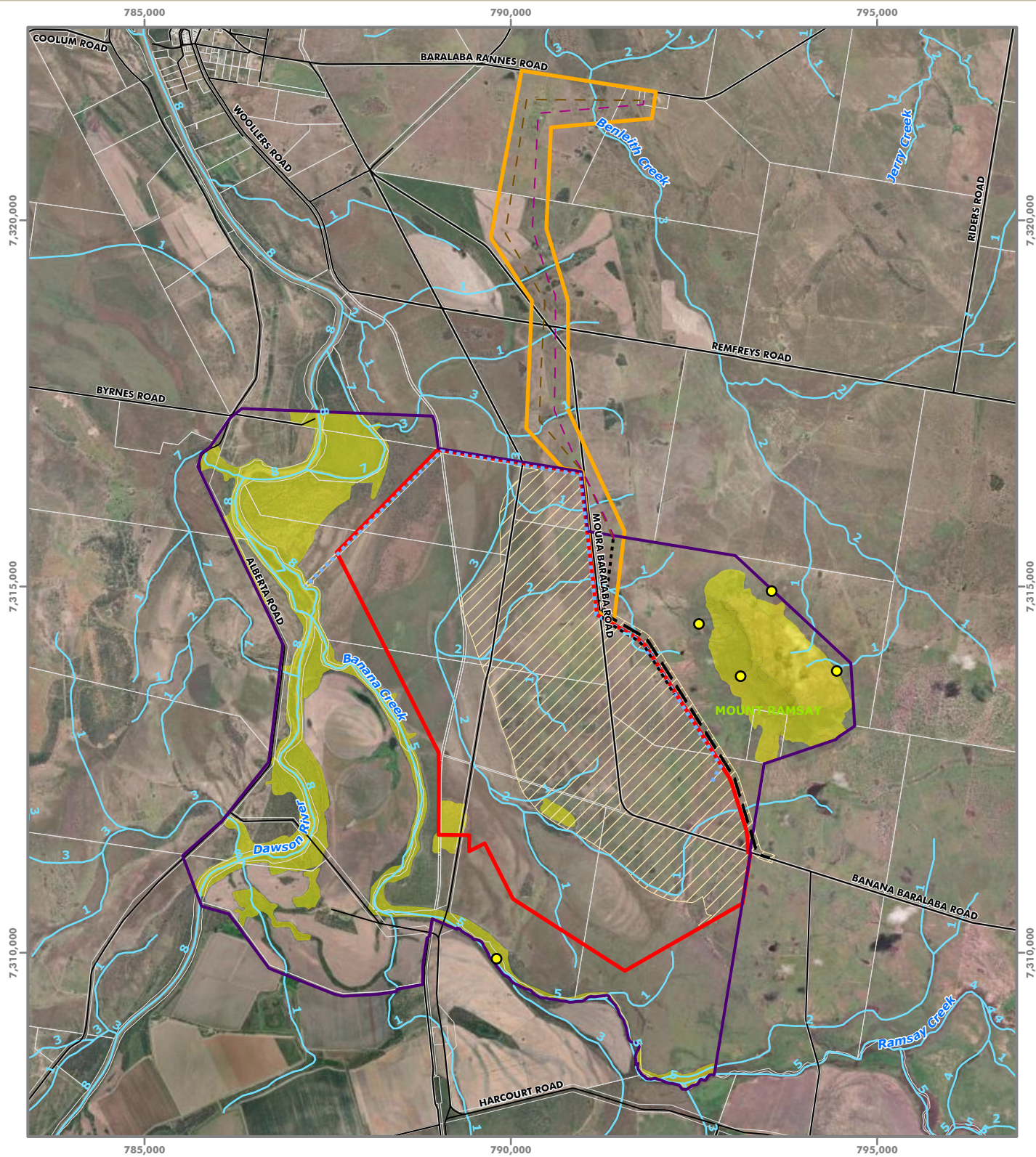
- White-throated Needletail (*Hirundapus caudacutus*) - Vulnerable (EPBC Act and NC Act)

Figure 19 : White-throated Needletail habitat mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_19_D
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022





Legend

- Project Site (MLA 700057)
- ETL (electricity transmission line) study area
- Additional investigation area
- Disturbance footprint
- Water release/extraction infrastructure
- ETL alignment (option 1)
- ETL alignment (option 2)
- Proposed Mine Site ETL
- Proposed Moura Baralaba road realignment
- Road
- Vegetation Management Act watercourse
- Cadastral boundary

Recorded locations

- Scats - Short-beaked Echidna (*Tachyglossus aculeatus*) – Special Least Concern (NC Act)

Habitat mapping

- Short-beaked Echidna (*Tachyglossus aculeatus*) – Special Least Concern (NC Act)

Figure 20 : Short-beaked Echidna records and habitat mapping

Baralaba South Project
Terrestrial Ecology Assessment

Map Number: 23015_TEA_20_C
Date: 13 October 2023
Map Projection: GDA2020 MGA Zone 55
Imagery: (c) Digital Globe
Data: Roads, Watercourse, DCDB - (c)DNRM 2022



Appendix A

Detailed methodology

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This appendix provides a detailed description of the methodologies used in the preparation of this ecological assessment.

A1 Nomenclature

A1.1 Flora

Application of flora scientific names in this report follows Bostock and Holland (Bostock and Holland 2010). In the first occurrence in the text, common names (if one exists) will be followed by its scientific name. Common names for flora were derived from Harden et al. (Harden et al. 2006), Brooker and Kleinig (Brooker and Kleinig 2008), Maslin (Maslin 2001), Hacker (Hacker 1990), Tothill and Hacker (Tothill and Hacker 1996), Sharp and Simon (Sharp and Simon 2002), and Auld and Medd (Auld and Medd 2002). Use of an asterisk (*) indicates the species is not native to Queensland, e.g. Common Lantana (**Lantana camara* var. *camara*). Following the first in-text reference, species will be referred to by common name only, where one exists.

A1.2 Fauna

Taxonomy and nomenclature for fauna species within this report follows the following references:

- amphibians – (Tyler and Knight 2011)
- reptiles – (Wilson and Swann 2013)
- birds – Pizzey et al. (2012)
- mammals (except bats) – (Menkhorst and Knight 2011)
- bats – (Churchill 2009)
- nomenclature (Macdonald 2013).

Common names are used where a species has an accepted common name with the scientific name provided at the first instance of the name appearing in the text. Common names for fauna are sourced from the references listed above or where no common name is provided, searches are made for other widely accepted common names.

A2 Desktop study

A2.1 Database searches and government mapping

Database searches were undertaken to identify records or potential occurrences of threatened, near threatened, migratory and/or special least concern flora and fauna species and endangered and of concern vegetation communities that potentially occur in the study area. Database searches were undertaken within a 25 km radius of the boundary of the project site (the search area). The search area is considered to be representative of the broader region and an appropriate size given the number of surveys that have been conducted in the region.

Desktop searches covered the following databases and government mapping sources. Some database searches are repeated to ensure this ecological assessment is taking into consideration the most recent information available.

- EPBC Act Protected Matters Search Tool, accessed 14 February 2018 and 9 March 2021 (DCCEEW 2023) (Appendix B)
- Queensland Wildlife Online database, accessed 14 February 2018 and 9 March 2021 (DES 2023a) (Appendix B)
- Australia's Virtual Herbarium database, accessed 14 February 2018 (CHAH 2018) (Table B1 of Appendix B)
- Queensland Museum Zoology Database, accessed 21 February 2018 (Queensland Museum 2018) (Table B2 of Appendix B)
- The Atlas of Australian Birds, accessed 15 March 2018 (BirdLife Australia 2017) (Table B3 of Appendix B)
- The Atlas of Living Australia¹, accessed 16 February 2018 and 15 October 2020 (CSIRO 2023)
- Regulated Vegetation Management Map, regional ecosystem mapping Version 13 and Essential Habitat Mapping and Database Version 5, maps at 1:100 000 scale (NRM 2016). Essential habitat is mapped by the DES and is vegetation in which a species that is endangered, vulnerable or near threatened has been known to occur.
- Protected Plants Flora Survey Trigger Map, accessed 11 August and 15 October 2020 (DES 2023b) (Appendix B)
- Geological Survey of Queensland 1:100 000 mapping (NRM 2011)
- Atlas of Groundwater Dependent Ecosystems, accessed 9 March 2021 (BoM 2023). The Commonwealth Bureau of Meteorology (BoM) has produced a Groundwater Dependent Ecosystem Atlas, which provides ecological and hydrogeological information on known GDEs and ecosystems that could potentially use groundwater. The GDE Atlas collates information from a number of sources into a central database, including published research and interpreted remote sensing data.
- Queensland Wetland Data Springs Mapping (DES 2020a). The Queensland Government has prepared the Queensland Wetland Data Springs mapping, which show the location of springs in the state. These springs are dependent on the surface expression of groundwater and their locations are used to infer the location of potential GDEs.
- Map of Referable Wetlands, accessed 11 August and 15 October 2020 (DES 2023c). DES has a range of policies and programs to manage wetlands. As part of a broader policy of wetland protection, and in accordance with schedule 12, part 2 of the Queensland Environmental Protection Regulation

¹ The Atlas of Living Australia is a publicly available database that is populated by a wide range of contributors including 'citizen-based' contributors. The database does not allow for every individual observation to be validated, therefore, this database has been used as secondary supporting information.

2008 (EP Regulation), the DES has prepared a map of referable wetlands. The map of referable wetlands includes:

- WPAs, which comprise:
 - wetlands of high ecological significance (HES) located within Great Barrier Reef catchments
 - trigger areas that represent the area of hydrological influence of HES wetlands. Outside urban areas, the trigger area is 500 m from the edge of a HES wetland
 - wetlands of general ecological significance (GES).
 - WPAs and HES wetlands contain wetland environmental values as listed under section 81A of the EP Regulation. WPAs are derived using a mapping method developed by the DES called the Aquatic Biodiversity Assessment and Mapping Method. Significant residual impacts on WPAs are required to be offset in accordance with the Queensland Environmental Offsets Framework.
- Queensland Government Vegetation Management Wetlands map (NRME 2020a)
 - Queensland Government Vegetation Management Watercourse map (NRME 2020b).

The Biodiversity Assessment and Mapping Methodology (BAMM) has been prepared to provide a consistent approach for assessing biodiversity values at the landscape scale in Queensland using vegetation mapping data generated or approved by the Queensland Herbarium as a fundamental basis. It is being used by DES to generate Biodiversity Planning Assessments (BPAs) for each of Queensland's bioregions, including the Brigalow Belt Bioregion where the project is located.

BPAs are developed in two stages:

- 1) diagnostic criteria: involves the integration of ecological criteria using BAMM to determine the relative Biodiversity Significance
- 2) supplementary/expert panel criteria: allows for the refinement of the mapped information from Stage 1 by incorporating local knowledge and expert opinion.

The methodology has application for identifying areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes.

Three biodiversity significance levels are mapped for any given region as follows:

- State biodiversity significance - areas assessed as being significant for biodiversity at the bioregional or state scales
- Regional biodiversity significance - areas assessed as being significant for biodiversity at the sub-bioregional scale
- Local biodiversity significant and/or other values - local values that are of significance at the local government scale.

The BPA mapping is for planning purposes and does not provide any specific statutory protection.

A2.2 Literature review and previous studies

Available literature was reviewed to establish whether findings of recent and nearby studies are relevant to the vegetation and habitat that occurs in the study area. Studies within, adjacent to or within 25 km of the project site, were reviewed where available.

A2.3 Review of aerial photography

The most currently available aerial photography (June 2011) was used for this assessment. Digital Globe photography was viewed in relation to relevant biodiversity spatial layers. Aerial photography was used to identify features for ground-truthing during the field surveys, to identify appropriate survey locations and for determining and characterising potential terrestrial flora and fauna habitats.

A2.4 Regional ecosystem mapping

The Queensland Government produces regulated vegetation maps and supporting RE maps showing the distribution of remnant REs throughout Queensland. These published maps are produced using Landsat satellite imagery, aerial photography and field-based ground-truthing. Review of version 11.0 (statutory regulated vegetation mapping) RE maps was undertaken prior to field surveys to assist in the verification of RE types mapped in the study area. The Queensland Herbarium has also produced non-statutory RE mapping, *2015 remnant and pre-clearing regional ecosystem mapping - Version 10.1* and *Version 11.0*. This mapping was also reviewed prior to field surveys to inform survey locations.

A2.5 Geological mapping

A review of geological mapping of the study area has been undertaken and is discussed in Section 4.1 and shown on Figure 5. The geological mapping was reviewed in order to gain an understanding of the geology within the study area and to provide an indication of likely land zones for assigning REs.

A2.6 Soil mapping

A review of the soil mapping for the study area has been undertaken and is discussed in Section 4.2. The soil mapping was reviewed in order to correlate vegetation types and habitat preferences of particular flora and fauna, to soil types present in the study area (NRME 2018).

A3 Terrestrial ecology field surveys

A3.1 Survey team

Four ecologists undertook the field surveys and preparation of this terrestrial ecology assessment. The team and their qualifications are outlined in Table A1.

Table A1: Ecology survey team

Team Member	Title	Years of experience	Qualifications	Role
Steve Marston	Principal Ecologist	20	BEnvEng (Hons) MWildMgt	Fauna survey field lead, reporting and review
Chris Hansen	Principal Botanist	16	BSc (Hons)	Flora survey field lead, reporting and review
Meredith Watherston	Principal Ecologist	15	BSc (Env)	Reporting and review
Monica Campbell	Senior Ecologist	13	BSc (Hons), PhD	Report preparation
Michael O'Connor	Ecologist	9	BEnvSc	Flora and fauna field surveys and reporting (ETL study area and additional investigation area)

A3.2 Permits

Surveys were undertaken under the following permits and approvals:

- Animal Ethics Committee Approval: CA2015/09/898 (valid from 1 October 2015 to 25 August 2018)
- Scientific Purposes Permit: WISP16474815 (valid from 26 October 2015 to 25 October 2020)
- Animal Ethics Committee Approval: CA2018/06/1200 (valid from 25 August 2018 to 25 August 2021).

A3.3 Coordinate system and map datum

Positional data was collected using a geographic positioning system with an accuracy of 3 to 5 m. Positional locations were recorded using the Latitude and Longitude coordinate system. All locations presented in this report are within zone 55K. The map datum used was WGS84.

A3.4 Survey timing

Post-wet and dry season terrestrial flora and fauna surveys were conducted simultaneously in order to field-validate the type, distribution and remnant status of vegetation communities, assess fauna habitat values and develop an inventory of flora and fauna species present. The following surveys were conducted:

- post-wet season = 5 days (16 - 20 May 2017, inclusive)
- dry season = 5 days (16 - 20 December 2017, inclusive)

- o post-wet season (targeted threatened flora searches) = 1 day (9 March 2018)
- o post-wet season (additional investigation area) = 9 days (6 - 14 May 2020)
- o dry season (electricity transmission line (ETL) study area) = 3 days (23 to 25 September 2020).

Field surveys were completed at these times in order to capture the effects of seasonality and rainfall on the abundance of flora and fauna species.

An additional flora survey was carried out on 9 March 2018, within a patch of vegetation (non-remnant RE 11.9.1) where threatened flora species were recorded during the dry season survey (Sections 5.3.1 and 5.3.2). The purpose of this survey was to accurately assess the population distribution and abundance of the threatened flora species present.

The additional surveys undertaken in May 2020 were conducted to assess an additional investigation area at the request of the DAWE and DES. The purpose of the additional investigation area, including the water release/extraction pipeline corridor, was to capture specific field information in relation to adjacent and downstream reaches of the Dawson River and Banana Creek to the west of the project site, and Mt Ramsay to the east of the project site.

The surveys undertaken in September 2020 focused on assessing vegetation and potential habitat areas along the proposed electricity transmission line (ETL) study area to the north of the project site (Figure 1).

A3.5 Climatic conditions

Climate data from the Belvedere weather station (Station No.: 39201), (which is the closest long-term BoM station to the project site) has been drawn upon to provide the regional climatic conditions prior to and during the flora and fauna surveys.

A3.5.1 Rainfall patterns

Monthly rainfall averages for all years recorded at the Belvedere BoM weather station are provided in Table A2. This provides 80 years of rainfall data and is therefore considered to reflect long-term average rainfall patterns for the region.

Actual monthly rainfall totals recorded in 2015 to 2017 and 2019 to 2020 at the Belvedere BoM weather station are also provided in Table A2. This data was used to show average regional rainfall information at the time of the surveys and in the preceding year.

As can be seen from Table A2, actual rainfall fluctuated markedly in the six months (i.e. November 2016 – April 2017) preceding the post-wet season surveys in May 2017. Below average rainfall was generally recorded across this period, most notably in November and December 2016 and February 2017. The only exception was March 2017, when ex-tropical cyclone Debbie may have influenced rainfall toward the end of the month.

The six months preceding the dry season were generally characterised by below average rainfall. However, substantially above average rainfall was recorded in October 2017, which followed by approximately average rainfall in November 2017. Overall, the dry season survey was undertaken during wetter conditions than is typical for this seasonal survey period. This rainfall made conditions relatively good for the identification and detection of grasses and herbs and frogs.

Table A2 shows relatively low rainfall in the weeks leading up to the May 2020 surveys, and overall the region experienced below average rainfall in the six months prior to these surveys (November to April). Although, rainfall in the region in the six months prior to the September 2020 surveys (April to September) was above average.

Table A2: Monthly recorded rainfall for the local area

Month	Belvedere Weather Station (039201)					
	Mean Rainfall (mm)	Actual Total Rainfall 2015 (mm)	Actual Total Rainfall 2016 (mm)	Actual Total Rainfall 2017 (mm)	Actual Total Rainfall 2019 (mm)	Actual Total Rainfall 2020 (mm)
January	95.1	123.4	111.0	78.0	<i>68.0</i>	<i>125.0</i>
February	110.2	167.6	75.0	6.0	18.0	<i>185.0</i>
March	71.2	44.0	34.0	88.0	<i>179.0</i>	<i>75.0</i>
April	35.8	49.4	0.0	0.0	21.0	<i>10.0</i>
May	37.2	43.0	0.0	22.0	0.0	<i>8.0</i>
June	30.2	27.0	74.0	11.0	27.0	<i>14.0</i>
July	26.3	0.0	127.0	2.4	<i>13.0</i>	<i>8.0</i>
August	22.4	25.4	23.4	<i>27.0</i>	2.0	<i>4.0</i>
September	22.9	20.0	38.4	<i>0.0</i>	0.0	<i>13.0</i>
October	56.4	51.0	9.0	<i>217.0</i>	55.0	-
November	74.9	146.0	0.0	<i>72.0</i>	5.0	-
December	89.7	13.0	13.0	<i>106.0</i>	9.0	-

Source: (BoM 2020)

Note: data in italics have not been fully quality controlled.

A3.5.2 Weather conditions during the surveys

Daily weather conditions for the two weeks preceding, as well as during the period of the ecology surveys, are presented in Table A3.

Weather conditions during the 2017 post-wet season survey period (16 to 20 May 2017) were characterised by dry, mild to warm days with maximum daily temperatures between 21.4°C and 26.9°C, and cool evenings (9.5–17.0°C). A total of 40 mm of rain was recorded in the region during the two weeks preceding the post-wet season survey period (Table A3). No rainfall was recorded during the post-wet season survey period. However, the rainfall received in the region prior to the survey resulted in conditions that were suitable for amphibians and wetland birds, with many gilgai, watercourses and other water points in the study area still holding water during the surveys. Condition preceding the surveys were also

sufficient to stimulate germination, emergence and establishment of many groundcover species.

Weather conditions during the 2017 dry season surveys (16 to 20 December 2017) were characterised by hot days with maximum temperatures between 33.0°C and 34.9°C and mild evenings (14.0–17.1°C). No rainfall was recorded during the dry-season survey period (Table A3). However, the region received 40 mm in the two weeks prior to the dry season survey, which resulted in similar conditions to that experienced during the post-wet season survey. Gilgai, watercourses and other water points in the study area were holding water during the surveys providing favourable conditions for detecting amphibians and wetland bird species. Similarly, species richness and plant vigour was also high as a result of the rainfall prior to the survey.

The 2020 post-wet season survey (6 to 14 May 2020) was, preceded by a marked drop in temperatures in the week leading up to the survey period, and then characterised by cool to cold overnight temperatures, and mild to warm day time temperatures (refer Table A3). Overnight lows in the region ranged from 7.0°C to 12.2°C and day time maximums ranged from 25.2°C to 29.8°C. No rainfall was experienced in the region during, or in the two weeks leading up to the survey period.

Conditions leading up to the 2020 dry season survey of the ETL study area were characterised by average day time maximum temperatures but varied overnight lows. Overnight lows during this period ranged between 7.7 °C and 20.4 °C, while maximum day time temperatures ranged from 24.4.°C and 33.0°C (refer Table A3).

Table A3: Daily weather conditions recorded two weeks preceding and during the ecology surveys

Date	Temp Min (°C) ¹	Temp Max(°C) ¹	Rainfall (mm) ²
<i>Post-wet season survey 2017</i>			
2 May 2017	12.2	27.7	0.0
3 May 2017	12.0	28.2	0.0
4 May 2017	17.1	26.2	0.0
5 May 2017	14.0	26.9	0.0
6 May 2017	11.0	27.0	0.0
7 May 2017	9.7	26.0	0.0
8 May 2017	16.9	26.2	0.0
9 May 2017	15.7	22.3	0.0
10 May 2017	14.2	17.0	22.0
11 May 2017	11.5	23.6	11.0
12 May 2017	8.6	23.8	0.0
13 May 2017	12.9	24.8	0.0
14 May 2017	15.7	27.0	0.0
15 May 2017	11.6	25.9	7.0
16 May 2017	9.5	26.6	0.0
17 May 2017	10.6	26.4	0.0

Date	Temp Min (°C)¹	Temp Max(°C)¹	Rainfall (mm)²
18 May 2017	15.3	21.5	0.0
19 May 2017	17.0	21.4	0.0
20 May 2017	13.8	26.9	0.0
<i>Dry season survey 2017</i>			
2 December 2017	17.6	28.7	3.0
3 December 2017	20.4	27.5	0.0
4 December 2017	19.3	26.6	37.0
5 December 2017	17.9	29.8	0.0
6 December 2017	13.2	31.0	0.0
7 December 2017	15.7	33.3	0.0
8 December 2017	18.9	33.6	0.0
9 December 2017	19.0	34.0	0.0
10 December 2017	17.3	32.0	0.0
11 December 2017	16.8	n.d.	0.0
12 December 2017	16.3	30.6	0.0
13 December 2017	15.9	31.5	0.0
14 December 2017	14.2	32.5	0.0
15 December 2017	14.4	33.4	0.0
16 December 2017	15.9	33.2	0.0
17 December 2017	15.8	33.0	0.0
18 December 2017	14.9	33.8	0.0
19 December 2017	15.8	34.9	0.0
20 December 2017	17.1	34.8	0.0
<i>Post-wet seasons survey 2020 (additional investigation area)</i>			
22 April 2020	13.1	31.8	0.0
23 April 2020	14.2	31.8	0.0
24 April 2020	14.4	30.5	0.0
25 April 2020	13.6	29.3	0.0
26 April 2020	11.2	29.2	0.0
27 April 2020	12.0	29.6	0.0
28 April 2020	12.4	29.2	0.0
29 April 2020	16.1	29.4	0.0
30 April 2020	14.1	30.0	0.0
1 May 2020	15.7	23.8	0.0
2 May 2020	3.1	23.2	0.0
3 May 2020	3.6	23.1	0.0
4 May 2020	6.2	26.5	0.0
5 May 2020	12.3	26.5	0.0
6 May 2020	10.1	28.0	0.0
7 May 2020	9.9	28.2	0.0
8 May 2020	10.6	28.7	0.0
9 May 2020	10.7	29.5	0.0
10 May 2020	11.0	29.8	0.0

Date	Temp Min (°C) ¹	Temp Max(°C) ¹	Rainfall (mm) ²
11 May 2020	12.2	25.2	0.0
12 May 2020	7.0	26.3	0.0
13 May 2020	7.7	27.2	0.0
14 May 2020	11.0	27.6	0.0
<i>Dry season survey 2020 (ETL study area)</i>			
10 September 2020	7.7	28.5	0.0
11 September 2020	14.7	24.4	9.0
12 September 2020	12.2	26.1	0.0
13 September 2020	13.6	28.3	0.0
14 September 2020	12.2	30.4	0.0
15 September 2020	9.6	30.1	0.0
16 September 2020	9.9	29.2	0.0
17 September 2020	8.9	31.1	0.0
18 September 2020	9.4	29.7	0.0
19 September 2020	13.6	28.3	0.0
20 September 2020	18.6	30.9	0.0
21 September 2020	13.4	32.5	0.0
22 September 2020	17.5	33.0	0.0
23 September 2020	20.4	25.2	0.0
24 September 2020	17.3	30.2	4.0
25 September 2020	10.9	32.9	0.0

Source: (BoM 2020)

Survey dates indicated in grey highlight; n.d. indicates no data available; italics indicates data has not been fully quality controlled

¹Temperature data retrieved from Thangool Airport (Station No. 039089), the closest open BOM station that records temperature (approximately 75 km from the project site).

²Rainfall data retrieved from Belvedere (Station No. 039201) the closest open BOM station that records rainfall (approximately 5 km from the project site).

A3.6 Flora field survey methods

The flora field survey methods described in this section were developed based on the results of database searches for the search area, as presented in Section 4 and Appendix B.

A3.6.1 Site selection

The field flora survey methods were developed in order to:

- validate existing Queensland Government RE vegetation mapping, and better define the distribution and proportionate composition of REs within mixed polygons of more than one RE type
- target threatened flora species and vegetation communities identified from database searches and their habitats
- produce a comprehensive floral inventory for all vegetation assessment sites and the study area as a whole.

The field flora surveys were carried out in compliance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Versions 5.1, 5.0 and 4.0*, current at the time of the field surveys (Neldner et al. 2020; 2019; 2017). Assessment sites were performed throughout the study area so as to thoroughly assess Queensland Government mapped remnant vegetation.

The validation and mapping of remnant vegetation was undertaken at a total of 132 vegetation assessment sites and 102 quaternary photo points across all flora surveys (Figure 3).

Of the 132 vegetation assessment sites, 11 were detailed secondary sites, 68 tertiary sites and 53 quaternary sites (Figure 3). The less detailed sampling (tertiary and quaternary sites) was conducted to provide additional information relating to the vegetative structure and composition and to assist in mapping the extent and distribution of the identified REs within the study area. Photo monitoring sites were also undertaken to capture supplementary field validation information or record a noteworthy landscape, vegetation or habitat feature. Relevant observations and a series of photos are taken at these sites.

Detailed flora species lists were collated at all secondary sites (Figure 3) and traverse lists were compiled to account for additional species that were recorded outside of the secondary site plots. In addition to the vegetation assessment sites described above, additional vegetation condition data was collected by upgrading 15 of the vegetation assessment sites into habitat quality plots (HQPs), in accordance with the methodology described in the Department of Environment and Science's (DES) *Guide to determining terrestrial habitat quality, V1.3* (Habitat Quality Guide) (DES 2020b). These HQPs were concentrated in vegetation communities that were most likely to be directly impacted by the project (Figure 3).

The remnant status of existing vegetation was determined by comparing the existing predominant canopy with the undisturbed predominant canopy. The Queensland Herbarium defines the predominant canopy under the VM Act, as the Ecologically Dominant Layer (EDL), namely, that stratum of the vegetation that contains the most above ground biomass. The EDL can be defined in terms of growth form, height, cover density and species. In the majority of cases, the EDL is equivalent to the upper stratum (Walker and Hopkins 1990).

The crown cover definitions and associated crown separation descriptions (e.g. sparse) were also applied to the lower strata to allow a consistent description of the spatial distribution of the respective vegetation layers.

The landform description upon which the field validated vegetation communities occurred was based on simple erosional landform patterns characterised by relief and modal slope and described by (McDonald et al. 1990).

A3.6.2 Secondary sites

Data at each secondary site was collected in accordance with the Queensland Herbarium's secondary site assessment methodology current at the time of the

surveys (Neldner et al. 2020; 2019; 2017). Data recorded at each secondary site (Figure 3) included:

- date and precise location (with reference to handheld GPS)
- soils, slope, aspect and landform observations
- ground-layer, mid-stratum and canopy species composition and abundance
- structural characteristics
- condition and disturbance of existing vegetation communities (including distribution of weed species)
- quantitative and qualitative species composition within a 1,000 m² quadrat, and documentation of ancillary species identified within the immediate area or during foot traverse
- basal area of vegetation (Bitterlich Stick methodology)
- photographs of the community (north, east, south, west, groundcover and soils).

A3.6.3 Tertiary sites

Data recorded at each tertiary site (Figure 3) included:

- date and precise location (with reference to handheld GPS)
- soils, slope, aspect and landform observations
- ground-layer, mid-stratum and canopy species composition and abundance
- structural characteristics
- basal area of vegetation (Bitterlich Stick methodology)
- condition and disturbance of existing vegetation communities (including distribution of weed species)
- photographs of the community.

A3.6.4 Quaternary sites

Data recorded at each quaternary site (Figure 3) included:

- precise location (with reference to handheld GPS)
- ground-cover, mid-stratum and canopy species composition and abundance
- structural characteristics of the EDL
- condition
- limited photographs of the community.

A3.6.5 Quaternary photo points

Data recorded at each quaternary photo point (Figure 3) included:

- precise location (with reference to handheld GPS)
- a description of the vegetation community, flora habitat value or feature of interest
- photographs of the vegetation community, flora habitat value or feature of interest.

A3.6.6 Habitat quality plots (HQPs)

Each HQP involved a 100 m x 50 m plot in which a series of ecological condition attributes were recorded in accordance with the Habitat Quality Guide. Attributes recorded are listed below:

- 100 m transect
 - Tree canopy cover
 - Tree sub-canopy cover
 - Native shrub cover
- 100 m x 50 m plot
 - Number of large eucalypt trees
 - Number of large non-eucalypt trees
 - Tree canopy height – median canopy height
 - Recruitment of canopy species – proportion of dominant canopy species that are regenerating
 - Native tree species richness – number of species present
- 50 m x 20 m plot
 - Coarse woody debris – length of all logs >10 cm diameter, 0.5 m in length
- 50 m x 10 m plot
 - Native shrub, grass and forbs/other species richness
 - Non-native plant cover – cover of exotic species as a component of the overall vegetation cover
- 1 m x 1 m quadrats
 - Cover (%) of:
 - Native perennial grass
 - Organic litter
 - Native forbs and other species
 - Native shrubs (<1 m in height)
 - Non-native grass
 - Non-native forbs and shrubs.

The median vegetation height data was measured using a laser rangefinder (hypsometer) and the diameter of trees measured at breast height (nominally 1.3 m above the ground) with a diameter at breast height (DBH) tape.

In addition to the information collected above, the following was noted at each HQP:

- orientation of the HQP

- date and precise location (with reference to a handheld GPS)
- soils, slope, aspect and landform observations.

A3.6.7 Threatened ecological community surveys

For some TECs, the DAWE has specific condition thresholds and diagnostic criteria that are required to be met for a vegetation community to form a part of a TEC. The flora surveys were therefore designed to assess the structural and floristic characteristics of the vegetation communities within the study area against the relevant listing criteria.

For example, areas of Brigalow (RE 11.3.1) and Coolibah (RE 11.3.3) vegetation were confirmed to be present within the study area. These vegetation communities were therefore surveyed in detail during the seasonal flora surveys to determine whether these communities met the structural and floristic criteria for Brigalow TEC or Coolibah - Black Box Woodlands TEC under the EPBC Act. The secondary and/or tertiary sites completed within these vegetation types were considered sufficient to assess whether the communities satisfied the condition criteria for both TECs. Detailed transects, which are typically used to validate the ecological condition, were therefore not considered necessary.

Section 4.5.1 discusses the TECs that database searches have indicated may be present within the study area.

A3.6.8 Targeted species surveys

Significant flora species listed under the EPBC Act and NC Act that were recorded or predicted to occur from database searches (Appendix B) were reviewed and, where relevant, formed the focus of targeted flora species surveys. Detailed traverses of habitat that was considered suitable for significant flora species were undertaken.

Areas identified as high risk for the presence of significant plants on the Protected Plants Flora Survey Trigger Map were assessed using the Queensland *Flora Survey Guidelines - Protected Plants Versions 2.01 and 2.0*, current at the time of the field surveys (DES 2019; EHP 2016). This guideline requires the timed meander method to be employed in areas of high risk. The timed meander method involved the following process:

- the sampled vegetation or habitat was traversed in a random manner to maximise the coverage of habitat and potential for encountering different flora species
- after the initial saturation of species, the time was recorded every five to ten minutes
- searching continued until no new flora species have been recorded for 30 minutes or when the entire area of habitat type or RE was surveyed
- where suspected significant flora species were encountered, the extent and density of the population was determined and a more comprehensive assessment of the vegetation community was undertaken

- specimens of any recorded significant flora species were collected and will be submitted to the Queensland Herbarium for confirmation and addition to the Herbarium collection.

A3.6.9 Vegetation mapping

Queensland Government mapped REs in the study area were validated in the field using the survey data as previously described, and utilised the latest geology mapping (NRM 2011). The boundaries of vegetation types were mapped in the field using a GPS and/or aerial photograph interpretation.

A3.6.10 Random traverses

In addition to secondary, tertiary and quaternary assessment sites, large portions of the study area were traversed on foot and the random meander technique applied (Cropper 1993). The purpose of random traverses was to ensure adequate site coverage and to establish a comprehensive floral species list. This method is also essential for the detection of cryptic, pest and other significant species. This method was supplemented with 'educated walks' (Garrard et al. 2008) in habitat areas that possessed a higher likelihood of supporting threatened flora species.

A3.6.11 Ancillary information

Other field characteristics such as areas of weed infestation, habitat areas for significant species and regional connectivity were recorded and described. Photographic records were taken throughout the study area, capturing each community type, habitat type and the broader landscape.

A3.6.12 Flora inventory and abundance

A comprehensive flora species list, including native and introduced species, was compiled for the project area. Relative abundance of flora species was assessed on a site-by-site basis, with detailed inventories compiled at all secondary assessment sites.

In relation to vegetation structure, abundance estimates were determined for species within each stratum of the community, with particular focus on the EDL as it is by these species that the community is defined, and from this, the RE determined (Neldner et al. 2020; 2019; 2012).

The relative abundance of species was based on the Braun-Blanquet technique, (Mueller-Dombois and Ellenberg 2003; Whittaker 1975).

A3.7 Fauna field survey methods

The fauna field survey methods described in this section were developed based on the results of database searches for the search area, as presented in Section 4 and Appendix B.

A3.7.1 Overview of survey effort

A variety of fauna survey methods were used, including systematic trap sites, spotlighting, call playback, infrared cameras, active searching, bird surveys,

Anabat survey sites and observation (e.g. bird surveys and opportunistic observations).

Sites selected for each of the survey methods were determined through desktop review of aerial photography, RE and high-value regrowth vegetation mapping and database search results in order to stratify survey effort across major habitat types for species likely to occur in the study area. Major habitat types were identified through broad vegetation groups (BVGs) mapped for the study area. BVGs were developed by the Queensland Herbarium to group vegetation communities at a high level, and are included in the RE spatial dataset (NRM 2016).

These major habitat types were initially used to design the survey, which was then refined where necessary in the field, once an on-ground appreciation for the vegetation communities and habitat features (e.g. locations of gilgai etc.) could be obtained.

Table A4 details the survey effort conducted during the survey periods. The following sections describe the methods used during the surveys and locations of the survey sites.

Table A4: Fauna survey effort

Survey Technique	Survey Effort				Target Fauna
	2017 Post-wet Season	2017 Dry Season	2020 Surveys*	Total	
Elliot Traps	200 trap nights	200 trap nights	-	400 trap nights	Small mammals, some reptiles
Pitfall Traps	32 trap nights	32 trap nights	-	62 trap nights	Small mammals, reptiles and frogs
Funnel Traps	48 trap nights	48 trap nights	-	96 trap nights	Small mammals, reptiles (including Ornamental Snake) and frogs
Spotlighting	8 person hours on foot	7 person hours on foot	18 person hours on foot	33 person hours on foot	Mammals (including Koala), reptiles (including Ornamental Snake), nocturnal birds
Call Playback	3 sessions	3 sessions	12 sessions	18 sessions	Owls and Koala
Infrared Cameras	8 trap nights for cameras at systematic trap sites	8 trap nights for cameras at systematic trap sites	-	16 trap nights	Medium to large mammals (including Koala) and reptiles
Bird Survey	13 person hours	14 person hours	10 person hours	37 person hours	Birds (including Squatter Pigeon, migratory birds)

Survey Technique	Survey Effort			Total	Target Fauna
	2017 Post-wet Season	2017 Dry Season	2020 Surveys*		
Active Searching	5 person hours (including 1 person hour at each systematic trap site)	6 person hours (including 1 person hour at each systematic trap site)	9.5 person hours	20.5 person hours	All conservation significant species, including mammals (incl. Koala) reptiles, and birds
Anabat	6 nights	5 nights	8 nights	19 nights	Bats
Koala SAT Surveys	4 sites	n/a	31 sites	35 sites	Koalas
Opportunistic / Incidental Bird Survey	72 diurnal person hours and 24 nocturnal person hours	72 diurnal person hours and 24 nocturnal person hours	138 diurnal person hours and 56 nocturnal person hours	282 diurnal person hours and 104 nocturnal person hours	Birds (including Squatter Pigeon, migratory birds), macropods, medium to large reptiles

* includes post-wet season flora and fauna surveys of additional investigation area (including sections of the Dawson River, Banana Creek and Mt Ramsay) and dry season flora and fauna survey of the ETL study area

A3.7.2 Systematic trap sites

A total of four systematic trap sites were established in areas of native vegetation in the project site during the terrestrial fauna surveys (Figure 4).

Each systematic trap site consisted of:

- 25 small Elliot traps
- 4 pitfall traps
- 3 sets of two funnel traps
- 1 infrared camera.

The combined surveys comprised a total of 280 trap nights at systematic trap sites (trap nights refers to the total number of traps that were open for a total number of nights e.g. four traps open for four nights equates to 16 trap nights). In addition, one infrared camera trap was also placed at each systematic trap site, giving a total of 296 trap nights over the seasonal surveys.

Elliot traps were baited with a mixture of rolled oats, honey, peanut butter and banana. Banana was added to the bait mixture as it has been found in the past to be effective bait for the Yakka Skink (*Egernia rugosa*). Traps were located 5 to 10 m apart and positioned close to suitable microhabitat features such as fallen logs, dense grass tussocks or areas of surface rock (e.g. exposed rocky outcrops). Traps were checked early in the morning and any animals captured were identified and immediately released.

Pitfall traps comprised three 20 L buckets dug into the ground to rim level, with a drift fence that intersected the mouth of each bucket and extended beyond the line of buckets to guide fauna towards the buckets. A water soaked sponge, leaf


litter and a small piece of polystyrene foam was placed in each bucket to provide moisture and shelter for animals captured. The polystyrene foam is able to be used as a flotation device for captured animals so that they do not drown in the event of heavy rain.



Three sets of two funnel traps were also located along the drift fence to capture larger lizards and snakes that could escape or avoid the buckets. Funnel traps were covered with a towel to provide shelter for captured animals.


A minimum of one person hour of spotlighting and active searching was conducted at each systematic trap site. A minimum of one person hour of early morning bird surveys was also conducted at each trap site, each morning while traps were being checked.

A brief description of the location and habitat attributes of each of the systematic trap sites is provided in Table A5.

Table A5: Descriptions of habitat at each systematic fauna trap site

Survey site ID	Vegetation description and representative photograph
<i>Post-wet season survey</i>	
T1	<p>Mixed eucalypt woodland of Poplar Box, Carbeen (<i>Corymbia tessellaris</i>) and Long-fruited Bloodwood (<i>C. clarksoniana</i>). Sparse mature hollow bearing trees. Diverse shrub layer of Bitter Bark (<i>Alstonia constricta</i>), Quinine Bush (<i>Petalostigma pubescens</i>) and Current Bush (<i>Cassia brewsteri</i>). Moderate cover of fallen timber. Mostly exotic grasses in groundcover and areas of deep leaf litter absent. Heavily grazed and evidence of historic clearing across entire community.</p> 

Survey site ID	Vegetation description and representative photograph
T2	<p>Narrow band of Black Tea-tree (<i>Melaleuca bracteata</i>) with occasional regrowth Coolibah (<i>E. coolabah</i>) and Brigalow (<i>Acacia harpophylla</i>) with stands of Lignum (<i>Duma florulenta</i>) along small, braided drainage line. Mature hollow bearing trees mostly absent. Moderate cover of fallen timber and deep leaf litter. Low cover of weeds in all strata.</p> 
Dry season survey	
T3	<p>Poplar Box with vine thicket generalists and Queensland Blue Gum along drainage line. Community has been cleared in the past and currently has a sparse coverage of mature hollow bearing trees and fallen timber. Groundcover dominated by exotic species.</p> 

Survey site ID	Vegetation description and representative photograph
T4	<p>Small patch of Dawson River Gum (<i>E. cambageana</i>) with Current Bush thickets in shrub layer. Some hollow bearing trees present but sparse coverage of fallen timber. Groundcover is degraded and dominated by Buffel Grass (<i>Pennisetum ciliare</i>) and other exotic grasses.</p> 

A3.7.3 Supplementary survey sites

A total of 33 supplementary survey sites were completed during the field surveys (Figure 4). Techniques employed at supplementary sites included spotlighting, call playback, bird survey and/or active searching.

A description of the location, survey techniques and vegetation types of the supplementary survey sites is provided in Table A6.

Table A6: Description of supplementary survey sites

Survey site ID	Survey season	Survey techniques	Vegetation description
<i>Project site and proposed road realignment</i>			
S1	Both	Bird survey, active search, spotlight and call playback	Regrowth Coolabah, sparse mature hollow bearing trees and fallen timber. Deep leaf litter absent. Mostly native groundcover.
S2	Post-wet	Bird survey and active search	Sparse regrowth Brigalow and Coolabah. No mature hollow bearing trees, no fallen timber, mostly native groundcover.
S3	Post-wet	Bird survey and active search	Sparse Brigalow, no mature trees very sparse fallen timber, mostly native groundcover. Some leaf litter but not deep. Some small very minor Gilgai but would not hold water for long.
S4	Post-wet	Spotlight and call playback	Small patch of Dawson River Gum some mature trees but very few hollows. Sparse fallen timber and mostly exotic groundcover.

Survey site ID	Survey season	Survey techniques	Vegetation description
S5	Post-wet	Spotlight and call playback	Coolibah with some Brigalow and stands of Lignum. Some very large hollow bearing trees. Moderate levels of fallen timber.
S6	Post-wet	Spotlight and call playback	Small patch of Coolibah with some Brigalow. One or two mature trees. Moderate fallen timber and mostly native groundcover.
	Dry	Bird survey and active search	
S7	Post-wet	Bird survey and active search	Regrowth rosewood on rocky knoll. Abundant fallen timber from previous clearing, lots of surface rock. Groundcover dominated by exotic grasses.
S8	Both	Spotlight	Well-developed gilgai in cleared Buffel pasture. Well used by cattle and mostly grasses in Gilgai suggesting they don't hold water for extended periods. Mounds of earth too maybe evidence of past blade ploughing. In December, lilies were present in bottom of some gilgai some still holding water indicating suitable habitat for Ornamental Snake.
S9	Post-wet	Bird survey and active search	Small degraded patch of vine thicket. Few mature trees, moderate cover of fallen timber. Mostly exotic grasses. Heavily utilised by cattle.
S10	Post-wet	Bird survey and active search	Small patch of Brigalow with Coolibah around dam. Some mature trees. Moderate cover of fallen timber, mix of native and exotic groundcover. Deeply cracking clay soil.
S11	Post-wet	Spotlight	Degraded Brigalow along small drainage line. No mature trees, some fallen timber, mix of native and exotic groundcover.
S12	Post-wet	Spotlight and call playback	Coolibah and Brigalow lignum wetland. Few mature trees and sparse fallen timber.
S13	Post-wet	Bird survey	Small patch of regrowth Brigalow with wet area. No mature trees, very sparse fallen timber and mostly exotic grasses.
S14	Post-wet	Bird survey and active search	Brigalow and Dawson River Gum with vine thicket mid storey. Few mature hollow bearing trees but some stags with hollows. Moderate abundance of fallen timber. Mostly exotic grasses.
S15	Post-wet	Spotlight	Shallow gilgai in cleared pasture.
<i>Additional investigation area, incorporating water release/extraction infrastructure pipeline</i>			
S16	Post-wet	Bird survey	Queensland Blue Gum woodland fringing the Dawson River. Abundant hollow-bearing trees, moderate levels of fallen timber. Sparse deep leaf litter. High cover of exotic grasses and weeds.
S17	Post-wet	Bird survey	Coolibah woodland with some Queensland Blue Gum in overflow channel and fringing Dawson River. Abundant hollow-bearing trees, moderate cover of fallen timber and deep leaf litter. High cover of exotic grasses and herbs.

Survey site ID	Survey season	Survey techniques	Vegetation description
S18	Post-wet	Bird survey	Coolibah woodland with some Queensland Blue Gum. Wetland infested with Hymenachne. High abundance of hollow-bearing trees and moderate cover of fallen timber. Abundant deep leaf litter around margins. Pig diggings present.
S19	Post-wet	Bird survey	Fringing Coolibah woodland and Queensland Blue Gum woodland with some Brigalow. Abundant hollow-bearing trees, sparse fallen timber and moderate cover of deep leaf litter. Moderate cover of exotic grasses.
S20	Post-wet	Spotlight & Koala call playback	Coolibah lined wetland and adjacent Brigalow with gilgai. Abundant soil cracks and fallen timber.
S21	Post-wet	Spotlight & Koala call playback	Coolibah and Queensland Blue Gum with Brigalow fringing the Dawson River. Abundant hollow-bearing trees and fallen timber. Moderate cover of deep leaf litter. Moderate cover of exotic species.
S22	Post-wet	Spotlight & Koala call playback	Queensland Blue Gum and Coolibah +/- Carbeen riparian woodland. Sally Wattle, Brigalow and Black Wattle in the understory. Abundant hollow-bearing trees and deep leaf litter. Sparse to moderate coarse woody debris.
S23	Post-wet	Spotlight & Koala call playback	Queensland Blue Gum and Coolibah riparian study area on Banana Creek. Black Tea Tree understory. Abundant hollow-bearing trees. High abundance of deep leaf litter and moderate abundance of coarse woody debris.
S24	Post-wet	Spotlight & Koala call playback	Coolibah woodland with dense Sesbania Pea understory. Moderate deep leaf litter. Low abundance of hollow-bearing trees. Moderate to abundant fallen woody debris.
S25	Post-wet	Bird survey, active search, spotlight, call playback	Brigalow and Coolibah riparian study area. Moderate to high abundance of hollow-bearing trees. Understory comprising of native grass and herbs with thickets of Lignum. Some areas of deep leaf litter and moderate areas of coarse woody debris.
S26	Post-wet	Bird survey, spotlight, Koala call playback	Riparian Coolibah woodland on Banana Creek. Large pools of standing water. Understory dominated by native species. Moderate abundance of hollow-bearing trees. Abundant deep leaf litter, moderate coarse woody debris.
S27	Post-wet	Bird survey, spotlight	Riparian vegetation fringing the Dawson River of Queensland Blue Gum with some Coolibah and abundant hollow bearing trees. Shrub layer of Sally Wattle and Pegunny. High cover of weeds. Moderate cover of fallen timber.

Survey site ID	Survey season	Survey techniques	Vegetation description
S28	Post-wet	Bird survey, spotlight, Koala call playback	Queensland Blue Gum riparian vegetation. Some Coolibah present. Understorey of Sally Wattle and Pegunny. Dense groundcover of weeds, with some natives. Tree hollows abundant.
<i>ETL study area</i>			
S29	Dry	Bird survey, active search, spotlight, call playback	Regrowth Brigalow on undulating plains. Gilgai formations throughout. Areas of deep leaf litter in depressions. Sparse native grass cover on rises. Tree hollows absent. Decortivating bark and stags present.
S30	Dry	Bird survey	Farm dam in natural depression. Heavily grazed and limited emergent vegetation.
S31	Dry	Bird survey, active search, spotlight, call playback	Small isolated patch of Dawson Gum. Understorey heavily grazed Buffel Grass. Consistent cover of moderately deep leaf litter throughout patch. Sparse to moderate fallen timber. Low abundance of tree hollows.
S32	Dry	Bird survey, active search, spotlight	Vegetated gully/drainage line. Mixed canopy of Pegunny, Brigalow and Queensland Bottle Trees. Some dense thickets of Belah. Exotic grasses dominate the ground layer. Mid-dense leaf litter present throughout. Tree hollows sparse.
S33	Dry	Bird survey, active search, spotlight, call playback	Dawson Gum and Brigalow woodland with mid-dense Scrub Boonaree shrub layer. Ground cover dominated by Currant Bush and exotic grasses. Tree hollows sparse and only small in diameter. Fallen woody debris abundant.

A3.7.4 Spotlighting

Spotlighting was undertaken on foot for 1 person hour in the vicinity of each systematic trap site, with the exception of systematic trap site T2 where two person hours of spotlighting were undertaken. There was also a total of 28 person hours at 21 of the supplementary sites (Tables A4 and A6), with a total of 33 person hours over all survey periods. Fauna were located from eye shine or direct observation and identified. The distinctive calls of some fauna were also used to identify their presence.

A3.7.5 Call playback

Call playback involved broadcasting a recorded call of an owl or arboreal mammal through a megaphone in an effort to elicit a territorial response from any animals that hear the call. Animals either call in response to the recording and/or move into the location that the call was played from. The call is played and then approximately 2 to 3 minutes are spent listening for a response and looking for animals that have moved into the area without calling. Three sessions of call playback were undertaken during each seasonal survey and an additional nine sessions in the additional investigation area and three along the ETL study area. A total of 18 call playback sessions were conducted throughout the study area

(Figure 4). Following the call playback session, spotlighting was conducted of the immediate area to locate any owls that had flown into the area without calling and had not been seen during the call playback.

The calls of the following species were played:

- Powerful Owl (*Ninox strenua*)
- Barking Owl (*Ninox connivens*)
- Masked Owl (*Tyto novaehollandiae*)
- Barn Owl (*Tyto alba*)
- Southern Boobook (*Ninox novaeseelandiae*)
- Koala (*Phascolarctos cinereus*).

A3.7.6 Infrared cameras

A Reconyx infrared camera was set up at each of the four systematic trap sites for four nights during the post-wet season survey period. The cameras were set on a bait station of chicken, apple and sweet potato. In total, cameras were set for 16 trap nights.

A3.7.7 Bird surveys

During the checking of traps at each systematic trap site, bird surveys were conducted along the trap transect, with records made of all birds seen and heard. The order in which systematic trap sites were checked varied each morning to ensure that sites were surveyed for birds at slightly different times each day. Five person hours was spent in total at each of the four systematic trap sites and a total of 17 person hours at 22 of the supplementary sites (Tables A4 and A6), with a total of 37 person hours over all surveys. Opportunistic records of birds were also made while undertaking other activities throughout the study area. Approximately 282 person hours were spent undertaking opportunistic diurnal observations and 104 nocturnal bird observations during the field surveys.

A3.7.8 Active searches

Active searching was conducted to detect reptiles, frogs and small ground dwelling mammals. It involved the searching of suitable microhabitat such as logs, bark, deep leaf litter, surface rocks and shedding bark. Active searching was undertaken for 20.5 person hours, which included 1 person hour at each systematic trap sites and 16.5 person hours at 13 of the supplementary sites (Tables A4 and A6).

A3.7.9 Anabat

The Anabat surveys involved the use of an Anabat Swift detectors to record the echolocation calls of micro bats as they forage. A sonogram was then produced using software that allows for comparison against reference calls for identification. Unfortunately, some species of bat have very similar and/or quiet calls and cannot be positively distinguished via Anabat (e.g. *Nyctophilus* species). Therefore, a

probability rating is provided for calls identified. All Anabat calls were analysed by Greg Ford, a specialist in analysing Anabat recordings.

Anabat units were deployed for 1 night from dusk until dawn at 11 locations in the project site and 4 locations over 2 nights at each site along the ETL study area (Figure 4) with a total survey effort of 19 nights. Anabat survey sites were selected on the basis of having suitable flyways, flowering trees that attract insects or water that attracts insects and bats.

A3.7.11 Koala SAT surveys

A total of 35 Koala Spot Assessment Technique (SAT) surveys were completed in suitable habitat within the study area (i.e. vegetation supporting Koala habitat trees). SAT surveys involved searching the base of 30 trees for characteristic Koala scats (Phillips and Callaghan 2011).

A3.7.12 Opportunistic observations

Records of fauna were also made opportunistically while undertaking other activities, such as moving between trap sites, throughout the survey period.

A3.7.13 Habitat assessment

The quality of fauna habitat in the study area was assessed on the basis of the following criteria:

- **Low:** Many fauna habitat elements in low quality areas have been removed or altered such as mature, hollow-bearing trees, fallen timber and deep leaf litter. Remnants are often small in size, support substantial weed infestations of high or moderate threat weeds (e.g. Buffel Grass) and are poorly connected to other areas of remnant vegetation.
- **Moderate:** Some habitat components are present but others are lacking. For example, a remnant may have a reasonably intact understorey but lack mature canopy species and fallen timber. Some weed infestations are present but are relatively small in size or comprise species of low to moderate threat. Linkages with other remnant habitats in the landscape may be lacking or somewhat tenuous.
- **High:** Most habitat components are present (e.g. old-growth trees, fallen timber, lack of weeds and deep leaf litter), the remnant is large enough to support species that are typically associated with large intact areas of habitat and it is well connected or contiguous with other areas of native vegetation.

These criteria were adapted for treeless habitat types such as grasslands as appropriate.

A4 Field survey standards

A number of guidelines have been consulted in the development of methods for the field surveys, particularly with regard to survey timing and techniques employed to target threatened and migratory species and TECs most likely to occur within the study area.

Threatened species survey guidelines used to inform the requirements of the terrestrial flora and fauna surveys included both Commonwealth and Queensland guidelines:

- Commonwealth guidelines:
 - Survey guidelines for Australia's threatened birds (DEWHA 2010a)
 - Survey guidelines for Australia's threatened bats (DEWHA 2010b)
 - Survey guidelines for Australia's threatened reptiles (SEWPaC 2011a)
 - Survey guidelines for Australia's threatened mammals (SEWPaC 2011b)
 - EPBC Act referral guidelines for the vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DotE 2014)
 - Draft Referral guidelines for the nationally listed Brigalow Belt reptiles (SEWPaC 2011c)
 - Referral guideline for 14 birds listed as migratory species under the EPBC Act - Draft (DotE 2015)
 - SPRAT databases for relevant EPBC Act listed species and communities, accessed on 3 November 2017 and 6 August 2020
 - Approved Conservation Advice for the Brigalow TEC (TSSC 2013).
- Queensland guidelines:
 - Flora Survey Guidelines – Protected Plants Nature Conservation Act 1992, Version 2.01 and 2.0 (DES 2019; EHP 2014a)
 - Terrestrial Vertebrate Fauna Survey Guidelines for Queensland, Versions 3.0 and 2.0 (Eyre et al. 2014; Queensland Herbarium 2018).

The Commonwealth guidelines provide specific survey guidelines for individual threatened flora and fauna species and ecological communities listed under the EPBC Act, while the Queensland survey guidelines provide general guidance on survey methodology and minimum effort advice for detection of all species.

A5 Likelihood of occurrence

A5.1 Ecological community assessment

Flora surveys were conducted at a scale and intensity to sufficiently identify ecological communities present. Ecological communities not recorded during the field surveys were therefore considered to have a low likelihood to occur within the study area.

An assessment of impacts was undertaken for communities identified as present within the project area during the field surveys.

A5.2 Significant species assessment

Database searches identified threatened and migratory species that potentially occur in the search area. The likelihood of these species occurring was then assessed based on the results of the field surveys.

The likelihood of species occurring in the project area was classified using the criteria presented in Table A7. The assessment was based on the species' known ranges and habitat preferences, which were assessed against the characteristics of the project area observed during field surveys.

Table A7: Criteria to assess potential for species to occur in the project area

Likelihood to occur	Definition
Present	The species was recorded in the project area during the field surveys.
High	The species was not recorded within the project area during the field surveys but is known to occur within the surrounding area, and habitat of suitable quality exists within the project area.
Moderate	The species was not recorded in the project area during the field surveys, although it is known to occur in the wider region. Habitat was identified for the species in the project area during the field surveys; however, it is marginal, fragmented and/or small in size, or degraded.
Low	The species was not recorded in the project area during the field surveys. The species is either: a) unlikely to occur in the wider region and due to the lack of, or extremely poor quality habitat in the project area, the species is not expected to occur in the project area; or b) may forage periodically in the wider region and may overfly the project area, but the habitat in the project area is generally not suitable.

A6 Threatened species habitat mapping

Habitat mapping was undertaken for threatened flora and fauna species that were recorded as being present in the project area or that were assessed as having a high or moderate likelihood to occur in the project area (refer to Appendices C and D). Habitat mapping was also undertaken for target species within the additional investigation area.

Habitat mapping considered a combination of aerial photo interpretation and detailed field-validated RE mapping to assign areas of suitable habitat based on known species specific habitat preferences, field observations from the study area and previous experience, where applicable. Habitat preferences for threatened species were derived from information contained in conservation advice and SPRAT profiles, as well as any relevant published research. The habitat mapping criteria for each species are described in Section 6.3.

A7 Assessment of impacts

For MNES listed under the EPBC Act, the significance of impacts was assessed in accordance with the Significant Impact Guidelines (DotE 2013) (Sections 8 and 9).

For MSES listed under the EO Act, the significance of impacts was assessed in accordance with the Queensland Significant Residual Impact Guidelines (EHP 2014b). The Landscape Fragmentation and Connectivity (LFC) Tool, referred to in the SRI Guideline was used to assess impacts to connectivity.

A conservative, risk-based approach was adopted to determine the need for a significance assessment of species under the EPBC Act and EO Act (i.e., an assessment of impacts using the Significant Impact Guidelines or Significant Residual Impact Guidelines). This approach considers both the likelihood of occurrence of the species within the study area and the potential for habitat loss or disturbance (directly or indirectly) resulting from the project's impacts. This approach considers both the likelihood of occurrence of the species within the study area and the potential for habitat loss or disturbance (directly or indirectly) resulting from the project's impacts. This approach ensures that potential impacts from project on conservation significant species, which were recorded within the study area or had a moderate or high likelihood to occur within the study area were considered. The criteria for determining if a significance assessment is required are presented in Table A8.

Table A8: Criteria to determine if assessment of significance of impacts from the project is required for significant species

Likelihood to occur	No potential for habitat loss or disturbance from the project	Potential for habitat loss or disturbance from the project
Present	NO	YES
High	NO	YES
Moderate	NO	YES
Low	NO	NO

A8 Limitations

Surveys undertaken in the additional investigation area were targeted at detecting specific threatened species and field-validating vegetation communities rather than collating an inventory of all species and communities that may occur within the additional investigation area. The species to be targeted in the additional investigation area was requested by the Queensland and Commonwealth Governments and reflected the types of matters likely to be present in the region and the larger order waterways. Therefore, targeted techniques were used in this additional investigation area rather than standardised trapping techniques.

Standardised trapping techniques were also not applied to the proposed ETL study area due to the limited native vegetation and habitat availability within this study area. Instead the small areas of native vegetation were assessed using targeted techniques, for their habitat values for particular species and their potential to represent threatened communities.

The survey effort and techniques applied to each component of the study area are shown on Figures 3 and 4.

The local region received approximately 40 mm of rain in the two weeks prior to the 2017 seasonal surveys commencing, although below average rainfall fell in the region leading up to the 2020 survey period and none in the weeks prior to this survey (Tables A2 and A3).

The post-wet fauna survey was conducted within the optimal survey timing for the Brigalow Belt bioregion (i.e. March to mid-May) according to the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Queensland Herbarium 2018). This is most relevant for detection of the Brigalow Belt reptiles (Ornamental Snake and Dunmall's Snake). Conditions during the 2017 post-wet season survey were conducive to the detection of these species, particularly given that there were large numbers of frogs present in some riparian and gilgai areas.

Similarly, the conditions preceding both the 2017 post-wet and dry season flora survey resulted in a significantly increased level of observed flora species richness and plant vigor, particularly within the groundcover layer. Conditions during the 2020 post-wet season survey were not optimal, but were considered reasonable for the detection of most animal groups and flora species. Climatic conditions in the region during the dry season survey of the ETL study area were fair, for the detection for most flora and fauna groups, although cool overnight temperatures and lack of recent rainfall were likely to have reduced activity levels and hence detectability of amphibians and nocturnal reptiles during the 2020 survey.

Nonetheless, ecological surveys often fail to record all species of flora and fauna present on a site for a variety of reasons, including seasonal absence or reduced activity during certain seasons or very large home ranges of some animals. Furthermore, the ecology and nature of significant and/or cryptic species means that such species are potentially not recorded during short survey periods. This assessment overcomes these limitations by assessing impacts not only on species recorded during the field surveys, but also on species that are potentially present (based on known distribution and habitat availability).

Appendix B

Database search results



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 29-Aug-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	37
Listed Migratory Species:	15

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	21
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	13
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community likely to occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species

[\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
MAMMAL		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
PLANT		
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Bertya opposens [13792]	Vulnerable	Species or species habitat known to occur within area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat likely to occur within area
Cossinia australiana Cossinia [3066]	Endangered	Species or species habitat may occur within area
Cycas megacarpa [55794]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Dichanthium queenslandicum King Blue-grass [5481]	Endangered	Species or species habitat likely to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Solanum dissectum [75720]	Endangered	Species or species habitat known to occur within area
Solanum johnsonianum [84820]	Endangered	Species or species habitat known to occur within area
Xerothamnella herbacea [4146]	Endangered	Species or species habitat known to occur within area

REPTILE

Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Denisonia maculata Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat known to occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text
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Migratory Marine Birds

Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
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Migratory Marine Species

Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
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Migratory Terrestrial Species

Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
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Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
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Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
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Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
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Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
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Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area
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Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
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Scientific Name	Threatened Category	Presence Text
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area

Reptile

Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
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Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Baralaba South Coal Project and Transport Corridor, Bowen Basin, QLD	2012/6547		Approval

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Baralaba North Coal Mine Continued Operations, Baralaba, Qld	2013/7036	Controlled Action	Post-Approval
Construct and operate 447km high pressure gas transmission pipeline	2009/4976	Controlled Action	Post-Approval
Gas Pipeline with Alternative Pipeline to Supply Natural Gas Liquefaction Park	2008/4096	Controlled Action	Post-Approval
ZeroGen Integrated Gasification Combined Cycle Power Plant and CO2 Capture, Transport and Storage	2009/5195	Controlled Action	Completed
Not controlled action			
Baralaba Mine haul road upgrade & private access road, north of Baralaba, Qld	2014/7398	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Molopo gas fired power station and associated infrastructure	2010/5675	Not Controlled Action	Completed
Molopo Gas Fired Power Station and Associated Infrastructure	2010/5416	Not Controlled Action	Completed
Moura Solar Farm	2021/8973	Not Controlled Action	Completed
Queensland Nitrates Pipeline Project Theodore - Baralaba Road, Moura, QLD	2014/7371	Not Controlled Action	Completed
Surat Basin Railway	2008/3944	Not Controlled Action	Completed
Referral decision			
Gas Transmission Pipeline to supply Natural Gas Liquefaction Park	2008/4061	Referral Decision	Completed

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

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

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



Queensland Government

WildNet species list

Search Criteria: Species List for a Defined Area
Species: All
Type: All
Queensland status: All
Records: All
Date: All
Latitude: 24.0087 to 24.5238
Longitude: 149.5863 to 150.1351
Email: craig.marston@ecosm.com.au
Date submitted: Tuesday 29 Aug 2023 10:52:10
Date extracted: Tuesday 29 Aug 2023 11:00:05

The number of records retrieved = 830

Disclaimer

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Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.

The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (<https://www.qld.gov.au/environment/plants-animals/species-information/wildnet>) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufo	<i>Rhinella marina</i>	cane toad	Y			27/1
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		9
animals	amphibians	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog		C		1
animals	amphibians	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog		C		1
animals	amphibians	Hylidae	<i>Cyclorana verrucosa</i>	rough collared frog		C		1
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		19
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		9
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		4
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		9
animals	amphibians	Hylidae	<i>Litoria peronii</i>	emerald spotted treefrog		C		1
animals	amphibians	Hylidae	<i>Litoria rothii</i>	northern laughing treefrog		C		6
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		8
animals	amphibians	Hylidae	<i>Litoria wilcoxii</i>	eastern stony creek frog		C		1/1
animals	amphibians	Limnodynastidae	<i>Limnodynastes salmini</i>	salmon striped frog		C		10
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		11
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		3
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		5
animals	amphibians	Microhylidae	<i>Austrochaperina sp.</i>			C		1
animals	amphibians	Myobatrachidae	<i>Crinia signifera</i>	clicking froglet		C		2
animals	amphibians	Myobatrachidae	<i>Uperoleia rugosa</i>	chubby gungan		C		2/1
animals	birds	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill		C		12
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		6/2
animals	birds	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill		C		1
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		44
animals	birds	Acanthizidae	<i>Pyrrholaemus sagittatus</i>	speckled warbler		C		2
animals	birds	Acanthizidae	<i>Smicrornis brevirostris</i>	weebill		C		47
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		2
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		13
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		1
animals	birds	Accipitridae	<i>Circus approximans</i>	swamp harrier		C		3
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		3
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		2
animals	birds	Accipitridae	<i>Erythrotriorchis radiatus</i>	red goshawk	E		E	1
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		10
animals	birds	Accipitridae	<i>Haliaeetus sphenurus</i>	whistling kite		C		35
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		1
animals	birds	Accipitridae	<i>Lophoictinia isura</i>	square-tailed kite		C		1
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		4
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		1
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		24
animals	birds	Alaudidae	<i>Mirafra javanica</i>	Horsfield's bushlark		C		6
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		2
animals	birds	Alcedinidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		18/2
animals	birds	Alcedinidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		46
animals	birds	Alcedinidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		26
animals	birds	Alcedinidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		6

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Alcedinidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		9
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		14
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		31
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		4
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		19
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		3
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		1
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		5
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		C		1
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		15
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	magpie goose		C		2
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	2
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		16
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		8
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		13
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		1
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		20
animals	birds	Ardeidae	<i>Ixobrychus flavicollis</i>	black bittern		C		2
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		3
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		7
animals	birds	Artamidae	<i>Artamus leucorynchus</i>	white-breasted woodswallow		C		12
animals	birds	Artamidae	<i>Artamus minor</i>	little woodswallow		C		2
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		1
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		1
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		39
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		31
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		60
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		5
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		75/1
animals	birds	Cacatuidae	<i>Cacatua sanguinea</i>	little corella		C		16
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		17
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		19
animals	birds	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		47
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		12
animals	birds	Campephagidae	<i>Edolisoma tenuirostre</i>	common cicadabird		C		7
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		3
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		13
animals	birds	Charadriidae	<i>Euseyornis melanops</i>	black-fronted dotterel		C		11
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		5
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		C		15
animals	birds	Charadriidae	<i>Vanellus tricolor</i>	banded lapwing		C		2
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		2
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		10
animals	birds	Climacteridae	<i>Climacteris picumnus</i>	brown tree creeper		C		17
animals	birds	Climacteridae	<i>Cormobates leucophaea metastasis</i>	white-throated tree creeper (southern)		C		25

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animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		27
animals	birds	Columbidae	<i>Geopelia placida</i>	peaceful dove		C		65
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	31
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		29
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		3
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		31
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		12
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		28
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		7
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		101
animals	birds	Corvidae	<i>Corvus sp.</i>			C		1
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		9
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		19
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		18
animals	birds	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		C		6
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		9
animals	birds	Cuculidae	<i>Chalcites minutillus</i>	little bronze-cuckoo		C		2
animals	birds	Cuculidae	<i>Chalcites osculans</i>	black-eared cuckoo		C		2
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		7
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		8
animals	birds	Dicaeidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		20
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		25
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		5
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		10
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		47
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		7
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		1
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		18
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		19
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		4
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		1
animals	birds	Gruidae	<i>Antigone rubicunda</i>	brolga		C		18
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		2
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		4
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		19
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		3
animals	birds	Locustellidae	<i>Cincloramphus mathewsi</i>	rufous songlark		C		4
animals	birds	Locustellidae	<i>Cincloramphus timoriensis</i>	tawny grassbird		C		1
animals	birds	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren		C		1
animals	birds	Maluridae	<i>Malurus lamberti</i>	variegated fairy-wren		C		1
animals	birds	Maluridae	<i>Malurus lamberti sensu lato</i>	variegated fairy-wren		C		5
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		48
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey		C		6
animals	birds	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		C		8
animals	birds	Meliphagidae	<i>Anthochaera chrysoptera</i>	little wattlebird		C		1
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		31

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animals	birds	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater		C		2
animals	birds	Meliphagidae	<i>Lichenostomus melanops</i>	yellow-tufted honeyeater		C		1
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		13
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		19
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		15
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		11
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		83
animals	birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater		C		12
animals	birds	Meliphagidae	<i>Melithreptus lunatus</i>	white-naped honeyeater		C		2
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		1
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		62
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		26
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		23
animals	birds	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater		C		3
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		44
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		63
animals	birds	Monarchidae	<i>Myiagra cyanoleuca</i>	satin flycatcher		SL		2
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		18
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		21
animals	birds	Monarchidae	<i>Symposiachrus trivirgatus</i>	spectacled monarch		SL		1
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		7
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		6
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		6
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		13
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		11
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		35
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		1
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		4
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		55
animals	birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote		C		1
animals	birds	Pardalotidae	<i>Pardalotus rubricatus</i>	red-browed pardalote		C		1
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		116
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			9
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		14
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		3
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		12
animals	birds	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin		C		1
animals	birds	Petroicidae	<i>Petroica rosea</i>	rose robin		C		2
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		7
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		3
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		6
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		3
animals	birds	Phasianidae	<i>Synoicus ypsilophorus</i>	brown quail		C		8
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		16
animals	birds	Podicipedidae	<i>Poliocephalus poliocephalus</i>	hoary-headed grebe		C		1
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		7

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animals	birds	Pomatostomidae	<i>Pomatostomus superciliosus</i>	white-browed babbler		C		1
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		23
animals	birds	Psittaculidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		1
animals	birds	Psittaculidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		35
animals	birds	Psittaculidae	<i>Melopsittacus undulatus</i>	budgerigar		C		1
animals	birds	Psittaculidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		7
animals	birds	Psittaculidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		38
animals	birds	Psittaculidae	<i>Psephotus pulcherrimus</i>	paradise parrot		PE	EX	1
animals	birds	Psittaculidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		29
animals	birds	Psittaculidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		46
animals	birds	Ptilonorhynchidae	<i>Chlamydera maculata</i>	spotted bowerbird		C		10
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		6
animals	birds	Rallidae	<i>Gallirallus philippensis</i>	buff-banded rail		C		1
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		3
animals	birds	Recurvirostridae	<i>Himantopus leucocephalus</i>	pieb stilt		C		5
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		55
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		62
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		SL		2
animals	birds	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		SL		2
animals	birds	Scolopacidae	<i>Tringa stagnatilis</i>	marsh sandpiper		SL		2
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		15
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		14
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		8
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		7
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		6
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		12
animals	birds	Turnicidae	<i>Turnix melanogaster</i>	black-breasted button-quail		V	V	2
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		1
animals	birds	Turnicidae	<i>Turnix velox</i>	little button-quail		C		1
animals	birds	Tytonidae	<i>Tyto javanica</i>	eastern barn owl		C		12
animals	birds	Zosteropidae	<i>Zosterops lateralis</i>	silveryeye		C		11
animals	mammals	Bovidae	<i>Bos taurus</i>	European cattle	Y			2
animals	mammals	Canidae	<i>Canis familiaris</i>	dog	Y			5
animals	mammals	Canidae	<i>Canis familiaris (dingo)</i>	dingo				2
animals	mammals	Canidae	<i>Canis sp.</i>		Y			1
animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale		C		1
animals	mammals	Dasyuridae	<i>Planigale sp.</i>			C		1
animals	mammals	Emballonuridae	<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat		C		9
animals	mammals	Emballonuridae	<i>Taphozous troughtoni</i>	Troughton's sheath-tail bat		C		1
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			5
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			1
animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			4
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		13
animals	mammals	Macropodidae	<i>Notamacropus dorsalis</i>	black-striped wallaby		C		1
animals	mammals	Macropodidae	<i>Notamacropus parryi</i>	whiptail wallaby		C		1
animals	mammals	Macropodidae	<i>Notamacropus rufogriseus</i>	red-necked wallaby		C		3

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animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		2
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		1
animals	mammals	Molossidae	<i>Austronomus australis</i>	white-striped freetail bat		C		1
animals	mammals	Molossidae	<i>Chaerephon jobensis</i>	northern freetail bat		C		2
animals	mammals	Molossidae	<i>Mormopterus lumsdenae</i>	northern free-tailed bat		C		2
animals	mammals	Molossidae	<i>Mormopterus ridei</i>	eastern free-tailed bat		C		2
animals	mammals	Muridae	<i>Hydromys chrysogaster</i>	water rat		C		5
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			10
animals	mammals	Muridae	<i>Pseudomys delicatulus</i>	delicate mouse		C		2
animals	mammals	Muridae	<i>Pseudomys gracilicaudatus</i>	eastern chestnut mouse		C		1
animals	mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot		C		1
animals	mammals	Peramelidae	<i>Isoodon sp.</i>			C		2
animals	mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider		C		3
animals	mammals	Petauridae	<i>Petaurus notatus</i>	Kreff's glider		C		1
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		17
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		E	E	12
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		10
animals	mammals	Pseudocheiridae	<i>Petauroides armillatus</i>	central greater glider		E	E	10
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			8
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		12
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat		C		2
animals	mammals	Vespertilionidae	<i>Chalinolobus morio</i>	chocolate wattled bat		C		2
animals	mammals	Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	hoary wattled bat		C		1
animals	mammals	Vespertilionidae	<i>Chalinolobus picatus</i>	little pied bat		C		3
animals	mammals	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat		C		1
animals	mammals	Vespertilionidae	<i>Nyctophilus sp.</i>			C		2
animals	mammals	Vespertilionidae	<i>Scotorepens balstoni</i>	inland broad-nosed bat		C		2
animals	mammals	Vespertilionidae	<i>Scotorepens greyii</i>	little broad-nosed bat		C		2
animals	mammals	Vespertilionidae	<i>Vespadelus baverstocki</i>	inland forest bat		C		2
animals	mammals	Vespertilionidae	<i>Vespadelus troughtoni</i>	eastern cave bat		C		2
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				11/1
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				1
animals	ray-finned fishes	Apogonidae	<i>Glossamia aprion</i>	mouth almighty				11
animals	ray-finned fishes	Ariidae	<i>Neoarius graeffei</i>	blue catfish				61
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				10/1
animals	ray-finned fishes	Belontiidae	<i>Strongylura krefftii</i>	freshwater longtom				14
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				360/1
animals	ray-finned fishes	Cyprinidae	<i>Carassius auratus</i>	goldfish	Y			2
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				6
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris galii</i>	firetail gudgeon				2
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris klunzingeri</i>	western carp gudgeon				5/1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris sp.</i>					4
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris species 1</i>	Midgley's carp gudgeon				7
animals	ray-finned fishes	Eleotridae	<i>Mogurnda adspersa</i>	southern purplespotted gudgeon				5
animals	ray-finned fishes	Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod				14/2
animals	ray-finned fishes	Eleotridae	<i>Philypnodon grandiceps</i>	flathead gudgeon				5/1

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animals	ray-finned fishes	Megalopidae	<i>Megalops cyprinoides</i>	oxeye herring				2
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				9/1
animals	ray-finned fishes	Osteoglossidae	<i>Scleropages leichardti</i>	southern saratoga				60/1
animals	ray-finned fishes	Percichthyidae	<i>Macquaria ambigua</i>	golden perch				25/2
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtlii</i>	Hyrtl's catfish				11/1
animals	ray-finned fishes	Plotosidae	<i>Tandanus tandanus</i>	freshwater catfish				11
animals	ray-finned fishes	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish	Y			5
animals	ray-finned fishes	Retropinnidae	<i>Retropinna semoni</i>	Australian smelt				1
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				40/1
animals	ray-finned fishes	Terapontidae	<i>Bidyanus bidyanus</i>	silver perch			CE	1
animals	ray-finned fishes	Terapontidae	<i>Hephaestus fuliginosus</i>	sooty grunter				3
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				5/1
animals	ray-finned fishes	Terapontidae	<i>Scortum hillii</i>	leathery grunter				27/2
animals	reptiles	Agamidae	<i>Chlamydosaurus kingii</i>	frilled lizard			C	1
animals	reptiles	Agamidae	<i>Diporiphora nobbi</i>	nobbi			C	1
animals	reptiles	Agamidae	<i>Intellagama lesueurii</i>	eastern water dragon			C	6
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon			C	2
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python			C	4
animals	reptiles	Boidae	<i>Aspidites melanocephalus</i>	black-headed python			C	1
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python			C	3
animals	reptiles	Carphodactylidae	<i>Nephrurus asper</i>	spiny knob-tailed gecko			C	3
animals	reptiles	Chelidae	<i>Elseya albagula</i>	white-throated snapping turtle		CR	CE	4
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		7
animals	reptiles	Chelidae	<i>Rheodytes leukops</i>	Fitzroy River turtle		V	V	2
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake			C	1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake			C	5
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake			C	7
animals	reptiles	Diplodactylidae	<i>Nebulifera robusta</i>	robust velvet gecko			C	1
animals	reptiles	Diplodactylidae	<i>Oedura monillis sensu lato</i>	ocellated velvet gecko			C	11
animals	reptiles	Elapidae	<i>Acanthophis antarcticus</i>	common death adder			V	1
animals	reptiles	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake			C	4
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake			C	5
animals	reptiles	Elapidae	<i>Denisonia maculata</i>	ornamental snake		V	V	7
animals	reptiles	Elapidae	<i>Hoplocephalus bitorquatus</i>	pale-headed snake			C	1
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake			C	5
animals	reptiles	Elapidae	<i>Rhinoplocephalus sp.</i>					1
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy			C	1
animals	reptiles	Gekkonidae	<i>Gehyra catenata</i>	chain-backed dtella			C	7
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella			C	34/1
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko			C	38
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard			C	2
animals	reptiles	Pygopodidae	<i>Paradelma orientalis</i>	brigalow scaly-foot			C	1
animals	reptiles	Scincidae	<i>Anomalopus verreauxii</i>	three-clawed worm-skink			C	6/1
animals	reptiles	Scincidae	<i>Calyptotis sp.</i>				C	1
animals	reptiles	Scincidae	<i>Carlia munda</i>	shaded-litter rainbow-skink			C	3/1
animals	reptiles	Scincidae	<i>Carlia pectoralis</i>	open-litter rainbow skink			C	2

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animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		11
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		9
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		1/1
animals	reptiles	Scincidae	<i>Carlia sp.</i>			C		1
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		2
animals	reptiles	Scincidae	<i>Concinnia brachysoma</i>	northern bar-sided skink		C		1
animals	reptiles	Scincidae	<i>Concinnia martini</i>	dark bar-sided skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus metallicus</i>	metallic snake-eyed skink		C		6/1
animals	reptiles	Scincidae	<i>Cryptoblepharus pannosus</i>	ragged snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		28/2
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		5/1
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		4
animals	reptiles	Scincidae	<i>Egernia striolata</i>	tree skink		C		2
animals	reptiles	Scincidae	<i>Eulamprus quoyii</i>	eastern water skink		C		4
animals	reptiles	Scincidae	<i>Lerista fragilis</i>	eastern mulch slider		C		5
animals	reptiles	Scincidae	<i>Lerista sp.</i>			C		1
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		13
animals	reptiles	Scincidae	<i>Morethia boulengeri</i>	south-eastern morethia skink		C		12/1
animals	reptiles	Scincidae	<i>Morethia sp.</i>			C		3
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		1
animals	reptiles	Scincidae	<i>Pygmaeascincus timlowi</i>	dwarf litter-skink		C		4/1
animals	reptiles	Varanidae	<i>Varanus tristis</i>	black-tailed monitor		C		2
animals	uncertain	Indeterminate	<i>Indeterminate</i>	Unknown or Code Pending				7
plants	Charophyceae	Characeae	<i>Nitella</i>					1/1
plants	land plants	Acanthaceae	<i>Brunoniella australis</i>	blue trumpet		C		10/1
plants	land plants	Acanthaceae	<i>Dipteracanthus australasicus subsp. corynothecus</i>			C		4/1
plants	land plants	Acanthaceae	<i>Pseuderanthemum tenellum</i>			C		2
plants	land plants	Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower		C		6
plants	land plants	Acanthaceae	<i>Rostellularia adscendens</i>			C		4/1
plants	land plants	Acanthaceae	<i>Xerothamnella herbacea</i>			E	E	15/8
plants	land plants	Aizoaceae	<i>Tetragonia tetragonoides</i>	New Zealand spinach		C		1
plants	land plants	Aizoaceae	<i>Trianthema portulacastrum</i>	black pigweed	Y			2
plants	land plants	Aizoaceae	<i>Trianthema triquetra</i>	red spinach		C		3
plants	land plants	Alismataceae	<i>Caldesia oligococca</i>			SL		1/1
plants	land plants	Amaranthaceae	<i>Achyranthes aspera</i>			C		6/2
plants	land plants	Amaranthaceae	<i>Alternanthera denticulata</i>	lesser joyweed		C		7/1
plants	land plants	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed		C		2/2
plants	land plants	Amaranthaceae	<i>Alternanthera pungens</i>	khaki weed	Y			2/2
plants	land plants	Amaranthaceae	<i>Amaranthus viridis</i>	green amaranth	Y			1/1
plants	land plants	Amaranthaceae	<i>Gomphrena celosioides</i>	gomphrena weed	Y			3/1
plants	land plants	Amaranthaceae	<i>Nyssanthes diffusa</i>	barbed-wire weed			C	1/1
plants	land plants	Amaranthaceae	<i>Nyssanthes erecta</i>				C	3/3
plants	land plants	Amaryllidaceae	<i>Crinum flaccidum</i>	Murray lily			SL	1
plants	land plants	Amaryllidaceae	<i>Zephyranthes drummondii</i>		Y			3/3
plants	land plants	Apiaceae	<i>Cyclospermum leptophyllum</i>		Y			1/1

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plants	land plants	Apocynaceae	<i>Alstonia constricta</i>	bitterbark		C		4/2
plants	land plants	Apocynaceae	<i>Carissa ovata</i>	currantbush		C		11/1
plants	land plants	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			1
plants	land plants	Apocynaceae	<i>Cynanchum viminale subsp. brunonianum</i>			C		3/1
plants	land plants	Apocynaceae	<i>Leichhardtia viridiflora subsp. viridiflora</i>			C		7
plants	land plants	Apocynaceae	<i>Parsonsia lanceolata</i>	northern silkpod		C		3
plants	land plants	Apocynaceae	<i>Secamone elliptica</i>			C		1/1
plants	land plants	Araceae	<i>Landoltia punctata</i>			C		1
plants	land plants	Araceae	<i>Lemna aquinoctialis</i>	common duckweed		C		1/1
plants	land plants	Araceae	<i>Pistia stratiotes</i>	water lettuce	Y			1/1
plants	land plants	Araliaceae	<i>Astrotricha cordata</i>			C		1/1
plants	land plants	Araliaceae	<i>Trachymene procumbens</i>	creeping wild parsnip		C		1/1
plants	land plants	Asteraceae	<i>Calotis cuneata</i>			C		1/1
plants	land plants	Asteraceae	<i>Calotis cuneifolia</i>	burr daisy		C		4/1
plants	land plants	Asteraceae	<i>Calotis dentex</i>	white burr daisy		C		1/1
plants	land plants	Asteraceae	<i>Calotis squamigera</i>			C		1/1
plants	land plants	Asteraceae	<i>Calyptocarpus vialis</i>	creeping cinderella weed	Y			1/1
plants	land plants	Asteraceae	<i>Centipeda minima</i>			C		3
plants	land plants	Asteraceae	<i>Cyanthillium cinereum</i>			C		3/2
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			1/1
plants	land plants	Asteraceae	<i>Erigeron bonariensis</i>		Y			1/1
plants	land plants	Asteraceae	<i>Erigeron pusillus</i>		Y			1/1
plants	land plants	Asteraceae	<i>Flaveria trinervia</i>		Y			1/1
plants	land plants	Asteraceae	<i>Hypochaeris albiflora</i>		Y			1/1
plants	land plants	Asteraceae	<i>Lactuca serriola forma serriola</i>		Y			1/1
plants	land plants	Asteraceae	<i>Olearia canescens subsp. discolor</i>			C		1/1
plants	land plants	Asteraceae	<i>Olearia xerophila</i>			C		1/1
plants	land plants	Asteraceae	<i>Peripleura hispidula var. setosa</i>			C		1/1
plants	land plants	Asteraceae	<i>Rhodanthe polyphylla</i>			C		1/1
plants	land plants	Asteraceae	<i>Senecio brigalowensis</i>			C		3/3
plants	land plants	Asteraceae	<i>Sphaeromorphaea australis</i>			C		1/1
plants	land plants	Asteraceae	<i>Symphotrichum subulatum</i>		Y			1
plants	land plants	Asteraceae	<i>Verbesina encelioides var. encelioides</i>		Y			2/2
plants	land plants	Asteraceae	<i>Vittadinia pustulata</i>			C		1
plants	land plants	Asteraceae	<i>Xanthium occidentale</i>		Y			4
plants	land plants	Bignoniaceae	<i>Dolichandra unguis-cati</i>	cat's claw creeper	Y			1/1
plants	land plants	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		9/1
plants	land plants	Boraginaceae	<i>Heliotropium brachygyne</i>			C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium indicum</i>		Y			4/2
plants	land plants	Brassicaceae	<i>Cardamine paucijuga</i>			C		3
plants	land plants	Brassicaceae	<i>Lepidium bonariense</i>	Argentine peppercress	Y			2/2
plants	land plants	Brassicaceae	<i>Sisymbrium irio</i>	london rocket	Y			1/1
plants	land plants	Byttneriaceae	<i>Commersonia</i>					1/1
plants	land plants	Byttneriaceae	<i>Hannafordia shanesii</i>			C		1/1
plants	land plants	Byttneriaceae	<i>Melochia pyramidata</i>		Y			2/2
plants	land plants	Byttneriaceae	<i>Seringia corollata</i>			C		1/1

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plants	land plants	Byttneriaceae	<i>Seringia hookeriana</i>			C		1/1
plants	land plants	Byttneriaceae	<i>Waltheria indica</i>			C		1/1
plants	land plants	Cactaceae	<i>Cylindropuntia imbricata</i>	devil's rope cactus	Y			1/1
plants	land plants	Cactaceae	<i>Harrisia martinii</i>		Y			1
plants	land plants	Cactaceae	<i>Opuntia stricta</i>		Y			1
plants	land plants	Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear	Y			11
plants	land plants	Campanulaceae	<i>Lobelia concolor</i>			SL		1
plants	land plants	Capparaceae	<i>Capparis anomala</i>			C		2
plants	land plants	Capparaceae	<i>Capparis canescens</i>			C		1/1
plants	land plants	Capparaceae	<i>Capparis lasiantha</i>	nipan		C		12
plants	land plants	Capparaceae	<i>Capparis loranthifolia</i>			C		6
plants	land plants	Capparaceae	<i>Capparis mitchellii</i>			C		4
plants	land plants	Capparaceae	<i>Capparis shanesiana</i>			C		1/1
plants	land plants	Caryophyllaceae	<i>Polycarpaea spirostylis subsp. spirostylis</i>			C		1/1
plants	land plants	Casuarinaceae	<i>Allocasuarina littoralis</i>			C		3
plants	land plants	Casuarinaceae	<i>Allocasuarina luehmannii</i>	bull oak		C		1
plants	land plants	Casuarinaceae	<i>Casuarina cristata</i>	belah		C		2/1
plants	land plants	Celastraceae	<i>Denhamia cunninghamii</i>			C		1/1
plants	land plants	Celastraceae	<i>Denhamia disperma</i>			C		2
plants	land plants	Celastraceae	<i>Denhamia oleaster</i>			C		1
plants	land plants	Celastraceae	<i>Elaeodendron australe</i>			C		3
plants	land plants	Celastraceae	<i>Siphonodon australis</i>	ivorywood		C		1/1
plants	land plants	Ceratophyllaceae	<i>Ceratophyllum demersum</i>	hornwort		C		1
plants	land plants	Chenopodiaceae	<i>Atriplex</i>					2/2
plants	land plants	Chenopodiaceae	<i>Atriplex muelleri</i>	lagoon saltbush		C		2/1
plants	land plants	Chenopodiaceae	<i>Chenopodium desertorum</i>			C		2
plants	land plants	Chenopodiaceae	<i>Einadia</i>					1/1
plants	land plants	Chenopodiaceae	<i>Einadia nutans</i>			C		7
plants	land plants	Chenopodiaceae	<i>Einadia nutans subsp. linifolia</i>			C		2/2
plants	land plants	Chenopodiaceae	<i>Einadia polygonoides</i>	knotweed goosefoot		C		5/1
plants	land plants	Chenopodiaceae	<i>Enchylaena</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Enchylaena tomentosa</i>			C		10
plants	land plants	Chenopodiaceae	<i>Maireana microphylla</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Salsola australis</i>			C		2
plants	land plants	Chenopodiaceae	<i>Sclerolaena anisacanthoides</i>	yellow burr		C		1/1
plants	land plants	Chenopodiaceae	<i>Sclerolaena birchii</i>	galvanised burr		C		1/1
plants	land plants	Chenopodiaceae	<i>Sclerolaena muricata</i>			C		9
plants	land plants	Chenopodiaceae	<i>Sclerolaena tetracuspis</i>	brigalow burr		C		5/2
plants	land plants	Commelinaceae	<i>Commelina diffusa</i>			C		7
plants	land plants	Commelinaceae	<i>Commelina lanceolata</i>			C		1/1
plants	land plants	Commelinaceae	<i>Murdannia graminea</i>	murdannia		C		1
plants	land plants	Convolvulaceae	<i>Cuscuta campestris</i>	dodder	Y			1/1
plants	land plants	Convolvulaceae	<i>Evolvulus alsinoides</i>			C		2
plants	land plants	Convolvulaceae	<i>Evolvulus alsinoides var. decumbens</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea plebeia</i>	bellvine		C		1
plants	land plants	Convolvulaceae	<i>Ipomoea polymorpha</i>			C		1/1

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plants	land plants	Convolvulaceae	<i>Polymeria pusilla</i>			C		2/2
plants	land plants	Crassulaceae	<i>Bryophyllum delagoense</i>		Y			8/2
plants	land plants	Cucurbitaceae	<i>Cucumis melo</i>			C		2/1
plants	land plants	Cupressaceae	<i>Callitris glaucophylla</i>	white cypress pine		C		3/1
plants	land plants	Cyperaceae	<i>Abildgaardia ovata</i>			C		2/2
plants	land plants	Cyperaceae	<i>Bulbostylis barbata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Carex inversa</i>	knob sedge		C		1
plants	land plants	Cyperaceae	<i>Cyperus betchei</i>			C		7
plants	land plants	Cyperaceae	<i>Cyperus betchei</i> subsp. <i>betchei</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus concinnus</i>			C		3/2
plants	land plants	Cyperaceae	<i>Cyperus difformis</i>	rice sedge		C		4/3
plants	land plants	Cyperaceae	<i>Cyperus distans</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus exaltatus</i>	tall flatsedge		C		2
plants	land plants	Cyperaceae	<i>Cyperus flaccidus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus fulvus</i>			C		3/3
plants	land plants	Cyperaceae	<i>Cyperus gilesii</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus gracilis</i>			C		10/1
plants	land plants	Cyperaceae	<i>Cyperus gymnocaulos</i>	spiny flatsedge		C		1
plants	land plants	Cyperaceae	<i>Cyperus iria</i>			C		3/1
plants	land plants	Cyperaceae	<i>Cyperus isabellinus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus javanicus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus leiocaulon</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus leptocarpus</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus polystachyos</i>			C		1
plants	land plants	Cyperaceae	<i>Cyperus pygmaeus</i>	dwarf sedge		C		2/2
plants	land plants	Cyperaceae	<i>Cyperus trinervis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis</i>					2
plants	land plants	Cyperaceae	<i>Eleocharis blakeana</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis dietrichiana</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis philippinensis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis plana</i>	ribbed spikerush		C		2/2
plants	land plants	Cyperaceae	<i>Eleocharis sphacelata</i>	tall spikerush		C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis aestivalis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis aestivalis</i> var. <i>aestivalis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis bisumbellata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis depauperata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush		C		2/1
plants	land plants	Cyperaceae	<i>Fimbristylis microcarya</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fuirena ciliaris</i>			C		1/1
plants	land plants	Cyperaceae	<i>Scleria sphacelata</i>			C		3/3
plants	land plants	Dilleniaceae	<i>Hibbertia stricta</i> var. <i>stricta</i>			C		1/1
plants	land plants	Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony		C		5/1
plants	land plants	Elatinaceae	<i>Elatine gratioloides</i>	waterwort		C		1/1
plants	land plants	Erythroxylaceae	<i>Erythroxylum australe</i>	cocaine tree		C		3
plants	land plants	Erythroxylaceae	<i>Erythroxylum</i> sp. (<i>Splityard Creek L.Pedley 5360</i>)			C		1/1
plants	land plants	Euphorbiaceae	<i>Acalypha eremorum</i>	soft acalypha		C		1

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plants	land plants	Euphorbiaceae	<i>Bertya opposens</i>			C	V	1/1
plants	land plants	Euphorbiaceae	<i>Bertya pedicellata</i>			NT		2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia dallachyana</i>			C		2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia hirta</i>		Y			1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia mitchelliana</i> var. <i>mitchelliana</i>			C		2/2
plants	land plants	Euphorbiaceae	<i>Euphorbia prostrata</i>		Y			1/1
plants	land plants	Goodeniaceae	<i>Goodenia glabra</i>			C		1/1
plants	land plants	Haloragaceae	<i>Haloragis aspera</i>	raspweed		C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i>			C		1
plants	land plants	Hemerocallidaceae	<i>Dianella longifolia</i>			C		1
plants	land plants	Hemerocallidaceae	<i>Dianella nervosa</i>			C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella revoluta</i>			C		1
plants	land plants	Hydrocharitaceae	<i>Ottelia ovalifolia</i> subsp. <i>ovalifolia</i>			SL		1/1
plants	land plants	Juncaceae	<i>Juncus</i>					1
plants	land plants	Juncaginaceae	<i>Cycnogeton procerus</i>			SL		1
plants	land plants	Lamiaceae	<i>Ajuga australis</i>	Australian bugle		C		2/2
plants	land plants	Lamiaceae	<i>Basilicum polystachyon</i>			C		2/2
plants	land plants	Lamiaceae	<i>Coleus australis</i>			C		2
plants	land plants	Lamiaceae	<i>Salvia plebeia</i>	common sage		C		3
plants	land plants	Lamiaceae	<i>Teucrium argutum</i>			C		1
plants	land plants	Lamiaceae	<i>Teucrium daucoides</i>			C		2/2
plants	land plants	Lamiaceae	<i>Teucrium puberulum</i>			C		1/1
plants	land plants	Laxmanniaceae	<i>Eustrephus latifolius</i>	wombat berry		C		2
plants	land plants	Laxmanniaceae	<i>Lomandra confertifolia</i> subsp. <i>pallida</i>			C		2/2
plants	land plants	Laxmanniaceae	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>			C		1/1
plants	land plants	Laxmanniaceae	<i>Lomandra longifolia</i>			C		2/2
plants	land plants	Leguminosae	<i>Acacia</i>					12
plants	land plants	Leguminosae	<i>Acacia complanata</i>	flatstem wattle		C		1/1
plants	land plants	Leguminosae	<i>Acacia crassa</i> subsp. <i>longicoma</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia fasciculifera</i>	scaly bark		C		6/3
plants	land plants	Leguminosae	<i>Acacia harpophylla</i>	brigalow		C		21
plants	land plants	Leguminosae	<i>Acacia leiocalyx</i> subsp. <i>leiocalyx</i>			C		1
plants	land plants	Leguminosae	<i>Acacia melvillei</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia oswaldii</i>	miljee		C		1
plants	land plants	Leguminosae	<i>Acacia rhodoxylon</i>	ringy rosewood		C		2/2
plants	land plants	Leguminosae	<i>Acacia salicina</i>	doolan		C		4/1
plants	land plants	Leguminosae	<i>Acacia shirleyi</i>	lancewood		C		1/1
plants	land plants	Leguminosae	<i>Aeschynomene brevifolia</i>			C		1/1
plants	land plants	Leguminosae	<i>Aeschynomene indica</i>	budda pea		C		1/1
plants	land plants	Leguminosae	<i>Albizia lebbek</i>	Indian siris		C		1/1
plants	land plants	Leguminosae	<i>Bauhinia</i>					12
plants	land plants	Leguminosae	<i>Cassia tomentella</i>			C		8/4
plants	land plants	Leguminosae	<i>Chamaecrista rotundifolia</i> var. <i>rotundifolia</i>		Y			1/1
plants	land plants	Leguminosae	<i>Clitoria ternatea</i>	butterfly pea	Y			2/2
plants	land plants	Leguminosae	<i>Crotalaria juncea</i>	sunhemp	Y			1/1
plants	land plants	Leguminosae	<i>Daviesia filipes</i> subsp. <i>filipes</i>			C		1/1

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plants	land plants	Leguminosae	<i>Desmanthus pernambucanus</i>		Y			1/1
plants	land plants	Leguminosae	<i>Desmodium brachypodum</i>	large ticktrefoil		C		3/2
plants	land plants	Leguminosae	<i>Desmodium filiforme</i>			C		1/1
plants	land plants	Leguminosae	<i>Glycine</i>					1/1
plants	land plants	Leguminosae	<i>Glycine tabacina</i>	glycine pea		C		1
plants	land plants	Leguminosae	<i>Glycine tomentella</i>	woolly glycine		C		1/1
plants	land plants	Leguminosae	<i>Indigofera colutea</i>	sticky indigo		C		1
plants	land plants	Leguminosae	<i>Indigofera hirsuta</i>	hairy indigo		C		2/1
plants	land plants	Leguminosae	<i>Indigofera suffruticosa</i>		Y			1/1
plants	land plants	Leguminosae	<i>Lysiphyllum carronii</i>	ebony tree		C		3
plants	land plants	Leguminosae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C		5/1
plants	land plants	Leguminosae	<i>Macroptilium lathyroides</i>		Y			2/1
plants	land plants	Leguminosae	<i>Rhynchosia minima var. australis</i>			C		1
plants	land plants	Leguminosae	<i>Senna coronilloides</i>			C		2/2
plants	land plants	Leguminosae	<i>Senna occidentalis</i>	coffee senna	Y			1/1
plants	land plants	Leguminosae	<i>Sesbania cannabina</i>			C		2
plants	land plants	Leguminosae	<i>Stylosanthes hamata</i>		Y			1/1
plants	land plants	Leguminosae	<i>Stylosanthes scabra</i>		Y			2/1
plants	land plants	Leguminosae	<i>Tipuana tipu</i>	tipuana	Y			1/1
plants	land plants	Leguminosae	<i>Vachellia farnesiana</i>		Y			1/1
plants	land plants	Leguminosae	<i>Zornia areolata</i>			C		1/1
plants	land plants	Leguminosae	<i>Zornia dyctiocarpa var. filifolia</i>			C		1/1
plants	land plants	Linderniaceae	<i>Lindernia</i>					1/1
plants	land plants	Loranthaceae	<i>Amyema congener subsp. congener</i>			C		1
plants	land plants	Loranthaceae	<i>Amyema quandang</i>			C		1
plants	land plants	Loranthaceae	<i>Amyema quandang var. bancroftii</i>	broad-leaved grey mistletoe		C		5/1
plants	land plants	Loranthaceae	<i>Diplatia furcata</i>			C		3
plants	land plants	Loranthaceae	<i>Diplatia grandibractea</i>			C		1/1
plants	land plants	Loranthaceae	<i>Lysiana subfalcata</i>			C		2
plants	land plants	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry		C		2/2
plants	land plants	Malvaceae	<i>Abutilon guineense</i>		Y			1/1
plants	land plants	Malvaceae	<i>Abutilon malvifolium</i>	bastard marshmallow		C		7
plants	land plants	Malvaceae	<i>Abutilon otocarpum</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon oxycarpum var. incanum</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon oxycarpum var. subsagittatum</i>			C		8/1
plants	land plants	Malvaceae	<i>Gossypium hirsutum</i>		Y			1/1
plants	land plants	Malvaceae	<i>Hibiscus divaricatus</i>			C		1/1
plants	land plants	Malvaceae	<i>Hibiscus sturtii</i>			C		1/1
plants	land plants	Malvaceae	<i>Hibiscus sturtii var. sturtii</i>			C		2
plants	land plants	Malvaceae	<i>Hibiscus vitifolius</i>			C		1/1
plants	land plants	Malvaceae	<i>Malvastrum americanum</i>		Y			3
plants	land plants	Malvaceae	<i>Malvastrum coromandelianum subsp. coromandelianum</i>		Y			1/1
plants	land plants	Malvaceae	<i>Modiola caroliniana</i>	red-flowered mallow	Y			1
plants	land plants	Malvaceae	<i>Sida aprica var. aprica</i>			C		3/3
plants	land plants	Malvaceae	<i>Sida atherophora</i>			C		2/2
plants	land plants	Malvaceae	<i>Sida brachypoda</i>			C		1/1

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plants	land plants	Malvaceae	<i>Sida cordifolia</i>		Y			7/1
plants	land plants	Malvaceae	<i>Sida corrugata</i>			C		3
plants	land plants	Malvaceae	<i>Sida hackettiana</i>			C		1/1
plants	land plants	Malvaceae	<i>Sida rohlenae</i>			C		1
plants	land plants	Malvaceae	<i>Sida sp. (Jericho E.J.Thompson+ JER117)</i>			C		1/1
plants	land plants	Malvaceae	<i>Sida trichopoda</i>			C		1
plants	land plants	Marsileaceae	<i>Marsilea drummondii</i>	common nardoo		C		3
plants	land plants	Marsileaceae	<i>Marsilea hirsuta</i>	hairy nardoo		C		1
plants	land plants	Marsileaceae	<i>Marsilea mutica</i>	shiny nardoo		C		2
plants	land plants	Meliaceae	<i>Melia azedarach</i>	white cedar		C		1
plants	land plants	Meliaceae	<i>Owenia acidula</i>	emu apple		C		1
plants	land plants	Meliaceae	<i>Owenia x reliqua</i>			C		1/1
plants	land plants	Menyanthaceae	<i>Nymphoides crenata</i>	wavy marshwort		SL		2/1
plants	land plants	Molluginaceae	<i>Glinus oppositifolius</i>			C		1
plants	land plants	Moraceae	<i>Ficus</i>					3
plants	land plants	Moraceae	<i>Ficus coronata</i>	creek sandpaper fig		C		1
plants	land plants	Moraceae	<i>Ficus opposita</i>			C		2
plants	land plants	Moraceae	<i>Malaisia scandens</i>					1
plants	land plants	Myrtaceae	<i>Aggreflorum brachyandrum</i>			C		1/1
plants	land plants	Myrtaceae	<i>Angophora leiocarpa</i>	rusty gum		C		3
plants	land plants	Myrtaceae	<i>Backhousia angustifolia</i>	narrow-leaved backhousia		C		1/1
plants	land plants	Myrtaceae	<i>Corymbia citriodora subsp. citriodora</i>			C		1/1
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		4
plants	land plants	Myrtaceae	<i>Corymbia dallachiana</i>			C		2
plants	land plants	Myrtaceae	<i>Corymbia intermedia</i>	pink bloodwood		C		2
plants	land plants	Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C		16
plants	land plants	Myrtaceae	<i>Corymbia trachyphloia</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus</i>					4
plants	land plants	Myrtaceae	<i>Eucalyptus camaldulensis</i>			C		6
plants	land plants	Myrtaceae	<i>Eucalyptus cambageana</i>	Dawson gum		C		10
plants	land plants	Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine red gum		C		1
plants	land plants	Myrtaceae	<i>Eucalyptus coolabah</i>	coolabah		C		22/2
plants	land plants	Myrtaceae	<i>Eucalyptus coolabah x Eucalyptus populnea</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus fibrosa</i>			C		1
plants	land plants	Myrtaceae	<i>Eucalyptus melanophloia</i>			C		13
plants	land plants	Myrtaceae	<i>Eucalyptus populnea</i>	poplar box		C		12/1
plants	land plants	Myrtaceae	<i>Eucalyptus tereticornis</i>			C		2
plants	land plants	Myrtaceae	<i>Eucalyptus tereticornis subsp. tereticornis</i>			C		6/1
plants	land plants	Myrtaceae	<i>Eucalyptus thozetiana</i>			C		5/1
plants	land plants	Myrtaceae	<i>Lophostemon suaveolens</i>	swamp box		C		3/1
plants	land plants	Myrtaceae	<i>Lysicarpus angustifolius</i>	budgeroo		C		1
plants	land plants	Myrtaceae	<i>Melaleuca</i>					1
plants	land plants	Myrtaceae	<i>Melaleuca bracteata</i>			C		6
plants	land plants	Myrtaceae	<i>Melaleuca nervosa</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca trichostachya</i>			C		6/2
plants	land plants	Nelumbonaceae	<i>Nelumbo nucifera</i>	pink waterlily		SL		1/1

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plants	land plants	Nyctaginaceae	<i>Boerhavia dominii</i>			C		9
plants	land plants	Nyctaginaceae	<i>Boerhavia sp. (Bargara L.Pedley 5382)</i>			C		1/1
plants	land plants	Oleaceae	<i>Jasminum didymum subsp. lineare</i>			C		5
plants	land plants	Oleaceae	<i>Jasminum didymum subsp. racemosum</i>			C		2
plants	land plants	Oleaceae	<i>Notelaea microcarpa</i>			C		2
plants	land plants	Onagraceae	<i>Ludwigia octovalvis</i>	willow primrose		C		1
plants	land plants	Onagraceae	<i>Ludwigia peploides subsp. montevidensis</i>			C		5/2
plants	land plants	Orchidaceae	<i>Cymbidium canaliculatum</i>			SL		3
plants	land plants	Oxalidaceae	<i>Oxalis</i>					2
plants	land plants	Oxalidaceae	<i>Oxalis perennans</i>			C		1/1
plants	land plants	Papaveraceae	<i>Argemone ochroleuca subsp. ochroleuca</i>	Mexican poppy	Y			1/1
plants	land plants	Passifloraceae	<i>Passiflora foetida</i>		Y			1/1
plants	land plants	Phrymaceae	<i>Glossostigma diandrum</i>			C		1/1
plants	land plants	Phrymaceae	<i>Peplidium foecundum</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Breynia oblongifolia</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus</i>					1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus hebecarpus</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>			C		1
plants	land plants	Phyllanthaceae	<i>Phyllanthus virgatus</i>			C		1
plants	land plants	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree		C		2
plants	land plants	Pittosporaceae	<i>Bursaria spinosa subsp. spinosa</i>			C		1
plants	land plants	Pittosporaceae	<i>Pittosporum angustifolium</i>			C		1
plants	land plants	Pittosporaceae	<i>Pittosporum spinescens</i>			C		3/1
plants	land plants	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			1/1
plants	land plants	Plumbaginaceae	<i>Plumbago zeylanica</i>	native plumbago		C		1
plants	land plants	Poaceae	<i>Alloteropsis cimicina</i>			C		2/2
plants	land plants	Poaceae	<i>Aristida calycina var. calycina</i>			C		3/1
plants	land plants	Poaceae	<i>Aristida contorta</i>	bunched kerosene grass		C		1
plants	land plants	Poaceae	<i>Aristida holathera</i>			C		1
plants	land plants	Poaceae	<i>Aristida holathera var. holathera</i>			C		2
plants	land plants	Poaceae	<i>Aristida personata</i>			C		2/2
plants	land plants	Poaceae	<i>Aristida vagans</i>			C		2
plants	land plants	Poaceae	<i>Arundinella nepalensis</i>	reedgrass		C		1/1
plants	land plants	Poaceae	<i>Austrostipa</i>					1
plants	land plants	Poaceae	<i>Bothriochloa bladhii subsp. bladhii</i>			C		2/1
plants	land plants	Poaceae	<i>Calyptochloa gracillima subsp. gracillima</i>			C		4/4
plants	land plants	Poaceae	<i>Calyptochloa sphaerocarpa</i>			C		3/3
plants	land plants	Poaceae	<i>Cenchrus ciliaris</i>		Y			16/1
plants	land plants	Poaceae	<i>Cenchrus echinatus</i>	Mossman River grass	Y			1/1
plants	land plants	Poaceae	<i>Chloris divaricata</i>			C		2
plants	land plants	Poaceae	<i>Chloris pectinata</i>	comb chloris		C		1/1
plants	land plants	Poaceae	<i>Chloris ventricosa</i>	tall chloris		C		2/1
plants	land plants	Poaceae	<i>Chrysopogon sylvaticus</i>			C		1/1
plants	land plants	Poaceae	<i>Cleistochloa subjuncea</i>			C		1/1
plants	land plants	Poaceae	<i>Cymbopogon obtectus</i>			C		1/1
plants	land plants	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass		C		1

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plants	land plants	Poaceae	<i>Cynodon dactylon</i>		Y			8
plants	land plants	Poaceae	<i>Dactyloctenium radulans</i>	button grass		C		2
plants	land plants	Poaceae	<i>Dichanthium sericeum</i>			C		3
plants	land plants	Poaceae	<i>Digitaria</i>					1
plants	land plants	Poaceae	<i>Digitaria ammophila</i>	silky umbrella grass		C		1/1
plants	land plants	Poaceae	<i>Digitaria bicornis</i>			C		1/1
plants	land plants	Poaceae	<i>Digitaria brownii</i>			C		6/2
plants	land plants	Poaceae	<i>Digitaria ciliaris</i>	summer grass	Y			1/1
plants	land plants	Poaceae	<i>Digitaria divaricatissima var. divaricatissima</i>			C		1
plants	land plants	Poaceae	<i>Digitaria longiflora</i>			C		1/1
plants	land plants	Poaceae	<i>Digitaria ramularis</i>			C		1/1
plants	land plants	Poaceae	<i>Dinebra decipiens var. asthenes</i>			C		3
plants	land plants	Poaceae	<i>Dinebra decipiens var. decipiens</i>			C		7/2
plants	land plants	Poaceae	<i>Dinebra decipiens var. peacockii</i>			C		1/1
plants	land plants	Poaceae	<i>Dinebra ligulata</i>			C		1/1
plants	land plants	Poaceae	<i>Diplachne fusca var. fusca</i>			C		2/1
plants	land plants	Poaceae	<i>Echinochloa colona</i>	awnless barnyard grass	Y			8/1
plants	land plants	Poaceae	<i>Eleusine indica</i>	crowsfoot grass	Y			1/1
plants	land plants	Poaceae	<i>Enneapogon intermedius</i>			C		3
plants	land plants	Poaceae	<i>Enneapogon lindleyanus</i>			C		2/2
plants	land plants	Poaceae	<i>Enneapogon truncatus</i>			C		1
plants	land plants	Poaceae	<i>Enneapogon virens</i>			C		1/1
plants	land plants	Poaceae	<i>Enteropogon acicularis</i>	curly windmill grass		C		7/1
plants	land plants	Poaceae	<i>Enteropogon unispiceus</i>			C		8/1
plants	land plants	Poaceae	<i>Eragrostis</i>					1
plants	land plants	Poaceae	<i>Eragrostis elongata</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass		C		6
plants	land plants	Poaceae	<i>Eragrostis megalosperma</i>			C		1
plants	land plants	Poaceae	<i>Eragrostis parviflora</i>	weeping lovegrass		C		1/1
plants	land plants	Poaceae	<i>Eragrostis sororia</i>			C		2/2
plants	land plants	Poaceae	<i>Eremochloa bimaclulata</i>	poverty grass		C		1/1
plants	land plants	Poaceae	<i>Eriachne mucronata forma (Alpha C.E.Hubbard 7882)</i>			C		2/2
plants	land plants	Poaceae	<i>Eriochloa crebra</i>	spring grass		C		3
plants	land plants	Poaceae	<i>Eriochloa procera</i>	slender cupgrass		C		4
plants	land plants	Poaceae	<i>Eulalia aurea</i>	silky browntop		C		1/1
plants	land plants	Poaceae	<i>Heteropogon contortus</i>	black speargrass		C		2/1
plants	land plants	Poaceae	<i>Hymenachne amplexicaulis 'Olive'</i>		Y			1/1
plants	land plants	Poaceae	<i>Hyparrhenia rufa</i>		Y			1/1
plants	land plants	Poaceae	<i>Iseilema convexum</i>			C		1/1
plants	land plants	Poaceae	<i>Iseilema membranaceum</i>	small flinders grass		C		1/1
plants	land plants	Poaceae	<i>Leersia hexandra</i>	swamp rice grass		C		1/1
plants	land plants	Poaceae	<i>Leptochloa digitata</i>			C		5/1
plants	land plants	Poaceae	<i>Megathyrsus maximus var. pubiglumis</i>		Y			10
plants	land plants	Poaceae	<i>Melinis repens</i>	red natal grass	Y			2/1
plants	land plants	Poaceae	<i>Panicum</i>					1
plants	land plants	Poaceae	<i>Panicum decompositum var. tenuius</i>			C		2

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plants	land plants	Poaceae	<i>Panicum larcomianum</i>			C		1/1
plants	land plants	Poaceae	<i>Paspalidium albovillosum</i>			C		1/1
plants	land plants	Poaceae	<i>Paspalidium caespitosum</i>	brigalow grass		C		10
plants	land plants	Poaceae	<i>Paspalidium constrictum</i>			C		2/1
plants	land plants	Poaceae	<i>Paspalidium globoideum</i>	sago grass		C		1
plants	land plants	Poaceae	<i>Paspalidium rarum</i>			C		2/1
plants	land plants	Poaceae	<i>Paspalum distichum</i>	water couch	Y			2/2
plants	land plants	Poaceae	<i>Schizachyrium fragile</i>	firegrass		C		1/1
plants	land plants	Poaceae	<i>Setaria parviflora</i>	slender pigeon grass	Y			1/1
plants	land plants	Poaceae	<i>Setaria paspalidioides</i>			C		1/1
plants	land plants	Poaceae	<i>Setaria surgens</i>			C		2/2
plants	land plants	Poaceae	<i>Sorghum arundinaceum</i>	Rhodesian Sudan grass	Y			1/1
plants	land plants	Poaceae	<i>Sporobolus actinocladus</i>	katoora grass		C		1
plants	land plants	Poaceae	<i>Sporobolus caroli</i>	fairy grass		C		8/1
plants	land plants	Poaceae	<i>Sporobolus creber</i>			C		8
plants	land plants	Poaceae	<i>Sporobolus elongatus</i>			C		1
plants	land plants	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		1
plants	land plants	Poaceae	<i>Thyridolepis xerophila</i>			C		1/1
plants	land plants	Poaceae	<i>Tragus australianus</i>	small burr grass		C		3/1
plants	land plants	Poaceae	<i>Urochloa mosambicensis</i>	sabi grass	Y			4/2
plants	land plants	Poaceae	<i>Urochloa subquadripara</i>		Y			1/1
plants	land plants	Poaceae	<i>Walwhalleya subxerophila</i>			C		4
plants	land plants	Polygalaceae	<i>Polygala triflora</i>			C		1/1
plants	land plants	Polygonaceae	<i>Duma florulenta</i>			C		2/1
plants	land plants	Polygonaceae	<i>Persicaria attenuata</i>			C		4/1
plants	land plants	Polygonaceae	<i>Persicaria hydropiper</i>	water pepper		C		1/1
plants	land plants	Polygonaceae	<i>Persicaria lapathifolia</i>	pale knotweed		C		2/2
plants	land plants	Polygonaceae	<i>Persicaria orientalis</i>	princes feathers		C		4/3
plants	land plants	Polygonaceae	<i>Polygonum plebeium</i>	small knotweed		C		3
plants	land plants	Polygonaceae	<i>Rumex hypogaeus</i>		Y			2
plants	land plants	Pontederiaceae	<i>Monochoria cyanea</i>			C		4/3
plants	land plants	Portulacaceae	<i>Calandrinia pickeringii</i>			C		3
plants	land plants	Portulacaceae	<i>Portulaca filifolia</i>			C		4/1
plants	land plants	Portulacaceae	<i>Portulaca oleracea</i>	pigweed	Y			8
plants	land plants	Proteaceae	<i>Hakea lorea subsp. lorea</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes sieberi subsp. sieberi</i>			C		7
plants	land plants	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		2/1
plants	land plants	Rhamnaceae	<i>Ventilago viminalis</i>	supplejack		C		3/2
plants	land plants	Rubiaceae	<i>Asperula geminifolia</i>			C		1/1
plants	land plants	Rubiaceae	<i>Everistia vacciniifolia var. nervosa</i>			C		1
plants	land plants	Rubiaceae	<i>Pavetta australiensis</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psydrax odorata forma subnitida</i>			C		4
plants	land plants	Rubiaceae	<i>Psydrax odorata subsp. australiana</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psydrax oleifolia</i>			C		2/1
plants	land plants	Rubiaceae	<i>Richardia brasiliensis</i>	white eye	Y			2/2
plants	land plants	Rubiaceae	<i>Spermacoce brachystema</i>			C		2/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Rubiaceae	<i>Spermacoce multicaulis</i>			C		1/1
plants	land plants	Rutaceae	<i>Citrus glauca</i>			C		4
plants	land plants	Rutaceae	<i>Flindersia collina</i>	broad-leaved leopard tree		C		1/1
plants	land plants	Rutaceae	<i>Flindersia dissosperma</i>			C		2/1
plants	land plants	Rutaceae	<i>Geijera parviflora</i>	wilga		C		8
plants	land plants	Rutaceae	<i>Murraya lucida</i>			C		1
plants	land plants	Rutaceae	<i>Phebalium glandulosum subsp. glandulosum</i>			C		1/1
plants	land plants	Salviniaceae	<i>Azolla pinnata</i>	fern azolla		C		2
plants	land plants	Salviniaceae	<i>Salvinia molesta</i>	salvinia	Y			1/1
plants	land plants	Santalaceae	<i>Exocarpos latifolius</i>			C		1/1
plants	land plants	Santalaceae	<i>Santalum lanceolatum</i>			SL		9
plants	land plants	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		1
plants	land plants	Sapindaceae	<i>Alectryon diversifolius</i>	scrub boonaree		C		10
plants	land plants	Sapindaceae	<i>Alectryon oleifolius</i>			C		1
plants	land plants	Sapindaceae	<i>Alectryon oleifolius subsp. elongatus</i>			C		4
plants	land plants	Sapindaceae	<i>Atalaya hemiglauca</i>			C		1
plants	land plants	Sapindaceae	<i>Cardiospermum halicacabum var. halicacabum</i>		Y			1/1
plants	land plants	Sapindaceae	<i>Dodonaea stenophylla</i>			C		2/1
plants	land plants	Sapindaceae	<i>Elattostachys xylocarpa</i>	white tamarind		C		1/1
plants	land plants	Sapotaceae	<i>Planchonella cotinifolia var. pubescens</i>			C		1
plants	land plants	Scrophulariaceae	<i>Eremophila debilis</i>	winter apple		C		3/1
plants	land plants	Scrophulariaceae	<i>Eremophila deserti</i>			C		3
plants	land plants	Scrophulariaceae	<i>Eremophila mitchellii</i>			C		3
plants	land plants	Scrophulariaceae	<i>Myoporum acuminatum</i>	coastal boobialla		C		1
plants	land plants	Solanaceae	<i>Nicotiana glauca</i>	tree tobacco	Y			1/1
plants	land plants	Solanaceae	<i>Physalis peruviana</i>		Y			5
plants	land plants	Solanaceae	<i>Solanum coracinum</i>			C		3
plants	land plants	Solanaceae	<i>Solanum dissectum</i>			E	E	23/6
plants	land plants	Solanaceae	<i>Solanum elachophyllum</i>			E		5/4
plants	land plants	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		3
plants	land plants	Solanaceae	<i>Solanum esuriale</i>	quena		C		1/1
plants	land plants	Solanaceae	<i>Solanum johnsonianum</i>			E	E	31/18
plants	land plants	Solanaceae	<i>Solanum parvifolium subsp. parvifolium</i>			C		4/1
plants	land plants	Sparrmanniaceae	<i>Corchorus trilocularis</i>			C		2
plants	land plants	Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C		2/1
plants	land plants	Sterculiaceae	<i>Brachychiton</i>					4
plants	land plants	Sterculiaceae	<i>Brachychiton australis</i>	broad-leaved bottle tree			SL	1
plants	land plants	Sterculiaceae	<i>Brachychiton rupestris</i>				SL	6
plants	land plants	Sterculiaceae	<i>Brachychiton x turgidulus</i>				SL	1/1
plants	land plants	Thymelaeaceae	<i>Pimelea haematostachya</i>			C		2/2
plants	land plants	Verbenaceae	<i>Phyla canescens</i>		Y			1/1
plants	land plants	Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	Y			1/1
plants	land plants	Verbenaceae	<i>Verbena africana</i>			C		2/2
plants	land plants	Violaceae	<i>Pigea enneasperma</i>			C		2/2
plants	land plants	Violaceae	<i>Pigea stellarioides</i>			C		2/1
plants	land plants	Vitaceae	<i>Clematicissus opaca</i>			C		14

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Zygophyllaceae	<i>Tribulus eichlerianus</i>	bull head		C		1
plants	uncertain	Indet.	<i>Indet.</i>			C		5

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.

Table B1: Australia’s Virtual Herbarium database search results for the search area

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Cyperaceae	<i>Abildgaardia ovata</i>	LC	NL
Malvaceae	<i>Abutilon guineense</i>	LC	NL
Malvaceae	<i>Abutilon otocarpum</i>	LC	NL
Malvaceae	<i>Abutilon oxycarpum</i>	LC	NL
Fabaceae	<i>Acacia bancroftiorum</i>	LC	NL
Fabaceae	<i>Acacia complanata</i>	LC	NL
Fabaceae	<i>Acacia conferta</i>	LC	NL
Fabaceae	<i>Acacia crassa</i>	LC	NL
Fabaceae	<i>Acacia fasciculifera</i>	LC	NL
Fabaceae	<i>Acacia harpophylla</i>	LC	NL
Fabaceae	<i>Acacia maidenii</i>	LC	NL
Fabaceae	<i>Acacia melvillei</i>	LC	NL
Fabaceae	<i>Acacia rhodoxylon</i>	LC	NL
Fabaceae	<i>Acacia salicina</i>	LC	NL
Fabaceae	<i>Acacia shirleyi</i>	LC	NL
Fabaceae	<i>Acacia sparsiflora</i>	LC	NL
Fabaceae	<i>Acacia stenophylla</i>	LC	NL
Amaranthaceae	<i>Achyranthes aspera</i>	LC	NL
Asteraceae	<i>Acmella grandiflora</i>	LC	NL
Rutaceae	<i>Acronychia laevis</i>	LC	NL
Euphorbiaceae	<i>Adriana tomentosa</i>	LC	NL
Fabaceae	<i>Aeschynomene brevifolia</i>	LC	NL
Fabaceae	<i>Aeschynomene indica</i>	LC	NL
Violaceae	<i>Afrohybanthus enneaspermus</i>	LC	NL
Violaceae	<i>Afrohybanthus stellarioides</i>	LC	NL
Lamiaceae	<i>Ajuga australis</i>	LC	NL
Fabaceae	<i>Albizia lebeck</i>	*	*
Sapindaceae	<i>Alectryon oleifolius</i>	LC	NL
Sapindaceae	<i>Alectryon subcinereus</i>	LC	NL
Poaceae	<i>Alloteropsis cimicina</i>	LC	NL
Rhamnaceae	<i>Alphitonia excelsa</i>	LC	NL
Apocynaceae	<i>Alstonia constricta</i>	LC	NL
Amaranthaceae	<i>Alternanthera denticulata</i>	LC	NL
Amaranthaceae	<i>Alternanthera nana</i>	LC	NL
Amaranthaceae	<i>Alternanthera nodiflora</i>	LC	NL
Amaranthaceae	<i>Alternanthera pungens</i>	*	*
Amaranthaceae	<i>Amaranthus viridis</i>	*	*
Lythraceae	<i>Ammannia multiflora</i>	LC	NL
Loranthaceae	<i>Amyema quandang</i>	LC	NL
Poaceae	<i>Ancistrachne uncinulata</i>	LC	NL

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Malvaceae	<i>Androcalva leichhardtii</i>	LC	NL
Fabaceae	<i>Archidendropsis basaltica</i>	LC	NL
Papaveraceae	<i>Argemone ochroleuca</i>	*	*
Poaceae	<i>Aristida calycina</i>	LC	NL
Poaceae	<i>Aristida caput-medusae</i>	LC	NL
Poaceae	<i>Aristida holathera</i>	LC	NL
Poaceae	<i>Aristida personata</i>	LC	NL
Poaceae	<i>Arundinella nepalensis</i>	LC	NL
Rubiaceae	<i>Asperula geminifolia</i>	LC	NL
Araliaceae	<i>Astrotricha cordata</i>	LC	NL
Chenopodiaceae	<i>Atriplex muelleri</i>	LC	NL
Parmeliaceae	<i>Austroparmelina conlabrosa</i>	LC	NL
Myrtaceae	<i>Backhousia angustifolia</i>	LC	NL
Lamiaceae	<i>Basilicum polystachyon</i>	LC	NL
Fabaceae	<i>Bauhinia cunninghamii</i>	LC	NL
Fabaceae	<i>Bauhinia hookeri</i>	LC	NL
Euphorbiaceae	<i>Bertya opponens</i>	LC	V
Euphorbiaceae	<i>Bertya pedicellata</i>	NT	NL
Poaceae	<i>Bothriochloa bladhii</i>	LC	NL
Malvaceae	<i>Brachychiton bidwillii</i>	LC	NL
Malvaceae	<i>Brachychiton x turgidulus</i>	LC	NL
Asteraceae	<i>Brachyscome basaltica</i>	LC	NL
Asteraceae	<i>Brachyscome dentata</i>	LC	NL
Phyllanthaceae	<i>Breynia oblongifolia</i>	LC	NL
Acanthaceae	<i>Brunoniella australis</i>	LC	NL
Crassulaceae	<i>Bryophyllum delagoense</i>	*(RI)	*
Boraginaceae	<i>Buglossoides arvensis</i>	*	*
Cyperaceae	<i>Bulbostylis barbata</i>	LC	NL
Cupressaceae	<i>Callitris glaucophylla</i>	LC	NL
Asteraceae	<i>Calotis cuneata</i>	LC	NL
Asteraceae	<i>Calotis cuneifolia</i>	LC	NL
Asteraceae	<i>Calotis dentex</i>	LC	NL
Asteraceae	<i>Calotis squamigera</i>	LC	NL
Asteraceae	<i>Calyptocarpus vialis</i>	*	*
Poaceae	<i>Calyptochloa gracillima</i>	LC	NL
Leucobryaceae	<i>Campylopus pyriformis</i>	LC	NL
Capparaceae	<i>Capparis canescens</i>	LC	NL
Capparaceae	<i>Capparis lasiantha</i>	LC	NL
Capparaceae	<i>Capparis loranthifolia</i>	LC	NL
Capparaceae	<i>Capparis mitchellii</i>	LC	NL
Capparaceae	<i>Capparis shanesiana</i>	LC	NL
Sapindaceae	<i>Cardiospermum halicacabum</i>	*	*
Apocynaceae	<i>Carissa spinarum</i>	LC	NL

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Brassicaceae	<i>Carrichtera annua</i>	LC	NL
Fabaceae	<i>Cassia tomentella</i>	LC	NL
Asteraceae	<i>Cassinia laevis</i>	LC	NL
Casuarinaceae	<i>Casuarina cunninghamiana</i>	LC	NL
Cannabaceae	<i>Celtis australis</i>	LC	NL
Poaceae	<i>Cenchrus ciliaris</i>	*	*
Poaceae	<i>Cenchrus echinatus</i>	*	*
Fabaceae	<i>Chamaecrista rotundifolia</i>	*	*
Poaceae	<i>Chloris pectinata</i>	LC	NL
Poaceae	<i>Chloris ventricosa</i>	LC	NL
Poaceae	<i>Chloris virgata</i>	*	*
Poaceae	<i>Chrysopogon filipes</i>	LC	NL
Poaceae	<i>Chrysopogon sylvaticus</i>	LC	NL
Cladoniaceae	<i>Cladia muelleri</i>	LC	NL
Poaceae	<i>Cleistochloa subjuncea</i>	LC	NL
Fabaceae	<i>Clitoria ternatea</i>	*	*
Commelinaceae	<i>Commelina lanceolata</i>	LC	NL
Myrtaceae	<i>Corymbia citriodora</i>	LC	NL
Myrtaceae	<i>Corymbia clarksoniana</i>	LC	NL
Myrtaceae	<i>Corymbia dallachiana</i>	LC	NL
Myrtaceae	<i>Corymbia erythrophloia</i>	LC	NL
Myrtaceae	<i>Corymbia trachyphloia</i>	LC	NL
Fabaceae	<i>Crotalaria incana</i>	*	*
Fabaceae	<i>Crotalaria juncea</i>	*	*
Fabaceae	<i>Crotalaria mitchellii</i>	LC	NL
Cucurbitaceae	<i>Cucumis melo</i>	LC	NL
Convolvulaceae	<i>Cuscuta campestris</i>	*	*
Asteraceae	<i>Cyanthillium cinereum</i>	*	*
Apiaceae	<i>Cyclospermum leptophyllum</i>	LC	NL
Cactaceae	<i>Cylindropuntia imbricata</i>	*	*
Poaceae	<i>Cymbopogon obtectus</i>	LC	NL
Cyperaceae	<i>Cyperus betchei</i>	LC	NL
Cyperaceae	<i>Cyperus clarus</i>	LC	NL
Cyperaceae	<i>Cyperus concinnus</i>	LC	NL
Cyperaceae	<i>Cyperus difformis</i>	LC	NL
Cyperaceae	<i>Cyperus distans</i>	LC	NL
Cyperaceae	<i>Cyperus flaccidus</i>	LC	NL
Cyperaceae	<i>Cyperus fulvus</i>	LC	NL
Cyperaceae	<i>Cyperus gilesii</i>	LC	NL
Cyperaceae	<i>Cyperus gracilis</i>	LC	NL
Cyperaceae	<i>Cyperus iria</i>	LC	NL
Cyperaceae	<i>Cyperus isabellinus</i>	LC	NL
Cyperaceae	<i>Cyperus javanicus</i>	LC	NL

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Cyperaceae	<i>Cyperus leiocaulon</i>	LC	NL
Cyperaceae	<i>Cyperus pygmaeus</i>	LC	NL
Cyperaceae	<i>Cyperus rigidellus</i>	LC	NL
Cyperaceae	<i>Cyperus sesquiflorus</i>	*	*
Cyperaceae	<i>Cyperus trinervis</i>	LC	NL
Cyperaceae	<i>Cyperus victoriensis</i>	LC	NL
Fabaceae	<i>Daviesia filipes</i>	LC	NL
Celastraceae	<i>Denhamia cunninghamii</i>	LC	NL
Celastraceae	<i>Denhamia oleaster</i>	LC	NL
Fabaceae	<i>Desmanthus pernambucanus</i>	*	*
Fabaceae	<i>Desmodium brachypodium</i>	LC	NL
Fabaceae	<i>Desmodium filiforme</i>	LC	NL
Hemerocallidaceae	<i>Dianella nervosa</i>	LC	NL
Poaceae	<i>Digitaria ammophila</i>	LC	NL
Poaceae	<i>Digitaria bicornis</i>	*	*
Poaceae	<i>Digitaria brownii</i>	LC	NL
Poaceae	<i>Digitaria ciliaris</i>	*	*
Poaceae	<i>Digitaria imbricata</i>	LC	NL
Poaceae	<i>Digitaria longiflora</i>	LC	NL
Poaceae	<i>Digitaria ramularis</i>	LC	NL
Poaceae	<i>Dinebra decipiens</i>	LC	NL
Poaceae	<i>Dinebra ligulata</i>	LC	NL
Ebenaceae	<i>Diospyros humilis</i>	LC	NL
Loranthaceae	<i>Diplatia grandibractea</i>	LC	NL
Acanthaceae	<i>Dipteracanthus australasicus</i>	LC	NL
Bignoniaceae	<i>Dolichandra unguis-cati</i>	*(RI)	*
Polygonaceae	<i>Duma florulenta</i>	LC	NL
Poaceae	<i>Echinochloa colona</i>	*	*
Poaceae	<i>Echinochloa polystachya</i>	*	*
Asteraceae	<i>Eclipta prostrata</i>	*	*
Boraginaceae	<i>Ehretia saligna</i>	LC	NL
Chenopodiaceae	<i>Einadia nutans</i>	LC	NL
Chenopodiaceae	<i>Einadia polygonoides</i>	LC	NL
Elatinaceae	<i>Elatine gratioloides</i>	LC	NL
Sapindaceae	<i>Elattostachys xylocarpa</i>	LC	NL
Cyperaceae	<i>Eleocharis blakeana</i>	LC	NL
Cyperaceae	<i>Eleocharis dietrichiana</i>	LC	NL
Cyperaceae	<i>Eleocharis philippinensis</i>	LC	NL
Cyperaceae	<i>Eleocharis plana</i>	LC	NL
Cyperaceae	<i>Eleocharis sphacelata</i>	LC	NL
Poaceae	<i>Eleusine indica</i>	*	*
Chenopodiaceae	<i>Enchylaena tomentosa</i>	LC	NL
Poaceae	<i>Enneapogon gracilis</i>	LC	NL

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Poaceae	<i>Enneapogon lindleyanus</i>	LC	NL
Poaceae	<i>Enneapogon truncatus</i>	LC	NL
Poaceae	<i>Enneapogon virens</i>	LC	NL
Poaceae	<i>Enteropogon acicularis</i>	LC	NL
Poaceae	<i>Enteropogon ramosus</i>	LC	NL
Poaceae	<i>Enteropogon unispiceus</i>	LC	NL
Poaceae	<i>Eragrostis elongata</i>	LC	NL
Poaceae	<i>Eragrostis parviflora</i>	LC	NL
Poaceae	<i>Eragrostis pilosa</i>	*	*
Poaceae	<i>Eragrostis sororia</i>	LC	NL
Poaceae	<i>Eragrostis speciosa</i>	LC	NL
Poaceae	<i>Eremochloa bimaculata</i>	LC	NL
Scrophulariaceae	<i>Eremophila debilis</i>	LC	NL
Scrophulariaceae	<i>Eremophila maculata</i>	LC	NL
Asteraceae	<i>Erigeron bonariensis</i>	LC	NL
Asteraceae	<i>Erigeron canadensis</i>	*	*
Erythroxylaceae	<i>Erythroxylum australe</i>	LC	NL
Erythroxylaceae	<i>Erythroxylum</i> sp. Splyyard Creek (L.Pedley 5360)	LC	NL
Myrtaceae	<i>Eucalyptus camaldulensis</i>	LC	NL
Myrtaceae	<i>Eucalyptus cambageana</i>	LC	NL
Myrtaceae	<i>Eucalyptus coolabah</i>	LC	NL
Myrtaceae	<i>Eucalyptus mediocris</i>	LC	NL
Myrtaceae	<i>Eucalyptus orgadophila</i>	LC	NL
Myrtaceae	<i>Eucalyptus populnea</i>	LC	NL
Myrtaceae	<i>Eucalyptus tenuipes</i>	LC	NL
Myrtaceae	<i>Eucalyptus tereticornis</i>	LC	NL
Myrtaceae	<i>Eucalyptus thozetiana</i>	LC	NL
Poaceae	<i>Eulalia aurea</i>	LC	NL
Euphorbiaceae	<i>Euphorbia dallachyana</i>	LC	NL
Euphorbiaceae	<i>Euphorbia hirta</i>	LC	NL
Euphorbiaceae	<i>Euphorbia mitchelliana</i>	LC	NL
Euphorbiaceae	<i>Euphorbia prostrata</i>	LC	NL
Euphorbiaceae	<i>Euphorbia tannensis</i>	LC	NL
Convolvulaceae	<i>Evolvulus alsinoides</i>	LC	NL
Santalaceae	<i>Exocarpos cupressiformis</i>	LC	NL
Santalaceae	<i>Exocarpos latifolius</i>	LC	NL
Moraceae	<i>Ficus virens</i>	LC	NL
Cyperaceae	<i>Fimbristylis aestivalis</i>	LC	NL
Cyperaceae	<i>Fimbristylis bisumbellata</i>	LC	NL
Cyperaceae	<i>Fimbristylis depauperata</i>	LC	NL
Cyperaceae	<i>Fimbristylis dichotoma</i>	LC	NL
Cyperaceae	<i>Fimbristylis microcarya</i>	LC	NL

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Asteraceae	<i>Flaveria trinervia</i>	LC	NL
Rutaceae	<i>Flindersia collina</i>	LC	NL
Rutaceae	<i>Flindersia dissosperma</i>	LC	NL
Cyperaceae	<i>Fuirena ciliaris</i>	LC	NL
Rutaceae	<i>Geijera parviflora</i>	LC	NL
Rutaceae	<i>Geijera salicifolia</i>	LC	NL
Verbenaceae	<i>Glandularia aristigera</i>	LC	NL
Papaveraceae	<i>Glaucium corniculatum</i>	LC	NL
Phrymaceae	<i>Glossostigma diandrum</i>	LC	NL
Fabaceae	<i>Glycine tomentella</i>	LC	NL
Apocynaceae	<i>Gomphocarpus physocarpus</i>	*	*
Amaranthaceae	<i>Gomphrena celosioides</i>	*	*
Goodeniaceae	<i>Goodenia glabra</i>	LC	NL
Malvaceae	<i>Gossypium hirsutum</i>	LC	NL
Proteaceae	<i>Grevillea helmsiae</i>	LC	NL
Malvaceae	<i>Grewia latifolia</i>	LC	NL
Proteaceae	<i>Hakea lorea</i>	LC	NL
Haloragaceae	<i>Haloragis aspera</i>	LC	NL
Malvaceae	<i>Hannafordia shanesii</i>	LC	NL
Boraginaceae	<i>Heliotropium brachygyne</i>	LC	NL
Boraginaceae	<i>Heliotropium indicum</i>	LC	NL
Asteraceae	<i>Hemistephtia lyrata</i>	LC	NL
	<i>Heterodea muelleri</i>	LC	NL
Poaceae	<i>Heteropogon contortus</i>	LC	NL
Dilleniaceae	<i>Hibbertia stricta</i>	LC	NL
Malvaceae	<i>Hibiscus divaricatus</i>	LC	NL
Malvaceae	<i>Hibiscus sturtii</i>	LC	NL
Malvaceae	<i>Hibiscus vitifolius</i>	LC	NL
Dicranaceae	<i>Holomitrium perichaetiale</i>	LC	NL
Fabaceae	<i>Hovea longipes</i>	LC	NL
Araliaceae	<i>Hydrocotyle laxiflora</i>	LC	NL
Poaceae	<i>Hymenachne amplexicaulis</i>	*	*
Poaceae	<i>Hyparrhenia rufa</i>	*	*
Asteraceae	<i>Hypochaeris albiflora</i>	LC	NL
Fabaceae	<i>Indigofera hirsuta</i>	LC	NL
Fabaceae	<i>Indigofera linifolia</i>	LC	NL
Fabaceae	<i>Indigofera suffruticosa</i>	LC	NL
Convolvulaceae	<i>Ipomoea polymorpha</i>	LC	NL
Poaceae	<i>Iseilema membranaceum</i>	LC	NL
Poaceae	<i>Iseilema vaginiflorum</i>	LC	NL
Juncaceae	<i>Juncus continuus</i>	LC	NL
Juncaceae	<i>Juncus usitatus</i>	LC	NL
Malvaceae	<i>Keraudrenia corollata</i>	LC	NL

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Malvaceae	<i>Keraudrenia hookeriana</i>	LC	NL
Asparagaceae	<i>Laxmannia gracilis</i>	LC	NL
Lecanoraceae	<i>Lecanora helva</i>	LC	NL
Poaceae	<i>Leersia hexandra</i>	LC	NL
Araceae	<i>Lemna aequinoctialis</i>	LC	NL
Brassicaceae	<i>Lepidium bonariense</i>	LC	NL
Myrtaceae	<i>Leptospermum brachyandrum</i>	LC	NL
Myrtaceae	<i>Leptospermum neglectum</i>	LC	NL
Fabaceae	<i>Leucaena leucocephala</i>	*	*
Plantaginaceae	<i>Limnophila aromatica</i>	LC	NL
Cyperaceae	<i>Lipocarpa microcephala</i>	LC	NL
Campanulaceae	<i>Lobelia concolor</i>	LC	NL
Asparagaceae	<i>Lomandra confertifolia</i>	LC	NL
Asparagaceae	<i>Lomandra filiformis</i>	LC	NL
Asparagaceae	<i>Lomandra longifolia</i>	LC	NL
Myrtaceae	<i>Lophostemon suaveolens</i>	LC	NL
Onagraceae	<i>Ludwigia peploides</i>	LC	NL
Myrtaceae	<i>Lysicarpus angustifolius</i>	LC	NL
Orthotrichaceae	<i>Macromitrium repandum</i>	LC	NL
Fabaceae	<i>Macroptilium lathyroides</i>	*	*
Chenopodiaceae	<i>Maireana microphylla</i>	LC	NL
Malvaceae	<i>Malvastrum americanum</i>	LC	NL
Malvaceae	<i>Malvastrum coromandelianum</i>	LC	NL
Myrtaceae	<i>Melaleuca decora</i>	LC	NL
Myrtaceae	<i>Melaleuca nervosa</i>	LC	NL
Myrtaceae	<i>Melaleuca trichostachya</i>	LC	NL
Poaceae	<i>Melinis repens</i>	*	*
Malvaceae	<i>Melochia pyramidata</i>	*	*
Pontederiaceae	<i>Monochoria cyanea</i>	LC	NL
Scrophulariaceae	<i>Myoporum montanum</i>	LC	NL
Nelumbonaceae	<i>Nelumbo nucifera</i>	*	*
Solanaceae	<i>Nicotiana glauca</i>	*	*
Solanaceae	<i>Nicotiana megalosiphon</i>	LC	NL
Oleaceae	<i>Notelaea microcarpa</i>	LC	NL
Menyanthaceae	<i>Nymphoides crenata</i>	LC	NL
Amaranthaceae	<i>Nyssanthes diffusa</i>	LC	NL
Amaranthaceae	<i>Nyssanthes erecta</i>	LC	NL
Asteraceae	<i>Olearia xerophila</i>	LC	NL
Convolvulaceae	<i>Operculina aequisejala</i>	LC	NL
Hydrocharitaceae	<i>Ottelia ovalifolia</i>	LC	NL
Meliaceae	<i>Owenia acidula</i>	LC	NL
Meliaceae	<i>Owenia x reliqua</i>	LC	NL
Oxalidaceae	<i>Oxalis perennans</i>	LC	NL

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Asteraceae	<i>Ozothamnus cassinioides</i>	LC	NL
Bignoniaceae	<i>Pandorea pandorana</i>	LC	NL
Poaceae	<i>Panicum larcomianum</i>	LC	NL
Poaceae	<i>Panicum queenslandicum</i>	LC	NL
	<i>Parmotrema praesorediosum</i>	LC	NL
	<i>Parmotrema subsumptum</i>	LC	NL
Asteraceae	<i>Parthenium hysterophorus</i>	*(RI)	*
Poaceae	<i>Paspalidium albovillosum</i>	LC	NL
Poaceae	<i>Paspalidium constrictum</i>	LC	NL
Poaceae	<i>Paspalidium distans</i>	LC	NL
Poaceae	<i>Paspalidium globoideum</i>	LC	NL
Poaceae	<i>Paspalidium gracile</i>	LC	NL
Poaceae	<i>Paspalidium rarum</i>	LC	NL
Poaceae	<i>Paspalum distichum</i>	LC	NL
Passifloraceae	<i>Passiflora aurantia</i>	LC	NL
Passifloraceae	<i>Passiflora foetida</i>	*	*
Rubiaceae	<i>Pavetta australiensis</i>	LC	NL
Phrymaceae	<i>Peplidium foecundum</i>	LC	NL
Polygonaceae	<i>Persicaria attenuata</i>	LC	NL
Polygonaceae	<i>Persicaria hydropiper</i>	LC	NL
Polygonaceae	<i>Persicaria lapathifolia</i>	LC	NL
Polygonaceae	<i>Persicaria orientalis</i>	LC	NL
Polygonaceae	<i>Persicaria prostrata</i>	LC	NL
Pertusariaceae	<i>Pertusaria subsidiosa</i>	LC	NL
Pertusariaceae	<i>Pertusaria thiospoda</i>	LC	NL
Picrodendraceae	<i>Petalostigma pubescens</i>	LC	NL
Rutaceae	<i>Phebalium glandulosum</i>	LC	NL
Verbenaceae	<i>Phyla canescens</i>	*	*
Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>	LC	NL
Thymelaeaceae	<i>Pimelea haematostachya</i>	LC	NL
Araceae	<i>Pistia stratiotes</i>	*	*
Pittosporaceae	<i>Pittosporum angustifolium</i>	LC	NL
Pittosporaceae	<i>Pittosporum spinescens</i>	LC	NL
Caryophyllaceae	<i>Polycarpaea spirostylis</i>	LC	NL
Polygalaceae	<i>Polygala triflora</i>	LC	NL
Convolvulaceae	<i>Polymeria calycina</i>	LC	NL
Convolvulaceae	<i>Polymeria pusilla</i>	LC	NL
Portulacaceae	<i>Portulaca filifolia</i>	LC	NL
Rubiaceae	<i>Psydrax odorata</i>	LC	NL
Rubiaceae	<i>Psydrax oleifolia</i>	LC	NL
Chenopodiaceae	<i>Rhagodia parabolica</i>	LC	NL
Asteraceae	<i>Rhodanthe gossypina</i>	LC	NL
Asteraceae	<i>Rhodanthe polyphylla</i>	LC	NL

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Rubiaceae	<i>Richardia brasiliensis</i>	LC	NL
Acanthaceae	<i>Rostellularia adscendens</i>	LC	NL
Salviniaceae	<i>Salvinia molesta</i>	*	*
Adoxaceae	<i>Sambucus gaudichaudiana</i>	LC	NL
Poaceae	<i>Schizachyrium fragile</i>	LC	NL
Cyperaceae	<i>Scleria brownii</i>	LC	NL
Cyperaceae	<i>Scleria sphacelata</i>	LC	NL
Chenopodiaceae	<i>Sclerolaena anisacanthoides</i>	LC	NL
Chenopodiaceae	<i>Sclerolaena birchii</i>	LC	NL
Chenopodiaceae	<i>Sclerolaena muricata</i>	LC	NL
Chenopodiaceae	<i>Sclerolaena tetracuspis</i>	LC	NL
Plantaginaceae	<i>Scoparia dulcis</i>	LC	NL
Apocynaceae	<i>Secamone elliptica</i>	LC	NL
Asteraceae	<i>Senecio brigalowensis</i>	LC	NL
Fabaceae	<i>Senna barclayana</i>	LC	NL
Fabaceae	<i>Senna coronilloides</i>	LC	NL
Fabaceae	<i>Senna occidentalis</i>	*	*
Poaceae	<i>Setaria australiensis</i>	LC	NL
Poaceae	<i>Setaria incrassata</i>	*	*
Poaceae	<i>Setaria parviflora</i>	*	*
Poaceae	<i>Setaria paspalidioides</i>	LC	NL
Poaceae	<i>Setaria surgens</i>	LC	NL
Malvaceae	<i>Sida aprica</i>	LC	NL
Malvaceae	<i>Sida atherophora</i>	LC	NL
Malvaceae	<i>Sida brachypoda</i>	LC	NL
Malvaceae	<i>Sida cordifolia</i>	*	*
Malvaceae	<i>Sida hackettiana</i>	LC	NL
Malvaceae	<i>Sida rhombifolia</i>	*	*
Malvaceae	<i>Sida rohlenae</i>	LC	NL
Celastraceae	<i>Siphonodon australis</i>	LC	NL
Brassicaceae	<i>Sisymbrium irio</i>	LC	NL
Brassicaceae	<i>Sisymbrium thellungii</i>	LC	NL
Solanaceae	<i>Solanum dissectum</i>	E	E
Solanaceae	<i>Solanum elachophyllum</i>	E	NL
Solanaceae	<i>Solanum ellipticum</i>	LC	NL
Solanaceae	<i>Solanum esuriale</i>	LC	NL
Solanaceae	<i>Solanum furfuraceum</i>	LC	NL
Solanaceae	<i>Solanum johnsonianum</i>	E	E
Solanaceae	<i>Solanum mitchellianum</i>	LC	NL
Solanaceae	<i>Solanum parvifolium</i>	LC	NL
Poaceae	<i>Sorghum arundinaceum</i>	*	*
Family	<i>Species Name</i>	LC	NL
Rubiaceae	<i>Spermacoce brachystema</i>	LC	NL

Family	Botanical Name	Status	
		NC Act ¹	EPBC Act ²
Rubiaceae	<i>Spermacoce multicaulis</i>	LC	NL
Asteraceae	<i>Sphaeromorphaea australis</i>	LC	NL
Poaceae	<i>Sporobolus caroli</i>	LC	NL
Poaceae	<i>Sporobolus scabridus</i>	LC	NL
Verbenaceae	<i>Stachytarpheta jamaicensis</i>	LC	NL
Fabaceae	<i>Stylosanthes hamata</i>	*	*
Fabaceae	<i>Stylosanthes scabra</i>	*	*
Combretaceae	<i>Terminalia oblongata</i>	LC	NL
Poaceae	<i>Themeda avenacea</i>	LC	NL
Poaceae	<i>Themeda triandra</i>	LC	NL
Poaceae	<i>Thyridolepis xerophila</i>	LC	NL
Cladoniaceae	<i>Thysanothecium scutellatum</i>	LC	NL
Fabaceae	<i>Tipuana tipu</i>	*	*
Poaceae	<i>Tragus australianus</i>	LC	NL
Cannabaceae	<i>Trema tomentosa</i>	LC	NL
Aizoaceae	<i>Trianthema triquetrum</i>	LC	NL
Pottiaceae	<i>Trichostomum brachydontium</i>	LC	NL
Rubiaceae	<i>Triflorensia ixoroides</i>	LC	NL
Poaceae	<i>Tripogon loliiformis</i>	LC	NL
Malvaceae	<i>Triumfetta rhomboidea</i>	LC	NL
Poaceae	<i>Urochloa foliosa</i>	LC	NL
Poaceae	<i>Urochloa mosambicensis</i>	*	*
Poaceae	<i>Urochloa subquadripara</i>	*	*
Fabaceae	<i>Vachellia bidwillii</i>	LC	NL
Fabaceae	<i>Vachellia farnesiana</i>	*	*
Rhamnaceae	<i>Ventilago viminalis</i>	LC	NL
Verbenaceae	<i>Verbena africana</i>	LC	NL
Verbenaceae	<i>Verbena gaudichaudii</i>	LC	NL
Asteraceae	<i>Verbesina encelioides</i>	*	*
Fabaceae	<i>Vicia sativa</i>	*	*
Santalaceae	<i>Viscum articulatum</i>	LC	NL
Asteraceae	<i>Vittadinia hispidula</i>	LC	NL
Campanulaceae	<i>Wahlenbergia gracilis</i>	LC	NL
Malvaceae	<i>Waltheria indica</i>	LC	NL
Acanthaceae	<i>Xerothamnella herbacea</i>	LC	E
Amaryllidaceae	<i>Zephyranthes drummondii</i>	*	*
Asteraceae	<i>Zinnia peruviana</i>	LC	NL
Fabaceae	<i>Zornia dyctiocarpa</i>	LC	NL

¹ Status under Queensland's *Nature Conservation Act 1992*: E = Endangered; V = Vulnerable; NT = Near Threatened; LC = Least Concern

² Status under the Commonwealth's *Environment Protection and Biodiversity Act 1999*: E = Endangered; V = Vulnerable; NL = Not listed

* = Exotic species; RI = Restricted Invasive species under the Queensland *Biosecurity Act 2014*

Table B2: Queensland Museum database search results for the search area

Family	Scientific name	Common name	Status	
			NC Act ¹	EPBC Act ²
Hylidae	<i>Litoria wilcoxii</i>	Stony Creek Frog	LC	NL
Ptilonorhynchidae	<i>Ptilonorhynchus violaceus violaceus</i>	Satin Bowerbird	LC	NL
Acrobatidae	<i>Acrobates pygmaeus</i>	Narrow-toed Feathertail Glider	LC	NL
Potoroidae	<i>Aepyprymnus rufescens</i>	Rufous Bettong	LC	NL
Vespertilionidae	<i>Chalinolobus nigrogriseus nigrogriseus</i>	Hoary Wattled Bat	LC	NL
Peramelidae	<i>Isoodon macrourus</i>	Northern Brown Bandicoot	LC	NL
Dasyuridae	<i>Sminthopsis macroura macroura</i>	Stripe-faced Dunnart	LC	NL
Typhlopidae	<i>Anilius wiedii</i>	Brown-snouted Blind Snake	LC	NL
Elapidae	<i>Brachyuropsis australis</i>	Australian Coral Snake	LC	NL
Scincidae	<i>Carlia munda</i>	Shaded-litter Rainbow-skink	LC	NL
Scincidae	<i>Carlia schmeltzii</i>	Robust Rainbow-skink	LC	NL
Scincidae	<i>Cryptoblepharus metallicus</i>	Metallic Snake-eyed Skink	LC	NL
Scincidae	<i>Cryptoblepharus sp.</i>	Wall Skink	LC	NL
Scincidae	<i>Ctenotus robustus</i>	Eastern Striped Skink	LC	NL
Elapidae	<i>Denisonia maculata</i>	Ornamental Snake	V	V
Scincidae	<i>Egernia rugosa</i>	Yakka Skink	V	V
Gekkonidae	<i>Gehyra dubia</i>	Dubious Dtella	LC	NL
Elapidae	<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	LC	NL
Scincidae	<i>Lygisaurus foliorum</i>	Burnett's Skink	LC	NL
Scincidae	<i>Morethia boulengeri</i>	South-eastern Morethia Skink	LC	NL
Pygopodidae	<i>Paradelma orientalis</i>	Brigalow Scaly-foot	LC	NL
Elapidae	<i>Pseudechis australis</i>	Mulga Snake	LC	NL
Elapidae	<i>Pseudechis guttatus</i>	Spotted Black Snake	LC	NL
Elapidae	<i>Pseudonaja textilis</i>	Eastern Brown Snake	LC	NL
Scincidae	<i>Pygmaeascincus timlowi</i>	Dwarf Litter-skink	LC	NL
Varanidae	<i>Varanus gouldii</i>	Sand Goanna	LC	NL

¹ Status under Queensland's Nature Conservation Act 1992: V = Vulnerable; LC = Least Concern

² Status under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*: V = Vulnerable; NL = Not listed

* = Exotic species

Table B3: BirdLife Atlas database search results for the search area

Common Name	Scientific Name	Status	
		NC Act ¹	EPBC Act ²
Apostlebird	<i>Struthidea cinerea</i>	LC	NL
Australasian Darter	<i>Anhinga novaehollandiae</i>	LC	NL
Australasian Figbird	<i>Sphecotheres vieilloti</i>	LC	NL
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	LC	NL
Australasian Pipit	<i>Anthus novaeseelandiae</i>	LC	NL
Australian Brush-turkey	<i>Alectura lathami</i>	LC	NL
Australian Bustard	<i>Ardeotis australis</i>	LC	NL
Australian Hobby	<i>Falco longipennis</i>	LC	NL
Australian King-Parrot	<i>Alisterus scapularis</i>	LC	NL
Australian Magpie	<i>Gymnorhina tibicen</i>	LC	NL
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	LC	NL
Australian Pelican	<i>Pelecanus conspicillatus</i>	LC	NL
Australian Raven	<i>Corvus coronoides</i>	LC	NL
Australian White Ibis	<i>Threskiornis moluccus</i>	LC	NL
Australian Wood Duck	<i>Chenonetta jubata</i>	LC	NL
Azure Kingfisher	<i>Ceyx azureus</i>	LC	NL
Banded Lapwing	<i>Vanellus tricolor</i>	LC	NL
Barn Owl	<i>Tyto alba</i>	LC	NL
Bar-shouldered Dove	<i>Geopelia humeralis</i>	LC	NL
Black Bittern	<i>Ixobrychus flavicollis</i>	LC	NL
Black Kite	<i>Milvus migrans</i>	LC	NL
Black Swan	<i>Cygnus atratus</i>	LC	NL
Black-chinned Honeyeater	<i>Melithreptus gularis</i>	LC	NL
Black-eared Cuckoo	<i>Chalcites osculans</i>	LC	NL
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	LC	NL
Black-faced Woodswallow	<i>Artamus cinereus</i>	LC	NL
Black-fronted Dotterel	<i>Elseya melanops</i>	LC	NL
Black-shouldered Kite	<i>Elanus axillaris</i>	LC	NL
Black-winged Stilt	<i>Himantopus leucocephalus</i>	LC	NL
Blue Bonnet	<i>Northiella haematogaster</i>	LC	NL
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	LC	NL
Blue-winged Kookaburra	<i>Dacelo leachii</i>	LC	NL
Brolga	<i>Antigone rubicunda</i>	LC	NL
Brown Falcon	<i>Falco berigora</i>	LC	NL
Brown Honeyeater	<i>Lichmera indistincta</i>	LC	NL
Brown Quail	<i>Synoicus ypsilophora</i>	LC	NL
Brown Treecreeper	<i>Climacteris picumnus</i>	LC	NL
Cattle Egret	<i>Bubulcus ibis</i>	LC	NL
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>	LC	NL
Chestnut-breasted Mannikin	<i>Lonchura castaneothorax</i>	LC	NL
Cicadabird	<i>Edolisoma tenuirostris</i>	LC	NL

Common Name	Scientific Name	Status	
		NC Act ¹	EPBC Act ²
Cockatiel	<i>Nymphicus hollandicus</i>	LC	NL
Comb-crested Jacana	<i>Irediparra gallinacea</i>	LC	NL
Common Bronzewing	<i>Phaps chalcoptera</i>	LC	NL
Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>	LC	NL
Crested Pigeon	<i>Ocyphaps lophotes</i>	LC	NL
Dollarbird	<i>Eurystomus orientalis</i>	LC	NL
Double-barred Finch	<i>Taeniopygia bichenovii</i>	LC	NL
Dusky Moorhen	<i>Gallinula tenebrosa</i>	LC	NL
Eastern Koel	<i>Eudynamys orientalis</i>	LC	NL
Eastern Yellow Robin	<i>Eopsaltria australis</i>	LC	NL
Emu	<i>Dromaius novaehollandiae</i>	LC	NL
Fairy Martin	<i>Petrochelidon ariel</i>	LC	NL
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	LC	NL
Forest Kingfisher	<i>Todiramphus macleayii</i>	LC	NL
Fuscous Honeyeater	<i>Ptilotula fusca</i>	LC	NL
Galah	<i>Eolophus roseicapilla</i>	LC	NL
Golden Whistler	<i>Pachycephala pectoralis</i>	LC	NL
Golden-headed Cisticola	<i>Cisticola exilis</i>	LC	NL
Great Cormorant	<i>Phalacrocorax carbo</i>	LC	NL
Great Egret	<i>Ardea alba</i>	LC	M
Grey Butcherbird	<i>Cracticus torquatus</i>	LC	NL
Grey Fantail	<i>Rhipidura fuliginosa</i>	LC	NL
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	LC	NL
Grey Teal	<i>Anas gracilis</i>	LC	NL
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	LC	NL
Ground Cuckoo-shrike	<i>Coracina maxima</i>	LC	NL
Hardhead	<i>Aythya australis</i>	LC	NL
Horsfield's Bronze-Cuckoo	<i>Chalcites basalis</i>	LC	NL
Horsfield's Bushlark	<i>Mirafra javanica</i>	LC	NL
House Sparrow	<i>Passer domesticus</i>	LC	NL
Intermediate Egret	<i>Ardea intermedia</i>	LC	M
Jacky Winter	<i>Microeca fascinans</i>	LC	NL
Latham's Snipe	<i>Gallinago hardwickii</i>	SLC	Mi, M
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	LC	NL
Leaden Flycatcher	<i>Myiagra rubecula</i>	LC	NL
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	LC	NL
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	LC	NL
Little Bronze-Cuckoo	<i>Chalcites minutillus</i>	LC	NL
Little Corella	<i>Cacatua sanguinea</i>	LC	NL
Little Eagle	<i>Hieraetus morphnoides</i>	LC	NL
Little Egret	<i>Egretta garzetta</i>	LC	M
Little Friarbird	<i>Philemon citreogularis</i>	LC	NL

Common Name	Scientific Name	Status	
		NC Act ¹	EPBC Act ²
Little Lorikeet	<i>Glossopsitta pusilla</i>	LC	NL
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	LC	NL
Little Woodswallow	<i>Artamus minor</i>	LC	NL
Magpie Goose	<i>Anseranas semipalmata</i>	LC	NL
Magpie-lark	<i>Grallina cyanoleuca</i>	LC	NL
Marsh Sandpiper	<i>Tringa stagnatilis</i>	SLC	M
Masked Lapwing	<i>Vanellus miles</i>	LC	NL
Masked Woodswallow	<i>Artamus personatus</i>	LC	NL
Mistletoebird	<i>Dicaeum hirundinaceum</i>	LC	NL
Nankeen Kestrel	<i>Falco cenchroides</i>	LC	NL
Nankeen Night-Heron	<i>Nycticorax caledonicus</i>	LC	NL
Noisy Friarbird	<i>Philemon corniculatus</i>	LC	NL
Noisy Miner	<i>Manorina melanocephala</i>	LC	NL
Olive-backed Oriole	<i>Oriolus sagittatus</i>	LC	NL
Pacific Baza	<i>Aviceda subcristata</i>	LC	NL
Pacific Black Duck	<i>Anas superciliosa</i>	LC	NL
Pale-headed Rosella	<i>Platycercus adscitus</i>	LC	NL
Pallid Cuckoo	<i>Heteroscenus pallidus</i>	LC	NL
Peaceful Dove	<i>Geopelia placida</i>	LC	NL
Pheasant Coucal	<i>Centropus phasianinus</i>	LC	NL
Pied Butcherbird	<i>Cracticus nigrogularis</i>	LC	NL
Pied Cormorant	<i>Phalacrocorax varius</i>	LC	NL
Pied Currawong	<i>Strepera graculina</i>	LC	NL
Plumed Whistling-Duck	<i>Dendrocygna eytoni</i>	LC	NL
Plum-headed Finch	<i>Neochmia modesta</i>	LC	NL
Purple Swamphen	<i>Porphyrio porphyrio</i>	LC	NL
Rainbow Bee-eater	<i>Merops ornatus</i>	LC	M
Rainbow Lorikeet	<i>Trichoglossus moluccanus</i>	LC	NL
Red-backed Fairy-wren	<i>Malurus melanocephalus</i>	LC	NL
Red-backed Kingfisher	<i>Todiramphus pyrrhopygius</i>	LC	NL
Red-browed Pardalote	<i>Pardalotus rubricatus</i>	LC	NL
Red-winged Parrot	<i>Aprosmictus erythropterus</i>	LC	NL
Restless Flycatcher	<i>Myiagra inquieta</i>	LC	NL
Royal Spoonbill	<i>Platalea regia</i>	LC	NL
Rufous Fantail	<i>Rhipidura rufifrons</i>	SLC	M
Rufous Songlark	<i>Cincloramphus mathewsi</i>	LC	NL
Rufous Whistler	<i>Pachycephala rufiventris</i>	LC	NL
Sacred Kingfisher	<i>Todiramphus sanctus</i>	LC	NL
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	LC	M
Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>	LC	NL
Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>	LC	NL
Shining Bronze-Cuckoo	<i>Chalcites lucidus</i>	LC	NL

Common Name	Scientific Name	Status	
		NC Act ¹	EPBC Act ²
Silvereye	<i>Zosterops lateralis</i>	LC	NL
Singing Honeyeater	<i>Gavicalis virescens</i>	LC	NL
Southern Boobook	<i>Ninox boobook</i>	LC	NL
Spangled Drongo	<i>Dicrurus bracteatus</i>	LC	NL
Speckled Warbler	<i>Pyrrholaemus sagittatus</i>	LC	NL
Spectacled Monarch	<i>Symposiarchus trivirgatus</i>	LC	NL
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	LC	NL
Spotted Bowerbird	<i>Ptilonorhynchus maculatus</i>	LC	NL
Spotted Dove	<i>Streptopelia chinensis</i>	LC	NL
Spotted Harrier	<i>Circus assimilis</i>	LC	NL
Square-tailed Kite	<i>Lophoictinia isura</i>	LC	NL
Squatter Pigeon	<i>Geophaps scripta</i>	V	V
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	LC	NL
Striated Pardalote	<i>Pardalotus striatus</i>	LC	NL
Striped Honeyeater	<i>Plectorhyncha lanceolata</i>	LC	NL
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	LC	NL
Superb Fairy-wren	<i>Malurus cyaneus</i>	LC	NL
Swamp Harrier	<i>Circus approximans</i>	LC	NL
Tawny Frogmouth	<i>Podargus strigoides</i>	LC	NL
Torresian Crow	<i>Corvus orru</i>	LC	NL
Tree Martin	<i>Petrochelidon nigricans</i>	LC	NL
Varied Sittella	<i>Daphoenositta chrysoptera</i>	LC	NL
Variiegated Fairy-wren	<i>Malurus lamberti</i>	LC	NL
Wedge-tailed Eagle	<i>Aquila audax</i>	LC	NL
Weebill	<i>Smicronis brevirostris</i>	LC	NL
Welcome Swallow	<i>Hirundo neoxena</i>	LC	NL
Whistling Kite	<i>Haliastur sphenurus</i>	LC	NL
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	LC	NL
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	LC	NL
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	LC	NL
White-browed Scrubwren	<i>Sericornis frontalis</i>	LC	NL
White-browed Woodswallow	<i>Artamus superciliosus</i>	LC	NL
White-faced Heron	<i>Egretta novaehollandiae</i>	LC	NL
White-naped Honeyeater	<i>Melithreptus lunatus</i>	LC	NL
White-necked Heron	<i>Ardea pacifica</i>	LC	NL
White-throated Gerygone	<i>Gerygone olivacea</i>	LC	NL
White-throated Honeyeater	<i>Melithreptus albobularis</i>	LC	NL
White-throated Needletail	<i>Hirundapus caudacutus</i>	V	V, M
White-throated Treecreeper	<i>Cormobates leucophaea</i>	LC	NL
White-winged Chough	<i>Corcorax melanorhamphos</i>	LC	NL
White-winged Triller	<i>Lalage tricolor</i>	LC	NL
Willie Wagtail	<i>Rhipidura leucophrys</i>	LC	NL

Common Name	Scientific Name	Status	
		NC Act ¹	EPBC Act ²
Wonga Pigeon	<i>Leucosarcia melanoleuca</i>	LC	NL
Yellow Thornbill	<i>Acanthiza nana</i>	LC	NL
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	LC	NL
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	LC	NL
Yellow-throated Miner	<i>Manorina flavigula</i>	LC	NL
Yellow-tufted Honeyeater	<i>Lichenostomus melanops</i>	LC	NL
Zebra Finch	<i>Taeniopygia guttata</i>	LC	NL

¹ Status under Queensland's *Nature Conservation Act 1992*: V = Vulnerable; LC = Least concern; SLC = Special least concern

² Status under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*: V = Vulnerable; M = Migratory; NL = Not listed



Protected Plants Flora Survey Trigger Map

Legend

- Coordinates
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets



This product is projected into:
GDA 1994 Queensland Albers

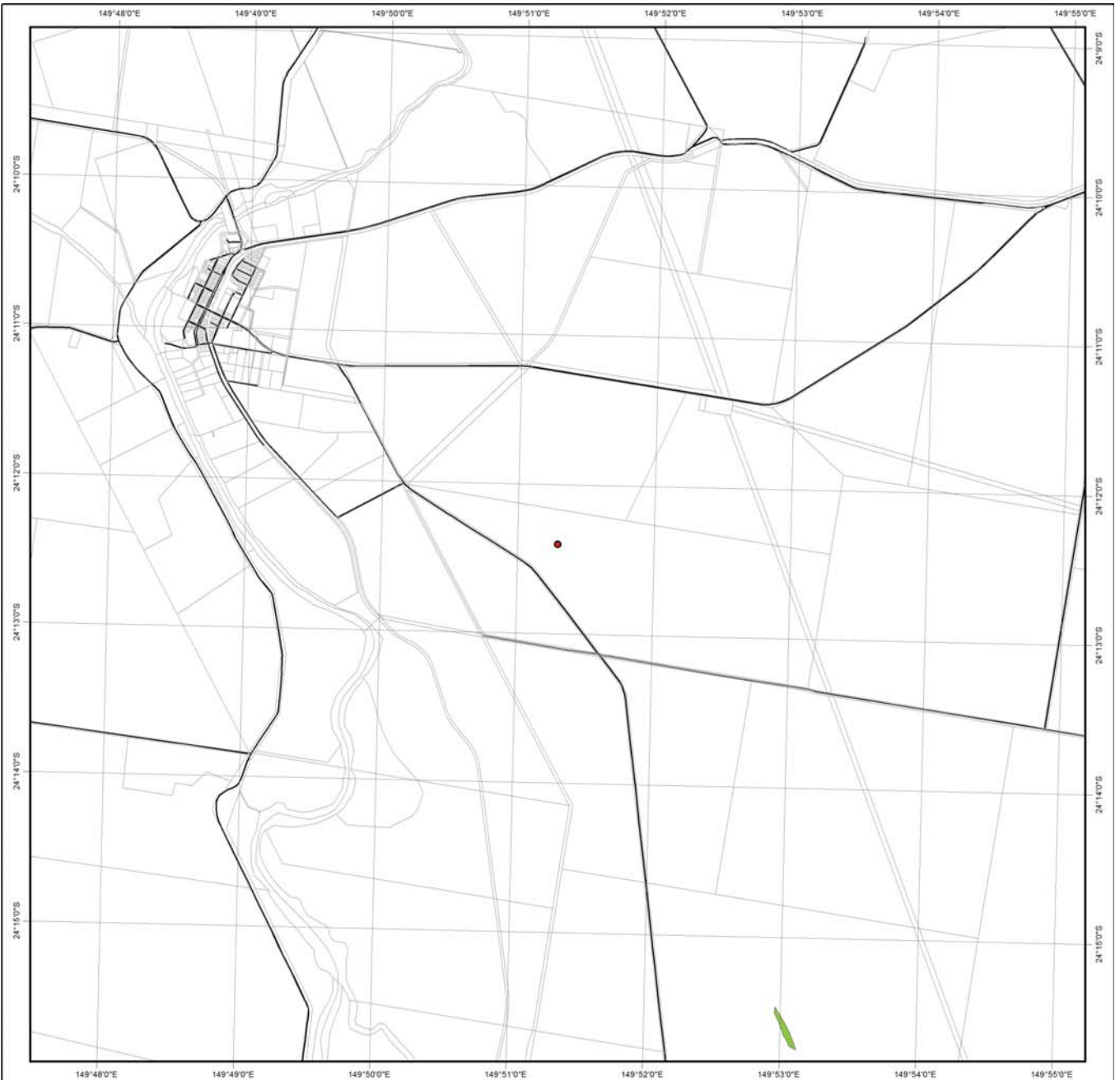
This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@des.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.



Protected Plants Flora Survey Trigger Map

Legend

- Coordinates
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets



This product is projected into:
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Appendix C

Assessment of likelihood of flora species

Table C1: Assessment of likelihood for significant flora species to occur in the project area

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
<i>Bertya opposens</i> (no common name)	V	LC	PMST, Wildlife Online, AVH	<p>Distribution: This species occurs in Queensland and New South Wales. In Queensland it is known from an area bounded by Emerald in the north and Charleville in the west, with an outlier near Charters Towers.</p> <p>Habitat preferences: The species has been recorded in mixed shrubland, Lancewood woodland, Mallee woodland, eucalypt/Wattle forest with shrubby understorey, eucalypt/Cypress Pine open woodland and semi-evergreen vine-thicket on shallow sandy loams or red earths associated mostly with sandstone, but also with rhyolite, shale and metasediments (DCCEEW 2023I).</p> <p>Notable features: Flowering has been recorded from June to August. It is thought this is a long-lived species, i.e. surviving for more than 26 years (DCCEEW 2023I).</p> <p>Dispersal mode: Explosive release; Water and invertebrates may assist dispersal.</p> <p>Nearest record: The nearest record is approximately 25 km to south-west of the project area (CSIRO 2018).</p>	<p>Low: This species was not identified in the study area during the seasonal surveys. The preferred eucalypt woodlands and wattle scrubs on coarse-grained sedimentary soils are not present in the project area.</p> <p>Potentially suitable habitat is present on Mt Ramsay, in the additional investigation area, in REs on land zone 12. However, this habitat was searched extensively for this species and it was not recorded.</p>
<i>Bertya pedicellata</i> (no common name)	NL	NT	Wildlife Online ALA	<p>Distribution: This species is confined to central and south-east Queensland, from Eaglefield in the north, near Aramac in the west, Carnarvon National Park in the south-west and south to near Gayndah. There are some isolated records near the Queensland New South Wales border in the Warwick district and an historic record on Cape York Peninsula (CSIRO 2018).</p> <p>Habitat preferences: This species typically grows on rocky hillsides in eucalypt forests or woodlands, <i>Acacia</i> woodland or shrubland and open heathland or</p>	<p>Low: This species was not identified in the study area during the post-wet season survey. No suitable shrubland and woodland habitats on rocky outcrops are present in the project area.</p> <p>The HRA in the project site associated with this species is likely to be the result of co-ordinate error with the actual location potentially to occur on the foot slopes of Mt Ramsay situated</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>vine thicket communities. It is known to occur in skeletal to shallow sandy, sandy clay or clay loams overlaying rhyolite, trachyte or sandstone substrates. Associated species include <i>Corymbia trachyphloia</i>, <i>Dodonaea filifolia</i>, <i>Acacia catenulata</i>, <i>A. curvinervia</i>, <i>A. shirleyi</i>, <i>A. rhodoxylon</i>, <i>A. sparsiflora</i>, <i>Eucalyptus crebra</i>, <i>A. harpophylla</i> and <i>E. decorticans</i> (CSIRO 2018; DES 2018c).</p> <p>Notable features: An extensively branched shrub growing to 6 m tall (DES 2018c).</p> <p>Dispersal mode: Explosive release; Water and invertebrates may assist dispersal.</p> <p>Nearest record: There is a 2012 record of this species within the study area in the remnant patch of RE 11.5.9. However, the notes on this record indicate that it was recorded on 'the lower slopes of a massive rocky outcrop' (CSIRO 2018). This type of landscape feature is not present in the project area, therefore, the location of this record is likely to be erroneous.</p>	<p>approximately 400 m east of the project site. Suitable habitat is present in REs on land zone 12 that covers Mt Ramsay. However, this habitat area was searched extensively for threatened species and none were recorded.</p>
<i>Cossinia (Cossinia australiana)</i>	E	E	PMST	<p>Distribution: <i>Cossinia</i> occurs in scattered and disjunct populations in central Queensland, where its distribution is from Rockhampton to Kingaroy east of the Great Dividing Range (DES 2021b; DEWHA 2008b).</p> <p>Habitat preferences: This small tree occurs at altitudes of between 20 and 520 m in ecotones and dry rainforest edges as well as in araucarian microphyll vine forest and fragmented relict Araucarian vine thicket on fertile soils, including red volcanic soils and black loams (DES 2021b; DEWHA 2008b). Species that occur in association with <i>Cossinia</i> often include: Chain Fruit (<i>Alyxia ruscifolia</i>), Brush Caper Berry (<i>Capparis arborea</i>), Yellow Tulip</p>	<p>Low: The small patch of non-remnant vine thicket (RE 11.5.15) is marginally suitable for this species. However, detailed traverses of this patch failed to identify this vegetatively distinct species and it is not known from the region.</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>(<i>Drypetes deplanchei</i>), Crow's Ash (<i>Flindersia australis</i>), Crow's Apple (<i>Owenia venosa</i>) and Ivory Wood (<i>Siphonodon australis</i>) (DES 2021b).</p> <p>Notable features: Flowering occurs from October to January, with fruiting recorded in February (DES 2021b). Nearest record: The nearest record of this species is approximately 68 km east of the study area in the Callide Timber Reserve, north of Biloela. Several records exist from this reserve (CSIRO 2021).</p>	
<i>Cycas megacarpa</i> (no common name)	E	E	PMST	<p>Distribution: This cycad is found north from Kilkivan to Moonlight Range, west of Rockhampton (DNR 1999; Harden et al. 2006; Queensland Herbarium 2007).</p> <p>Habitat preferences: <i>Cycas megacarpa</i> grows on margins or occasionally in dry rainforest and in sclerophyll forest and woodland (DNR 1999; Harden et al. 2006; Queensland Herbarium 2007). It is found in woodland, open woodland and open forests, often in conjunction with a grassy understory and overstorey of Narrow-leaved Red ironbark (<i>Eucalyptus crebra</i>), Lemon-scented Gum (<i>Corymbia citriodora</i>), Silerver-leaved Ironbark (<i>Eucalyptus melanophloia</i>) and Swamp Box (<i>Lophostemon confertus</i>). It may also occur on the edge of rainforest habitat. It is often found on undulating to hilly terrain at an altitude of 40-680 m (DCCEEW 2023m)</p> <p>Notable features: A small to medium-sized cycad with erect trunk to 3 m in height. Seeds are large and ovoid, 38-50 mm long and 35-45 mm in diameter (DCCEEW 2023m).</p>	Low: Suitable habitat and terrain for this species is not present in the project area and it is not known from the region.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				Nearest record: There are a number of undated records approximately 80 km east of the project area, north of Biloela (CSIRO 2021). The location of these records has been generalised due to the sensitivity of the species.	
<i>Ooline (Cadellia pentastylis)</i>	V	V	PMST	<p>Distribution: This species occurs on the western edge of the New South Wales north-west slopes, from Mt Black Jack near Gunnedah to west of Tenterfield, and extends into Queensland to Carnarvon Range and Callide Valley, south-west of Rockhampton.</p> <p>Habitat preferences: This species occurs in dry rainforest, semi-evergreen vine thicket, sclerophyll forest, Brigalow-Belah, Poplar Box and Bendee communities on moderately fertile soils.</p> <p>Notable features: This is a tree growing to between 10 m and 25 m with hard scaly bark. It is often locally dominant or is present as an emergent (TSSC 2008d).</p> <p>Dispersal mode: Gravity and/or bird dispersed.</p> <p>Nearest record: The nearest record is approximately 35 km south-east of the study area (CSIRO 2018).</p>	<p>Low: This species has the potential to occur within the small patch of non-remnant vine thicket (RE 11.5.15) or as a regrowth specimen and/or relic paddock tree in the south-eastern portion of the project site.</p> <p>Potentially suitable habitat also occurs on and in the vicinity of Mt Ramsay in the additional investigation area. However, traverses of these habitats failed to identify this vegetatively distinct species. .</p>
Hairy-joint Grass (<i>Arthraxon hispidus</i>)	V	V	PMST	<p>Distribution: Hairy-joint grass occurs in scattered populations throughout Queensland overseas and northern New South Walesb. Most records are from Noosa and south of Noosa, but it also occurs north to Port Douglas, and west to Carnarvon National Park within Queensland (DES 2021c; DEWHA 2008c).</p> <p>Habitat preferences: Hairy-joint Grass occurs in or on the edges of rainforest, woodland and wet eucalypt forest often in the vicinity to creeks or swamps. In south-east Queensland this species has been known to grow around freshwater springs on</p>	<p>Low: This species is not known from the region, and is generally associated with mound springs in central Queensland. This type of habitat is not present in the project area.</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>coastal foreshore dunes, in shaded small gullies, on creek banks and on sandy alluvium in creek beds in open forest (DES 2021c; DEWHA 2008c). It has been associated with bog mosses in mound springs (DEWHA 2008c).</p> <p>Notable features: Flowering is thought to occur from summer to autumn with fertile specimens having been collected from March to May and July. This species is thought to be perennial, which dies down in winter (DES 2021c).</p> <p>Nearest record: The nearest record for this species is from a population located more than 120 km south of the Project area, approximately 30 km north-east of Taroom (CSIRO 2021).</p>	
King Blue-grass (<i>Dichanthium queenslandicum</i>)	E	V	PMST	<p>Distribution: This species is known from three disjunct populations: 1) Hughenden district, 2) Nebo to Monto and west to Clermont and Rolleston, and 3) Dalby district.</p> <p>Habitat preferences: This grass is confined to natural tussock grassland areas on heavy black cracking clay soils. It mainly occurs in association with other species of blue grasses (i.e. <i>Dichanthium</i> spp. And <i>Bothriochloa</i> spp.). It is strongly associated with the natural bluegrass grasslands of central and southern Queensland, including the EPBC Act listed natural grassland ecological communities (TSSC 2013d). Recorded only from well-managed and conservatively grazed properties (Fletcher 2001; Sharp and Simon 2002).</p> <p>Notable features: A grass growing to 80 cm in height.</p>	Low: The study area does not support natural grasslands or grassy woodlands on heavy black soils.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>Dispersal mode: Wind and mammal dispersed – awned seeds assist with wind movement and attachment to mammals.</p> <p>Nearest record: The nearest record is approximately 50 km south-east of the study area (CSIRO 2018).</p>	
<i>Dichanthium setosum</i> (no common name)	V	LC	PMST	<p>Distribution: This grass species is known from inland New South Wales and Queensland. In Queensland the species has been recorded in the Leichardt, Morton, North Kennedy and Port Curtis regions.</p> <p>Habitat preferences: It grows on heavy basaltic black soils and red-brown loams with clay subsoil. It is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnant and highly disturbed pasture (DCCEEW 2023n).</p> <p>Notable features: This is a perennial grass that commences growing in spring, flowers in summer and becomes dormant in late autumn (DCCEEW 2023n).</p> <p>Dispersal mode: Wind and mammal dispersed – awned seeds assist with wind movement and attachment to mammals.</p> <p>Nearest record: The nearest record is approximately 170 km west of the study area, near Springsure, in 5 Mile Reserve (CSIRO 2018).</p>	Low: The study area does not support natural grasslands or grassy woodlands on heavy black soils.
<i>Solanum dissectum</i> (no common name)	E	E	Wildlife Online, PMST, AVH, ALA	<p>Distribution: This species is known from the Leichardt and Port Curtis pastoral districts in the Biloela-Banana-Baralaba area.</p> <p>Habitat preferences: It grows in Brigalow/Belah open forest on clay soils, semi-evergreen vine thicket or <i>Eucalyptus thozetiana</i> woodland on solodic clay soils.</p>	Low: Suitable habitat, albeit limited and over-utilised by cattle, is present in the project site and ETL study area, however detailed traverses failed to identify this vegetatively distinct species during optimal survey conditions.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>Notable features: Small sub-shrub to 0.8 m high with prickles on the branchlets and occasionally on the upper and lower mid-veins of the deeply lobed leaves (Bean 2013).</p> <p>Dispersal mode: Vertebrate dispersed, particularly birds – multi-seeded fleshy fruit.</p> <p>Nearest record: There are two records of this species approximately 15 km south-east of the study area (CSIRO 2018).</p>	
<i>Solanum elachophyllum</i> (no common name)	NL	E	Wildlife Online, ALA	<p>Distribution: This species is known only from limited collections in the Leichhardt pastoral district of Queensland between Middlemount and Theodore.</p> <p>Habitat preferences: Occurs on cracking clay soils associated with Brigalow, Belah, and <i>Macropteranthes</i> dominated vine thickets or <i>Eucalyptus cambageana</i> woodlands.</p> <p>Notable features: Prostrate or sprawling sub-shrub to 30 cm in height with numerous prickles on branchlets. (Bean 2013).</p> <p>Dispersal mode: Vertebrate dispersed, particularly birds – multi-seeded fleshy fruit.</p> <p>Nearest record: This species was recorded within the study area.</p>	<p>Present: <i>Solanum elachophyllum</i> was recorded in the project site and ETL study area at two primary locations; in a patch of non-remnant Dawson River Gum woodland (RE 11.4.8) in the central-eastern portion of the project site, and regrowth Brigalow woodland (RE 11.4.9a) in the far north of the ETL study area (Figure 12). The southern population of this species was recorded during the dry season surveys in 2017 where the unseasonally high rainfall in the region prior to the surveys must have encouraged growth of this seasonal sprouter. The number of individuals within each sub-population was 26, 17 and 46 to 57. An additional survey was carried out in March 2018 recorded an increase in the number of individuals present within each of population to 37, 23 and 57 respectively. The northern population was identified during the dry season in 2020 and the region had not experienced significant rainfall. Three</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
					sub-pouulations were identified comprising, 8, 12 and 24 individuals.
<i>Solanum Johnsonianum</i> (no common name)	E	E	Wildlife Online, PMST, AVH, ALA	<p>Distribution: <i>Solanum johnsonianum</i> is endemic to Queensland. There are nine documented populations distributed over a distance of approximately 100 km, extending from north-west of Theodore to north of Jambin (Bean 2004).</p> <p>Habitat preferences: Occurs on cracking clay soils associated with Brigalow. Other associated species include <i>Eucalyptus thozetiana</i> with an understory of Wilga (<i>Geijera parvifolia</i>). This species often occurs after fire or disturbance (Bean 2004).</p> <p>Notable features: An erect rhizomatous, perennial shrub growing 0.15 to 0.3 m high without prickles. The adult leaves are broadly ovate, entire, hairy and green in colour (Bean 2004).</p> <p>Dispersal mode: Vertebrate dispersed, particularly birds – multi-seeded fleshy fruit.</p> <p>Nearest record: There are a number of records within approximately 15 km of the study area to the south-east and north-east (CSIRO 2018).</p>	Low: Suitable habitat, albeit limited and over-utilised by cattle, is present in the project site and ETL study area, however detailed traverses failed to identify this vegetatively distinct species during optimal survey conditions.
<i>Xerothamnella herbacea</i> (no common name)	E	E	PMST, Wildlife Online, AVH, ALA	<p>Distribution: <i>Xerothamnella herbacea</i> is known from two sites north east of Chinchilla, a single record from near Theodore and a record near Yelarbon east of Goondiwindi, Queensland. This species occurs within the Condamine, Border Rivers Maranoa-Balonne and Fitzroy (Queensland) Natural Resource Management Regions (TSSC 2008a).</p> <p>Habitat preferences: This species occurs in Brigalow (<i>Acacia harpophylla</i>) dominated communities in shaded situations, often in leaf litter and is associated with gilgais (shallow ground</p>	<p>Present: This species was recorded in 10 locations within a small patch of non-remnant Dawson River Gum open woodland (RE 11.4.8) in the central eastern portion of the project site (Figure 12). This species was only recorded during the dry season surveys in 2017.</p> <p>The number of individuals present at each location was low and ranged from one individual to around 20 individuals. A total of approximately</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>depressions). Soils are heavy, grey to dark brown clays (TSSC 2008a).</p> <p>Notable features: <i>Xerothamnella herbacea</i> is a sparse, sprawling, perennial herb growing to a height of 30 cm with small pink to mauve two lipped flowers (TSSC 2008a).</p> <p>Dispersal mode: Gravity, wind and/or water dispersed – no specific morphological features that aid secondary dispersal.</p> <p>Nearest record: This species was recorded within the study area.</p>	<p>90 individuals was recorded in this population.</p> <p>Potentially suitable habitat for this species also occurs in RE 11.3.1/11.3.3 along Banana Creek in the south of the study area (Figure 12). However, extensive searches of this habitat area failed to locate this species.</p>

¹ E = Endangered; V = Vulnerable; NL = Not listed

² E = Endangered; V = Vulnerable; NT = Near threatened, LC = Least concern

³ – Record source:

- ALA – Atlas of Living Australia. Some recorded locations have been generalised due to the sensitivity of the species
- AVH – The Australasian Virtual Herbarium (refer to AVH database results provided a Table B1 Appendix B)
- PMST – Protected Matters Search Tool (refer to PMST database results provided in Appendix B)
- Wildlife Online – Wildlife Online database (refer to Wildlife Online database search results provided in Appendix B).

Appendix D

Assessment of likelihood of fauna species

Table D1: Assessment of likelihood for significant fauna species to occur in project area

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
Birds					
Australian Painted Snipe (<i>Rostratula australis</i>)	E	V	PMST	<p>Distribution: The Australian Painted Snipe has been recorded at wetlands in all states of Australia. It is most common in eastern Australia, where it has been recorded at scattered locations throughout much of Queensland, New South Wales, Victoria and south-eastern South Australia. This population is considered to occur as a single, contiguous breeding population (DCCEE 2023d).</p> <p>General habitat preferences: This secretive, cryptic, crepuscular (active at dawn, dusk and during the night) species occurs in terrestrial shallow wetlands, both ephemeral and permanent, usually freshwater but occasionally brackish. They also use inundated grasslands, salt-marsh, dams, rice crops, sewage farms and bore drains with rank emergent tussocks of grass, sedges, rushes or reeds or samphire, and often with scattered clumps of Lignum (<i>Muehlenbeckia florulenta</i>), canegrass or sometimes tea trees. It has been known to use areas lined with trees, or that have some scattered fallen or washed-up timber (DCCEE 2023d).</p> <p>Foraging habitat: The species feeds on vegetation, seeds, and invertebrates including crustaceans and molluscs as well as insects, worms and other invertebrates (DotE 2016; Marchant and Higgins 1994). Foraging habitats are not well understood (DCCEE 2023d).</p> <p>Breeding habitat: Requirements are specific and include shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Almost all records of nests occur on or near small islands in freshwater wetlands characterised by a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover. Although this species uses modified habitat, it doesn't necessarily breed in these habitats. It most likely breeds in response to wetland</p>	<p>Moderate: This species was not recorded in the study area during the fauna surveys. However, the species has been recorded in the broader area and the vegetated gilgai and sections of the broad drainage lines in the south of the study area that support Lignum, provide some areas of suitable habitat for this species. Cleared gilgai may provide marginal foraging habitat value during periods of inundation, although the species is unlikely to breed in these areas as they lack vegetative cover.</p> <p>Approximately 42.0 ha of habitat for the Australian Painted Snipe (including 33.9 ha of marginal habitat) has been identified in the project site and ETL study area. It is unlikely to occur in the road realignment or water release/extraction infrastructure area.</p> <p>Potential habitat mapping for Australian Painted Snipe in the study area is shown on Figure 16.</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>conditions rather than during a particular season (DCCEEW 2022a).</p> <p>Notable features: This is a distinctive species.</p> <p>Nearest record: The nearest record of this species is approximately 45 km north-north-west of the project area adjacent Dawson Range State Forest (CSIRO 2023).</p>	
Black-breasted Button-quail (<i>Turnix melanogaster</i>)	V	V	Wildlife Online, ALA	<p>Distribution: Endemic to eastern Australia, this species is restricted to coastal and near-coastal regions of south-eastern Queensland and north-eastern New South Wales. The main populations occur within south-east Queensland, where the current known distribution extends from near Byfield in the north, south to the New South Wales border and westwards to Palm Grove National Park and Barakula State Forest (DCCEEW 2022b). The most significant populations appear to be in the Yarraman-Nanango, Jimna-Conondale and Great Sandy regions.</p> <p>General habitat preferences: This species is most commonly associated with vine thicket rainforest with greater than 800 mm rainfall, deep leaf litter and a closed canopy but also occur in softwood scrubs in the Brigalow Belt, vine scrub regrowth and mature Hoop Pine (<i>Araucaria cunninghamii</i>) particularly with a Common Lantana (<i>*Lantana camara</i>) understorey. They also occur in dry sclerophyll forest adjacent to rainforest and <i>Acacia</i> and <i>Austromyrtus</i> scrubs on sandy coastal soils (Inskip Point) (Garnett et al. 2011).</p> <p>Foraging habitat: An extensive dense leaf-litter layer is required for foraging. As such, optimum habitat is often associated with highly fertile soils. It is believed that the highly fertile soils promote rapid leaf growth on plants, which dropped to the ground during dry periods thus maintaining the deep leaf litter layer which is crucial to the foraging requirements of the species. In Googa State Forest, south-eastern Queensland, birds are most commonly associated with remnant microphyll vine forest with no lantana in the understorey, but lantana is</p>	<p>Low: This species was not recorded in the study area during the fauna surveys. The species has been recorded near Mt Ramsay, approximately 2 km to the north-east of the project area. However, no evidence in the form of platelets (shallow disks) was identified on Mt Ramsay despite targeted searches for significant fauna.</p> <p>No areas of potentially suitable habitat, i.e. large areas of vine thicket or rainforest habitat with extensive deep litter preferred by this species, occurs inproject area.</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>often used for diurnal foraging and nocturnal roosting (DCCEEW 2022b).</p> <p>Breeding habitat: Nests consist of a scrape in the ground, lined with leaves, grass or moss. Fallen logs and a dense, heterogeneously distributed shrub layers are also considered to be important habitat characteristics for shelter and breeding. Nests are often in areas where the common understorey plants include species such as Bracken (<i>Pteridium esculentum</i>), Rasp Fern (<i>Doodia aspera</i>) and Lantana (<i>Lantana camara</i>) and are often placed in the buttress root of a tree or sapling, the base of a fern or under a low bush or grass tussock (DCCEEW 2022b).</p> <p>Notable features: Black-breasted Button quail are commonly seen in pairs or occasionally in small groups. Being territorial, females are occasionally seen singly (Marchant & Higgins 1993). This species is cryptic in nature and direct observation can be difficult. One of the key methods of detecting the presence of birds in an area is the presence of feeding traces (platelets) (DCCEEW 2022b).</p> <p>Nearest record: The nearest record of this species is approximately 2 km east of the project area (CSIRO 2023). This record is dated from 1964. There are no other published records of this species within 25 km of the project area.</p>	
Curllew Sandpiper (<i>Calidris ferruginea</i>)	CE/M	E	PMST	<p>Distribution: This species occurs along the coasts but is also widespread inland. In Queensland there are scattered records in the Gulf of Carpentaria, widespread records along the coast, south of Cairns, and sparsely scattered records inland.</p> <p>General habitat preferences: Near the coast it inhabits intertidal mudflats in sheltered areas, such as estuaries, bays inlets and lagoons and non-tidal swamps, lakes, lagoons, ponds in saltworks and sewage farms. Inland they are occasionally recorded around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. The will use fresh and brackish habitats and floodwaters.</p>	Low: This species was not recorded in the study area during the fauna surveys. This species is not known from the region and substantial and permanent wetland habitats are not present in or in close proximity to the project area.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>The usually wade and forage in waters 15-30 mm deep, but up to 60 mm deep at the edge of saltmarsh, emergent vegetation and inundated saltflats. It feeds on invertebrates, including worms, molluscs, crustaceans, and insects as well as seeds.</p> <p>The species usually roosts on bare dry shingle, shell or sand beaches, sandspits and islets and sometimes in dunes (DCCEEW 2023o).</p> <p>Notable features: This species does not breed in Australia (DCCEEW 2023o).</p> <p>Nearest Record: There are no records within 100 km of the project area (CSIRO 2023).</p>	
Diamond Firetail (<i>Stagonopleura guttata</i>)	V	V	PMST	<p>Distribution: Diamond firetails occur on the south-east mainland of Australia from south-east Queensland to Eyre Peninsula, South Australia, and about 300 km inland from the sea. Their range once extended to north Queensland inland from Cardwell, but they now occur only in the very south of the state (TSSC 2023).</p> <p>General habitat preferences: Diamond firetails occur in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees (Higgins et al. 2007). They prefer areas with relatively low tree density, few large logs, and little litter cover but high grass (TSSC 2023).</p> <p>Nearest Record: There are no published records of this species within 25 km of the project area (CSIRO 2023).</p>	Low: Broadly suitable habitat for this species is present in the form of eucalypt or acacia woodlands and open forests. However, this species was not recorded during the fauna surveys and the species is not known from the region.
Eastern Curlew (<i>Numenius madagascariensis</i>)	CE/M	E	PMST	<p>Distribution: Within Australia, the eastern curlew has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. Eastern curlews are rarely recorded inland (TSSC 2015a). They have a continuous distribution from Barrow Island and Dampier Archipelago, Western Australia, through the Kimberley and along the Northern Territory, Queensland,</p>	Low: This species was not recorded in the study area during the fauna surveys. This species is not known from the region and the substantial and permanent wetland habitats are not present in or in close proximity to the project area.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>and NSW coasts and the islands of Torres Strait. They are patchily distributed elsewhere (TSSC 2015a).</p> <p>General habitat preferences: During the non-breeding season in Australia, the Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (TSSC 2015a). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes within the mangroves. The birds are also found in coastal saltworks and sewage farms (TSSC 2015a).</p> <p>The eastern curlew mainly forages during the non-breeding season on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on saltflats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline (TSSC 2015a). The birds are rarely seen on near-coastal lakes or in grassy areas (TSSC 2015a).</p> <p>Notable features: The Eastern Curlew does not breed while in Australia.</p> <p>Nearest Record: There are no published records of this species within 25 km of the project area (CSIRO 2023).</p>	
Grey Falcon (<i>Falco hypoleucos</i>)	V	V	PMST	<p>Distribution: This species occurs in low densities across arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia (Marchant and Higgins 1993; TSSC 2020). The species is mainly found where annual rainfall is less than 500 mm, except when wet years are followed by drought, when the species might become marginally more widespread, although it is essentially confined to the arid and semi-arid zones at all times. In Queensland, the species is generally absent from the Cape York Peninsula and areas east of the Great Dividing Range (TSSC 2020).</p>	<p>Low: This species is typically associated with more arid areas of Queensland. The species is a rare vagrant closer to the coast when wet years in arid and semi-arid areas are followed by drought.</p> <p>The species was not detected during the seasonal fauna field surveys.</p> <p>Furthermore, this species has not been recorded within 25 km of the</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>General habitat preferences: The species is typically associated with timbered lowland plains, particularly <i>Acacia</i> shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter (TSSC 2020).</p> <p>Breeding habitat: Breeding occurs from June to November. Eggs are laid in the old nests of other birds, particularly those of other raptors or corvids. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (<i>Eucalyptus camaldulensis</i>) and Coolibah (<i>E. coolabah</i>). Falcons also nest in telecommunication towers (TSSC 2020).</p> <p>Nearest record: There is an historic undated record for this species approximately 45 km south of the project area near the existing Moura Mine (CSIRO 2023).</p>	study area despite the numerous fauna surveys that have been completed in the region.
Painted Honeyeater (<i>Grantiella picta</i>)	V	V	PMST	<p>Distribution: This species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. Greatest concentrations, including all breeding records, come from south of 26°, on inland slopes of the Great Dividing Range between the Grampians in Victoria and Roma in Queensland. After breeding, many birds move to semi-arid regions such as north-eastern South Australia, central and western Queensland and central Northern Territory. This species is considered to have a single population.</p> <p>General habitat preferences: This species occurs in mistletoes in eucalypt forests, woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, Callitris, and trees on farmland or gardens. Prefers woodlands with a higher number of mature trees, as these generally support more mistletoes. More common in larger remnant tracts, rather than narrow remnant strips.</p> <p>Breeding preferences: Breeding season is closely aligned with fruiting of mistletoe, therefore north-south movements have been observed (TSSC 2015b). It has been known to breed</p>	Low: This species was not recorded in the study area during the fauna surveys. While some habitats in the study area are potentially suitable for this species, the vegetation communities within the study area generally did not support the high abundance of mistletoe required by this species. Furthermore, the study area is at the north-eastern edge of this species' known distribution and the record in Blackdown Tableland National Park is considered to be an outlying record of this species.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>in narrow roadside strips if ample mistletoe fruit is present. The species appears to prefer mistletoe as a nest substrate and is likely to be attracted to habitats where mistletoe is prevalent and parasitism rates are high (TSSC 2015b).</p> <p>Nearest record: The nearest record of this species is approximately 65 km south-west of the project area near Biloela (CSIRO 2023).</p>	
Red Goshawk (<i>Erythrotriorchis radiatus</i>)	V	E	Wildlife Online, PMST, ALA	<p>Distribution: This species is sparsely dispersed across coastal and sub-coastal Australia from western Kimberly Division to north-eastern New South Wales and occasionally on continental islands.</p> <p>General habitat preferences: This species occurs in woodlands and forests, ideally with a mosaic of vegetation types and permanent water, particularly riverine forests. The species avoids both very dense and very open habitats. They are solitary and secretive birds and hunt mainly from ambush. Their prey is mostly birds, but also mammals, reptiles and insects (Marchant and Higgins 1994).</p> <p>Breeding habitat: Nests are restricted to trees taller than 20 m and within 1 km of a watercourse or wetland. It is thought to rarely breed in areas with fragmented native vegetation (Garnett et al. 2011). Home ranges of 120 km² and 200 km² for females and males, respectively have been recorded (Marchant and Higgins 1994).</p> <p>Nearest record: The nearest records of this species are associated with the Dawson Range State Forest approximately 30 km west of the project area. The most recent of these records is from 1914 (CSIRO 2023).</p>	Low: This species was not recorded in the study area during the fauna surveys. Portions of the Dawson River, are likely to provide suitable habitat for this species. However, the project area lack large tracts of riverine vegetation and permanent water, which is the preferred habitat of this species.
Southern Black-throated Finch (<i>Poephila cincta cincta</i>)	E	E	PMST	<p>Distribution: The Black-throated Finch (southern) occurs at two general locations: in the Townsville region, where it is considered to be locally common at a few sites around Townsville and Charters Towers (Garnett and Crowley 2000). It has also been recorded at scattered sites in central-eastern Queensland (between Aramac and Great Basalt Wall National</p>	Low: This species was not recorded in the study area during the fauna surveys. This species has not been recorded in the broader region for a significant period and its distribution

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>Park) (DCCEEW 2023p). DCCEEW considers birds recorded since 1998, at the following locations to be part of the southern:</p> <ul style="list-style-type: none"> ▪ Townsville and its surrounds (Giru, Serpentine Lagoon, Toonpan, and near Ross River Dam) ▪ Ingham, and sites nearby (near Mutarnee [at Ollera Creek], and near Mount Fox) ▪ scattered sites in central-eastern Queensland (Great Basalt Wall, Yarrowmere Station, Moonoomoo Station, Doongmabulla Station, Fortuna Station and Aramac) (DCCEEW 2023o). <p>General habitat preferences: This species is known from dry, open grassy woodlands and forests and grasslands of the sub-tropics and tropics with seeding grasses and ready access to water (Higgins et al. 2006). Also thought to probably require a mosaic of different habitat in the wet season to find seed (Garnett et al. 2011). Black-throated Finch mainly inhabit dry open to very open eucalypt woodlands with dense grassy ground cover and often along watercourses or in the vicinity of water (DCCEEW 2023p; Higgins et al. 2006). Almost all recent records of this species, south of the tropics, have been from riparian habitat. It is thought that permanent sources of water and surrounding habitat provides refuge for this species during the dry season and particularly during drought conditions. This species has been recorded in degraded habitats such as heavily grazed paddocks (DCCEEW 2023p). This species has undergone a significant range contraction from the southern parts of its former distribution. It has not been recorded in south-east Queensland since the early 80s and is now thought to be extinct in NSW. It is noted as being mostly absent from the coastal plain but occasionally recorded from the area around Townsville and Ingham (Higgins et al. 2006).</p> <p>Foraging habitat: This subspecies is thought to require a mosaic of different habitats in which it can find seed during the wet season (DCCEEW 2023p).</p>	has contracted to central and northern Queensland.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>Breeding habitat: Nests are often built in a hollow branch of a tree, or in a fork of a tree, shrub or sapling. It is not uncommon for nests to be placed in other sites, such as in tall grass, amongst mistletoe, beneath active raptor nests, or in an old nest of a Babbler (<i>Pomatostomus</i> spp.) or Diamond Firetail (<i>Stagonopleura guttata</i>) (DCCEEW 2023p). Nest sites tend to be located in close proximity to water.</p> <p>Nearest record: An historic record record of this species from 1897 occurs approximately 45 km north of the project area in the Dawson Range State Forest. Another is located further north near Duaringa (CSIRO 2023).</p>	
Squatter Pigeon (southern subspecies) (<i>Geophaps scripta scripta</i>)	V	V	Wildlife Online, PMST, ALA, Birdlife Australia Atlas	<p>Distribution: The southern sub-species for the Squatter Pigeon (southern subspecies) is described as occurring south of the Burdekin River-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern New South Wales, and from the east coast to Hughenden, Longreach and Charleville (Higgins and Davies 1996). The known distribution of the southern sub-species overlaps with the known distribution of the northern subspecies (DCCEEW 2023c).</p> <p>General habitat preferences: This species is known from tropical dry, open sclerophyll woodlands and sometimes savannah with <i>Eucalyptus</i>, <i>Corymbia</i>, <i>Acacia</i> or <i>Callitris</i> species in the overstorey. The groundcover layer is patchy consisting of native, perennial tussock grasses or a mix of grasses and low shrubs or forbs. However, the groundcover layer rarely exceeds 33% of the ground area. It appears to favour sandy soil dissected with low gravelly ridges and is less common on heavier soils with dense grass cover. It is nearly always found in close association i.e. within 3 km, with permanent water. While the species is unlikely to move far from woodland trees, where scattered trees still occur and the distance of cleared land between remnant trees or patches of habitat does not exceed 100 m, individuals may be found foraging in, or moving across modified or degraded environments (DCCEEW 2023c).</p>	<p>PRESENT: This species was recorded in the ETL study area during the seasonal fauna surveys. Habitat has been identified within the project site, the water extraction/release infrastructure traverses the riparian zone of the Dawson River and ETL study area in the form of the polygon of remnant and regrowth <i>Eucalyptus</i>, <i>Corymbia</i>, <i>Acacia</i> or <i>Callitris</i> woodlands and open forests on land zones 3, 5 and 7, within 3 km of water sources.</p> <p>Approximately 84.8 ha of Squatter Pigeon foraging habitat has been mapped within the project site and water release/extraction infrastructure area, including 83.3 ha of breeding habitat. Habitat mapping for the Squatter Pigeon is shown on Figure 15.</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				Nearest record: This species was recorded along the ETL study area during the 2020 fauna surveys (Figure 15).	
Star Finch (<i>Neochmia ruficauda ruficauda</i>)	E	E	PMST	<p>Distribution: In Queensland this species' range has largely contracted to southern Cape York. There have not been any confirmed records from the Cairns to Townsville region for some time and none were recorded during the Birds Australia Atlas project. Recent records around Rockhampton are thought likely to be aviary escapees (Higgins et al. 2006).</p> <p>General habitat preferences: This species usually inhabits low dense damp grasslands bordering wetlands and waterways and also open savannah woodlands near water or subject to inundation but is absent from expanses of open country and uplands usually occurring in valleys (Higgins et. Al. 2006). Woodland communities in which it occurs include <i>Eucalyptus coolabah</i>, <i>E. tereticornis</i>, <i>E. tessellaris</i>, <i>Melaleuca leucadendra</i>, <i>E. camaldulensis</i> and <i>Casuarina cunninghamii</i>.</p> <p>Foraging habitat: It feeds on grass and shrub seeds, most likely from <i>Arundinella</i>, <i>Brachyachne</i>, <i>Chloris</i>, <i>Chrysopogon</i>, <i>Digitaria</i>, <i>Echinochloa</i>, <i>Heterachne</i>, <i>Iselema</i>, <i>Oryza</i>, <i>Panicum</i>, <i>Setaria</i>, <i>Sorghum</i>, <i>Themeda</i>, <i>Urochloa</i>, <i>Casuarina</i>, <i>Fimbristylis</i> and <i>Tridax</i> species. It also feeds on insects. It has been recorded foraging, in the shade of eucalypt species, on the ground (DCCEEW 2023c).</p> <p>Breeding habitat: Nests are thought to be bottle-shaped and placed in trees, amongst grass, sedges or reeds, at heights of approximately 3-9 m above the ground.</p> <p>Notable features: Nesting occurs in November, with eggs recorded from February to May and in September.</p> <p>Nearest record: There are no records within 100 km of the study area (CSIRO 2023).</p>	Low: This species was not recorded in the study area during the fauna surveys. The range of this species is believed to have contracted into southern Cape York. It is not known from the region and there are no damp grassland and waterway woodland habitats within the project area.
White-throated Needletail	V	V	Wildlife Online	<p>Distribution: This species is widespread in eastern and south-eastern Australia, occurring as non-breeding vagrants in the Northern Territory and Western Australia. It occurs in all coastal regions of eastern Queensland and New South Wales,</p>	Moderate: This species was not recorded in the study area during the fauna surveys, although, it has been recorded in the region. This species

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
(<i>Hirundapus caudacutus</i>)				<p>extending inland onto the western slopes of the Great Divide and occasionally on to inland plains (TSSC 2019a).</p> <p>General habitat preferences: This is an aerial species that occurs over forests, woodlands, farmlands, plains, lakes and towns (Pizzey et al. 2012). It is known from above mainly wooded areas, and larger tracts of vegetation, particularly forest. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks (TSSC 2019b). Large tracts of native forest vegetation may be considered important in Australia (DotE 2015a)</p> <p>Foraging habitat: This species forages aerially, from just above the ground to heights up to 'cloud level' over forested and open areas. They have been recorded above disturbed areas, e.g. in the vicinity of bushfires or slashed paddocks, in areas of updraughts or in whirlwinds and often along the edges of low-pressure systems (DCCEE 2023f).</p> <p>Roosting habitat: The species roosts in tree hollows in tall trees on ridge-tops, on bark or rock faces and its thought to have traditional roost sites (DotE 2015a). This species has been recorded roosting in trees in foliage and hollows in forests and woodlands, although this is probably uncommon. It is thought to also roost aerially. They possibly alight or take refuge during adverse conditions (DCCEE 2023f).</p> <p>Breeding habitat: The species does not breed in Australia (TSSC 2019a).</p> <p>Nearest record: The nearest record of this species is approximately 10 km north-west of the project area (CSIRO 2023).</p>	will potentially overfly the study area, particularly vegetated areas. However, as it is an almost exclusively aerial species it is unlikely to use the project area for roosting due to the largely cleared nature of the project area. All vegetated areas may provide potential overfly habitat for this species (Figure 18).
Mammals					
Corben's Long-eared Bat	V	V	PMST	Distribution: In Queensland, this species is mainly recorded in the Brigalow Belt South Bioregion, extending eastwards to the Bunya Mountains National Park, as far north as the	Low: This species was not recorded in the study area during the fauna surveys. This species is not known

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
<i>(Nyctophilus corbeni)</i>				<p>Expedition Range and Dawson River areas and west into the Mulga Lands Bioregion and west of Bollon.</p> <p>General habitat preferences: The Corben's Long-eared Bat occurs in a range of inland woodland vegetation types, including box, ironbark and cypress pine woodlands as well as Buloke woodland, Brigalow woodland, Belah woodland, Smooth-barked Apple (<i>Angophora leiocarpa</i>) woodland, River Red Gum (<i>Eucalyptus camaldulensis</i>) woodland and dry sclerophyll forest. It is known from habitat dominated by various eucalypt and bloodwood species and various types of tree mallee, being most abundant in vegetation with a distinct canopy and a dense cluttered shrub layer (DCCEEW 2023q).</p> <p>Foraging habitat: This insectivorous bat feeds in flight, by gleaned vegetation and during ground foraging. It feeds on beetles, bugs, moths, grasshoppers, crickets, ants, spiders and mosquitoes. Foraging tends to be concentrated around patches of trees and is important for managing foliage feeding insects on eucalypt trees (DCCEEW 2023q).</p> <p>Roosting habitat: Occurs solitarily under exfoliated bark an in the crevices on trees (DCCEEW 2023q).</p> <p>Breeding habitat: Maternity roosts are likely to occur in colonies in larger tree cavities. Breeding is thought to occur around November, although there is little information about this (DCCEEW 2023q).</p> <p>Nearest record: The nearest record of this species approximately 50 km north west of the project area (CSIRO 2023).</p>	<p>from the region and the vegetation communities in the project area do not provide the distinct canopy and dense shrub layer that is preferred by this species. Dr Greg Ford was consulted in relation to the potential for this species to occur within the project area. His advice was that he considered there was a low chance this species could occur along the Dawson River, but as the species is reliant on large tracts of intact vegetation, it would be extremely unlikely to occur in the largely cleared project area (Greg Ford pers. comm. April 2020).</p> <p>This species has not been recorded as part of nearby largescale fauna surveys conducted over the last 20 years by Eco Solutions & Management, and which includes the Dawson, Belvedere, Callide and Springsure projects, or as part of surveys by others at Baralaba North, Dawson and Callide mine sites.</p> <p><i>Nyctophilus</i> species are usually only caught in areas with a dense shrub layer (S. Marston pers. comm. February 2020). These habitat characteristics are generally not present in the project area.</p>
Ghost Bat (<i>Macroderma gigas</i>)	V	V	PMST	<p>Distribution: It is predicted, based on analysis of historic climatic data, fossils, and modelling that the Ghost Bat is a geographically relictual species in southern, arid landscapes, present only because caves provide suitable roost</p>	<p>Low: This species was not recorded in the study area during the fauna surveys. This species is not known from the region and suitable</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>microclimates (TSSC 2016b). Although this species is thought to once occupy much of Australia, its current range is discontinuous across northern Australia, with colonies known in the Pilbara, Kimberly, northern Northern Territory, the Gulf of Carpentaria, coastal and near coastal eastern Queensland from Cape York to near Rockhampton and the Riversleigh and Camooweal districts in western Queensland and occupying both arid and lush rainforest habitats (TSSC 2016b; van Dyck and Strahan 2008).</p> <p>General habitat preferences: Habitat is comprised of thicket, open woodland, and spinifex and black soil grasslands (van Dyck et al. 2013; van Dyck and Strahan 2008). Monsoon forests, open savannah woodland, tall open forest, deciduous vine forest and tropical rainforest is also used (Churchill 2009). Cave habitat is important for roosting and breeding (van Dyck and Strahan 2008). Ghost bats usually require a number caves to move between seasonally (TSSC 2016b).</p> <p>Foraging habitat: This is Australia's only true carnivorous bat, feeding on frogs, lizards, birds, small mammals and sometimes other bats (TSSC 2016b; van Dyck and Strahan 2008). It captures prey on the ground and then returns to an established feeding site, e.g. rock overhang or small cave, to feed (van Dyck and Strahan 2008). It is known to forage up to 2 km from the roost cave and will use the same foraging area each night. Foraging areas are approximately 60 ha in size (Churchill 2009; TSSC 2016b).</p> <p>Roosting habitat: Caves provide suitable roost microclimates and it is known to rest during the day in large sandstone or limestone caves, boulder piles, shallow escarpments or deep rock fissures and mines (Churchill 2009; TSSC 2016b; van Dyck and Strahan 2008). This species appears to require caves with specific temperature and humidity ranges (DSITIA 2012; TSSC 2016b). Groups of greater than 100 individuals is unusual (van Dyck and Strahan 2008).</p>	vegetation and cave habitat does not occur in the study area. Mt Ramsay does not provide potential roosting habitat for this species.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>Breeding habitat: Breeding is likely to occur in July or August with young being born between September and November. Nursery colonies are formed separately to males (van Dyck and Strahan 2008). Only 14 breeding sites are currently known (TSSC 2016b). Young are fully weaned by about March each year but may be left in nurseries or forage with the mother up until this age (Churchill 2009). There is a tendency for breeding caves to have multiple entrances (TSSC 2016b).</p> <p>Nearest record: The nearest record of this species is approximately 35 km east of the project area near the Overdeen State Forest (CSIRO 2023).</p>	
Greater Glider (southern and central) (<i>Petauroides volans volans</i> and <i>Petauroides armillatus</i> ⁴)	E	E	Wildlife Online, PMST, ALA,	<p>Distribution: This species is restricted to eastern Australia, between Windsor Tableland in north Queensland and Wombat State Forest in central Victoria. It occurs from sea level up to 1,200 m above sea level. Two isolated subpopulations exist in Queensland, one in the Gregory Range west of Townsville and another in the Einasleigh Uplands (TSSC 2016a).</p> <p>General habitat preferences: The Greater Glider occurs in a range of eucalypt-dominated habitats, including low open forests on the coast to tall forests in the ranges and low woodland westwards of the Dividing Range. It does not use rainforest habitats (van Dyck et al. 2013; van Dyck and Strahan 2008). This species favours taller, montane, moist eucalypt forests with relatively old trees and abundant hollows and a diversity of eucalypt species (TSSC 2016a).</p> <p>Foraging habitat: The Greater Glider has an almost exclusive diet of eucalypt leaves and occasionally flowers or buds (TSSC 2016a; van Dyck and Strahan 2008). Although the species is known to feed on a range of eucalypt species, in any particular area it is likely to only forage on one or two species (van Dyck and Strahan 2008).</p> <p>Breeding habitat: Breeding occurs between March and June and a single young is born each year (TSSC 2016a; van Dyck and Strahan 2008). The young stays with the mother or is left</p>	<p>Moderate: This species was recorded in riparian vegetation along the Dawson River in the additional investigation area during the post-wet season 2020 fauna surveys. There is potential for it to use the small area of riparian habitat (i.e. 0.1 ha) at the far western end of the water release/extraction infrastructure area (Figure 17). However, potential habitat within the project site lacks mature, tall, moist vegetation communities that support abundant hollow-bearing trees and are somewhat removed from the Dawson River riparian corridor by distances of greater than 100 m. This significantly limits accessibility of the project site, and therefore this species is unlikely to access these areas. There is no suitable habitat along the road realignment or ETL study area.</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
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				<p>in the nest and becomes independent at about 9 months (Menkhorst and Knight 2011a).</p> <p>Nearest record: This species was recorded along a high order anabranch of the Dawson River, approximately 1 km north-west of the project area, during seasonal surveys for the project in 2020 (Figure 17).</p>	
Grey-headed Flying Fox (<i>Pteropus poliocephalus</i>)	V	LC	PMST	<p>Distribution: This species is endemic to Australia and occurs in the coastal belt between Rockhampton in central Queensland and Melbourne in Victoria. It infrequently occurs west of the Great Dividing Range. It moves throughout its range in response to availability of foraging resources (DCCEEW 2023r).</p> <p>General habitat preferences: This species is a canopy-feeding frugivore and nectarivore, usually feeding on rainforest, open forest, closed and open woodland communities as well as Melaleuca swamps and Banksia woodlands. It will also feed on fruit crops and other introduced tree species. Its primary food source is Eucalyptus (and related genera) blossom (DCCEEW 2023r).</p> <p>Camps: Camps are generally in rainforest patches, stands of Melaleuca, mangroves and riparian vegetation located near water, such as lakes, rivers or the coast (DCCEEW 2023r).</p> <p>Breeding: Mating occurs in early autumn with young are usually born in October (DCCEEW 2023r).</p> <p>Nearest record: There are no recent records for this species within 100 km of the project area (CSIRO 2023).</p>	<p>Low: This species was not recorded in the study area during the fauna surveys and the project area is not within the core range of this species. There are no active Grey-headed Flying Fox camps within 25 km of the project site. The nearest active camp that supports Grey-headed Flying-Fox is situated at least 100 km north-east of the project site near Gracemere (CSIRO 2023).</p> <p>This species is unlikely to utilise the project area given the distance of the study area to the nearest known camp, which is greater than the species foraging range (i.e. a maximum of 50 km). The project area presents limited foraging opportunities for this species.</p>
Koala (<i>Phascolarctos cinereus</i>)	V	V	Wildlife Online, PMST, ALA	<p>Distribution: This species is widespread in sclerophyll forest and woodlands on foothills and plains on both sides of the Great Dividing Range from about Chillagoe, Queensland to Mt Lofty Ranges in South Australia (Menkhorst and Knight 2011b). In Queensland the species is thought to occur in eight bioregions; Einasleigh Uplands, Wet Tropics, Desert Uplands, Central Mackay Coast, Mitchell Grass Downs, Mulga Lands, Brigalow</p>	<p>Moderate: This species was recorded via scratches on Queensland Blue Gum along Banana Creek in the additional investigation area during the post-wet season 2020 fauna surveys. No evidence of the Koala has been recorded in the</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>Belt North and Brigalow Belt South. In many locations Koalas are of low density, widespread and fragmented (TSSC 2022b).</p> <p>General habitat preferences: Koalas in Queensland use a range of habitats (typically dominated by <i>Eucalyptus</i> species), including moist coastal forests, southern and central western sub-humid woodlands and a number of eucalypt woodlands adjacent to waterbodies in the semi-arid western parts of the state (TSSC 2022b). These habitats may include forests or woodlands, road-side and rail vegetation and paddock trees, safe intervening ground matrix for travelling between trees and patches (TSSC 2022b). In north-west of Queensland, studies have found that Koalas are patchily distributed, associated with creek-lines, areas of higher tree species richness and with higher abundance correlating with leaf-moisture content (TSSC 2022b).</p> <p>Foraging habitat: The EPBC Act referral guidelines for the vulnerable koala define Koala food trees as species of the <i>Corymbia</i>, <i>Melaleuca</i>, <i>Lophostemon</i> or <i>Eucalyptus</i> genera (DotE 2014).</p> <p>Refuge habitat: Habitat that allows for the persistence of the Koala during droughts and periods of extreme heat, especially in riparian environments and other areas with reliable soil moisture and fertility. Such habitats occur on permanent aquifers, in riparian zones, on upper or mid-slopes, on fertile alluvial plains or where soil moisture/rainfall is reliable (DotE 2014).</p> <p>Nearest record: There are two records of this species within approximately 7 km of the project area close to the Dawson River, one near Baralaba to the north-west and one to the south-west (CSIRO 2018).</p>	<p>project area or on Mt Ramsay during seasonal surveys.</p> <p>Habitat for the Koala is considered to comprise any forest or woodland containing species that are Koala food trees, or any shrubland with emergent Koala food trees and approximately 111.1 ha of this habitat occurs within the project site and 0.1 ha occurs within the water release/extraction infrastructure area. However, the project site is unlikely to provide opportunities for dispersal for this species beyond the present habitat as these habitats are fragmented and well separate from any other suitable habitats to the east, north-east or south-east. Habitat mapping for the Koala is presented in Figure 14.</p>
Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	V	V	PMST	<p>Distribution: The species' current distribution is poorly known. Records exist from Shoalwater Bay, north of Rockhampton, Queensland, through to the vicinity of Ulladulla, NSW in the south. Despite the large range, it has been suggested that the species is far more restricted within the species' range than</p>	<p>Low: This species was not recorded in the study area during the fauna surveys. The species is not known from the broader area. The combination of suitable sandstone</p>

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	EPBC Act ¹	NC Act ²			
				<p>previously understood. In Queensland, records are known from sandstone escarpments in the Carnarvon, Expedition Ranges and Blackdown Tablelands. Additional records exist in the Scenic Rim near the NSW/Queensland border (DCCEEW 2023s).</p> <p>General habitat preferences: This species is uncommon in dry and wet eucalypt forests from Blackdown Tableland to near Wollongong NSW (Menkhorst and Knight 2011a). It is primarily a cave roosting species that inhabits sclerophyll forests and woodland throughout much of its range (Churchill 2009).</p> <p>Foraging habitat: Higher fertility sites, particularly box gum woodlands or river/rainforest corridors are used for foraging (DCCEEW 2023s).</p> <p>Roosting habitat: Sandstone cliffs (for roosting) and fertile woodland valley habitat (for foraging) within close proximity of each other is important for this species. Records from south-east Queensland suggest that rainforest and moist eucalypt forest habitats on other geological substrates (rhyolite, trachyte and basalt) at high elevation are of similar importance to the species are also of importance (DCCEEW 2023s).</p> <p>Breeding habitat: The structure of primary nursery roosts appears to be very specific, i.e. arch caves with dome roofs (that need to be deep enough to allow juvenile bats to learn to fly safely inside) and with indentations in the roof, presumably to allow the capture of heat (DCCEEW 2023s). These physical characteristics are not very common in the landscape and therefore a limiting factor. No maternity roost sites are known in Queensland (TSSC, 2010).</p> <p>Nearest record: The nearest record of this species is approximately 110 km south west of the project area in the Expedition National Park (CSIRO 2018).</p>	<p>escarpments and fertile foraging habitat is not located within the study area. This species is primarily a cave roosting species, which does not occur within or in close proximity to the project area. Suitable cave habitat was not observed on Mt Ramsay.</p>
Northern Quoll (<i>Dasyurus hallucatus</i>)	E	LC	PMST	<p>Distribution: The Northern Quoll was once widespread in Queensland but has undergone a severe range contraction and is now absent from much of its former range.</p>	<p>Low: This species was not recorded in the study area during the fauna surveys. There are no nearby</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>General habitat preferences: This species is usually associated with dissected rocky escarpments but also known from Eucalypt forest and woodlands, around human settlement and occasionally rainforest. In the Northern Territory Northern Quoll populations are becoming extinct within one year of the arrival of the Cane Toad (<i>*Rhinella marina</i>), although in Queensland some remnant quoll populations persist in areas where Cane Toads have long been present (van Dyck and Strahan 2008). The areas where the quoll persists in Queensland tend to be steep, rocky areas, close to water that have not been recently burnt. They appear to have become extinct in many lowland habitats formerly occupied (Woinarski et al. 2008).</p> <p>Breeding habitat: Dens are made in rock crevices, tree holes or occasionally termite mounds (TSSC, 2005). Breeding success is higher in animals that have a den near a creek line (Braithwaite & Begg 1995).</p> <p>Nearest record: The nearest record is approximately 55 km north-east of the project area on the eastern side of Mt Wheal (CSIRO 2018).</p>	records of this species and the study area does not provide suitable rocky escarpment habitat or large areas of intact vegetation required by this species.
Short-beaked Echidna (<i>Tachyglossus aculeatus</i>)	NL	SLC	Wildlife Online, ALA	<p>Distribution: This species occurs throughout mainland Australia and Tasmania, as well as King, Flinders and Kangaroo Islands (Menkhorst & Knight 2011).</p> <p>General habitat preferences: This species occurs in almost all terrestrial habitats except intensively managed farmland. It shelters in logs, crevices, burrows or piles of litter and feeds on ants, termites and other soil invertebrates, particularly beetle larvae (Menkhorst and Knight 2011a).</p> <p>Nearest record: The nearest record for this species is approximately 13 km north of the project area (CSIRO 2018).</p>	High: This species was recorded at a number of locations in the study area during the fauna surveys, particularly on Mt Ramsay. However, it was not recorded in the project area. This is a relatively commonly occurring species that is known from the broader area and uses a range of habitats, including disturbed or cleared areas. All areas of the study area provide potential habitat for this species, however, remnant areas are considered to be more important for this species. Approximately 26.4 ha of potential

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
					habitat occurs in project area. Habitat for this species is mapped on Figure 19.
Yellow-bellied Glider (<i>Petaurus australis australis</i>)	V	E	PMST	<p>Distribution: The yellow-bellied glider (south-eastern) occurs at altitudes ranging from sea level to 1400 m above sea level and has a widespread but patchy distribution from south-eastern Queensland (Qld) to far south-eastern SA, near the SA-Vic border. It is primarily associated with forests along the east coast but also extends inland to the western slopes of the Great Dividing Range in NSW and QLD. Isolated subpopulations are also found inland in the Blackdown and Canarvon Ranges of central Qld (TSSC 2022a).</p> <p>General habitat preferences: The yellow-bellied glider (south-eastern) occurs in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests. Abundance is highly dependent on habitat suitability, which is in turn determined by forest age and floristics. The subspecies shows a preference for large patches of mature old growth forest that provide suitable trees for foraging and shelter (. Forests with winter flowering, smooth barked eucalypts are heavily favoured by the yellow-bellied glider. They are unlikely to persist in forests dominated by only one or two species of eucalypt</p> <p>Nearest record: This species was recorded adjacent to the project area in the riparian vegetation along Bananna Creek approximately 800 m south-west of the project area.</p>	<p>Moderate: This species was recorded in the additional investigation area during the post-wet season 2020 fauna surveys. There is potential for it to use the small area of riparian habitat (i.e. 0.1 ha) at the far western end of the water release/extraction infrastructure area (Figure 18). However, potential habitat within the project site lacks mature, tall, moist vegetation communities that support abundant hollow-bearing trees and are somewhat removed from the Dawson River riparian corridor by distances of greater than 100 m. This significantly limits accessibility of the project site, and therefore this species is unlikely to access these areas. There is no suitable habitat along the road realignment or ETL study area..</p>
Reptiles					
Collared Delma (<i>Delma torquata</i>)	V	V	PMST	<p>Distribution: The species has been recorded within the Bunya Mountains, Blackdown Tablelands National Park, Expedition National Park (Central Queensland), Western Creek, near Millmerran and the Toowoomba Range. A large concentration of records are from the western suburbs of Brisbane (DCCEEW 2023t).</p>	Low: This species was not recorded in the study area during the fauna surveys. The species is not known from the region and there is limited eucalypt woodland supporting

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>General habitat preferences: This species is predominantly associated with open rocky terrain although it has also been found in eucalypt woodlands and brigalow with little surface rock (Wilson 2005). It is most likely to inhabit eucalypt-dominated woodland and open forests on land zones 3, 9 and 10. The presence of rocks, logs, bark and other coarse woody debris, and mats of leaf litter typically 30-100 mm thick) appear to be essential characteristics of Collared Delma microhabitat, which may be a limiting factor for recolonising recently burnt areas (DCCEEW 2023t). This species has been found in only a hand full of small isolated populations in South-east Queensland and the Brigalow Belt bioregions (DCCEEW 2023t).</p> <p>Nearest record: The nearest record of this species occurs approximately 85 km north west of the study area in Blackdown Tableland National Park (CSIRO 2023).</p>	course woody debris and leaf litter across the project area.
Common Death Adder (<i>Acanthophis antarcticus</i>)	NL	V	Wildlife Online, ALA	<p>Distribution: This species occurs from central Queensland through New South Wales to the southern parts of South Australia and Western Australia (Hines 2014).</p> <p>General habitat preferences: This species is found in a wide variety of well-drained habitats, including rainforests and wet sclerophyll forests, woodland, shrublands, grasslands and coastal heathlands, preferring sites with deep fixed leaf litter (Hines 2014).</p> <p>Notable features: A sedentary terrestrial snake, the common death adder spends much of its time lying concealed under loose sand, leaf litter or low foliage. The species may be active by day (diurnal), but is most commonly encountered at night (nocturnal) when moving between shelter sites. Individuals burrow into sand or leaf litter, or hide under overhanging foliage (Hines 2014).</p> <p>Nearest record: The nearest record is approximately 35 km south-east of the project area near the town of Banana (CSIRO 2023).</p>	Low: This species has been recorded in the broader area however, the project area lacks areas of loose surface soils and deep fixed leaf litter required by this species for refuge and ambushing prey.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
Dunmall's Snake (<i>Furina dunmalli</i>)	V	V	PMST	<p>Distribution: This snake occurs in the Brigalow Belt South and Nandewar bioregions from near the Queensland border south to Ashford in New South Wales.</p> <p>General habitat preferences: Dunmall's Snake has been found in a broad range of habitats between 200-500 m above sea level. Habitats including forests and woodlands on clay or clay loam soils dominated by Brigalow (<i>Acacia harpophylla</i>), other wattles such as <i>A. burrowii</i>, <i>A. deanii</i>, <i>A. leiocalyx</i>, native Cypress (<i>Callitris spp.</i>) or Bull Oak and various Spotted Gum (<i>Corymbia citriodora ssp. variegata</i>), Ironbark (<i>Eucalyptus crebra</i> and <i>E. melanophloia</i>), White Cypress Pine (<i>Callitris glaucophylla</i>) and Bull Oak open forest and woodland associations on sandstone derived soils. It has rarely been found on the edge of dry vine scrub and in hard ironstone country. It shelters under fallen timber and ground litter and may use cracks in alluvial clay soils. The Dunmall's Snake feeds on small skinks and geckos (DCCEEW 2023u).</p> <p>Notable features: This is a very secretive snake with few known records. The high number of mid-body scales (21) and small yellow flecks over the temporal region and lips will generally distinguish this snake from other similar species.</p> <p>Nearest record: The nearest record is approximately 105 km south of the project area in Theodore State Forest (CSIRO 2023).</p>	Low: This species was not recorded in the study area during the fauna surveys. This species is not known from the broader region and the project area lacks shelter habitat such as large fallen timber and leaf litter is limited.
Grey Snake (<i>Hemiaspis damelii</i>)	E	E		<p>Distribution: In Queensland, the grey snake has a broader and more dispersed distribution when compared to its more disjunct distribution in NSW. Most records occur along the Macintyre and Condamine Rivers and associated floodplains of the southern Brigalow Belt from Goondiwindi and Dalby west to Glenmorgan, on the Darling Downs and western Lockyer Valley, near Rockhampton on the central Queensland coast, and on the Darling Riverine Plains near Currawinya in south-western Queensland (TSSC 2022c). Occurrence records range from</p>	Low: This species occupies similar habitat to the Ornamental Snake (i.e RE 11.3.3) which was detected on site. However, the Grey Snake is not known from the region and the species was not detected during the field surveys despite significant survey effort within the potentially suitable habitat that occurs within the project area.

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>70 m above sea level to 540 m with most records in NSW and QLD occurring below 300 m (TSSC 2022c).</p> <p>General habitat preferences: In Queensland, grey snake habitat is Brigalow and Belah woodlands on heavy, dark brown to black cracking clay soils associated with water bodies and floodplain environments, sheltering under logs, rocks and soil cracks (TSSC 2022c).</p> <p>Nearest record: There are no published records of this species within 100 km of the project area (CSIRO 2023).</p>	
Ornamental Snake (<i>Denisonia maculata</i>)	V	V	Wildlife Online, Qld Museum, PMST	<p>Distribution: This snake species is known from the Brigalow Belt North and parts of the Brigalow Belt South Bioregions, with the main occurrences in the drainage system of the Fitzroy and Dawson Rivers.</p> <p>General habitat preferences: This snake is found in close association with frogs which form the majority of its prey. It is known to prefer woodlands and open forests associated with moist areas, particularly gilgai (melon-hole) mounds and depressions with clay soils but is also known from lake margins, wetlands and waterways. This species has been recorded mostly in Brigalow (<i>Acacia harpophylla</i>), Gidgee (<i>Acacia cambagei</i>), Blackwood (<i>Acacia argyrodendron</i>) or Coolibah (<i>Eucalyptus coolabah</i>) - dominated vegetation communities or pure grassland associated with gilgais. REs in which it has been recorded include; 11.4.3, 11.4.6, 11.4.8 and 11.4.9 and 11.3.3 and 11.5.16. It shelters in logs, under coarse woody debris and in ground litter. It appears to prefer a diversity of gilgai size and depth and with some fringing groundcover vegetation and ground timber and where soils are of a high clay content with deep-cracking characteristics. Habitat patches greater than 10 ha and connected to larger areas of remnant vegetation are preferred (DCCEE 2023b). The Draft Referral guidelines for the nationally listed Brigalow Belt reptiles describes gilgai depressions and mounds as being important habitat with habitat connectivity between gilgais and other suitable habitats also being important (SEWPac 2011).</p>	<p>Present: This species was recorded during the seasonal fauna surveys in a patch of Coolibah with Brigalow regrowth woodland (RE 11.3.3) associated with a stream order 1 drainage line in the south-western portion of the project site at supplementary sites 5 and 12 (Figures 4 and 13).</p> <p>Waterway/wetland habitats and better quality gilgai have the potential to hold water for some time during periods of high rainfall. It is therefore likely these areas periodically support populations of frogs, the preferred prey species for the Ornamental Snake.</p> <p>More heavily disturbed gilgai provides marginal habitat for this species. These marginal gilgai areas seem to have been previously cultivated or blade ploughed and have been used for cattle grazing, which has resulted in shallow gilgai in a highly degraded state and dominated by terrestrial grasses.</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>Foraging habitat: It prefers habitats where there is an abundance of burrowing frog species (DCCEEW 2023b).</p> <p>Refuge habitat: This species seeks refuge in soil cracks on gilgai mounds within habitat areas.</p> <p>Nearest record: This species was recorded in the study area during the seasonal surveys.</p>	<p>The prevalence of grasses during both seasonal surveys indicates that marginal gilgai do not hold water for extended periods of time. Nonetheless, they are considered to provide some marginal habitat for the Ornamental Snake during periods of extended rainfall when frog species may use the gilgai. Spotlighting surveys failed to detect the Ornamental Snake in gilgai habitats.</p> <p>Approximately 99.7 ha of Ornamental Snake habitat has been identified within the project area, including 34.6 ha of marginal gilgai habitat. Habitat mapping for the Ornamental Snake is provided in Figure 13.</p>
Yakka Skink (<i>Egernia rugosa</i>)	V	V	Qld Museum, PMST	<p>Distribution: The distribution of this species is highly fragmented. It extends from the coast to the hinterland of sub-humid to semi-arid eastern Queensland. It has been recorded between the Queensland/New South Wales border to Mungkan Kandju National Park on Cape York Peninsula, and from Bundaberg and the region west of Gympie to Mariala National Park west of Charleville (DCCEEW 2023v).</p> <p>General habitat preferences: This species occurs in woodland and open forest habitats, wet/dry sclerophyll forest and ecotonal rainforest habitats. This species is commonly found in cavities under and between partly buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. The species often takes refuge in large hollow logs and has been known to excavate deep burrow systems, sometimes under dense ground vegetation (Cogger 2000; Wilson 2005). In cleared habitat, this species can persist where there are</p>	<p>Low: This species was not recorded in the study area during the fauna surveys. This species is not known from the local area and there is a general lack of large size fallen timber across the majority of the project area.</p> <p>No signs of burrows or defecation sites were observed in the project area despite targeted searches.</p>

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				<p>shelter sites such as raked log piles, deep gullies, tunnel erosion/sinkholes and rabbit warrens. The species has also been found sheltering under sheds and loading ramps. This species is not generally found in trees or rocky habitats (Chapple 2003).</p> <p>Feeding habitat: This species burrows and feeds on soft plant material and fruits as well as a variety of invertebrates that venture into or near the burrow entrance.</p> <p>Nearest record: The nearest record of this species is approximately 30 km south-east of the project area near the town of Banana (CSIRO 2023).</p>	
Migratory					
Common Sandpiper (<i>Actitis hypoleucos</i>)	M	SLC	PMST	<p>Distribution/Habitat preferences: Occurs in a range of coastal wetland habitats, and some inland wetlands with varying levels of salinity. Generally occurs on muddy margins or rocky shores, which may be narrow or steep, and rarely found on mudflats. Forages in shallow water or edges of wetlands. May also use grassy areas adjoining wetlands (DCCEEW 2023w).</p> <p>Nearest record: There are no published records for this species within 25 km of the study area.</p>	Low: The study area lacks suitable wetland habitat with muddy margins.
Fork-tailed Swift (<i>Apus pacificus</i>)	M	SLC	PMST	<p>Distribution / Habitat Preferences: Aerial migratory species that flies over open habitat sometimes over forests and cities (Pizzey et al. 2012). Sometimes occurs above rainforests, wet sclerophyll forest or pine plantations (DCCEEW 2023x).</p> <p>Nearest record: There are no published records of this species within 25 km of the project area.</p>	Low: This species was not recorded in the study area during the fauna surveys. This species will potentially overfly the study area as it is an almost exclusively aerial species. However, it is unlikely to use the project area.
Glossy Ibis (<i>Plegadis falcinellus</i>)	M	SLC	ALA	<p>Distribution / Habitat Preferences: This species utilises the shallows of swamps, floodwaters, sewage ponds and flooded, moist irrigated pasture (DCCEEW 2023i; Morcombe and Stewart 2013). The species also occasionally feeds in sheltered marine habitats (Morcombe and Stewart 2013).</p>	Moderate: This species has been recorded in the region and may use dams and paddocks in the project area, when inundated. The extent of potential habitat in the project area

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				Nearest record: There is a record for this species approximately 7 km to the north of the project area (CSIRO 2023).	is difficult to predict and likely to vary depending on seasonal conditions.
Latham's Snipe (<i>Gallinago hardwickii</i>)	M	SLC	Wildlife Online, PMST, ALA	<p>Distribution / Habitat Preferences: This migratory species prefers soft wet ground or shallow water with tussocks, wet paddocks, seepage below dams, irrigated areas, scrub or open woodland (Pizzey et al. 2012).</p> <p>Nearest record: This species has been recorded approximately 20 km north-north-west of the project area near an anabranch of the Dawson River (CSIRO 2023)</p>	<p>Moderate: This species was not recorded in the study area during the fauna surveys. However, the species has been recorded in the broader area and the vegetated gilgai and sections of the broad drainage lines in the project site that support Lignum, provide some areas of suitable habitat for this species. As with the Australian Painted Snipe cleared gilgai (better quality and marginal) may provide marginal foraging habitat value during periods of inundation, although the species is unlikely to breed in these areas as they lack vegetative cover.</p> <p>Approximately 99.6 ha of habitat for the Latham's Snipe (including 68.5 ha of marginal habitat) has been identified in the project site and ETL study area.</p>
Marsh Sandpiper (<i>Tringa stagnatilis</i>)	M	SLC	Wildlife Online	<p>Distribution / Habitat Preferences: This species uses coastal and inland wetlands. The wetlands can be fresh or saltwater. Typical habitats include: estuarine and mangrove mudflats, beaches, shallows of swamps, lakes, billabongs, temporary flood waters, sewage ponds and saltworks (Morcombe and Stewart 2013).</p> <p>Nearest record: There are two records for this species approximately 25 km north of the project area (CSIRO 2023).</p>	Low: This species was not recorded in the study area during the fauna surveys. The study area lacks lakes and billabongs typically used by this species while inland.
Oriental Cuckoo (<i>Cuculus optatus</i>)	M	SLC	PMST	Distribution / Habitat Preferences: Non-breeding habitat occurs in Australia and is characterised by monsoonal	Low: This species was not recorded in the study area during the fauna

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or <i>Eucalyptus</i> woodlands (DCCEEW 2023y). Nearest record: There are no published records of this species within 25 km of the project area.	surveys. This species is not known from the region and suitable habitat is not present in the study area.
Osprey (<i>Pandion haliaetus</i>)	M	SLC	PMST	Distribution / Habitat Preferences: This species occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. The Osprey has been occasionally observed further inland along major rivers. This species requires extensive areas of fresh, brackish or saline waters for foraging (DCCEEW 2023z). Nearest record: There are no published records of this species within 25 km of the project area.	Low: This species was not recorded in the study area during the fauna surveys. The study area does not support suitable aquatic habitat.
Pectoral Sandpiper (<i>Calidris melanotos</i>)	M	SLC	PMST	Distribution / Habitat Preferences: In Queensland this species mainly occurs in shallow fresh to saline wetlands around Cairns, although there have been few records near Mt Isa, Longreach and Oakley. Wetland habitat includes lakes, swamps, inundated grasslands, saltmarshes, river pools, creeks, flood plains, estuaries, bays, coastal lagoons and artificial wetlands (DCCEEW 2023aa). Nearest record: There are no published records of this species within 25 km of the project area.	Low: This species was not recorded in the project area during the fauna surveys. The project area do not support suitable coastal aquatic habitat.
Rufous Fantail (<i>Rhipidura rufifrons</i>)	M	SLC	Wildlife Online, PMST, ALA	Distribution / Habitat Preferences: This migratory species prefers rainforest, wet eucalypt forests, monsoon forests, paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks (Pizzey et al. 2012). Nearest record: The nearest record for this species is approximately 10 km north-west of the project area (CSIRO 2023).	Low: This species was not recorded in the study area during the fauna surveys. Suitable rainforest and wet eucalypt forest is not present in the project area.
Satin Flycatcher (<i>Myiagra cyanoleuca</i>)	M	SLC	Wildlife Online, PMST, ALA	Distribution / Habitat Preferences: Heavily vegetated gullies in forests and taller woodlands and during migration coastal forests, woodlands, mangroves, gardens and open country (Pizzey et al. 2012).	Low: This species was not recorded in the study area during the fauna surveys. Suitable rainforest and wet

Common name (Species name)	Status		Record source ³	Habitat preferences	Likelihood to occur
	EPBC Act ¹	NC Act ²			
				Nearest record: There is a record for this species approximately 8 km west of the project area (CSIRO 2023).	eucalypt forest is not present in the largely cleared project area.
Sharp-tailed Sandpiper (<i>Calidris acuminata</i>)	M	SLC	PMST	Distribution / Habitat Preferences: The species uses a range of intertidal and inland freshwater saltmarsh, swamps, lakes, dams, waterholes, soaks, saltpans, sewage farms, flooded paddocks, sedgelands, ephemeral wetlands, creeks, estuaries and mudflats (DCCEEW 2023ab). Nearest record: There are no published records of this species within 25 km of the project area.	Low: This species was not recorded in the project area during the fauna surveys. Preferred coastal wetland habitat is not present within the project area.
Spectacled Monarch (<i>Monarcha trivirgatus</i>)	M	SLC	Wildlife Online, PMST, ALA	Distribution / Habitat references: Rainforest, thickly wooded gullies, waterside vegetation (Pizzey et al. 2012) Nearest record: The nearest record of this species is approximately 70 km south-east of the project area, although Wildlife Online results indicates there is one within 25 km of the project area (CSIRO 2023).	Low: This species was not recorded in the study area during the fauna surveys. Open eucalypt and wattle communities in the project area are unlikely to provide preferred habitat for this species.
Yellow Wagtail (<i>Motacilla flava</i>)	M	SLC	PMST	Distribution / Habitat Preferences: Non-breeding habitat occurs in Australia and is characterised by mostly well-watered open grasslands and the fringes of wetlands. Roosts in mangrove and other dense vegetation (DCCEEW 2023ac). Nearest record: There are no published records of this species within 25 km of the project area.	Low: This species was not recorded in the study area during the fauna surveys. Suitable wetland habitat is not present in the study area.

¹ E = Endangered; V = Vulnerable; NL = Not listed

² E = Endangered; V = Vulnerable; NT = Near threatened, LC = Least concern

³ Record source:

- ALA – Atlas of Living Australia. Some recorded locations have been generalised due to the sensitivity of the species
- Birdlife Australia Atlas database (refer to database results provided in Table B2 of Appendix B)
- PMST – Protected Matters Search Tool (refer to PMST database results provided in Appendix B)
- Queensland Museum database (refer to database results provided as Table B3 of Appendix B)
- Wildlife Online – Wildlife Online database (refer to Wildlife Online database search results provided in Appendix B).



⁴ Recent taxonomic revision of the Greater Glider (*Petauroides* spp.) has revealed three distinct species, i.e. being the northern (*P. minor*), central (*P. armillatus*) and southern (*P. volans*), species (McGregor et al. 2020b). Review of these three species has not yet been undertaken under the NC Act and EPBC Act and therefore, all are still considered to represent the threatened species, *Petauroides volans*.




Note: The Paradise Parrot (*Psephotus pulcherrimus*) was returned from the Wildlife Online database search for the search area. This species is listed as 'presumed extinct' and 'extinct in the wild' under the EPBC Act and NC Act respectively, as such their likelihood to occur in the project area has not been considered as part of this project.




Appendix E



Vegetation communities in the additional investigation area




Table E1: Vegetation communities identified in the additional investigation area




Regional Ecosystem	Species and structural composition	Condition	Representative photograph
<p>11.3.1 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains</p> <p>VM Act Status – endangered</p> <p>Biodiversity status – endangered</p> <p>EPBC Act status – Endangered</p>	<p>This community was recorded in two locations within the additional investigation area.</p> <p>A small patch was recorded on a broad high flow terrace of the Dawson River. Gilgai micro-relief and flood runner channelisation were evident. The canopy layer, which was variously fragmented, in part due to the prevalent micro-relief within the community, was dominated by Brigalow (<i>Acacia harpophylla</i>), with Coolibah (<i>Eucalyptus coolabah</i>) and Pegunny (<i>Lysiphyllum hookeri</i>) occurring occasionally. Coolibah was also recorded as an infrequent emergent. The canopy layer had a median height of 8 m and cover ranging from 25 to 70%.</p> <p>Brigalow fringing woodland to open forest was recorded along Banana Creek to the south and south-east of the project site. The watercourse at this location was variously represented by a series of braided channels and scattered pools of variable depth and area. The canopy layer was generally comprised of Coolibah and associated taller Brigalow. The sub-canopy was invariably the ecologically dominant layer and was comprised of Brigalow with a median height of 13 m and cover ranging from 40 to 70%. At certain locations within this community Coolibah was prevalent within the canopy.</p>	<p>Both distributions of this vegetation type were found to be in reasonable to excellent condition.</p> <p>The patch adjacent to the Dawson River was variously infiltrated by exotic grasses and herbs as well as Tiger Pear (<i>*Opuntia aurentiaca</i>). However, the gilgai and flood runners were primarily vegetated with native hydrophytes.</p> <p>The patch fringing Banana Creek was primarily in excellent condition with native grasses, herbs and various hydrophytes dominating the groundcover composition. Dense thickets of Lignum (<i>Duma florulenta</i>) were also frequently recorded. Exotic species were primarily limited to the edge of the community.</p> <p>Both of these distributions would satisfy the diagnostic criteria and condition thresholds that apply to the Brigalow TEC.</p>	 <p>T48 – patch adjacent to the Dawson River</p>  <p>T54 – patch fringing Banana Creek</p>




Regional Ecosystem	Species and structural composition	Condition	Representative photograph
<p>11.3.3 <i>Eucalyptus coolabah</i> woodland on alluvial plains</p> <p>VM Act Status – of concern</p> <p>Biodiversity status – of concern</p> <p>EPBC Act status – Potentially contributes to endangered TEC</p>	<p>Within the additional investigation area this vegetation type was represented by both remnant and high value regrowth vegetation. The distribution was commonly associated with residual patches on high flow terraces, overflow channels and floodplains associated with the Dawson River and Banana Creek. This vegetation type was also mapped as a fringing woodland along Banana Creek from the confluence with the Dawson River through to the gradation to RE 11.3.1 to the south of the project site (see above).</p> <p>Given the broad distributional range and the variety of landforms upon which the community subsists a broad description of composition is presented below.</p> <p>The patches of remnant vegetation associated with Dawson River generally possessed a relatively consistent and exclusive cover of Coolibah and had a median height of 18 m and cover ranging from 40 to 60%.</p> <p>The patches of high value regrowth on terraces and floodplains were commonly found to be well established but fragmented in nature due to historic clearing and/or thinning practices. The canopy in these patches was primarily comprised of Coolibah and commonly had a median height of 15 m and cover ranging from 10 to 30%.</p> <p>The woodland fringing Banana Creek was commonly dominated by Coolibah, with Queensland Blue Gum (<i>Eucalyptus tereticornis</i>) limited to scattered specimens within the main channel. The median height of the canopy of this community was typically 23 m and the canopy cover ranged from 30 to 40%.</p> <p>The various overflow channels on the broad floodplain between the Dawson River and Banana</p>	<p>The condition of the various distributions of remnant and high value regrowth within the additional investigation area was highly variable. Exotic grasses were frequently recorded within the groundcover layer of the distributions located on the high flow terraces and floodplains, while the patches fringing the various overflow channels were commonly infiltrated by exotic grasses and herbs upon the channel banks and overrun by <i>Hymenachne</i> (<i>*Hymenachne amplexicaulis</i>) within the inundated channel. However, the distribution of Coolibah woodland fringing Banana Creek to the immediate south of the project site was found to be in excellent condition within the broad drainage basin but tended to be degraded by exotic pasture grasses along the upper banks.</p> <p>Persistent inundation within the overflow channels and the downstream reach of Banana Creek has resulted in variable degrees of dieback of upper and mid-strata species, whilst also reducing the resilience of the groundcover layer within some of these systems.</p> <p>It is anticipated that certain distributions of this vegetation</p>	 <p>T18 – remnant adjacent to the Dawson River</p>  <p>T31 – remnant on floodplain</p>  <p>T60 – remnant on high flow terrace</p>




Regional Ecosystem	Species and structural composition	Condition	Representative photograph
	<p>Creek supported a variable cover of fringing Coolabah (+/- Brigalow) and were commonly influenced or impacted by sustained inundation due to various degrees of natural and anthropogenic impoundment. Typically, the median height of the canopy layer within the patches that represented remnant vegetation was 16 m with a cover ranging from 30 to 50%. Typically, the median height of the canopy layer within the patches that represented high value regrowth vegetation was 14 m with a cover ranging from less than 10 to 30%.</p> <p>The southern extent of the floodplain distribution of Coolibah woodland in the south-western portion of the project site is also located within the additional investigation area. This patch, as would be expected possess a similar composition to the patch within the project site.</p>	<p>type would satisfy the diagnostic criteria and condition thresholds that apply to the Coolibah TEC, however further detailed assessment would be required to determine this unequivocally.</p>	 <p>T55 – high value regrowth on high flow terrace</p>  <p>T75 – high value regrowth in overflow channel</p>  <p>T41 – remnant in Banana Creek</p>




Regional Ecosystem	Species and structural composition	Condition	Representative photograph
<p>11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains</p> <p>VM Act Status – of concern</p> <p>Biodiversity status – of concern</p> <p>EPBC Act status – not listed</p>	<p>This community was recorded in only one location within the additional investigation area.</p> <p>The patch was recorded on the lower bench of a high flow terrace of the Dawson River, which is associated with a broad sweeping bend of the river. The canopy layer, which was variously fragmented, in part due to a linear flood terrace wetland, was primarily comprised of Queensland Blue Gum, Coolibah and associated Carbeen (<i>Corymbia tessellaris</i>). The canopy layer had a median height of 20 m, with some large mature, emergent trees extending to greater than 30 m in height and cover ranging from 15 to 40%.</p>	<p>The community was found to be moderately to markedly fragmented in places due to historical timber getting and fence construction. The groundcover layer was heavily degraded by various exotic grasses and herbs.</p>	 <p>T60 – high flow terrace east of the Dawson River</p>
<p>11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines</p> <p>VM Act Status – least concern</p> <p>Biodiversity status – no concern at present</p> <p>EPBC Act status – not listed</p>	<p>This community was recorded in numerous locations within the additional investigation area and included the banks and immediate terraces of the main channel and anabranches of the Dawson River as well as the mouth of Banana Creek.</p> <p>The community was typically comprised of Queensland Blue Gum, Carbeen and associated Coolibah. Across all distributions, the canopy layer had an average median height of 25 m and cover ranging from 30 to 60%.</p>	<p>The community has been negatively influenced by weed infiltration into the groundcover layer, primarily by Green Panic (<i>*Megathyrsus maximus</i> var. <i>pubiglumis</i>). Sustained inundation within the Dawson River has also negatively impacted woody vegetation that would have historically subsisted on the lower banks. As such, stags (dead trees) were frequently recorded on the lower portions of the channel banks.</p>	 <p>T68 –banks of the Dawson River</p>

Regional Ecosystem	Species and structural composition	Condition	Representative photograph
			 <p>T15 – anabranch of the Dawson River</p>
<p>11.3.27 Freshwater wetlands</p> <p>VM Act Status – least concern</p> <p>Biodiversity status – no concern at present</p> <p>EPBC Act status – not listed</p>	<p>This vegetation type was recorded within the additional investigation area as a minor component of a broader distribution of Coolibah woodland that is located on a broad high flow terrace to the north-west of the project site. The wetlands were typically recorded as elongated or linear depressions, that were invariably fringed by mature specimens of Coolibah.</p> <p>Most of the wetlands were dry at the time of survey and supported a dense cover of Sesbania Pea (<i>Sesbania cannabina</i>) overtopping dried out <i>Eleocharis plana</i> in the deeper sections, tending to Spiny Sida (<i>*Sida spinosa</i>), Awnless Barnyard Grass (<i>*Echinochloa colona</i>) and Buddha Pea (<i>*Aeschynomene indica</i>) at the periphery. Other native hydrophytes were limited in number.</p> <p>The linear wetland holding water at the time of survey was heavily degraded by Water Lettuce (<i>*Pistia stratiotes</i>).</p>	<p>Initial surveys suggest these wetlands have been highly compromised by utilisation by cattle and infiltration of exotic flora species.</p>	 <p>T47 – linear wetland (dry)</p>  <p>Qp46 – linear wetland (holding water)</p>

Regional Ecosystem	Species and structural composition	Condition	Representative photograph
<p>11.7.2x3# <i>Acacia rhodoxylon</i> tall shrubland on Cretaceous trachyte</p> <p>VM Act Status – least concern</p> <p>Biodiversity status – no concern at present</p> <p>EPBC Act status – not listed</p>	<p>This community was recorded upon the northeast-facing slopes of Mt Ramsay in the eastern portion of additional investigation area.</p> <p>The community subsists on skeletal soils amongst trachyte scree and boulders and as such has a variable canopy cover. The canopy was typically comprised of Rosewood (<i>Acacia rhodoxylon</i>) and/or Catkin Wattle (<i>Acacia julifera</i>). Species that are commonly associated with adjacent vegetation types were recorded infrequently within the canopy layer near the ecotone of the community. The canopy layer had a median height of 5 m and cover ranging from 15 to 45%.</p> <p>[NOTE: It should be noted that this combination of structural composition and underlying geology does not currently align with any regional ecosystem prescribed in the REDD. Consultation was undertaken with the mapping co-ordinators at the Queensland Herbarium and a consensus of opinion determined that at this stage the assigned RE will be sufficient to acknowledge the community until further information regarding similar landforms area assessed.]</p>	<p>The community was found to be reasonably intact and weed infiltration limited to the periphery. However, the effect of medium to high intensity fire events were evident throughout the community, particularly within the southern half of the patch.</p>	 <p>Q27 – lower slopes (in NE of patch)</p>  <p>Q33 – upper slopes (in NW of patch)</p>  <p>Q35 – upper slopes (in SW of patch)</p>

Regional Ecosystem	Species and structural composition	Condition	Representative photograph
<p>11.9.1 <i>Acacia harpophylla</i>- <i>Eucalyptus cambageana</i> woodland to open forest on fine-grained sedimentary rocks</p> <p>VM Act Status – endangered</p> <p>Biodiversity status – endangered</p> <p>EPBC Act status – Endangered</p>	<p>This vegetation type was recorded on the south-facing lower slopes of an undulated spur flowing off Mt Ramsay. The community was sparsely distributed with occasional canopy thickening, most likely as a result of inappropriate fire regimes and local quarrying and prospecting.</p> <p>The canopy layer was comprised of Dawson River Gum (<i>Eucalyptus cambageana</i>) and had a median height of 20 m and cover intercept ranging from 10 to 30%. The sub-canopy, which was representative of the ecologically dominant layer in parts of the patch, was comprised of Dawson River Gum and associated Rosewood.</p> <p>[NOTE: This community aligns most closely with RE 11.9.1, however it must be acknowledged that trachyte scree and boulders were prevalent within the patch, i.e. landzone 12. There isn't an RE that is representative of this structural composition subsisting on igneous rocks. It is anticipated that the community is interacting with soils derived in-situ from sedimentary rocks dispersed upward by the trachyte plug but protected from deep weathering during the Tertiary period by the colluvial cover of trachyte scree and boulders.]</p>	<p>The community was found to be moderately to markedly fragmented due to historic activities. Mistletoe load within the canopy was also prevalent throughout the community.</p> <p>The groundcover layer was heavily degraded by various exotic grasses.</p>	 <p>Q31 – looking across slope to E</p>  <p>Q31 – looking across slope to W</p>  <p>Q31 – soils</p>

Regional Ecosystem	Species and structural composition	Condition	Representative photograph
<p>11.12.1 <i>Eucalyptus crebra</i> woodland on igneous rocks</p> <p>VM Act Status – least concern</p> <p>Biodiversity status – no concern at present</p> <p>EPBC Act status – not listed</p>	<p>This community was recorded in four locations on all faces of Mt Ramsay in the eastern portion of the additional investigation area. All four patches display particular differences due to slope position, orientation and impacts of inappropriate fire regimes.</p> <p>In general, the community was typically dominated by Narrow-leaved Red Ironbark (<i>Eucalyptus crebra</i>) with Dawson River Gum and Variable-barked Bloodwood occurring infrequently. The canopy layer had an average median height of 15 m and cover intercept ranging from 15 to 30%.</p>	<p>The community was found to present with variable levels of condition. The distribution of this vegetation type on the upper slopes were found to be more intact than those on the lower slopes, possibly due to lesser impacts from inappropriate fire regimes and historic timber getting.</p> <p>The groundcover layer throughout much of this vegetation type was found to be heavily degraded by various exotic grasses.</p>	 <p>Q26 – NE portion flank of Mt Ramsay</p>  <p>Q32 – NW portion flank of Mt Ramsay</p>  <p>Q38 – SW portion flank of Mt Ramsay</p>

Regional Ecosystem	Species and structural composition	Condition	Representative photograph
<p>11.12.4a Semi-evergreen vine thicket with open patches of <i>Acacia fasciculifera</i>, <i>Archidendropsis thozetiana</i>, <i>Pleiogynium timorense</i> and various other species</p> <p>VM Act Status – least concern</p> <p>Biodiversity status – no concern at present</p> <p>EPBC Act status – not listed</p>	<p>This community was recorded in six locations on the northern, southern and eastern flanks of Mt Ramsay in the eastern portion of the additional investigation area. All patches display particular differences due to slope position, orientation and impacts of inappropriate fire regimes. Of particular note is the patch recorded on the north-facing slopes which has been significantly impacted by sustained inappropriate fire regimes. This regime has almost obliterated the community in some parts of this patch, however the community has been retained as remnant (Figure 10) because the causal effect for patch reduction has been anthropogenic.</p> <p>Typically, the canopy and sub-canopy of this community was commonly comprised of species such as Southern Siris (<i>Archidendropsis thozetiana</i>), Tingle Tongue (<i>Dinosperma erythroocca</i>), Broad-leaved Wilga (<i>Geijera</i>), Corky Milk Vine (<i>Secamone elliptica</i>), Glossocarya (<i>Glossocarya hemiderma</i>), no common name (<i>Cissus reniformis</i>) and Little Kurrajong (<i>Brachychiton bidwillii</i>), Yellow Tulip (<i>Drypetes deplanchei</i>) with Southern Siris, Bottle Trees (<i>Brachychiton spp.</i>) and Helicopter Tree (<i>Gyrocarpus americanus</i>) occurring as emergents (median 12 m, 10%). The canopy layer had a median height of 8 m and cover ranging from 60 to 90%</p> <p>Species such as Coastal Canthium (<i>Cyclophyllum coprosmoides</i>), Python Tree (<i>Gossia bidwillii</i>), Corky Nightshade (<i>Solanum furfuraceum</i>) and Soft Acalypha (<i>Acalypha eremorum</i>) were commonly recorded in the shrub layer of this community.</p>	<p>Aside from the northern distribution of this vegetation type, the overall condition of this vegetation type was found to be reasonably sound and resilient to weed infiltration.</p>	 <p>Q36 – East flank of Mt Ramsay</p>  <p>Q36 – East flank of Mt Ramsay</p>  <p>Qp46 – Northern flank of Mt Ramsay impacted by fire</p>

Appendix F

Flora species recorded in the project area

Table F1 Flora species recorded in vegetation assessment sites in the project area

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses											
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r												
				S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Padd-ocks	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR	11.5.9 HVR	11.7.2 n-r			
<i>Abelmoschus ficulneus</i>	Native Rosella	LC	nl												1										
<i>Abutilon malvifolium</i>	Mallow-leaved Lantern Flower	LC	nl		2 (e)	+ (e,t)	1				2					1							2		
<i>Abutilon otocarpum</i>	Flannel Weed	LC	nl				1																		
<i>Acacia excelsa</i>	Ironwood	LC	nl															2							
<i>Acacia fasciculifera</i>	Scaly Bark	LC	nl							1					3-4	1									
<i>Acacia harpophylla</i>	Brigalow	LC	nl		3-5 (e)	3-4	3			2	5-6	1 (e)				5							6		
<i>Acacia maidenii</i>	Maiden's Wattle	LC	nl												2										
<i>Acacia oswaldii</i>	Umbrella Wattle	LC	nl		3 (e)					1	1				2	1									
<i>Acacia rhodoxylon</i>	Rosewood	LC	nl																					4-5	
<i>Acacia salicina</i>	Sally Wattle	LC	nl	2	1 (e)		2					1						4-5	4						
<i>Acacia stenophylla</i>	<i>ncn</i>	LC	nl				1																		
<i>Acalypha eremorum</i>	<i>ncn</i>	LC	nl									1-3 (e)	3-4	3											
<i>Achyranthes aspera</i>	Chaff Flower	LC	nl				1				1	+											2		
<i>Aeschynomene indica</i>	Buddha Pea	*	*	2		+												1							
<i>Afrohybanthus enneaspermus</i>	Purple Spade Flower	LC	nl									1													
<i>Alectryon connatus</i>	Bird's Eye	LC	nl										3-4	+											3
<i>Alectryon diversifolius</i>	Scrub Boonaree	LC	nl		4 (e)	2		4	4	4	2-3	2	3												
<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>	Western Rosewood	LC	nl				2					+							1						
<i>Alectryon pubescens</i>	Hairy Boonaree	LC	nl											1											
<i>Alphitonia excelsa</i>	Red Ash	LC	nl						1		1														1
<i>Alstonia constricta</i>	Bitterbark	LC	nl						2		3-4	1													2
<i>Alternanthera denticulata</i>	Lesser Joyweed	LC	nl	1	2	2-3	1 (bk)				2					1			+				1		
<i>Alternanthera nana</i>	(a) Joyweed	LC	nl		+			2	2																
<i>Alternanthera nodiflora</i>	Joyweed	LC	nl	+		+					2														
<i>Alternanthera pungens</i>	Khaki Weed	*	*												+2 (tk)								2		
<i>Ammannia multiflora</i>	Jerry-jerry	LC	nl	1	2						2					1								1	
<i>Amyema biniflorum</i>	<i>ncn</i>	LC	nl									1													
<i>Amyema congener</i> subsp. <i>congener</i>	Variable Mistletoe	LC	nl			1 (t)						+			3										

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses								
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r									
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Padd- ocks	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR
<i>Amyema maidenii</i> subsp. <i>angustifolium</i>	Pale-leaved Mistletoe	LC	nl						+	2				1							2	
<i>Amyema quandang</i> var. <i>bancroftii</i>	Grey Mistletoe	LC	nl		2 (e)				+	3				2	2					1		
<i>Aponogeton queenslandicus</i>	<i>ncn</i>	LC	nl			2																
<i>Apophyllum anomalum</i>	Warrior Bush	LC	nl					1	+				1		+					+		
<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Mexican Poppy	*	*											+								
<i>Aristida calycina</i> subsp. <i>calycina</i>	Dark Wiregrass	LC	nl								1											
<i>Aristida gracilipes</i>	<i>ncn</i>	LC	nl																1			
<i>Aristida holathera</i>	Kerosene Grass	LC	nl								1											
<i>Aristida jerichoensis</i> subsp. <i>jerichoensis</i>	(a) Wiregrass	LC	nl								1											
<i>Aristida latifolia</i>	Feathertop Wiregrass	LC	nl								+											
<i>Aristida lazardis</i>	<i>ncn</i>	LC	nl					+														
<i>Aristolochia meridionalis</i>	<i>ncn</i>	LC	nl								+											
<i>Astrebula elymoides</i>	Mitchell Grass	LC	nl											+4			+4					
<i>Atalaya hemiglauca</i>	Whitewood	LC	nl		2-3 (e)	+	(e,t)	2		2	+						2					
<i>Atriplex muelleri</i>	Annual Saltbush	LC	nl											+								
<i>Azolla filiculoides</i>	<i>ncn</i>	LC	nl			2																
<i>Azolla pinnata</i>	Azolla Fern	LC	nl											2 (d)								
<i>Backhousia angustifolia</i>	Narrow-leaved Backhousia	LC	nl										3								2	
<i>Basilicum polystachyon</i>	Musk Basil	LC	nl					+														
<i>Bidens bipinnata</i>	Cobbler's Pegs	*	*														1					
<i>Boerhavia dominii</i>	Tar Vine	LC	nl		2 (e)		2										1					
<i>Bothriochloa bladhii</i>	Forest Bluegrass	LC	nl													1						
<i>Bothriochloa decipiens</i> subsp. <i>decipiens</i>	Pitted Bluegrass	LC	nl								+	(t)					3-4					
<i>Bothriochloa pertusa</i>	Indian Bluegrass	*	*						2		2-3						2-3					
<i>Brachychiton australis</i>	Large-leaved Bottle Grass	LC	nl								+	(e)		2								
<i>Brachychiton bidwillii</i>	Little Kurrajong	LC	nl																2			1
<i>Brachychiton rupestris</i>	Queensland Bottle Tree	LC	nl					+	1	1	4	2	2									
<i>Brassica tournefortii</i>	Wild Turnip	*	*	+																		
<i>Breynia oblongifolia</i>	Coffee Bush	LC	nl								2											+

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses								
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r									
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Paddock	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR
<i>Bridelia leichhardtii</i>	Small-leaved Scrub Ironbark	LC	nl								3										2	
<i>Brunoniella australis</i>	Blue Trumpet	LC	nl					1	1	2	1											
<i>Caldesia oligococca</i>	ncn	LC	nl			1																+3 (g)
<i>Calotis scabiosifolia</i> var. <i>scabiosifolia</i>	Rough Burr-daisy	LC	nl		1																	2
<i>Capparis lasiantha</i>	Nipan	LC	nl		1 (e)		2	1	2	2	1		2									+
<i>Capparis loranthifolia</i>	Narrow-leaved Bumble	LC	nl		1 (e)				2	+	2	3	3									
<i>Capparis mitchellii</i>	Wild Orange	LC	nl			1 (t)		2	3		2		2-3									
<i>Cardiospermum halicacabum</i>	ncn	*	*				1															
<i>Carex inversa</i>	Knob Sedge	LC	nl		1	3-5																
<i>Carissa ovata</i>	Currant Bush	LC	nl					3	3	1	2-3	3-4	3-4									+
<i>Cassia brewsteri</i>	Leichhardt Bean	LC	nl								+	(t)										
<i>Cenchrus ciliaris</i>	Buffel Grass	*	*		2 (e)			2	5	2-5	3-5		4-5									3(g)
<i>Centipeda minima</i> subsp. <i>minima</i>	ncn	LC	nl			3					2											
<i>Chamaecrista absus</i>	ncn	LC	nl								2											
<i>Chamaesyce australis</i>	Caustic Weed	LC	nl			+	(t)															2
<i>Chamaesyce drummondii</i>	Caustic Weed	LC	nl											2								
<i>Chamaesyce</i> sp. (n-r)	ncn	LC	nl		1																	
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Mulga Fern	LC	nl								2											
<i>Chloris inflata</i>	Purpletop Grass	*	*			+	(e) (t)															1
<i>Citrus glauca</i>	Wild Lime	LC	nl					1	3-4	2-3												
<i>Clematicissus opaca</i>	Forest Grape	LC	nl		1 (e)			1	2	2	1 (t)	2	2									1
<i>Clerodendrum floribundum</i>	Lolly Bush	LC	nl										+									
<i>Coatesia paniculata</i>	Axebreaker	LC	nl										4									
<i>Commelina diffusa</i>	Native Wandering Jew	LC	nl				1				1											
<i>Commelina ensifolia</i>	ncn	LC	nl			1																
<i>Conyza bonariensis</i>	Fleabane	*	*								+											
<i>Conyza</i> sp.	Fleabane	*	*	+		+	(e)															
<i>Corchorus trilocularis</i>	Native Jute	LC	nl								+											
<i>Corymbia clarksoniana</i>	Long-fruited Bloodwood	LC	nl								4											
<i>Corymbia tessellaris</i>	Carbeen	LC	nl								4-5	+										

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses									
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r										
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Paddock	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR	11.5.9 HVR
<i>Crinum flaccidum</i>	Murray Lily	LC	nl										1										
<i>Crotalaria gorensis</i>	Gambia Pea	*	*																			1	
<i>Crotalaria medicaginea</i>	Tre-foil Rattlepod	*	*										+										
<i>Crotalaria novae-hollandiae</i>	New Holland Rattlepod	LC	nl										2										
<i>Croton insularis</i>	Silver Croton	LC	nl												+						1		
<i>Cucumis melo</i> subsp. <i>agrestis</i>	Wild Melon	LC	nl																				1
<i>Cyanthillium cinereum</i>	Vernonia	LC	nl					2					2										
<i>Cycnogeton dubium</i>	Water Ribbons	LC	nl					1															
<i>Cycnogeton multifructa</i>	Water Ribbons	LC	nl																				
<i>Cymbidium canaliculatum</i>	Black Orchid	LC	nl																				
<i>Cynodon dactylon</i> var. <i>dactylon</i>	Couch Grass	*	*																				
<i>Cyperus betchei</i>	<i>ncn</i>	LC	nl					1															
<i>Cyperus concinnus</i>	<i>ncn</i>	LC	nl										2										
<i>Cyperus difformis</i>	Dirty Dora	LC	nl					1															
<i>Cyperus fulvus</i>	<i>ncn</i>	LC	nl																				
<i>Cyperus gracilis</i>	Whisker Grass	LC	nl					1	1	2	2	2	2	2									
<i>Cyperus iria</i>	<i>ncn</i>	LC	nl										1										
<i>Cyperus isabellinus</i>	<i>ncn</i>	LC	nl					2															
<i>Cyperus javanicus</i>	<i>ncn</i>	LC	nl																				
<i>Cyperus victoriensis</i>	<i>ncn</i>	LC	nl					2															
<i>Dactyloctenium radulans</i>	Button Grass	LC	nl																				
<i>Damasonium minus</i>	Star Fruit	LC	nl					2															
<i>Dendrophthoe glabrescens</i>	Orange-flowered Mistletoe	LC	nl																				
<i>Denhamia oleaster</i>	Stiff Denhamia	LC	nl										1										
<i>Desmodium brachypodium</i>	Large Tick Tre-foil	LC	nl																				
<i>Desmodium campylocaulon</i>	Creeping Tick-trefoil	LC	nl																				
<i>Desmodium macrocarpum</i>	Large-fruited Trefoil	LC	nl																				
<i>Desmodium varians</i>	Slender Tick-trefoil	LC	nl																				
<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>	Queensland Bluegrass	LC	nl					1 (t)															
<i>Dichanthium fecundum</i>	<i>ncn</i>	LC	nl																				

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses									
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r										
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Padd- ocks	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR	11.5.9 HVR
<i>Eremophila debile</i>	Winter Apple	LC	nl		+		1									+		1					
<i>Eremophila mitchellii</i>	False Sandalwood	LC	nl		1 (e)					2	1												
<i>Erigeron sumatrensis</i>	Fleabane	*	*											1									
<i>Eriochloa crebra</i>	Cup Grass	LC	nl	2	1	2	1								1	2	2						
<i>Eriochloa procera</i>	Early Spring Grass	LC	nl			1																	
<i>Eryngium plantagineum</i>	Long Eryngium	LC	nl	+																			
<i>Erythroxyllum</i> sp. (Splityard Creek L.Pedley 5360)	ncn	LC	nl						2				+	3									+
<i>Eucalyptus cambageana</i>	Dawson River Gum	LC	nl					6	6					+									
<i>Eucalyptus coolabah</i>	Coolabah	LC	nl	6	6	3-4	4-5								3	3-4	6						
<i>Eucalyptus populnea</i>	Poplar Box	LC	nl						+	+	4-5												
<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i>	Queensland Blue Gum	LC	nl				2						+2 (t)										
<i>Eulalia aurea</i>	Silky Browntop	LC	nl	1													1						
<i>Euphorbia australis</i> var. <i>erythrantha</i>	(a) Caustic Weed	LC	nl										+										
<i>Euphorbia drummondii</i>	ncn	LC	nl				2																
<i>Eustrephus latifolius</i>	Wombat Berry	LC	nl				2			1	1												
<i>Everistia vacciniifolia</i> var. <i>nervosa</i>	Small-leaved Canthium	LC	nl						1				+	+								2	
<i>Evolvulus alsinoides</i> subsp. <i>sericea</i>	Creeping Speedwell	LC	nl								1												
<i>Excoecaria dallachyana</i>	Blind-your-eye	LC	nl										1										
<i>Exocarpos latifolius</i>	Native Cherry	LC	nl								1 (e)			1								1	
<i>Ficus obliqua</i>	Small-leaved Fig	LC	nl																	+			
<i>Ficus opposita</i>	Sandpaper Fig	LC	nl																			+	
<i>Fimbristylis dichotoma</i>	ncn	LC	nl						1		1												
<i>Flindersia australis</i>	Crow's Ash	LC	nl												+								
<i>Flueggea leucopyrus</i>	Bush Weed	LC	nl								1				+								
<i>Galactia tenuiflora</i>	ncn	LC	nl								+2												
<i>Geijera parviflora</i>	Wilga	LC	nl		+				1	+	1 (e)	2		4									2
<i>Geijera salicifolia</i>	Broad-leaved Wilga	LC	nl											2								1	
<i>Glandularia aristigera</i>	Mayne's Pest	*	*		+										3-4								
<i>Glinus lotoides</i>	Hairy Carpet Weed	LC	nl		2						1				2 (d)								

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses									
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r										
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Paddock	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR	11.5.9 HVR
<i>Glossocarya hemiderma</i>	Glossocarya	LC	nl						+			3											
<i>Glycine campylocaulon</i>	ncn	LC	nl	2-3																			
<i>Glycine tomentella</i>	Woolly Glycine	LC	nl							2													
<i>Gomphrena celosioides</i>	Gomphrena Weed	*	*						2	1 (e)								+					
<i>Goodenia glabra</i>	ncn	LC	nl											+	(cv)								
<i>Gratiola pedunculata</i>	ncn	LC	nl			2													+	2			
<i>Grewia latifolia</i>	Dysentery Bush	LC	nl							2													
<i>Haloragis aspera</i>	Rough Raspwort	LC	nl											1					1 (e)				
<i>Harrisia martinii</i>	Harissia Cactus	*	*							+													
<i>Heteropogon contortus</i>	Black Speargrass	LC	nl								3												
<i>Hibiscus meraukensis</i>	Merauke Hibiscus	LC	nl																				1
<i>Hibiscus sturtii</i> var. <i>sturtii</i>	Hill's Hibiscus	LC	nl								+									+			
<i>Hibiscus verdcourtii</i>	Bladder Ketmia	LC	nl											1	3	2							
<i>Hovea longipes</i>	Scrub Hovea	LC	nl						1	+3													2
<i>Hydrilla</i> sp.	ncn	LC	nl			2																	
<i>Indigofera colutea</i>	ncn	LC	nl								2												
<i>Indigofera hirsuta</i>	ncn	LC	nl																				1
<i>Indigofera suffruticosa</i>	ncn	LC	nl								2												
<i>Ipomoea plebeia</i>	Bell Vine	LC	nl		1	+ (e)																	+
<i>Iseilema vaginiflorum</i>	Red Flinders Grass	LC	nl											1-2					1				
<i>Jacquemontia paniculata</i>	ncn	LC	nl								2												
<i>Jasminum didymum</i> subsp. <i>racemosum</i>	Slender Jasmine	LC	nl				+		2	1	1	2	3										
<i>Juncus aridicola</i>	ncn	LC	nl		1	2																	
<i>Juncus continuus</i>	ncn	LC	nl							1													
<i>Juncus usitatus</i>	Common Rush	LC	nl					1 (bk)															
<i>Juncus</i> sp. (n-r)	ncn	LC	nl		1	+																	
<i>Lactuca serriola</i>	Prickly Lettuce	*	*											2									
<i>Leersia hexandra</i>	Swamp Rice Grass	LC	nl																2				+2
<i>Leptochloa digitata</i>	Umbrella Canegrass	LC	nl		2-3	+ (t)				1				+2 (g)					+				
<i>Lindernia alsinoides</i>	ncn	LC	nl	1																			

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				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r										
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Padd-ocks	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR	11.5.9 HVR
<i>Lipocarpa microcephala</i>	<i>ncn</i>	LC	nl													1(g)							
<i>Ludwigia octovalvis</i>	Native Willow Primrose	LC	nl																+				
<i>Ludwigia peploides</i> subsp. <i>montividenensis</i>	Creeping Primrose	LC	nl			2								1-3 (d)	1								
<i>Ludwigia perennis</i>	<i>ncn</i>	LC	nl							2													
<i>Lysiana subfalcata</i>	Northern Mistletoe	LC	nl							2				1	2		2						
<i>Lysiphyllum carronii</i>	Red-flowered Bauhinia	LC	nl		1 (e)	1 (e,t)	+			3													
<i>Lysiphyllum hookeri</i>	Pegunny	LC	nl		2-3			2-3	1-3		1-3	4	3		3								
<i>Macroptilium atropurpureum</i>	Sirato	*	*													+							
<i>Macroptilium lathyroides</i>	Phasey Bean	*	*													+							
<i>Maireana microphylla</i>	Blue Saltbush	LC	nl																			+	
<i>Malva parviflora</i>	Small-flowered Mallow	*	*												3 (cv)								
<i>Malvastrum americanum</i> var. <i>americanum</i>	Spiked Malvastrum	*	*	+2 (e,t)	1 (e)	1-2 (e)	2			1	1			2	1		+				1		
<i>Malvastrum coromandelianum</i>	Red-flowered Malvastrum	*	*												+	1						+	
<i>Marsdenia australis</i>	Native Pear	LC	nl		1 (e)				1		+												
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>	Native Pear	LC	nl							1													
<i>Marsilea drummondii</i>	Common Nardoo	LC	nl	3		3				1								1					
<i>Marsilea exarata</i>	<i>ncn</i>	LC	nl													1							
<i>Marsilea hirsuta</i>	Hairy Nardoo	LC	nl		3-4											2							
<i>Megathyrsus maximus</i> var. <i>pubiglumis</i>	Green Panic	*	*		+4 (e)	+4 (e)	2-5	2-5	3-4		3-4	5-6	5									4	3
<i>Melaleuca bracteata</i>	Black Tea Tree	LC	nl			5-6					1 (e)												
<i>Melaleuca trichostachya</i>	River Tea Tree	LC	nl				3 (bk)																
<i>Melinis repens</i>	Red Natal Grass	*	*	1							3-4												3
<i>Monochoria cyanea</i>	Pond Hyacinth	LC	nl	1-2						1					1-2 (g)	1							
<i>Murdannia graminea</i>	Slug Herb	LC	nl	1 (t)																			
<i>Murraya ovatifoliata</i>	Mock Orange	LC	nl								1	3-4	+										2
<i>Myrsine variabilis</i>	Muttonwood	LC	nl																				
<i>Neptunia gracilis</i>	Native Sensitive Plant	LC	nl	+												+2			2				
<i>Notelaea microcarpa</i> var. <i>microcarpa</i>	Narrow-leaved Mock Olive	LC	nl						2		2	2	1										

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses												
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r													
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Padd- ocks	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR	11.5.9 HVR	11.7.2 n-r		
<i>Nymphoides indica</i>	Water Snowflake	LC	nl																				1			
<i>Nyssanthes erecta</i>	ncn	LC	nl									1	+											1		
<i>Ocimum tenuiflorum</i>	Native Thyme	LC	nl	2	1	3-5	1 (bk)					2-3					3								2	
<i>Opuntia aurantiaca</i>	Tiger Pear	*(RI)	*(WoNS)				1																			
<i>Opuntia stricta</i>	Prickly Pear	*(RI)	*(WoNS)										+													
<i>Opuntia tomentosa</i>	Velvet Prickly Pear	*(RI)	*(WoNS)							1	1	2	2													
<i>Ottelia ovalifolia</i>	Swamp Lily	LC	nl									3 (d)														
<i>Owenia acidula</i>	Emu Apple	LC	nl									2														
<i>Owenia venosa</i>	Crow's Apple	LC	nl																							
<i>Owenia x reliqua</i>	Bellata Owenia	LC	nl										+													
<i>Oxalis perennans</i>	ncn	LC	nl										+													
<i>Pandorea pandorana</i>	Wonga Vine	LC	nl										1	+												
<i>Panicum antidotale</i>	Blue Panic	*	*																							
<i>Panicum decompositum</i> var. <i>decompositum</i>	Native Millet	LC	nl		1																					
<i>Panicum larcomianum</i>	ncn	LC	nl	3			2-3																			
<i>Panicum queenslandicum</i>	Yabilla Grass	LC	nl	2																						
<i>Parsonsia eucalyptophylla</i>	Gargaloo	LC	nl																							
<i>Parsonsia lanceolata</i> var. <i>lanceolata</i>	Rough Silkpod	LC	nl									1		+		2										
<i>Parthenium hysterophorus</i>	Parthenium	*(RI)	*(WoNS)																							
<i>Paspalidium caespitosum</i>	Brigalow Grass	LC	nl									2														
<i>Paspalidium gausum</i>	Shot Grass	LC	nl									2														
<i>Paspalidium jubiflorum</i>	Warrego Grass	LC	nl									2	2													
<i>Paspalum distichum</i>	Water Couch	LC	nl																							
<i>Passiflora foetida</i>	Stinking Passionfruit	*	*									1														
<i>Peripleura hispidula</i>	ncn	LC	nl																							
<i>Persicaria attenuata</i>	Smartweed	LC	nl																							
<i>Petalostigma pubescens</i>	Quinine Bush	LC	nl																							
<i>Phyllanthus maderaspatensis</i>	ncn	LC	nl		1																					
<i>Phyllanthus virgatus</i>	ncn	LC	nl																							

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses								
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r									
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Padd- ocks	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR
<i>Physalis minima</i>	Gooseberry	*	*										2									
<i>Physalis peruviana</i>	Cape Gooseberry	*	*											3								
<i>Pittosporum angustifolium</i>	Weeping Pittosporum	LC	nl							+	(t)											
<i>Pittosporum spinescens</i>	Wallaby Apple	LC	nl						1	+	2-3		2									
<i>Planchonella cotinifolia</i> subsp. <i>pubescens</i>	Lemon Aspen	LC	nl									4	3								2-3	
<i>Plectranthus parviflorus</i>	Cockspur Flower	LC	nl							+												
<i>Polycarpaea corymbosa</i>	<i>ncn</i>	LC	nl										1									
<i>Polymeria ambigua</i>	Creeping Polymeria	LC	nl				1										2					
<i>Polymeria pusilla</i>	<i>ncn</i>	LC	nl											1								
<i>Portulaca bicolor</i>	<i>ncn</i>	LC	nl																			
<i>Portulaca filifolia</i>	<i>ncn</i>	LC	nl										2									
<i>Portulaca oleracea</i>	Pigweed	*	*	1								2		1			1				2	
<i>Portulaca pilosa</i>	Hairy Pigweed	*	*																			
<i>Potamogeton tricarinatus</i>	Floating Pondweed	LC	nl											2 (d)								
<i>Pratia concolor</i>	<i>ncn</i>	LC	nl																			
<i>Pseuderanthemum tenellum</i>	<i>ncn</i>	LC	nl																			
<i>Pseuderanthemum variable</i>	<i>ncn</i>	LC	nl				2				1		2							1		
<i>Pseudoraphis spinescens</i>	Spiny Mudgrass	LC	nl										2									
<i>Psitia stratiotes</i>	Water Lettuce	*(RI)	*											1(d)								
<i>Psyrax buxifolia</i>	Stiff Canthium	LC	nl										1									
<i>Psyrax johnsonii</i>	Brigalow Canthium	LC	nl						1	1	1	2									2	
<i>Psyrax odorata</i>	Shiny-leaved Canthium	LC	nl									2 (e)	2									
<i>Psyrax odorata forma buxifolia</i>	Stiff-leaved Canthium	LC	nl																			
<i>Psyrax oleifolium</i>	Myrtle Bush	LC	nl									1-3										
<i>Pterocaulon redolens</i>	<i>ncn</i>	LC	nl									1										
<i>Pterocaulon sphacelatum</i>	Fruit-salad Plant	LC	nl																			
<i>Rhodanthe polyphylla</i>	<i>ncn</i>	LC	nl	1																		
<i>Rhynchosia minima var. australis</i>	Rhyncho	LC	nl										1									
<i>Rorippa eustylis</i>	<i>ncn</i>	LC	nl				2-3					2										
<i>Rostellularia adscendens</i>	Pink Tongues	LC	nl				1					1	1									

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses									
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r										
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Padd- ocks	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR	11.5.9 HVR
<i>Salsola kali</i>	Soft Roly Poly	LC	nl							1					1								
<i>Santalum lanceolatum</i>	Sandalwood	LC	nl				1			2			1							2			
<i>Schoenoplectiella dissachantha</i>	<i>ncn</i>	LC	nl			1																	
<i>Schoenoplectus vialis</i>	<i>ncn</i>	LC	nl		+																		
<i>Sclerolaena muricata</i>	<i>ncn</i>	LC	nl							2													
<i>Sclerolaena muricatus</i> var. <i>muricatus</i>	Black Roly Poly	LC	nl											1									
<i>Sclerolaena tetrauspis</i>	Brigalow Burr	LC	nl		2 (e)									1-3									
<i>Scoparia dulcis</i>	Scoparia	*	*							1													
<i>Secamone elliptica</i>	Corky Milk Vine	LC	nl							2	2	1											
<i>Senecio brigalowensis</i>	<i>ncn</i>	LC	nl			+	(e)																
<i>Senna barclayana</i>	Pepper-leaf Senna	LC	nl															+	(e)				
<i>Senna coronilloides</i>	Jewelbox Cassia	LC	nl																	+			
<i>Senna occidentalis</i>	Coffee Senna	*	*							1													
<i>Senna planitiicola</i>	Arsenic Bush	LC	nl				1																
<i>Sesbania cannabina</i> var. <i>cannabina</i>	Sesbania Pea	LC	nl	2	1	1				1				1-5 (cv)	3-4	5	1						
<i>Setaria sphacelata</i>	South African Pigeon Grass	*	*	+3 (t)			1							1-5 (cv)	1	2-3	2						
<i>Sida cordifolia</i>	Flannel Weed	LC	nl				1			2	1												
<i>Sida corrugata</i>	Corrugated Sida	LC	nl					1												1			
<i>Sida hackettiana</i>	<i>ncn</i>	LC	nl						1														
<i>Sida rhombifolia</i>	Paddy's Lucerne	*	*						+												2		
<i>Sida rohlenae</i>	Shrub Sida	LC	nl							1													
<i>Sida spinosa</i>	Spiny Sida	*	*	+	+	+	(e)	1		2				2-3	2	2	2			2			
<i>Sida subspicata</i>	Spiked Sida	LC	nl							+													
<i>Solanum elaeagnifolium</i>	<i>ncn</i>	E	nl							1										1			
<i>Solanum ellipticum</i>	Potato Bush	LC	nl							2													
<i>Solanum esuriale</i>	Quena	LC	nl							+							+	2					
<i>Solanum nigrum</i> subsp. <i>nigrum</i>	Blackberry Nightshade	*	*	+	(t)																		
<i>Sonchus oleraceus</i>	Milk Thistle	*	*		1 (e)	+	2 (e)			+				1									
<i>Sorghum arundinaceum</i>	Sorghum	*	*					6															
<i>Sorghum halapense</i>	Johnson's Grass	*	*	+																			

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses											
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r												
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Padd- ocks	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR	11.5.9 HVR	11.7.2 n-r	
<i>Spartothamnella juncea</i>	Red-fruited Stick Plant	LC	nl												+										
<i>Spermacoce brachystema</i>	ncn	LC	nl										2												
<i>Spirodela punctata</i>	Duckweed	LC	nl			2																			
<i>Sporobolus caroli</i>	Fairy Grass	LC	nl		2 (e)	1		1		2-3						+			3		1				
<i>Sporobolus creber</i>	Slender Rat's Tail Grass	LC	nl							+									4						
<i>Sporobolus mitchellii</i>	Swamp Rat's Tail Grass	LC	nl	+			2													+2					
<i>Stemodia glabella</i>	Smooth Blue Rod	LC	nl																2						
<i>Striga parviflora</i>	ncn	LC	nl																	+ (e)					
<i>Strychnos lucida</i>	Strychnine Tree	LC	nl																				2		
<i>Stylosanthes scabra</i>	Shrubby Stylo	*	*										2	1											
<i>Terminalia oblongata</i> subsp. <i>oblongata</i>	Yellow Wood	LC	nl										1-3								1				
<i>Tetragonia tetragonioides</i>	Warrigal Greens	LC	nl		1 (e)	+							+												
<i>Teucrium daucoidea</i>	ncn	LC	nl				2																		
<i>Thellungia advena</i>	Coolabah Grass	LC	nl		+															2					
<i>Themeda triandra</i>	Kangaroo Grass	LC	nl										+												
<i>Trianthema portulacastrum</i>	Black Pigweed	*	*		1 (e)	1 (e)	+													2-5			2		
<i>Trianthema triquetra</i>	Red Spinach	LC	nl										1							2 (cv)	1		1		
<i>Tribulus micrococcus</i>	Yellow Vine	LC	nl																	2-3	2				
<i>Tribulus terrestris</i>	Caltrop	*	*																	2 (cv)					
<i>Triflorensia ixoroides</i>	Shiny-leaved Tarena	LC	nl																				+		
<i>Trophis scandens</i> subsp. <i>scandens</i>	Burny Vine	LC	nl																						
<i>Turraea pubescens</i>	Witch Hazel	LC	nl																						
<i>Tylophora grandiflora</i>	Small-leaved Tylophora	LC	nl																						
<i>Typha domingensis</i>	Cumbungi	LC	nl																						
<i>Urochloa mosambicensis</i>	Sabi Grass	*	*		+2 (e)		2	1-5	3-4	1	2-3									3-4			+		4
<i>Urochloa mutica</i>	Para Grass	*	*																						
<i>Vachellia farnesiana</i>	Mimosa Bush	*(GBO)	*																						
<i>Ventilago viminalis</i>	Vine Tree	NL	LC										1												
<i>Verbena macrostachya</i>	ncn	LC	nl		1	+																		1	
<i>Vigna lanceolata</i> var. <i>lanceolata</i>	Maloga Bean	LC	nl																						

Botanical Name	Common Name	Status		Vegetation Communities and Relative Abundance										Additional species not recorded at secondary sites or during HRA traverses									
				11.3.3	11.3.3 n-r	11.3.3a HVR	11.3.25	11.4.8	11.4.8 n-r	11.4.9a HVR	11.5.9	11.5.15	11.5.15 n-r										
				NC Act (Biosecurity Act)	EPBC Act (WoNS)	S3	S5	S2	S11	S8 (ETL)	S4	S7, S9 (ETL)	S1	S4	S6	Padd- ocks	11.3.1 n-r	11.3.3 HVR	11.3.3 n-r	11.3.3a n-r	11.4.8 n-r	11.4.9a HVR	11.5.9 HVR
<i>Vittadinia cuneata</i>	ncn	LC	nl										+										
<i>Vittadinia pustulata</i>	ncn	LC	nl											+									
<i>Waltheria indica</i>	ncn	LC	nl										1										
<i>Walwhalleya subxerophila</i>	Gilgai Grass	LC	nl			1																	
<i>Xanthium pungens</i>	Noogera Burr	*(GBO)	*		1	+				1				2 (cv)	2								
<i>Xerothermella herbacea</i>	ncn	E	E																	+			
<i>Zaleya galericulata</i> subsp. <i>galericulata</i>	Hogweed	LC	nl											3-4									
<i>Zornia dyctiocarpa</i> subsp. <i>dyctiocarpa</i>	Zornia	LC	nl										1										
<i>Zygophyllum apiculatum</i>	Gallweed	LC	nl			+	(e)																

¹ Status under Queensland's *Nature Conservation Act 1992*: E = Endangered, LC = Least concern

² Status under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*: E = Endangered; nl = Not listed

* Denotes introduced taxa; RI = Restricted invasive species under *Biosecurity Act 2014*; ncn = no common name# ETL = electricity transmission line

Record details: cv = cultivation, d = dam, e = edge, t = traverse, tk = track

Relative abundance species was based on the Braun-Blanquet technique cover-abundance scale (Hurst and Allen 2007, Whittaker 1975, Mueller-Dombois 1974) as follows:

- + = one or two individuals only
- 1 = sparse, <5
- 2 = any number, <5%
- 3 = 5 - 24%
- 4 = 25 - 49%
- 5 = 50 - 74%
- 6 = 75 - 100%.

Appendix G

Fauna species recorded

Table G1: Fauna species recorded at systematic trap sites, incidentally and during drive spotlighting

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Amphibians											
Broad-palmed Rocket Frog	<i>Litoria latopalmata</i>	LC	NL					-, x(h)	x		
Bumpy Rocket Frog	<i>Litoria inermis</i>	LC	NL								
Cane Toad	<i>Rhinella marina</i>	*	-	2 (as) 1 (sp)	2 (pf) 18 (sp)			-, x(h)			
Desert Tree Frog	<i>Litoria rubella</i>	LC	NL				1 (pf)				
Eastern Sedge Frog	<i>Litoria fallax</i>	LC	NL					-, x(h)			
Green Tree Frog	<i>Litoria caerulea</i>	LC	NL		1 (pf)	1 (sp)	1 (as)		x		
Green-striped Burrowing Frog	<i>Cyclorana alboguttata</i>	LC	NL								1 (sp)
Ornate Burrowing Frog	<i>Platyplectrum ornatum</i>	LC	NL	1 (pf)		1 (pf) 1 (fu)	20 (pf)				
Roth's Tree Frog	<i>Litoria rothii</i>	LC	NL					-, x			
Rough Collared Frog	<i>Cyclorana verrucosa</i>	LC	NL								
Salmon-striped Frog	<i>Limnodynastes salmini</i>	LC	NL				1 (el)				
Short-footed Frog	<i>Cyclorana brevipes</i>	LC	NL								
Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>	LC	NL				1 (pf) 7 (sp)				
Striped Marsh Frog	<i>Limnodynastes peronii</i>	LC	NL						sp		
Birds											

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Apostlebird	<i>Struthidea cinerea</i>	LC	NL			bs	bs	x	x		
Australasian Darter	<i>Anhinga novaehollandiae</i>	LC	NL					x, x			
Australasian Figbird	<i>Sphecotheres vieilloti</i>	LC	NL								
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	LC	NL					x, x	x		
Australasian Pipit	<i>Anthus novaeseelandiae</i>	LC	NL					x, x	x		
Australian Bustard	<i>Ardeotis australis</i>	LC	NL					x, x			
Australian Hobby	<i>Falco longipennis</i>	LC	NL							x	
Australian Magpie	<i>Cracticus tibicen</i>	LC	NL					x, x	x		
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	LC	NL	h		sp (h)	sp (h)	x			
Australian Pelican	<i>Pelecanus conspicillatus</i>	LC	NL					x			
Australian Raven	<i>Corvus coronoides</i>	LC	NL				bs		x		
Australian Reed-Warbler	<i>Acrocephalus australis</i>	LC	NL					-, x			
Australian White Ibis	<i>Threskiornis molucca</i>	LC	NL		1 (ir)			x, x	x		
Australian Wood Duck	<i>Chenonetta jubata</i>	LC	NL								
Bar-shouldered Dove	<i>Geopelia humeralis</i>	LC	NL	bs				x			
Black Kite	<i>Milvus migrans</i>	LC	NL					x	x	x	
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	LC	NL	bs		bs	bs				
Black-faced Woodswallow	<i>Artamus cinereus</i>	LC	NL					x			
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	LC	NL			bs	bs		x		

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Black-fronted Dotterel	<i>Euseyornis melanops</i>	LC	NL						x	x	
Blue-winged Kookaburra	<i>Dacelo leachii</i>	LC	NL						x		
Black-winged Stilt	<i>Himantopus himantopus</i>	LC	NL								
Brolga	<i>Grus rubicunda</i>	LC	NL					x			
Brown Falcon	<i>Falco berigora</i>	LC	NL					x, x	x		
Brown Honeyeater	<i>Lichmera indistincta</i>	LC	NL						x		
Brown Quail	<i>Coturnix ypsilophora</i>	LC	NL					-, x			
Budgerigar	<i>Melopsittacus undulatus</i>	LC	NL					-, x			
Buff-banded Rail	<i>Gallirallus philippensis</i>	LC	NL								
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>	LC	NL			bs	bs				
Chestnut-breasted Mannikin	<i>Lonchura castaneothorax</i>	LC	NL						x		
Cicadabird	<i>Coracina tenuirostris</i>	LC	NL								
Cockatiel	<i>Nymphicus hollandicus</i>	LC	NL					-, x	x		
Common Bronzewing	<i>Phaps chalcoptera</i>	LC	NL					-, x			
Common Myna	<i>Sturnus tristis</i>	*	*						x		
Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>	LC	NL						x		
Crested Pigeon	<i>Ocyphaps lophotes</i>	LC	NL				bs	x	x		
Dollarbird	<i>Eurystomus orientalis</i>	LC	NL			bs	bs				
Double-barred Finch	<i>Taeniopygia bichenovii</i>	LC	NL		bs	bs			x		

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Eastern Barn Owl	<i>Tyto javanica</i>	LC	NL		h	sp (h)		x			
Eastern Great Egret	<i>Ardea modesta</i>	LC	NL						x		
Eastern Koel	<i>Eudynamys orientalis</i>	LC	NL			bs	bs				
Eastern Yellow Robin	<i>Eopsaltria australis</i>	LC	NL								
Emu	<i>Dromaius novaehollandiae</i>	LC	NL								
Eurasian Coot	<i>Fulica atra</i>	LC	NL								
Fairy Martin	<i>Petrochelidon ariel</i>	LC	NL					x	x		
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	LC	NL								
Forest Kingfisher	<i>Todiramphus macleayii</i>	LC	NL	bs					x		
Galah	<i>Eolophus roseicapillus</i>	LC	NL				bs	x, x	x	x	
Golden-headed Cisticola	<i>Cisticola exilis</i>	LC	NL					-, x	x		
Great Cormorant	<i>Phalacrocorax carbo</i>	LC	NL								
Grey Butcherbird	<i>Cracticus torquatus</i>	LC	NL				bs				
Grey Fantail	<i>Rhipidura albiscapa</i>	LC	NL	bs	bs			x		x	
Grey Teal	<i>Anas gracilis</i>	LC	NL					x, x	x		
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	LC	NL					x	x		
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	LC	NL								
Hardhead	<i>Aythya australis</i>	LC	NL						x		
Horsfield's Bushlark	<i>Mirafra javanica</i>	LC	NL					x, x	x		

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Intermediate Egret	<i>Ardea intermedia</i>	LC	NL					x, x			
Jacky Winter	<i>Microeca fascinans</i>	LC	NL		bs						
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	LC	NL	bs		bs	bs	x	x		
Leaden Flycatcher	<i>Myiagra rubecula</i>	LC	NL			bs			x		
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	LC	NL					x			
Little Bronze-Cuckoo	<i>Chalcites minutillus</i>	LC	NL								
Little Corella	<i>Cacatua sanguinea</i>	LC	NL								
Little Friarbird	<i>Philemon citreogularis</i>	LC	NL					x	x		
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	LC	NL					x			
Magpie-lark	<i>Grallina cyanoleuca</i>	LC	NL	bs				x, x	x		
Masked Lapwing	<i>Vanellus miles</i>	LC	NL					x, x	x		
Masked Woodswallow	<i>Artamus personatus</i>	LC	NL					-, x	x	x	
Mistletoebird	<i>Dicaeum hirundinaceum</i>	LC	NL	bs		bs	bs		x		
Nankeen Kestrel	<i>Falco cenchroides</i>	LC	NL					x, x	x	x	
Nankeen Night-Heron	<i>Nycticorax caledonicus</i>	LC	NL	LC	NL	LC	NL				
Noisy Friarbird	<i>Philemon corniculatus</i>	LC	NL						x		
Noisy Miner	<i>Manorina melanocephala</i>	LC	NL							x	
Nutmeg Mannikin	<i>Lonchura punctulata</i>	LC	NL						x		
Olive-backed Oriole	<i>Oriolus sagittatus</i>	LC	NL						x		

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Pacific Black Duck	<i>Anas superciliosa</i>	LC	NL					x, x	x		
Painted Button-quail	<i>Turnix varius</i>	LC	NL					-, x			
Pale-headed Rosella	<i>Platycercus adscitus</i>	LC	NL					x			
Pallid Cuckoo	<i>Cacomantis pallidus</i>	LC	NL	bs		bs		x			
Peaceful Dove	<i>Geopelia striata</i>	LC	NL	bs	bs	bs					
Pheasant Coucal	<i>Centropus phasianinus</i>	LC	NL	bs	bs	bs	bs		x		
Pied Butcherbird	<i>Cracticus nigrogularis</i>	LC	NL	bs		bs	bs		x		
Pied Currawong	<i>Strepera graculina</i>	LC	NL					x			
Plum-headed Finch	<i>Neochmia modesta</i>	LC	NL						x		
Plumed Whistling-Duck	<i>Dendrocygna eytoni</i>	LC	NL					-, x	x		
Purple Swamphen	<i>Porphyrio porphyrio</i>	LC	NL						x		
Rainbow Bee-eater	<i>Merops ornatus</i>	SLC	Mar		bs	bs	bs		x		
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	LC	NL			bs				x	
Red-backed Fairy-wren	<i>Malurus melanocephalus</i>	LC	NL					x, x	x		
Red-winged Parrot	<i>Aprosmictus erythropterus</i>	LC	NL					x, x			
Restless Flycatcher	<i>Myiagra inquieta</i>	LC	NL				bs	x	x		
Royal Spoonbill	<i>Platalea regia</i>	LC	NL					x			
Rufous Songlark	<i>Cincloramphus mathewsi</i>	LC	NL				bs	x, x			
Rufous Whistler	<i>Pachycephala rufiventris</i>	LC	NL	bs	bs	bs	bs				

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Shining Bronze-Cuckoo	<i>Chalcites lucidus</i>	LC	NL					x			
Spangled Drongo	<i>Dicrurus bracteatus</i>	LC	NL						x		
Spotted Harrier	<i>Circus assimilis</i>	LC	NL					-, x			
Southern Boobook	<i>Ninox novaeseelandiae</i>	LC	NL	cp							
Spotted Bowerbird	<i>Ptilonorhynchus maculatus</i>	LC	NL	bs							
Squatter Pigeon (southern)	<i>Geophaps scripta scripta</i>	V	V					x	x	x	
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	SLC	Mar				bs	-, x	x		
Striated Pardalote	<i>Pardalotus striatus</i>	LC	NL	bs		bs					
Striped Honeyeater	<i>Plectorhyncha lanceolata</i>	LC	NL	bs					x		
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	LC	NL	bs				x, x	x		
Superb Fairy-wren	<i>Malurus cyaneus</i>	LC	NL							x	
Tawny Frogmouth	<i>Podargus strigoides</i>	LC	NL			sp					
Tawny Grassbird	<i>Megalurus timoriensis</i>	LC	NL					-, x	x		
Torresian Crow	<i>Corvus orru</i>	LC	NL	bs ir	bs ir	bs	bs	x	x		
Variiegated Fairy-wren	<i>Malurus lamberti</i>	LC	NL								
Wandering Whistling-Duck	<i>Dendrocygna arcuata</i>	LC	NL					-, x	x		
Wedge-tailed Eagle	<i>Aquila audax</i>	LC	NL		bs			-, x			
Weebill	<i>Smicrornis brevirostris</i>	LC	NL		bs	bs (h)					

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Whistling Kite	<i>Haliastur sphenurus</i>	LC	NL				bs	x	x		
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	LC	NL								
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	LC	NL						x		
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	LC	NL				bs		x		
White-browed Woodswallow	<i>Artamus superciliosus</i>	LC	NL					-, x			
White-faced Heron	<i>Egretta novaehollandiae</i>	LC	NL					x, x			
White-necked Heron	<i>Ardea pacifica</i>	LC	NL					x, x			
White-throated Gerygone	<i>Gerygone albogularis</i>	LC	NL	bs		bs					
White-throated Honeyeater	<i>Melithreptus albogularis</i>	LC	NL	bs	bs	bs					
White-throated Treecreeper	<i>Cormobates leucophaea</i>	LC	NL								
White-winged Chough	<i>Corcorax melanorhamphos</i>	LC	NL	bs							
White-winged Triller	<i>Lalage sueurii</i>	LC	NL								
Willie Wagtail	<i>Rhipidura leucophrys</i>	LC	NL				bs	x, x	x		
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	LC	NL						x		
Yellow-throated Miner	<i>Manorina flavigula</i>	LC	NL	bs			bs				
Zebra Finch	<i>Taeniopygia guttata</i>	LC	NL					x, x	x		
Mammals											
Feral Cat	<i>Felis catus</i>	* (RI)	-								
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	LC	NL	2 (sp)			1 (sp)				

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Common Planigale	<i>Planigale maculata</i>	LC	NL	1 (pf)							
Delicate Mouse	<i>Pseudomys delicatulus</i>	LC	NL	1 (pf)			1 (pf)				
Dingo, Domestic Dog	<i>Canis lupus dingo</i> <i>Canis familiaris dingo</i>	* (RI)	-					-, tk			
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	LC	NL	2 (sp)				-, x			
Greater Glider	<i>Petauroides volans</i>	LC	NL								
House Mouse	<i>Mus musculus</i>	* (RI)	-								
Little Red Flying-fox	<i>Pteropus scapulatus</i>	LC	NL								
Northern Brown Bandicoot	<i>Isodon macrourus</i>	LC	NL								sp
Pig	<i>Sus scrofa</i>	* (RI)	-					-, x			
Rabbit	<i>Oryctolagus cuniculus</i>	* (RI)	-			1 (sp)					sp
Yellow-bellied Sheath-tailed Bat	<i>Saccolaimus flaviventris</i>	LC	NL				sp (h)				
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	SLC	NL						sc		
Squirrel Glider	<i>Petaurus norfolcensis</i>	LC	NL								
Reptiles											
Brown Tree Snake	<i>Boiga irregularis</i>	LC	NL								
Burns' Dragon	<i>Amphibolurus burnsi</i>	LC	NL								
Bynoe's Gecko	<i>Heteronotia binoei</i>	LC	NL	2 (as)	1 (as) 1 (pf)		1 (as)				

Common Name	Scientific Name	Status		TS1	TS2	TS3	TS4	Incidental 2017	Incidental 2020	Incidental ETL	Drive
		NC Act	EPBC Act								
Carpentaria Snake	<i>Cryptophis boschmai</i>	LC	NL								
Chain-backed Dtella	<i>Gehyra catenata</i>	LC	NL								
Dubious Dtella	<i>Gehyra dubia</i>	LC	NL				3 (sp)				
Elegant Snake-eyed Skink	<i>Cryptoblepharus pulcher</i>	LC	NL		2 (as)						
Iridescent Litter-Skink	<i>Lygisaurus foliorum</i>	LC	NL		1 (pf) 1 (as)	1 (as)	1 (pf)				
Keelback	<i>Tropidonophis mairii</i>	LC	NL		5 (sp)						
Ocellated Velvet Gecko	<i>Oedura monilis</i>	LC	NL								
Open-litter Rainbow-skink	<i>Carlia pectoralis</i>	LC	NL			1 (pf) 1 (fu)	2 (pf) 1 (as)				
Ornamental Snake	<i>Denisonia maculata</i>	V	V								
Ragged Snake-eyed Skink	<i>Cryptoblepharus pannosus</i>	LC	NL			1 (pf) 1 (fu)					
South-eastern Morethia Skink	<i>Morethia boulengeri</i>	LC	NL	1 (as)			1 (pf)				
Spotted Python	<i>Antaresia maculosa</i>	LC	NL								sp
Three-clawed Worm-skink	<i>Anomalopus verreauxii</i>	LC	NL				2 (pf)				
Yellow-faced Whipsnake	<i>Demansia psammophis</i>	LC	NL				1 (fu)				

¹ Status under Queensland's *Nature Conservation Act 1992*: V = Vulnerable; LC = Least concern; SLC = Special least concern

² Status under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*: V = Vulnerable; Mi = Migratory; NL = Not listed

³ Presence/absence of species indicated for 'post-wet season, dry season'

* ETL = electricity transmission line; Denotes introduced taxa; RI = Restricted invasive species under *Biosecurity Act 2014*.

TS – Trap site; as = Active search; bs = Bird survey; cp = Call playback; el = Elliot trap; h = Heard; ir = Infrared camera; pf = Pitfall; sc = Scats; sp = Spotlight; tk = Track or digging; x = Present

Common Name	Scientific Name	Status		Supp1	Supp 1 (DS)	Supp2	Supp3	Supp4	Supp5	Supp6	Supp6 (as)	Supp7	Supp8	Supp8 (as)	Supp9	Supp10	Supp10	Supp11	Supp12	Supp13	Supp14	Supp15	Supp16	Supp17	Supp18	Supp19	Supp20	Supp21	Supp22	Supp23	Supp24	Supp25	Supp26	Supp27	Supp28	Supp29	Supp30	Supp31	Supp32	Supp33								
		NC Act	EPBC Act																																													
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	LC	NL																				bs		bs									bs														
Forest Kingfisher	<i>Todiramphus macleayii</i>	LC	NL																						bs								bs	bs		x			x									
Galah	<i>Eolophus roseicapillus</i>	LC	NL												bs								bs									bs					x		x	x								
Golden-headed Cisticola	<i>Cisticola exilis</i>	LC	NL								as																																					
Great Cormorant	<i>Phalacrocorax carbo</i>	LC	NL																						bs																							
Grey Butcherbird	<i>Cracticus torquatus</i>	LC	NL																																				x		x							
Grey Fantail	<i>Rhipidura albiscapa</i>	LC	NL	bs			bs																bs	bs	bs	bs					bs	bs	bs	bs														
Grey Teal	<i>Anas gracilis</i>	LC	NL																																													
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	LC	NL				bs																																			x		x				
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	LC	NL																	as			bs	bs																								
Hardhead	<i>Aythya australis</i>	LC	NL																																													
Horsfield's Bushlark	<i>Mirafra javanica</i>	LC	NL																																													
Intermediate Egret	<i>Ardea intermedia</i>	LC	NL								as																																					
Jacky Winter	<i>Microeca fascinans</i>	LC	NL																																													
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	LC	NL																					bs	bs							bs		bs								x		x				
Leaden Flycatcher	<i>Myiagra rubecula</i>	LC	NL																																													
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	LC	NL																																													
Little Bronze-Cuckoo	<i>Chalcites minutillus</i>	LC	NL																						bs	bs																						
Little Corella	<i>Cacatua sanguinea</i>	LC	NL																																									x				
Little Friarbird	<i>Philemon citreogularis</i>	LC	NL																	as														bs	bs		x			x	x							
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	LC	NL																																													
Magpie-lark	<i>Grallina cyanoleuca</i>	LC	NL	bs	as						as				bs		bs																											x		x		

Common Name	Scientific Name	Status		Supp1	Supp 1 (DS)	Supp2	Supp3	Supp4	Supp5	Supp6	Supp6 (h)	Supp7	Supp8	Supp8 (h)	Supp9	Supp10	Supp10	Supp11	Supp12	Supp13	Supp14	Supp15	Supp16	Supp17	Supp18	Supp19	Supp20	Supp21	Supp22	Supp23	Supp24	Supp25	Supp26	Supp27	Supp28	Supp29	Supp30	Supp31	Supp32	Supp33									
		NC Act	EPBC Act																																														
Masked Lapwing	<i>Vanellus miles</i>	LC	NL											20 (sp)																											x								
Masked Woodswallow	<i>Artamus personatus</i>	LC	NL																																														
Mistletoebird	<i>Dicaeum hirundinaceum</i>	LC	NL	bs	as															as					bs																		x	x	x	x			
Nankeen Kestrel	<i>Falco cenchroides</i>	LC	NL																		as																												
Nankeen Night-Heron	<i>Nycticorax caledonicus</i>	LC	NL	LC	NL	LC	NL	LC	NL	LC	NL	LC	NL	LC	NL	LC		NL	LC	NL																													
Noisy Friarbird	<i>Philemon corniculatus</i>	LC	NL																																									x					
Noisy Miner	<i>Manorina melanocephala</i>	LC	NL																																									x	x				
Nutmeg Mannikin	<i>Lonchura punctulata</i>	LC	NL																																														
Olive-backed Oriole	<i>Oriolus sagittatus</i>	LC	NL																																														
Pacific Black Duck	<i>Anas superciliosa</i>	LC	NL																																														
Painted Button-quail	<i>Turnix varius</i>	LC	NL											1 (sp)																																			
Pale-headed Rosella	<i>Platycercus adscitus</i>	LC	NL	bs				bs																																							x		
Pallid Cuckoo	<i>Cacomantis pallidus</i>	LC	NL	bs																			bs		bs																				x	x			
Peaceful Dove	<i>Geopelia striata</i>	LC	NL	bs																			bs	bs		bs																							
Pheasant Coucal	<i>Centropus phasianinus</i>	LC	NL	bs											bs								bs		bs																								
Pied Butcherbird	<i>Cracticus nigrogularis</i>	LC	NL	bs		bs										bs		bs																															
Pied Currawong	<i>Strepera graculina</i>	LC	NL										bs										bs																										
Plum-headed Finch	<i>Neochmia modesta</i>	LC	NL																		as																												
Plumed Whistling-Duck	<i>Dendrocygna eytoni</i>	LC	NL																																														
Purple Swamphen	<i>Porphyrio porphyrio</i>	LC	NL																																														
Rainbow Bee-eater	<i>Merops ornatus</i>	SLC	Mar		as (h)																	as		bs	bs																								

Common Name	Scientific Name	Status		Supp1	Supp 1 (DS)	Supp2	Supp3	Supp4	Supp5	Supp6	Supp6 (act)	Supp7	Supp8	Supp8 (act)	Supp9	Supp10	Supp10	Supp11	Supp12	Supp13	Supp14	Supp15	Supp16	Supp17	Supp18	Supp19	Supp20	Supp21	Supp22	Supp23	Supp24	Supp25	Supp26	Supp27	Supp28	Supp29	Supp30	Supp31	Supp32	Supp33			
		NC Act	EPBC Act																																								
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	LC	NL	bs											bs										bs									bs	x								
Red-backed Fairy-wren	<i>Malurus melanocephalus</i>	LC	NL			bs						bs									as										bs		bs			x						x	
Red-winged Parrot	<i>Aprosmictus erythropterus</i>	LC	NL								as													bs											bs		x					x	
Restless Flycatcher	<i>Myiagra inquieta</i>	LC	NL								as												bs															x				x	
Royal Spoonbill	<i>Platalea regia</i>	LC	NL								as																																
Rufous Songlark	<i>Cincloramphus mathewsi</i>	LC	NL									bs				bs					as	as																					
Rufous Whistler	<i>Pachycephala rufiventris</i>	LC	NL		as (h)		bs				as										as	as		bs		bs	bs							bs		bs		x					
Shining Bronze-Cuckoo	<i>Chalcites lucidus</i>	LC	NL																																								
Spangled Drongo	<i>Dicrurus bracteatus</i>	LC	NL																																								
Spotted Harrier	<i>Circus assimilis</i>	LC	NL																																								
Southern Boobook	<i>Ninox novaeseelandiae</i>	LC	NL																									sp															
Spotted Bowerbird	<i>Ptilonorhynchus maculatus</i>	LC	NL																																								x
Squatter Pigeon (southern)	<i>Geophaps scripta scripta</i>	V	V													as																											x (4)
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	SLC	Mar								as																																
Striated Pardalote	<i>Pardalotus striatus</i>	LC	NL				bs																bs	bs	bs	bs							bs		bs	bs			x	x	x		
Striped Honeyeater	<i>Plectorhyncha lanceolata</i>	LC	NL				bs				as																								bs			x				x	
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	LC	NL	bs											bs								bs	bs	bs	bs								bs		bs		x				x	
Superb Fairy-wren	<i>Malurus cyaneus</i>	LC	NL																																								
Tawny Frogmouth	<i>Podargus strigoides</i>	LC	NL	sp																																							
Tawny Grassbird	<i>Megalurus timoriensis</i>	LC	NL																																								
Torresian Crow	<i>Corvus orru</i>	LC	NL	bs	as			bs			as	bs			bs	bs	bs																	bs		bs	bs	x		x	x	x	
Variigated Fairy-wren	<i>Malurus lamberti</i>	LC	NL																															bs									

Common Name	Scientific Name	Status		Supp1	Supp 1 (DS)	Supp2	Supp3	Supp4	Supp5	Supp6	Supp6 (as)	Supp7	Supp8	Supp8 (as)	Supp9	Supp10	Supp10	Supp11	Supp12	Supp13	Supp14	Supp15	Supp16	Supp17	Supp18	Supp19	Supp20	Supp21	Supp22	Supp23	Supp24	Supp25	Supp26	Supp27	Supp28	Supp29	Supp30	Supp31	Supp32	Supp33											
		NC Act	EPBC Act																																																
Wandering Whistling-Duck	<i>Dendrocygna arcuata</i>	LC	NL																																																
Wedge-tailed Eagle	<i>Aquila audax</i>	LC	NL																				bs																												
Weebill	<i>Smicronis brevirostris</i>	LC	NL	bs																											bs																				
Whistling Kite	<i>Haliastur sphenurus</i>	LC	NL								as												bs	bs																											
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	LC	NL																																																
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	LC	NL																																																
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	LC	NL																																																
White-browed Woodswallow	<i>Artamus superciliosus</i>	LC	NL																																																
White-faced Heron	<i>Egretta novaehollandiae</i>	LC	NL		as						as																																								
White-necked Heron	<i>Ardea pacifica</i>	LC	NL								as						bs																																		
White-throated Gerygone	<i>Gerygone albogularis</i>	LC	NL				bs																bs	bs	bs	bs																									
White-throated Honeyeater	<i>Melithreptus albogularis</i>	LC	NL																				bs	bs	bs	bs																									
White-throated Treecreeper	<i>Cormobates leucophaea</i>	LC	NL																																																
White-winged Chough	<i>Corcorax melanorhamphos</i>	LC	NL																																																
White-winged Triller	<i>Lalage sueurii</i>	LC	NL								as																																								
Willie Wagtail	<i>Rhipidura leucophrys</i>	LC	NL				bs				as										as	as		bs																											
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	LC	NL																																																
Yellow-throated Miner	<i>Manorina flavigula</i>	LC	NL	bs	as	bs	bs	bs									bs	bs																																	
Zebra Finch	<i>Taeniopygia guttata</i>	LC	NL																																																
Mammals																																																			
Feral Cat	<i>Felis catus</i>		*(RI)	-																																															

Common Name	Scientific Name	Status		Supp1	Supp 1 (DS)	Supp2	Supp3	Supp4	Supp5	Supp6	Supp6 (as)	Supp6 (h)	Supp7	Supp8	Supp8 (h)	Supp9	Supp10	Supp10	Supp11	Supp12	Supp13	Supp14	Supp15	Supp16	Supp17	Supp18	Supp19	Supp20	Supp21	Supp22	Supp23	Supp24	Supp25	Supp26	Supp27	Supp28	Supp29	Supp30	Supp31	Supp32	Supp33			
		NC Act	EPBC Act																																									
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	LC	NL						1 (sp)																				sp	sp		sp	sp	sp	sp							SP		
Common Planigale	<i>Planigale maculata</i>	LC	NL																																									
Delicate Mouse	<i>Pseudomys delicatulus</i>	LC	NL																																								SP	
Dingo, Domestic Dog	<i>Canis lupus dingo</i> <i>Canis familiaris dingo</i>	* (RI)	-																																									
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	LC	NL																																									AS
Greater Glider	<i>Petauroides volans</i>	LC	NL																																									sp
House Mouse	<i>Mus musculus</i>	* (RI)	-																																								SP	
Little Red Flying-fox	<i>Pteropus scapulatus</i>	LC	NL																										sp															SP
Northern Brown Bandicoot	<i>Isodon macrourus</i>	LC	NL																																									
Pig	<i>Sus scrofa</i>	* (RI)	-							tk													tt		bs		sp																	
Rabbit	<i>Oryctolagus cuniculus</i>	* (RI)	-																																								AS	
Yellow-bellied Sheath-tailed Bat	<i>Saccolaimis flaviventris</i>	LC	NL	h					h						sp (h)																													
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	SLC	NL																																								sp	
Squirrel Glider	<i>Petaurus norfolcensis</i>	LC	NL																																								sp	
Reptiles																																												
Brown Tree Snake	<i>Boiga irregularis</i>	LC	NL																									sp	sp														sp	
Burns' Dragon	<i>Amphibolurus burnsi</i>	LC	NL																																								AS	
Bynoe's Gecko	<i>Heteronotia binoei</i>	LC	NL																										sp												SP, AS	AS	SP, AS	
Carpentaria Snake	<i>Cryptophis boschmai</i>	LC	NL																																							sp		
Chain-backed Dtella	<i>Gehyra catenata</i>	LC	NL																																							SP	SP	

Common Name	Scientific Name	Status		Supp1	Supp 1 (DS)	Supp2	Supp3	Supp4	Supp5	Supp6	Supp6 (scat)	Supp6 (scat)	Supp7	Supp8	Supp8 (scat)	Supp9	Supp10	Supp10	Supp11	Supp12	Supp13	Supp14	Supp15	Supp16	Supp17	Supp18	Supp19	Supp20	Supp21	Supp22	Supp23	Supp24	Supp25	Supp26	Supp27	Supp28	Supp29	Supp30	Supp31	Supp32	Supp33					
		NC Act	EPBC Act																																											
Dubious Dtella	<i>Gehyra dubia</i>	LC	NL						3 (sp)			2 (as)									4 (sp)							sp											AS							
Elegant Snake-eyed Skink	<i>Cryptoblepharus pulcher</i>	LC	NL	1 (as)				1 (as)																																AS	AS					
Iridescent Litter-Skink	<i>Lygisaurus foliorum</i>	LC	NL		6 (sp)							1 (as)																																		
Keelback	<i>Tropidonophis mairii</i>	LC	NL						4 (sp)			1 (as)								1 (sp)								sp																		
Ocellated Velvet Gecko	<i>Oedura monilis</i>	LC	NL																									sp																		
Open-litter Rainbow-skink	<i>Carlia pectoralis</i>	LC	NL		1 (as)				1 (sp)													1 (as)																								
Ornamental Snake	<i>Denisonia maculata</i>	V	V						1 (sp)											1 (sp)																										
Ragged Snake-eyed Skink	<i>Cryptoblepharus pannosus</i>	LC	NL																			1 (as)																								
South-eastern Morethia Skink	<i>Morethia boulengeri</i>	LC	NL																																											
Spotted Python	<i>Antaresia maculosa</i>	LC	NL																																											
Three-clawed Worm-skink	<i>Anomalopus verreauxii</i>	LC	NL																																											
Yellow-faced Whipsnake	<i>Demansia psammophis</i>	LC	NL																																											

¹ Status under Queensland's Nature Conservation Act 1992: V = Vulnerable; LC = Least concern; SLC = Special least concern

² Status under the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999: V = Vulnerable; Mi = Migratory; M = Marine; NL = Not listed

* Denotes introduced taxa; RI = Restricted invasive species under Biosecurity Act 2014.

Supp = Supplementary site; WS = Wet season, DS = Dry season; as = Active search; bs = Bird survey; cp = Call playback; el = Elliot trap; h = Heard; ir = Infrared camera; pf = Pitfall; sc = Scats; sp = Spotlight; tk = Track or digging; x = Present

Table G3: Micro-bat field species list (Anabat sites)

Common Name	Scientific Name	Status		Anabat Sites															
		NC Act	EPBC Act	AB 1	AB 2	AB 3	AB 4	AB 5	AB 6	AB 7	AB 8	AB 9	AB1 0	AB1 1	AB1 2	AB1 3	AB1 4	AB1 5	
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	LC	NL	□	◆	◆	-	-	-	-	-	-	-	-	-	◆	◆	◆	
Eastern Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	LC	NL	◆	◆	◆	◆	◆	◆	-	-	-	□	-	◆	◆	-		
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	LC	NL	□	◆	◆	◆	◆	◆	-	-	-	◆	-	-	◆	◆		
Eastern Free-tailed Bat	<i>Ozimops ridei</i>	LC	NL	-	◆	-	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	LC	NL	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
Hoary Wattled Bat	<i>Chalinolobus nigrogriseus</i>	LC	NL	-	□	□	□	-	□	-	-	-	-	-	-	-	◆	-	
Inland Broad-nosed Bat	<i>Scotorepens balstoni</i>	LC	NL	◆	◆	◆	◆	-	-	◆	◆	◆	◆	◆	-	◆	◆		
Inland Forest Bat	<i>Vespadelus baverstocki</i>	LC	NL	-	-	◆	◆	◆	□	□	□	□	□	-	-	◆	◆		
Large-footed Myotis	<i>Myotis macropus</i>	LC	NL													□	-	□	□
Little Broad-nosed Bat	<i>Scotorepens greyii</i>	LC	NL	-	◆	◆	◆	◆	□	□	◆	◆	◆	◆	◆	◆	◆	◆	◆
Little Pied Bat	<i>Chalinolobus picatus</i>	LC	NL	-	◆	◆	◆	□	□	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

Long-eared Bat	<i>Nyctophilus sp.</i>	LC	NL	-	◆	◆	◆	-	◆	◆	-	-	◆	-	□	□	□	□
Northern Broad-nosed Bat	<i>Scotorepens sanborni</i>	LC	NL												□	□	□	□
Northern Freetail Bat	<i>Chaerephon jobensis</i>	LC	NL	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Northern Free-tailed Bat	<i>Ozimops lumsdenae</i>	LC	NL	◆	-	◆	◆	-	-	◆	◆	◆	◆	◆	◆	-	◆	◆
Troughton's Sheathtail Bat	<i>Taphozous troughtoni</i>	LC	NL	-	-	-	-	-	-	◆	-	-	◆	-	-	◆	-	-
White-striped Free-tailed Bat	<i>Austronomus australis</i>	LC	NL	◆	◆	-	◆	-	◆	-	-	-	-	-	-	-	-	-
Yellow-bellied Sheath-tailed Bat	<i>Saccolaimus flaviventris</i>	LC	NL	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	□	◆	◆	◆	◆

¹ Status under Queensland's *Nature Conservation Act 1992*: V = Vulnerable; LC = Least concern; SLC = Special least concern

² Status under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*: V = Vulnerable; Mi = Migratory; M = Marine; NL = Not listed

◆ = at least one call from the site was attributed unequivocally to the species; □ = calls similar to those of the species were recorded, but could not be reliably identified; - = species not recorded

Appendix H

Koala critical habitat assessment

Table H1: EPBC Act critical habitat assessment for the Koala

Attributes and scores from Koala Habitat Assessment Tool			Results of desktop analysis and field surveys	
Attribute	Score	Inland	Proposed Score	Comment
Koala occurrence	+2 (high)	Evidence of one or more Koalas within the last 5 years.	1: Evidence of Koalas within 2 km	Evidence of Koala, via scratches on Queensland Blue Gum along Banana Creek, was recorded approximately 300 m to the west of the project site during targeted surveys in the additional investigation area in 2020. Despite extensive survey effort, no Koalas have been recorded within the project area and Koalas are considered unlikely to traverse the project area to Mt Ramsay. No evidence of Koala usage of vegetation on Mt Ramsay was identified during the targeted surveys of the additional investigation area. Vegetation on Mt Ramsay primarily comprises vine thicket and <i>Acacia</i> spp. assemblages. Sparsely distributed eucalypts were observed on the lower slopes of this mountain. However, evidence of regular burning of this vegetation was observed and this area is more than 2 km from any nearby Koala habitat areas.
	+1 (medium)	Evidence of one or more Koalas within 2 km of the edge of the impact area within the last 10 years.		
	0 (low)	None of the above.		
Vegetation composition	+2 (high)	Has forest, woodland or shrubland with emerging trees with 2 or more known Koala food tree species, OR 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	2: Has forest, woodland or shrubland with emerging trees with 2 or more known Koala food tree species	The project area, and particularly the project site and water release/extraction infrastructure area supports fragmented remnant woodlands and regrowth woodland communities that contain at least the following six species of Koala food trees: <ul style="list-style-type: none"> ▪ Long-fruited Bloodwood (<i>Corymbia clarksoniana</i>) ▪ Carbeen (<i>Corymbia tessellaris</i>) ▪ Dawson River Gum (<i>Eucalyptus cambageana</i>) ▪ Coolibah (<i>Eucalyptus coolabah</i>) ▪ Poplar Box (<i>Eucalyptus populnea</i>) ▪ Queensland Blue Gum (<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i>).
	+1 (medium)	Has forest, woodland or shrubland with emerging trees with only 1 species of known Koala food tree present.		
	0 (low)	None of the above.		

Attributes and scores from Koala Habitat Assessment Tool			Results of desktop analysis and field surveys	
Attribute	Score	Inland	Proposed Score	Comment
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥ 1000 ha.	0: Low connectivity values	<p>There is no potential Koala habitat within the proposed road realignment.</p> <p>Habitat and connectivity is limited within the ETL study area with Koala food trees only present as sparsely distributed individual trees and small isolated stands (<1 ha) that are at least 2 km from any large patches of suitable habitat. The EPBC Act Koala referral guidelines indicate that treeless areas of more than 2 km are likely to present a barrier to movement for Koalas (DotE 2014).</p> <p>Approximately 111.1 ha of potential Koala habitat occurs in the project site. The Koala habitat present generally exists as isolated patches of vegetation with little connectivity between habitat areas within and external to the project site.</p> <p>The project site locality is characterised by fragmented patches of remnant, regrowth and non-remnant vegetation that have been isolated by historic broad-scale land clearing in the region. Contiguous intact vegetation is largely confined to the Dawson River and Banana Creek riparian corridor. There are some limited areas of tenuous connectivity, through patches of regrowth vegetation, between the project site and remnant vegetation fringing the Dawson River and Banana Creek. However overall, expanses of cleared agricultural land separate the project site and more contiguous Koala habitat associated with the Dawson River.</p> <p>Approximate 0.1 ha of the project water release/extraction infrastructure is proposed to be located on the edge of riparian Koala habitat along the Dawson River, which supports remnant RE 11.3.25. This area is contiguous with habitats in the broader waterway and floodplain landscape. However, this area is not contiguous with potential habitats in the project site.</p>
	+1 (medium)	Area is part of a contiguous landscape < 1000 ha, but ≥ 500 ha.		
	0 (low)	None of the above.		

Attributes and scores from Koala Habitat Assessment Tool			Results of desktop analysis and field surveys	
Attribute	Score	Inland	Proposed Score	Comment
Key existing threats	+2 (high)	Little or no evidence of Koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present	1: The project site is likely to have some degree of dog threat present.	Dog tracks were recorded incidentally throughout the project site and broader study area and dogs may therefore pose a degree of threat to any local Koala population. Vehicles are unlikely to pose a significant threat to Koalas within the proeject site itself given the majority of access tracks are unsealed and 4WD only. However, the Moura – Baralaba Road traverses the eastern portion of the project site.
	+1 (medium)	Evidence of infrequent or irregular Koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for Koala occurrence, OR Areas which score 0 for Koala occurrence and are likely to have some degree dog or vehicle threat present.		
	0 (low)	Evidence of frequent or regular Koala mortality from vehicle strike or dog attack in the project site at present, OR Areas which score 0 for Koala occurrence and have a significant dog or vehicle threat present.		
Recovery value [‡]	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	0: Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	The project site is unlikely to provide important refuge habitat for the Koala. Koala habitat within the project site generally occurs as isolated patches within a cleared landscape. Remnant vegetation associated with the Dawson River and Banana Creek, outside the project site, provides higher quality refuge habitat due to its riparian structure and connectivity along watercourses in the landscape. Approximtely, 0.1 ha of water release/extraction infrastructure is proposed to be
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.		

Attributes and scores from Koala Habitat Assessment Tool			Results of desktop analysis and field surveys	
Attribute	Score	Inland	Proposed Score	Comment
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.		located on the edge of this habitat. Given the small size of this area it is unlikely to influence the refuge values of the Dawson River and Banana Creek and is not large enough to be important for achieving the interim recovery objectives for this species. Koala habitat within the project site and water release/extraction infrastructure area is unlikely to be important for achieving the interim recovery objectives for inland areas.
TOTAL			4	Decision: Although habitat in the study area along the Dawson River riparian corridor is likely to be critical habitat for the Koala, habitat within the project site and project area as a whole is not critical to the survival of the Koala—assessment of significance not required.

Appendix I

LFC Tool LOGFILE output

Department of Environment and Heritage Protection (DEHP)

Landscape Fragmentation and Connectivity (LFC) Tool version 1.4 LOGFILE

Process started at 12-10-2023 02:23:39 PM

Python version: 2.7.18.4 (default, Aug 9 2021, 23:37:24) [MSC v.1500 32 bit (Intel)]

Arcpy version: 10.9.1

Username: Virginia N

INPUT PARAMETERS

Output Workspace: Q:\Baralaba Coal\Baralaba South Updated EIS 2023\30 GIS Spatial Data\30 Spatial analysis outputs\20231011_BS_SpatialPackage\LFC\LFC_OptionB

Threshold lookup table: S:\2. BUSINESS RESOURCES\6.COMPUTER SOFTWARE\ArcGIS Pro\ArcMap\2023 EHP LFC TOOL\DP_EHP_LFC_TOOL\LFC_data.gdb\tbl_Regional_frag_local_threshold

Remnant cover layer: S:\2. BUSINESS RESOURCES\6.COMPUTER SOFTWARE\ArcGIS Pro\ArcMap\2023 EHP LFC TOOL\DP_EHP_LFC_TOOL\LFC_data.gdb\QLD_VEG_RVM_100K_v2p0

Remnant cover layer edited: False

Regional buffer extent: 20 kilometres

Local buffer extent: 5 kilometres

Impact layer: DisturbanceLayer_OptionB

layer projection: GDA_1994_MGA_Zone_55

Raster cell resolution for analysis: 10 metres

Edge Width: 50 metres

(The distance from non-remnant landscapes through to the core ecosystem - the edge of remnant ecosystems)

Default projection: S:\2. BUSINESS RESOURCES\6.COMPUTER SOFTWARE\ArcGIS Pro\ArcMap\2023 EHP LFC TOOL\DP_EHP_LFC_TOOL\scripts\QLD Albers Equal Area Conic.prj

14:23:39 Checking out the spatial analyst tool - required for LFC

14:23:39 _____BEGINNING LANDSCAPE FRAGMENTATION AND
CONNECTIVITY ANALYSIS_____

14:23:39 This tool will categorise the landscape into:

{0: 'non-rem', 1: 'patch', 2: 'edge', 3: 'perforated', 4: 'core (< 100 hectares)', 5: 'core (100-500 hectares)', 6: 'core (> 500 hectares)', 7: 'water'}

14:23:42 Q:\Baralaba Coal\Baralaba South Updated EIS 2023\30 GIS Spatial
Data\30 Spatial analysis
outputs\20231011_BS_SpatialPackage\LFC\LFC_OptionB\lyr_file does not exist,
creating it now.

14:23:42 Copying across impact site feature(s) and calculating area in hectares
(AreaHA)

14:23:42 Making a local copy of the impact site

14:23:43 Preparing remnant cover layer for analysis

14:23:44 Created regional scale buffer of 20 kilometres

14:23:44 Created local scale buffer of 5 kilometres

14:23:50 Clipped the remnant cover to the regional buffer extent

14:23:50 Unioned the pre impact remnant layer with the impact site

14:23:53 Attributed the impact area as not RVM Cat B

14:23:53 Area of RVM Cat B clearing is 14.47 hectares

14:23:53 SQL selection used is "RVM_CAT" = 'B' and "Cover" = 'Not RVM Cat
B' on shapefile

Q:\Baralaba Coal\Baralaba South Updated EIS 2023\30 GIS Spatial Data\30
Spatial analysis
outputs\20231011_BS_SpatialPackage\LFC\LFC_OptionB\main_output\clip_remc
over_post.shp

14:23:55 Categorised the cover attributes in clip_remc
over_pre.shp ready for
raster conversion

14:24:09 Converted clip_remc
over_pre.shp to raster

14:24:11 Categorised the cover attributes in clip_remc
over_post.shp ready for
raster conversion

14:24:25 Converted clip_remc
over_post.shp to raster

14:24:25 Run Landscape fragmentation analysis on the pre impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 8.4 MINUTES)

14:32:52 Run Landscape fragmentation analysis on the post impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 8.4 MINUTES)

Extracting a local subset of lfc_regional_pre_impact

Extracting a local subset of lfc_regional_post_impact

Collating pre and post impact statistics and trigger assessment

14:41:54 Summarising area statistics for: lfc_localmsk_pre_impact

14:41:54 Summarising area statistics for: lfc_localmsk_post_impact

14:41:54 Summarising area statistics for: lfc_regional_pre_impact

14:41:54 Summarising patch count for lfc_localmsk_pre_impact

14:42:00 Summarising patch count for lfc_localmsk_post_impact

Analysing impact on Connectivity Areas

SIGNIFICANCE TEST ONE

The regional total area is 185082.73

The regional extent of core remnant is 22929.60

The regional extent of core remnant is 12.39 percent

This level of regional fragmentation sets a local impact threshold of: 5.0 percent

The table below lists the local impact thresholds for categories of regional core remnant extent:

REGIONAL CORE CATEGORY	LOCAL IMPACT THRESHOLD
< 10	2.0
10 - 30	5.0
30 - 50	10.0
50 - 70	20.0
70 - 90	30.0
>90	50.0

Area of core at the local scale (pre impact): 941.66

Area of core at the local scale (post impact): 934.45

Percent change of core at the local scale (post impact): 0.77 percent

SIGNIFICANCE TEST TWO

The number of core remnant areas occurring on the site: 2

The number of core remnant areas remaining on the site post impact: 1

(Only core polygons greater than or equal to 1 hectare are included)

RESULT

14:42:11 This analysis has determined a SIGNIFICANT impact on connectivity areas

(A significant reduction in core remnant at the local scale is False OR a change from core to non-core remnant at the site scale is True)

(Total area of RVM Cat B clearing is 14.47 hectares)

The significance table has been written to:
..\main_output\lfc_significance_assessment.csv

The local scale summary table has been written to:
..\main_output\lfc_local_scale_summary.csv

The site scale summary table has been written to:
..\main_output\lfc_site_scale_summary.csv

GIS layer files copied into folder \lyr_file within the project folder.

View layers in ArcMAP using..\Q:\Baralaba Coal\Baralaba South Updated EIS 2023\30 GIS Spatial Data\30 Spatial analysis outputs\20231011_BS_SpatialPackage\LFC\LFC_OptionB\lyr_file\lyr_file\Connectivity Area Impact Assessment.lyr

Please scrutinise the output tables and spatial layers to confirm the desktop modelling of connectivity area impact

This analysis used an unedited copy of the Regulated Vegetation layer.

14:45:01 _____COMPLETED LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____