Matters of National Environmental Significance (MNES)

Significant Impact Assessment Report

SGP North Solar Farm

Prepared for:
Arrow Energy Pty Ltd

8 January 2025



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1.0 Introduction

Arrow Energy Pty Ltd (Arrow Energy) is proposing to develop the SGP North Solar Farm (the Project) as part of the development of a hybrid power facility to supply power to the Girrahween Field Compression Station located north of Miles, in Queensland. Both the SGP North Solar Farm and the hybrid power facility are part of the Surat Gas Project (SGP) North (or SGP North) development. The impacts from the SGP North development have previously been assessed and approved under the:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), with EPBC 2010/5344 approval granted on 19 December 2013; and
- Queensland *Environmental Protection Act 1994* (EP Act), with the Environmental Authority EA001399 granted.

The hybrid power facility will comprise gas reciprocating engines, a battery energy storage system (BESS) and associated infrastructure to be located on Lot 16 on Plan AU38. The solar farm and associated power conversion systems (PCS) will be located on Lot 17 on Plan AU199. The solar farm will be connected to the main power facility via an 11 kV underground transmission line, which will be incorporated into the gas gathering network.

The hybrid power facility and the transmission line will be developed under the abovementioned existing approvals. However, the SGP North Solar Farm is being developed separately to Arrow Energy's coal seam gas network and it is intended that the solar farm will be operated by a third party provider. As such, the Project is being referred separately for consideration of its impacts on Matters of National Environmental Significance (MNES) protected under the EPBC Act.

1.1 Project site

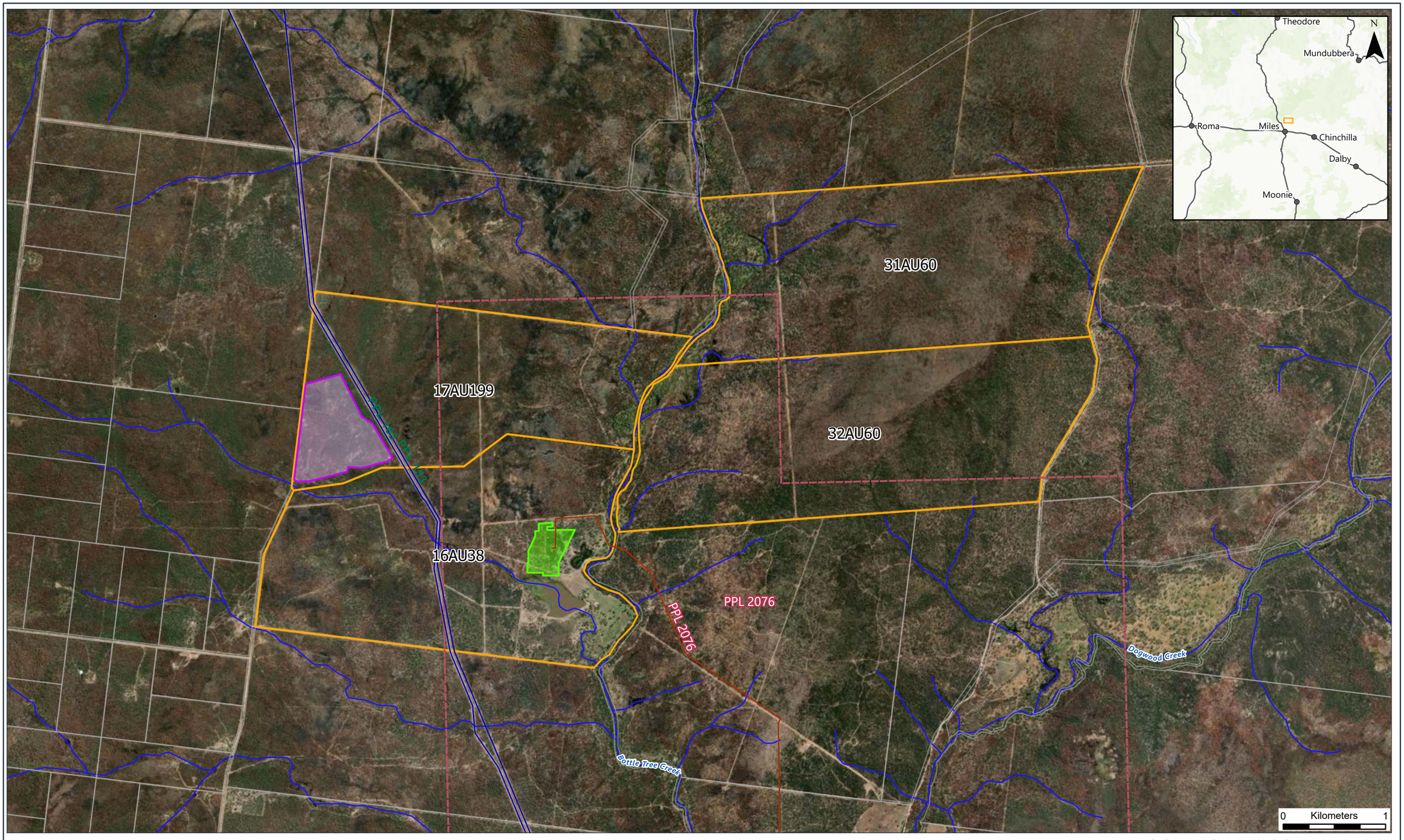
The Project is proposed on land described as Lot 17 on Plan AU199, which is one of four land parcels that make up the Girrahween Station (the Station), which was purchased by Arrow in 2012. The subject lot has a total area of approximately 491 hectares (ha). It is predominantly flat, sloping very gently towards Bottle Tree Creek in the east, and supports a mix of remnant and regrowth vegetation.

The Station property is bisected by two gas pipeline easements (PPL153[1] and PPL163[2]) which represent a cleared width of approximately 100 m. The Project is proposed on the western side of these easements ('the Project site')(refer to **Figure 1.1**).

Access to the Project site is from the south via Retreat Road.

[1] The authorised holder name for PL153 is APA WGP Pty Ltd

[2] The authorised holder name for PL63 is Australia Pacific LNG Gladstone Pipeline Pty Ltd



Project Location

SGP NORTH SOLAR FARM

- Watercourse
- PPL granted CL
- PPL application CL
- Girrahween Station
- Proposed Solar Farm
- Field Compression Station
- PPL application area
- Lot Boundary

Attexo

REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:35,000 | **DATE:** 17/06/2024 | **DWG No:** ARR-002_014[D] | **FIGURE 1.1**

GDA2020 MGA Zone 56

Data Source: World Topographic Map: Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Maxar
World Hillshade: Esri, USGS

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1.2 Purpose and scope

Arrow Energy has engaged Attexo Pty Ltd (Attexo) to undertake an assessment of the likely impacts of the Project on MNES to support a referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW, or, the Department) under the EPBC Act.

Specifically, the objectives of this report are to:

- Provide an overview of the relevant regulatory framework for the Project;
- Present the results of desktop and field-based ecological assessments undertaken for the Project site;
- Describe the ecological values of the Project site, particularly those values that are MNES protected under the EPBC Act;
- Provide recommendations with respect to avoidance and mitigation of those impacts; and
- Identify and assess the significance of any impacts that may occur to MNES as a result of the development of the Project.

1.3 Project description

The Project involves the development of a 17 MW solar farm over approximately 62 ha comprising:

- Approximately 30,000 individual solar panels on a single axis tracker mounting system;
- Four (4) modular power conversion station (PCS) container units enclosing inverters, including transformers and switchgear;
- Underground cabling connecting solar arrays ('strings') to the inverter stations;
- An underground transmission line (11-22 kV) from the PCS units to the boundary of the Project site. From the south-eastern boundary of the Project site, the transmission line will be incorporated into the corridors to be used for the gas gathering network and is excluded from the action being referred under the EPBC Act;
- Two (2) meteorological stations for recording meteorological data to track performance and monitor Project site conditions;
- Two laydown areas, a carpark and a water storage tank;
- Formalisation of site access from Retreat Road, and construction of an access road on the western Site boundary, including a gate; and
- Perimeter fencing.

It is noted that the Project design is in its early phases, with the development of the concept layout to be finalised with the preferred contractor. Arrow Energy have defined the 62 ha Project area (referred to throughout as the 'Project site') which will accommodate all infrastructure required for the solar farm. For the purposes of assessing impacts to MNES, it is assumed that the entire area will be cleared of vegetation however, this is likely to overstate Project impacts. Areas to be cleared and retained will be further defined as concept design progresses.

1.3.1 Project need

The SGP North Solar Farm is part of a planned hybrid power station designed to power the SGP North Field Compression Station (FCS). The hybrid power station will comprise the 17 MW solar farm, which is designed to complement 11 MW/h of BESS and 24.5 MW gas generation. The hybrid power facility is a key initiative in Arrow Energy's plans to reduce greenhouse gas emissions and support net zero targets into the future. The hybrid power supply alternative provides the lowest GHG emissions intensity option available for development, and represents 41% less than the emissions intensity than that from the current electricity grid, and 23% less than the prescribed emissions intensity for electricity generation by the Safeguard Mechanism[3].

1.3.2 Solar Farm site selection

The preferred location for development of the Project has been selected based on its proximity to the FCS in an area entirely mapped as Category X (i.e., non-remnant)[4] on the Queensland Regulated Vegetation Management Map (RVMM)(refer to **Figure 1.2**) on a part of Girrahween Station that has been subject to historical clearing (refer to **Section 4.1**). The Project and the FCS are both on Arrow-owned property, with the Project located on Lot 17AU199 and the FCS on Lot 16AU38 which is where the BESS and gas generation components of the power plant will also be located (i.e. within the footprint of the FCS)(refer to **Figure 1.1**).

The Project site is currently grazed by cattle and much of the area was significantly impacted by bushfires in 2022. As a consequence, the vegetation quality is reduced when compared to large tracts of remnant vegetation surrounding the Project site. This location is also separated from adjoining remnant vegetation areas by an approximately 100 m wide gas pipeline easement to the east (refer to **Figure 1.1**) and by cleared tracks and fence lines to the west, reducing the patch size and fragmenting it from surrounding areas.

The initial proposed footprint for the Project of 69 ha had incorporated remnant vegetation directly to the north of the current Project site, and intersected narrow bands of remnant vegetation so the south and east. By decreasing the Renewable Penetration Percentage, the number of panels has been reduced from 43,000 to 30,000 panels and the Project footprint has been refined to ensure that all remnant vegetation areas and associated habitat are avoided and has been reduced to 62 ha, with infrastructure to be located entirely in existing cleared areas and regrowth vegetation.

The reduction of the Project site from 69 ha to 62 ha has reduced the need to clear areas of remnant habitat for MNES species within the Project site (refer **Figure 1.3**).

[3] The Safeguard Mechanism is the Australian Government's policy for reducing emissions at Australia's largest industrial facilities.

[4] Category X -vegetation that is generally exempt from requirements under Queensland's *Vegetation Management Act 1999*.

Figure 1.2: Regional context of Project site showing large areas of remnant native vegetation

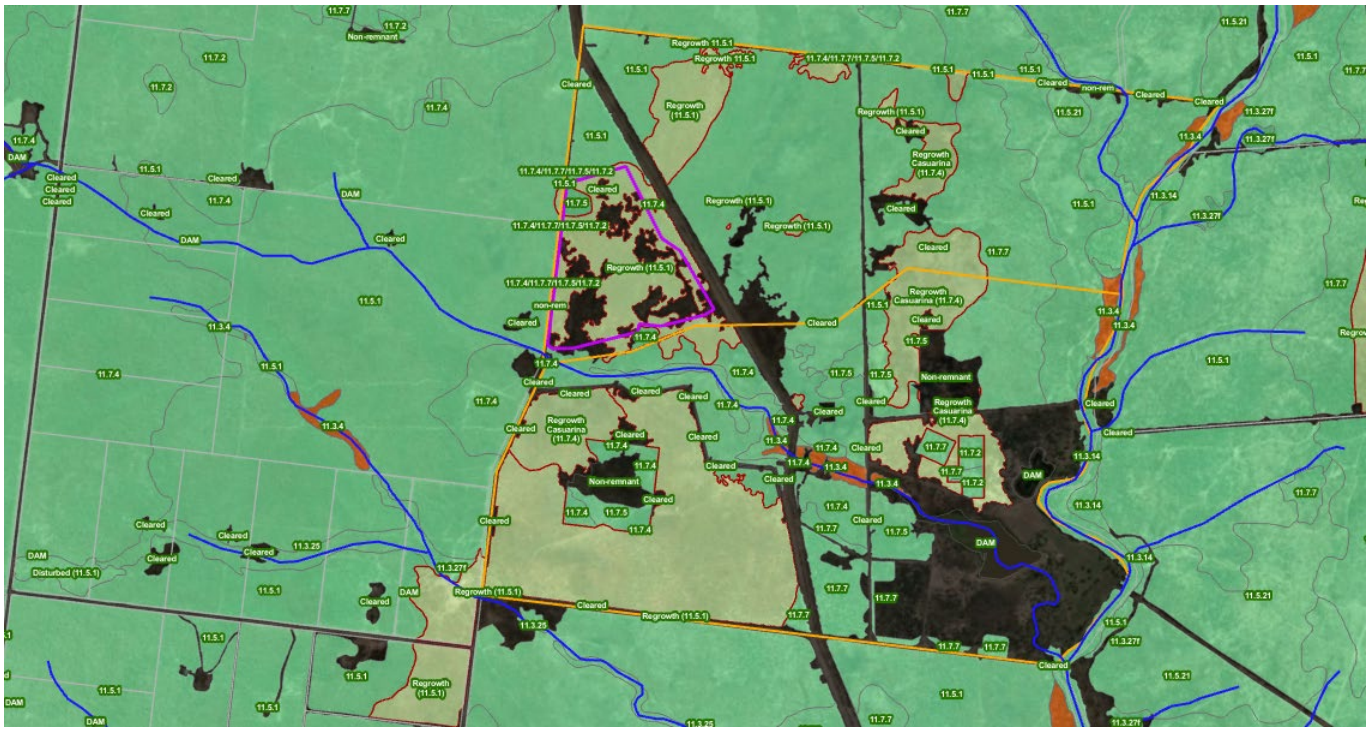


Figure 1.3: Original Project footprint (purple outline) versus reduced Project footprint (black outline)



2.0 Regulatory Framework

2.1 Australian Government Framework

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government's central piece of environmental legislation that provides a legal framework to protect and manage MNES, many of which are also internationally important. If a proposed development or other action is likely to have a significant impact on a protected matter under the EPBC Act, then it must be referred to the Australian Federal Government for assessment.

The EPBC Act covers the following nine (9) protected matters:

- World heritage areas;
- National heritage places;
- Wetlands of international importance (as listed under the Ramsar Convention);
- Listed threatened species and ecological communities ;
- Listed migratory species (protected under international agreements);
- Commonwealth marine areas;
- Great Barrier Reef Marine Park;
- nuclear actions (including uranium mines);
- Water resources (that relate to coal seam gas development and large coal mining development);

The EPBC Act also protects the environment when actions are taken:

- On Commonwealth land or impact upon Commonwealth land;
- By an Australian Government agency anywhere in the world; and
- That impact Commonwealth heritage places overseas.

Arrow Energy has an existing approval under the EPBC Act, EPBC 2010/5344 for the broader Surat Gas Project (SGP)[5] area of which the Project will form a part. However, because the solar farm component is a discrete commercial component a decision has been taken to seek separate approval for the Project under the EPBC Act.

This report has been prepared to support a referral of the Project to the Australian Government Environment Minister (the minister) under the EPBC Act. The report outlines those MNES which have potential to occur on the Project site and surrounding areas, and assesses the potential for significant impacts[6] on MNES associated with the Project.

[5] The broader SGP area has a combined extent of 206,594 ha and includes a southern, central (53,048 ha and contains the Project site) and northern area.

[6] A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity (refer to the Australian Government Matters of National Environmental Significance Department of Environment *Significant impact guidelines 1.1 EPBC Act 1999*).

2.1.2 Significant Impact Guidelines

Under the EPBC Act a 'controlled action' are those actions that the Minister decides have, will have, or is likely to have a significant impact on a MNES and will require approval from the Minister.

The *Significant Impact Guidelines 1.1: Matters of National Environmental Significance* (DoE 2013) (the guidelines) provide detailed criteria to determine whether or not a referral may be required and if the proposed action may have a significant impact on MNES. Thresholds provided in the guidelines vary according to the threat status of the MNES.

The guidelines have been applied to the impact assessments undertaken for listed threatened ecological communities and listed threatened and migratory species known or considered likely to occur in the Project site, to determine whether the Project is likely to have a significant impact on MNES (refer to **Section 6.0**).

2.1.3 Referral Guidance for the Endangered Koala

Koala was uplisted to 'endangered' under the EPBC Act on 12 February 2022. In its revised referral guidance, the Department states that *"it is the department's expectation that you refer any proposed project that is likely to impact the koala and/or its habitat"*. This includes disturbance and/or creation of barriers on areas of land that either contains locally important koala trees (LIKT), or is land that provides the means for koalas to move between patches of habitat. As an endangered species, even small areas of habitat (as little as 1 ha) may have a significant impact."

While no koalas have been recorded on the Project site, nor is there any evidence of use, the site does contain known browse species for koala, and it is proposed to refer the Project to the Department for consideration of potential impacts on this species. A discussion of koala habitat values and a significant impact assessment for this species is included in **Section 6.2**.

2.1.4 The 'water trigger'

The regulatory guideline relevant to the Project, developed from the amendment to the EPBC Act identifying water resources as being a MNES, is the *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (Commonwealth of Australia 2022b). Under the EPBC Act, an action which involves a coal seam gas (CSG) development requires approval if the action has, will have, or is likely to have a significant impact on a water resource. Whether a particular action can be described as involving a CSG development will be determined based on whether that action is so closely associated with the extraction of CSG or the mining of coal as to be integral to that extraction or mining (as relevant).

However, the Project does not trigger MNES water resource assessment under the EPBC Act as it is not integral to CSG extraction.

2.2 Queensland Framework

2.2.1 Environmental Protection Act 1994 and Planning Act 2016

The primary Queensland State approval under the State's legislative framework for petroleum and gas projects applicable to the Project is the Environmental Authority (EA) issued under the EP Act, EA0001399. Arrow Energy hold an EA001399 for the SGP North.

The hybrid power facility and transmission line will be developed under this EA. However, the Project is being developed separately to Arrow Energy's coal seam gas network and it is intended that it will be operated by a third

party provider. As such, it is proposed to seek a development approval for the Project under Queensland's *Planning Act 2016*. This will be achieved via a Material Change of Use (MCU) application under the Western Downs Regional Council Planning Scheme for a 'renewable energy facility (i.e., a solar farm)'.

2.2.2 Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VM Act) aims to regulate the clearing of native vegetation in a way that conserves remnant vegetation in declared areas, ensures the clearing does not cause land degradation, prevents the loss of biodiversity, maintains ecological processes, manages the environmental effects of the clearing, reduces greenhouse gas emissions, and allows for sustainable land use.

Under the VM Act, vegetation communities, which are known in Queensland as Regional Ecosystems (REs), are assigned to one of three classes. These classes are known as the VM Class and are:

- Endangered RE – less than 10% of the pre-clearing extent of a particular community remains across a given bioregion; or 10-30% of the pre-clearing extent remains and the remnant area is less than 10,000 ha;
- Of concern RE – 10-30% of the pre-clearing extent of a particular community remains across a given bioregion; or more than 30% of the pre-clearing extent remains and the remnant area is less than 10,000 ha; and
- Least concern RE – more than 30% of the pre-clearing extent of a particular community remains across a given bioregion, and the remnant area is greater than 10,000 ha.

Clearing of vegetation in areas mapped as Category X is exempt under the VM Act and no approval is required. As such, no State approvals are required for clearing of vegetation for the solar farm.

2.2.3 Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NC Act) provides the legislative basis for the conservation of nature through the dedication, declaration, and management of protected areas and the protection of native wildlife and habitat. It provides for the gazettal of protected areas including nature refuges, prescribes classes of wildlife, and sets out restrictions on the taking or harm to native wildlife without a valid permit. Restrictions on the taking or harm to threatened, special least concern and least concern wildlife under the NC Act apply separately and in addition to any conditions in the overarching EA and EPBC approvals and include the requirement to:

- Undertake protected plant surveys in areas shown as 'High Risk' on the Protected Plants Trigger Map prepared by Queensland's Department of Environment, Science and Industry (DESI) (Nature Conservation (Plants) Regulation 2020);
- Obtain clearing permits prior to the removal of critically endangered, endangered, vulnerable or near threatened plants listed under the NC Act (Nature Conservation (Plants) Regulation 2020); and
- Operate under an approved Species Management Program (SMP) where tampering with animal breeding places is required (Nature Conservation (Animal) Regulation 2020).

2.2.4 Biosecurity Act 2014

The *Biosecurity Act 2014* (the Act) provides a legislative framework to manage pest flora and fauna species, diseases, and environmental contaminants, and to address the impact they have on the economy, environment, agriculture and tourism industries, and society. The Act prohibits or restricts the introduction and spread of declared plant and animal pests species within Queensland. Under the Act, all individuals and organisations have a General Biosecurity

Obligation (GBO) to manage biosecurity risks that are under their control and that they should reasonably know about.

Pest plants and animals will be managed for the Project in accordance with Arrow Energy's *Biosecurity Procedure* (ORG-ARW-HSM-PRO-000187). This procedure outlines the measures to be undertaken by Arrow Energy to comply with regulatory obligations by managing the impact and spread of biosecurity matter at Arrow Energy's work sites, and applies to all Arrow Energy's employees and contractors engaged directly or indirectly by it, including visitors. The Arrow Energy *Biosecurity Guideline* (ORG-ARW-HSEM-GUI-00123) is a supporting document to be used in conjunction with the Biosecurity Procedure when managing biosecurity matter.

2.2.5 Environmental Offsets Act 2014

In Queensland there is an offsets framework governed by a range of legislation, policies and guidelines to support a determination as to when environmental offsets are required, and how they are to be delivered. A summary of the framework and guiding principles that apply is summarised below.

The Queensland Offsets Framework includes:

- *Environmental Offsets Act 2014* (EO Act);
- *Environmental Offsets Regulation 2014* (EO Regulation);
- Queensland Environmental Offsets Policy (QEOP) (version 1.9); and
- Significant Residual Impact Guideline – for prescribed activities under Planning Act (EHP 2014).

Under the Queensland Environmental Offsets Framework an environmental offset is required when a significant residual impact occurs to a MSES. MSES are prescribed in Schedule 2 of the EO Regulation and include:

- Endangered and vulnerable flora and fauna species under the NC Act and their habitats;
- Special least concern fauna species under the NC Act and their habitats;
- Endangered and of concern REs under the VM Act;
- Essential habitat (mapped by the DESI);
- REs that intersect with wetlands and watercourses;
- Connectivity values;
- Wetlands of high ecological significance;
- Protected areas (including nature refuges);
- Declared fish habitat areas and waterways providing for fish passage; and
- Legally secured offset areas.

3.0 Methodology

The ecological values of the Project site are described based on desktop assessments, ecological surveys across the broader SGP, and Project-specific field surveys aimed at ground-truthing Arrow Energy's vegetation mapping and confirming habitat values for conservation-significant flora and fauna species. A summary of the desktop and field assessments relevant to the Project site is provided in the following sections.

3.1 Desktop assessment

A desktop assessment was undertaken to develop an understanding of the environmental values, landscape features, vegetation communities and threatened species that are known or have the potential to occur within the Project site and the surrounding areas. The study area for this desktop assessment was defined as the Project site with a 10 km buffer radius. Likelihood of occurrence assessment searches were performed on a 50 km radius to ensure mobile fauna were included in the list of species for further assessment and consideration. The following data sources were reviewed:

- Department of Climate Change, Environment, Energy and Water (DCCEEW) Protected Matters Search Tool (PMST) to identify potential MNES within the study area. Search results were obtained from 25 March 2024 (refer to **Appendix E)**;
- DCCEEW Species Profiles and Threats Database (SPRAT);
- DESI WildNet database to identify previously recorded flora and fauna species within the study area, including non-native species;
- DESI mapping to identify potential MSES within the Project site including state conservation areas, wetlands, and waterways, threatened species and essential habitat, and regulated vegetation;
- Queensland Department of Resources (DoR) mapping to identify potential MSES within the Project site including regulated vegetation mapping (i.e., remnant, high-value regrowth, and non-remnant vegetation), and protected plants' high-risk trigger areas;
- eBird records of threatened and/or migratory birds;
- Atlas of Living Australia (ALA) database;
- High-resolution satellite imagery; and
- Published ecological information on threatened flora and fauna species where available.

3.1.1 Likelihood of occurrence assessment

Threatened species and communities identified in the desktop assessment were assessed for their likelihood of occurrence considering the species' distribution, habitat requirements, historical records in proximity to the Project site, and field observations.

The definitions adopted for the likelihood of occurrence assessment are as follows:

- **Known** – the species or ecological community has been recently recorded on the Project site (i.e., within the last 10 years);

- **Likely** – suitable habitat for the species is present within the Project site and historical records exist within 10 km radius within the last 20 years. Regional ecosystems that meet diagnostic criteria and condition thresholds for the ecological community are mapped within the Project site;
- **Potential** – suitable habitat for the species is present within the Project site and there are historical records between a 10 to 50 km radius. Regional ecosystems that meet diagnostic criteria and condition thresholds for the ecological community is adjacent to the Project site; and
- **Unlikely** – the Project site contains suitable habitat for the species; however, the nearest historical record is beyond the 50 km radius. Alternatively, where historical records exist within a 5 to 50 km radius, the Project site does *not* contain suitable habitat for the species. REs that meet diagnostic criteria and condition thresholds for the ecological community is *not* present within or adjacent to the Project site.

3.2 Field assessments

The habitat types mapped for the Project site are widely distributed across the Brigalow Belt, and all have been extensively sampled as part of a substantial and sustained fauna survey effort across the broader SGP Project area between 2013 and 2023. As a result of this effort, fauna assemblages and characteristic microhabitats associated with the broad vegetation communities and habitats are well-understood. The ecological surveys undertaken for the broader study area[5] since the original Environmental Impact Statement (EIS) for the Surat Gas Project in 2013 (SGP EIS)[7] that are relevant to the description of the ecological values of the Project site are summarised in **Table 3.1**.

Table 3.1 Overview of ecological surveys undertaken in and around the Project site

Survey	Survey type	Timing	Survey Team (experience)
MNES by Attexo	Targeted MNES Flora Survey	3 October 2023	Richard Floyd (30 years) Kate Rigg (5 years)
Habitat assessment by Attexo	Quaternary site assessments (vegetation) Habitat assessment	1 August 2023	Richard Floyd (30 years) Holly Morecroft (2 years)
Arrow pre-clear surveys	Pre-clear ecological field survey	4 September 2023	Arrow Energy's Ecology team
Flora and Fauna by EcoSmart	Vegetation survey, flora survey, fauna survey	12-23 September 2016 7-16 March 2017	David Stanton (3D Environmental) Mark Sanders, EcoSmart
Vegetation - Arrow Energy Surat Pipeline Survey	Vegetation survey	Various (2009-2013)	Arrow Energy's Ecology team
EIS Supplementary Report Surveys[#]	Vegetation survey	20-24 February 2013	David Stanton – (3D Environmental) Mark Sanders - EcoSmart

[7] SGP EIS and Supplementary Report, 2013.

The desktop assessment identified a number of gaps in the survey effort for SGP North Solar Farm; as a result previous Arrow/EcoSmart surveys were supplemented with additional ground-truthing surveys undertaken by Attexo in July 2023, which were specifically targeted at:

- Verifying Arrow Energy's ground-truthed vegetation community mapping, and
- Characterising vegetation condition and confirming likely habitat values.

As the results of the Attexo surveys have not been reported elsewhere, they are discussed separately in **Section 3.2.1**.

3.2.1 Supplementary ground-truthing surveys (Attexo, 2023)

Survey methodologies for the supplementary ground-truthing surveys undertaken by Attexo in 2023 are described below. Weather conditions in the 12 months prior to these surveys are summarised in **Table 3.2**.

Table 3.2 Weather conditions indicative of the Project site for Miles (Station 042112)(BoM 2023)

	Mean maximum temperature (°C)	Mean minimum temperature (°C)	Monthly rainfall (mm)
Oct-22	27.1	12.4	120.8
Nov-22	28.2	14.0	65.8
Dec-22	30.8	16.1	51.4
Jan-23	33.7	20.2	42.0
Feb-23	35.0	19.3	14.4
Mar-23	32.0	20.0	155.4
Apr-23	27.1	12.4	32.0
May-23	22.2	4.4	36.4
Jun-23	22.7	4.8	1.0
Jul-23	21.3	4.4	21.4
Aug-23	25.7	6.5	2.0
Sep-23	28.5	9.7	0.6
Oct-23	31.0	13.3	15.6

3.2.1.1 Quaternary site assessments

Quaternary surveys were undertaken at 17 sites within the Project site (refer to **Figure 3.1**). These surveys were undertaken in accordance with the *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland* version 6.0 (Neldner et al. 2022). At each site, the vegetation structure, floristic composition, and status was assessed, and the following information collected:

- Vegetation structure (i.e., height range, median height, estimated cover for each stratum) and the floristic composition, i.e., the dominant and common native species within each stratum;
- Vegetation status, i.e., remnant or regrowth and the RE classification;
- Brief condition assessment, including assessment of disturbance factors;

- Recorded fauna habitat and other ecological features and signs of fauna presence;
- Presence of weed species; and
- Geology and landscape attributes.

The purpose of these surveys was to verify the location, extent, and condition of vegetation across the Project site according to the Queensland RE framework and criteria for Threatened Ecological Communities (TECs) listed under the EPBC Act, where applicable, and to identify preferred habitat types for threatened flora species.

3.2.1.2 Targeted MNES flora surveys

Targeted MNES flora surveys were conducted in areas previously ground-truthed as containing RE 11.7.5 to confirm presence or absence of the MNES flora species, *Calytrix gurulmundensis* and *Homoranthus decumbens*. This involved timed meanders (refer **Figure 3.1**)throughout the entire area by ecologist Mr Richard Floyd[8], and Ms Kate Rigg. As there are no specific survey guidelines for these MNES flora species, meanders were conducted in accordance with Queensland's *Flora Survey Guidelines for Protected Plants* (DES 2020). Specimens of any unknown plant species were collected and pressed for later identification in the office.

3.2.1.3 Habitat assessments

Habitat assessments were undertaken at 13 sites within the Project site to document the value of habitats for birds, reptiles, mammals, and amphibians based on the presence of key resources and microhabitats, such as hollows, caves and rocky outcrops, leaf litter, water, etc. Key habitat features considered important for threatened species were recorded at each site (refer **Figure 3.2**).

3.2.1.4 Balanced koala scat survey

Balanced Koala Scat Surveys (BKSS) (Jiang et al 2020) were undertaken at two (2) sites along Bottle Tree Creek along the southern site boundary (refer **Figure 3.2**) to supplement the main survey effort for Koala. This method was deployed as a rapid assessment technique over other methods such as transect and point surveys (identified by Youngentob as suitable for medium to high density populations), or thermal detection drones / Koala detection dogs that require specialised equipment and training.

The BKSS involved searching for koala scats within a one (1) m radius of the base of a randomly selected central tree and its nearest 29 neighboring trees. Only trees with a diameter at breast height (dbh) of greater than or equal to10 cm were searched. No time limits were used at each tree and trees were searched until the observer found a single scat or was satisfied that a thorough search was conducted. The unlimited search time increases the time taken to complete surveys and also increases the probability of detecting scats (Youngentob et al. 2021).

3.2.1.5 Incidental observations

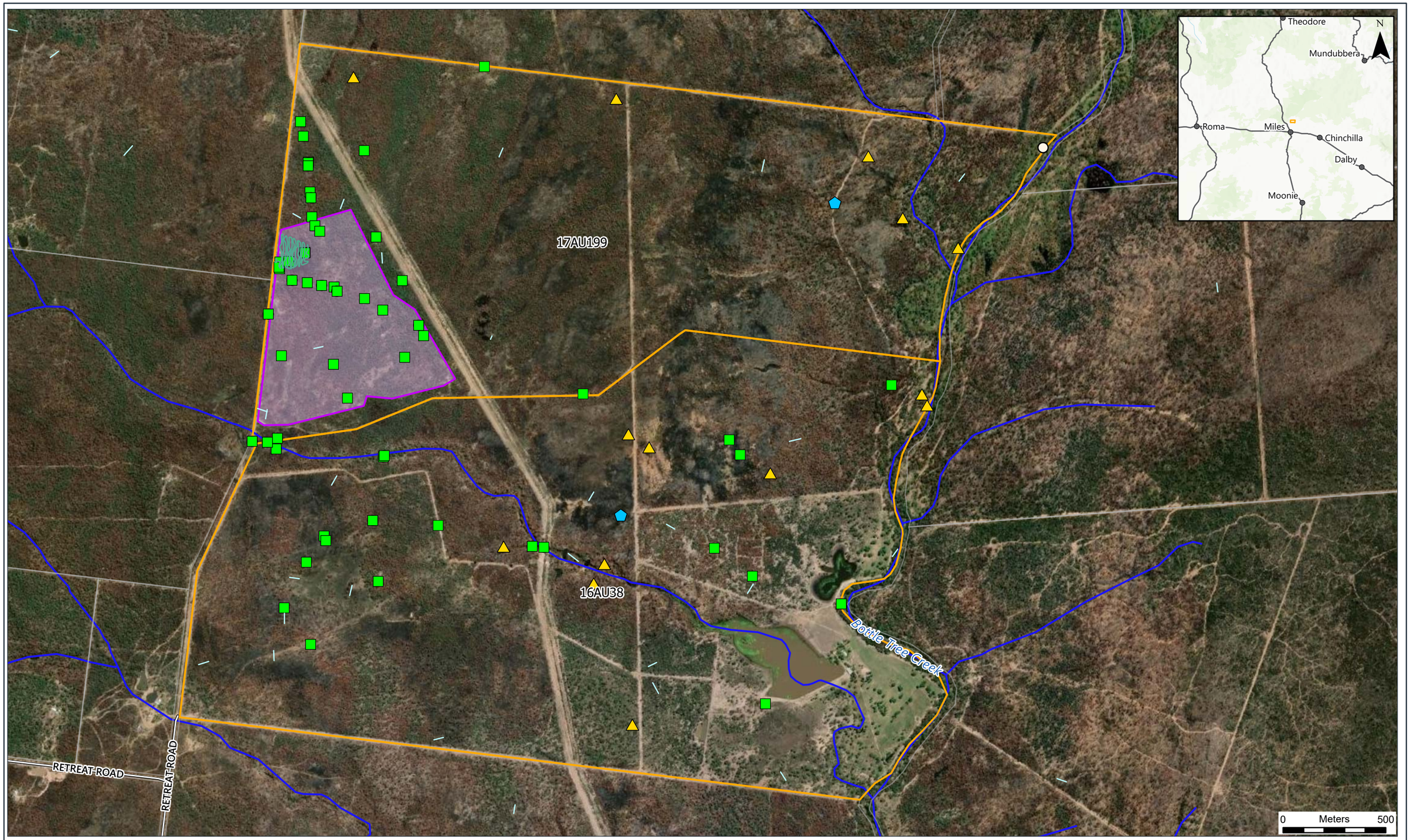
During the fauna surveys conducted as described in **Sections 3.2.1.3** and **3.2.1.4**, incidental observations of protected flora and fauna species listed under both the EPBC Act and NC Act were recorded. Species were recorded opportunistically while travelling within the Project site. In addition, the ecologists also recorded any secondary signs encountered at each site during the survey period, or while walking between sites in the Project site.

[8] Richard Floyd is a suitably qualified ecologist meeting the requirements within the Flora Survey Guidelines – Protected Plants.

Secondary signs can lead to the positive identification of mammals, reptiles, and birds. Animals often reveal their presence through tracks left in soft substrate. Similarly, arboreal animals may leave distinctive scratches on tree trunks as they climb. Some glider species leave feeding marks on tree trunks.. Scats of many mammals can be identified, for example faecal pellets of koalas at the base of trees are an indication of their presence. Finally, hair, feathers bones or nests can often be identified to species level.

3.2.1.6 Survey limitations

The Project site and surrounding area were significantly impacted by wildfire in December 2022, with some areas completely stripped of canopy cover and vegetation only just resprouting in late July 2023. Conditions prior to both 2023 surveys (refer to **Table 3.1**) were also dry, meaning that positive identification of vegetation communities was hampered in places. REs in affected areas have been extrapolated based on community composition elsewhere on the Girrahween Station with a relatively high confidence.



Flora Survey Effort

SGP NORTH SOLAR FARM

- General Observation
- Quaternary Site
- Secondary Site
- Tertiary Site
- Road
- Watercourse
- Girrahween Station
- Proposed Solar Farm
- Lot Boundary
- Transects
- Random meander

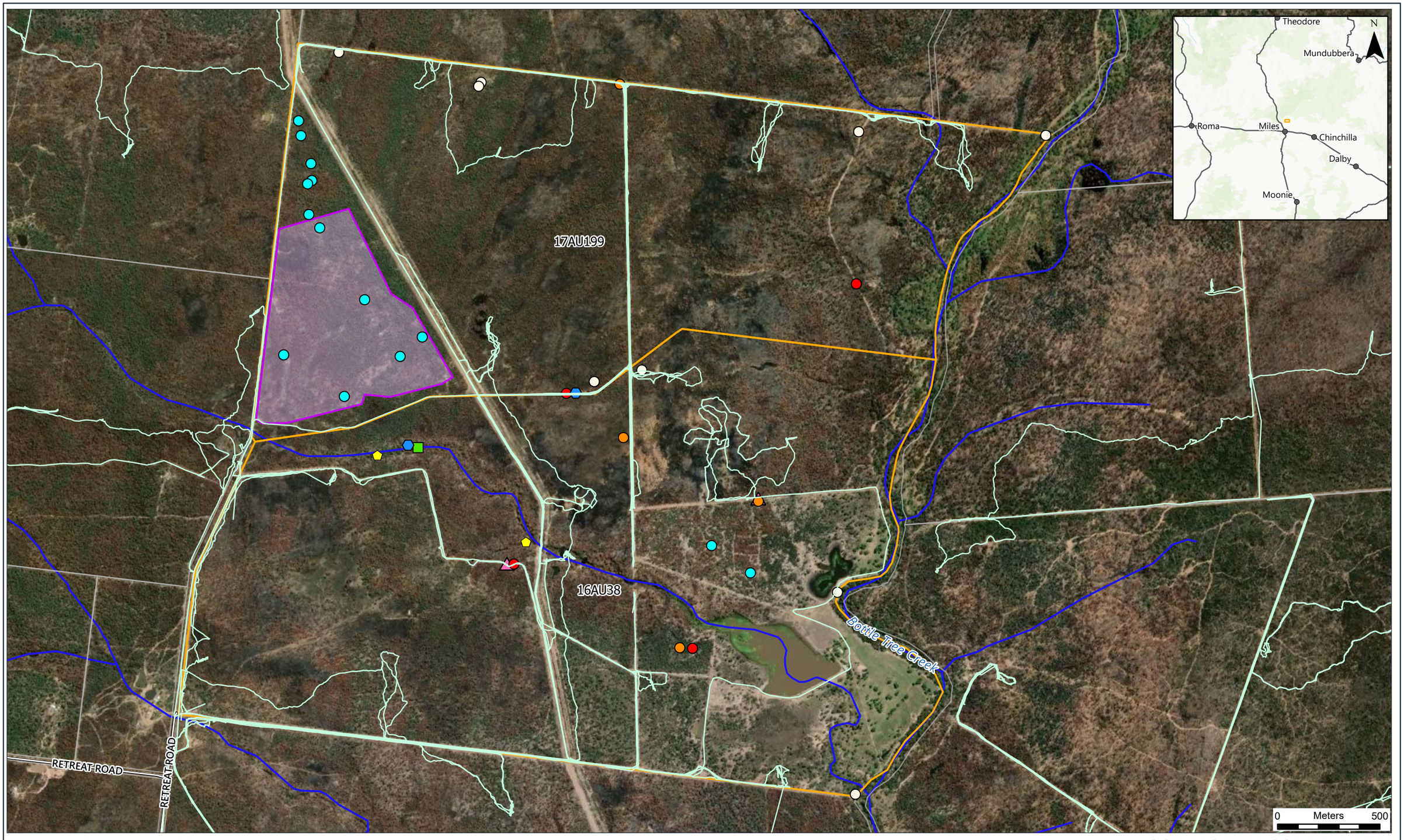
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REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:17,500 | **DATE:** 5/06/2024 | **DWG No:** ARR-002 | **FIGURE 2.1**

GDA2020 MGA Zone 56

Data Source: World Topographic Map: Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Maxar
World Hillshade: Esri, USGS

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Fauna Survey Effort

SGP NORTH SOLAR FARM

- Observation Site
- Anabat Sites
- Camera Trap
- Harp Trap Site
- Spotlighting Site
- Trap Site
- Habitat Assessment Sites
- Koala Spot Assessment
- Watercourse
- Road
- Girrahween Station
- Proposed Solar Farm
- Lot Boundary
- Ecologists Tracks

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FIGURE 2.2

GDA2020 MGA Zone 56

Data Source: World Topographic Map: Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Maxar
World Hillshade: Esri, USGS

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3.2.2 Survey adequacy assessment

Arrow Energy have undertaken several ecological surveys of the Project site and wider gas tenements as outlined in **Section 3.2**. An assessment of the survey effort for MNES species based on the likelihood of occurrence assessment and the Broad Vegetation Groups (BVGs) present on the Project site is presented in **Table 4.1**. The Project site consists of RE 11.7.5 which is BVG 29 and regrowth RE 11.5.1 which is BVG 18.

The broader gas field survey effort as per **Section 3.2** has been used in conjunction to the Project site specific surveys because the Project site is in the gas field wider area and is only a relatively small 62.0 ha that does not warrant repeating full targeted species specific surveys when survey data is already available for surrounding habitat types.

Table 3.3 Survey guideline requirements and effort undertaken per MNES

Species	Relevant Guidelines	Recommended Methodology	Effort Undertaken	Survey Adequacy
Nyctophilus corbeni, Corben's Long-eared Bat	Survey Guidelines for Australia's Threatened Bats (DEWHA 2010a)	• Prior to survey, determine size and pattern of vegetation so trapping effort can be planned. • Anabats used for acoustic detection, to identify areas used by long-eared bats. They should be located in forest or woodland, placed several metres above the ground oriented upwards towards gaps in vegetation and watercourses overnight. Echolocation to identify use by *Nyctophilus* spp. Should be followed up with appropriate level of trapping. • Mistnests and harp traps placed in woodland, mallee and forest below the tree canopy both in open fly-ways and within cluttered vegetation, particularly over open water bodies. • Mistnets and harp traps employed for a minimum of 5 nights with a total effort of 20 nights within a Study Area less than 50 ha.	Girrahween Station (within 3 km of Project site (2013 Supplementary EIS surveys) – 8 trap nights across 4 sites 6 Anabat nights across 3 sites Broader SGP survey effort^ - 164 trap nights across 75,118 ha (Potential BVG's 10,12, 13,16, 17,18, 25)	Complies with guideline intent[#]
Phascolarctos cinereus, Koala	A review of koala habitat assessment criteria and methods (Youngentob, Marsh & Skewes 2021). Survey Guidelines for Australia's Threatened Mammals (DSEWPC 2011a).	• Direct observation methods including transect and point surveys, spotlighting, mark-resight or mark-recapture, thermal detection drones, radio-tracking, camera traps and detection dogs. • Indirect methods including detection of scratchings, Spot Assessment Technique (SAT) and other scat search methods, call playback (typically at night during breeding season), passive acoustics and landscape nutritional quality surveys.	26 sites employing direct observation techniques plus 2 balanced koala scat survey of the Project site as described in **Section 3.2.1.4.** BVG 29 (RE 11.7.5 on the Project site) are heathlands and associated scrubs not suitable breeding and foraging koala habitat (refer to **Section 6.2**).	Adequate

Species	Relevant Guidelines	Recommended Methodology	Effort Undertaken	Survey Adequacy
Petauroides volans volans, Greater Glider (southern and central)	In lieu of species-specific guidance, surveys were conducted in consideration of the *Survey guidelines for Australia's threatened mammals (DSEWPC 2011a)* *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre et al. 2022a)	• Arboreal mammal survey methods include: o Diurnal searches for the presence of potentially suitable habitat resources for nest or den sites as well as signs of the species' presence, such as scratches on tree trunks and scats beneath trees. o Stag watching. o Spotlight surveys in suitable vegetation types. o Call detection and/or call playback surveys for vocal species, in addition to playback of the calls of owl predators that are known to induce a call response. o Cage trapping. • As per Eyre *et al.* (2022a): o Spotlighting transects are the most effective method. Where possible, survey effort should target habitat known to be suitable for listed species.	SGP survey^ - 139.75 hrs foot- based + 27.08 hrs vehicle-based spotlight Potential BVG's 13,16, 17,18, 34 Within 500 m of Project site on an unnamed stream order 2 drainage feature, spotlighting was conducted by a minimum of two ecologists for 1 hour over 2 nights in each location (i.e. 4 person hours).	Complies with guideline intent[#]
Calyptorhynchus lathami lathami, Glossy-black Cockatoo (south-eastern)	Survey guidelines for Australia's threatened birds (DEWHA 2010b) Targeted Species Survey Guidelines – Glossy black cockatoo (Hourigan 2012)	• Diurnal surveys on foot by walking transects through the Study Area, particularly in areas with *Allocasuarina* trees, water bodies and large hollow bearing eucalyptus. Surveys should be done at dawn or dusk, detected by sight or call. Minimum effort should be 5 hours over 1 day (for areas less than 50 ha). • Search for foraging and nesting signs such as discarded, chewed she-oak seed cones beneath *Allocasuarina* trees. Recommended effort is 20 hours over a minimum of 4 days (for areas less than 50 ha).	SGP survey^: 106 hrs bird survey + 1038 hrs site traverse Ecological site surveys and habitat assessments	Complies with guideline intent[#]

Species	Relevant Guidelines	Recommended Methodology	Effort Undertaken	Survey Adequacy
Geophaps scripta scripta, Squatter Pigeon (southern)	*Survey guidelines for Australia's threatened birds (DEWHA 2010b)* *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre et al. 2022a)	• Area searches for the species in representative habitat or transect surveys. Recommended effort is 15 hours over 3 days within an area of 50 ha. Or 6 x 5-10 minute searches within an area of 1 ha. Longer surveys may be required in complex habitats. • Flushing surveys. Recommended effort is 10 hours over 3 days within an areas of 50 ha. Surveys to be undertaken during peak bird activity.	Potential BVG's 10, 12, 13, 16, 17, 18, 25, 29, 30, 34 SGP survey^: • Transect/ area search 106 hrs bird survey • Flushing surveys 1038 hrs site traverse	Complies with guideline intent[#]
Hirundapus caudacutus, White-throated Needletail	Draft referral guideline for 14 birds listed as migratory species under the EPBC Act (DoE 2015)	• Although there are no standard survey techniques for this species, it is recommended they be counted by an experienced person from elevated viewpoints during summer. • For white-throated needletail, observations should be made as late as possible in the evening of birds coming into roost in tall trees along ridge tops.	SGP survey^: • 106 hrs bird survey + 1038 hrs site traverse	Adequate

Species	Relevant Guidelines	Recommended Methodology	Effort Undertaken	Survey Adequacy
Flora Species: • *Calytrix gurulmundensis* • *Homoranthus decumbens*	There are no Commonwealth-approved species-specific survey guidelines for these flora species. Survey techniques were adapted from the Flora Survey Guidelines – Protected Plants (DES 2020) and Management of endangered Plants (Cropper 1993) however survey effort in these guidelines was not intended to be met.	Walking meanders in areas of suitable habitat.	• Targeted MNES flora surveys using timed meanders throughout the entire area by conducted in accordance with Queensland's Flora Survey Guidelines for Protected Plants (DES 2020). • 17 quaternary plots were also undertaken on the Project site.	Adequate

^The SGP surveys covered the broader Surat Gas Project.

Published survey guidelines are designed for small-property assessments (typically < 50 – 500 ha) and are not practical for broad area assessments such as the Surat Gas Project (e.g., achieving >30,000 trap nights for Corben's Long-eared Bat is unrealistic). While the surveys do not strictly achieve survey effort, the surveys comply with the intent of these guidelines by stratifying the vegetation in to Broad Vegetation Groups, identifying core habitats for each species, and undertaking targeted surveys using suitable methods during suitable conditions. This approach 'maximised the chance of detection'.

4.0 Project site ecological values

The Project site contains predominantly non-remnant native vegetation which has been subject to a history of clearing and disturbance. A review of historical aerial photography in Qimagery confirmed that:

- The Project site was cleared by 1972 and maintained as cleared land until the 1980s; and
- Vegetation has been encroaching on cleared areas in the north of the Project site since the 1980s, though cleared areas have been maintained in the southern part (refer to **Figure 4.1**).

Vegetation on the Project site is still grazed, with patches of cleared land interspersed with mixed eucalypt regrowth, Buloke and *Callitris* stands (RE 11.5.1). Parts of the Project site also showed signs of significant fire damage as a result of the wildfires affecting the area in December 2022.

The existing ecological values of the Project site presented in the following sections have been described using a combination of desktop and field-based assessments as described in **Section 3.0**.

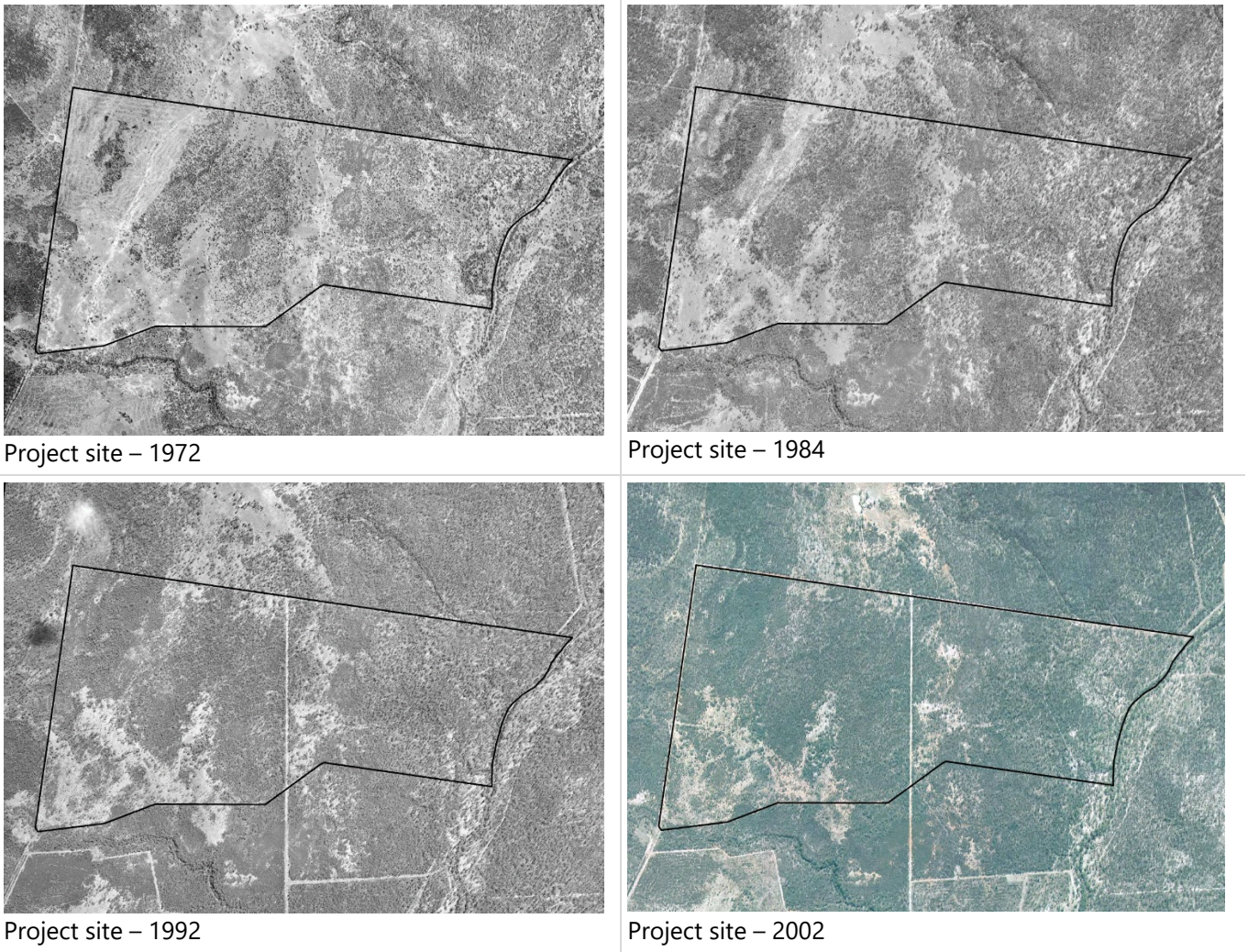


Figure 4.1 Historical imagery for the Project site

4.1 Hydrology

The Project site falls within the Condamine-Balonne River catchment area, which is one of the largest catchments in the Murray-Darling Basin. The lower Balonne River is a complex floodplain channel system which supports several wetlands of national importance, the nearest of which is the Ramsar-listed Narran Lake Nature Reserve approximately 400 km downstream of the Project site.

There are no watercourses within the Project site itself, with surface runoff conveyed via Bottle Tree Creek and Dogwood Creek, discharging into the Balonne River at its junction with the Condamine approximately 120 km downstream. All nearby waterways are ephemeral, typically carrying water only after rain. Specific hydrological characteristics that apply to the Project site/area include:

- The unnamed creek to the south of the Project site is mapped as a stream order 2; this drains east into Bottle Tree Creek which is mapped as a stream order 4;
- There are no mapped wetlands on the Project site. The only permanent water in the surrounding area is in the form of farm dams.

The major rivers in the Condamine-Balonne system typically support alluvial aquifers, with Bottle Tree Creek and tributaries mapped by the State as potentially supporting unconsolidated sedimentary aquifers. There are no identified groundwater dependent ecosystems (GDEs) within the Project site. The drainage line to the south of the Project site has been mapped as having a low confidence of terrestrial GDE areas.

4.2 Vegetation

The Project site is shown as 'Category X' (non-remnant), on the Queensland Department of Resources' Regulated Vegetation Management Map (RVMM). This mapping was verified in the field to confirm the type, extent and boundaries of remnant and regrowth vegetation on the Project site. The majority of the Project site was found to be either cleared or regrowth eucalypt woodland on Cainozoic sand plains, which corresponds to RE 11.5.1.

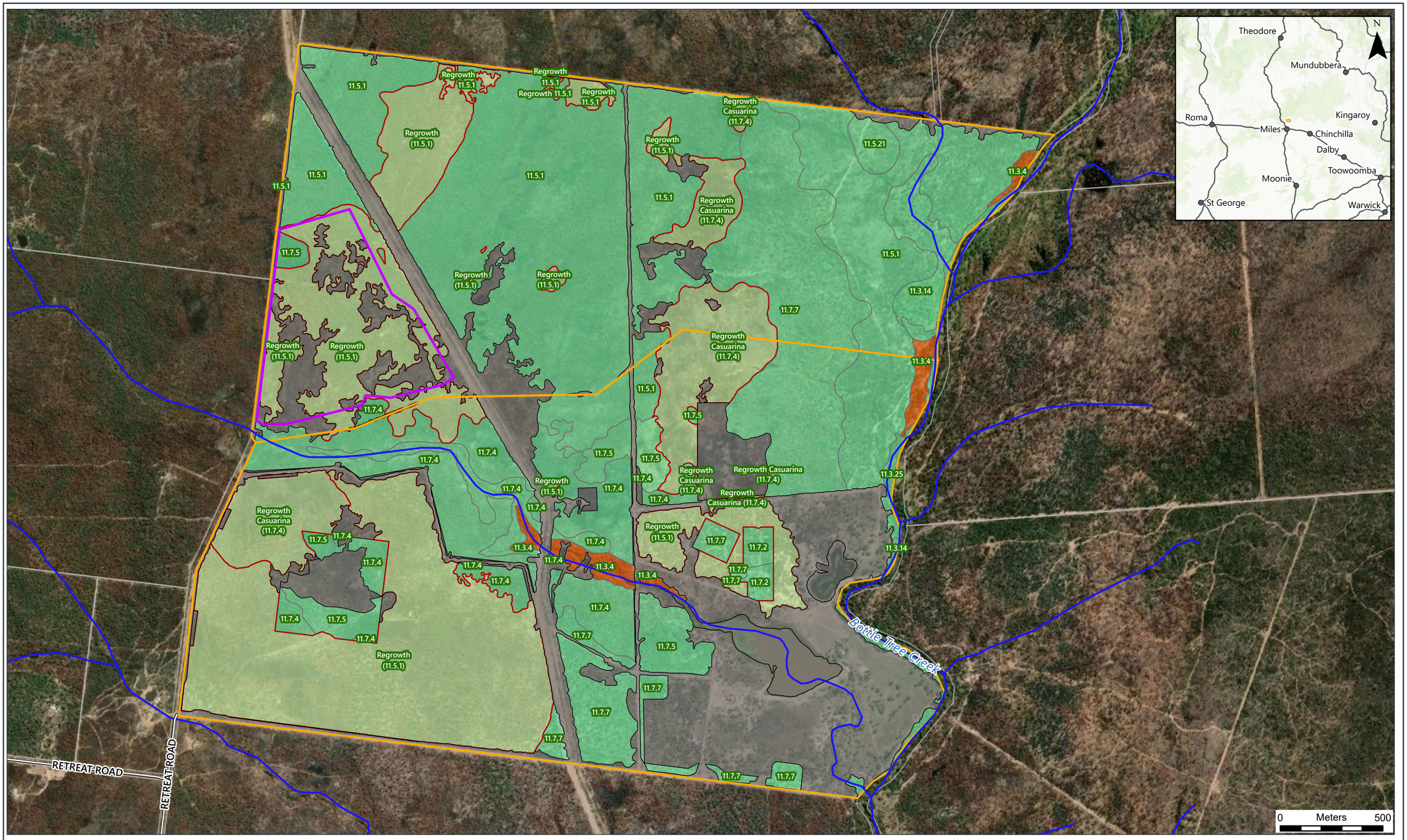
The areas mapped as regrowth (refer to **Figure 4.2**) correspond with previously cleared areas, with the following departure from certified RE mapping identified:

- There is a small discrete area of remnant shrubland (RE 11.7.5) dominated by *Melaleuca* species on the western boundary of the Project site. Other species recorded from this area included *Acacia triptera*, *Calytrix tetragona*, *Hakea purpurea* and *Micromyrtus sessilis*. At the time of the survey of late July 2023, this area showed signs of significant fire damage as a result of the December 2022 wildfires, with dominant shrub species only just resprouting from the base throughout.
- The area immediately to the north of the Project site was assessed as part of ground-truthing surveys in August 2023, and subsequently excluded from the Project site. It contains eucalypt woodland of poor quality but is considered to meet thresholds to be considered remnant in accordance with the Queensland Herbarium's Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities Version 6.0 (Neldner, 2022) when compared with BioCondition Benchmarks for RE 11.5.1 (20 m height and 25% canopy cover)(also refer to RE technical descriptions provided in **Appendix D**).

Ground-truthed RE descriptions for the Project site are set out in **Table 4.1**. Representative photos of vegetation communities on the Project site are shown in **Figure 4.3**.

Table 4.1 Ground-truthed Regional Ecosystems for the Project site

RE	DESCRIPTION	VMA STATUS	AREA (HA)
Remnant			
11.7.5	Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks. Characteristic genera include *Calytrix* spp., *Hakea* spp., *Kunzea* spp., *Micromyrtus* spp., *Acacia* spp., *Melaleuca* spp. And (in the ground layer) *Triodia* spp. Often scattered or fringing emergent tree species are present, including *Eucalyptus exserta*, *E. panda*, *E. curtisii*, *Corymbia trachyphloia* and *Acacia blakei*.	Least concern	2.2
Regrowth			
Regrowth 11.5.1	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces	Least concern	39.4
	Non-remnant	-	20.4
		Total	**62**



Ground Truthed Regional Ecosystem

SGP NORTH SOLAR FARM

- Road
- Watercourse
- Girrahween Station
- Proposed Solar Farm
- Lot Boundary
- Remnant - Of Concern
- Remnant - Least Concern
- Regrowth - Least Concern
- Non-Remnant

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GDA2020 MGA Zone 56

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Data Source: World Topographic Map: Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Maxar
World Hillshade: Esri, USGS



Remnant RE 11.5.1 with some fire damage north of the Project site



Cleared areas with *Callitris glaucophylla* (not impacted by fire)



Remnant shrubland (RE 11.7.5) damaged by December 2022 fires



Regrowth *Callitris glaucophylla* (RE 11.5.1) with fire damage

Figure 4.3 Vegetation typical of the Project site

4.3 Threatened Ecological Communities (TECs)

A search of the EPBC listed threatened species and ecological communities using the PMST (i.e., desktop assessment) was completed for a 50 km radius around Lot 17AU199 on 25 March 2024 (**Appendix E**). The PMST search identified six (6) TECs as potentially occurring within the search area, namely:

- Brigalow (*Acacia harpophylla* dominant and co-dominant);
- Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions;
- Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland;
- Poplar Box Grassy Woodland on Alluvial Plains;

- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions; and
- Weeping Myall Woodlands TEC.

A full list of these TECs and their corresponding RE descriptions as per conservation advice is provided in **Appendix C**. Ground-truthing vegetation conducted in July 2023 did not confirm any associated RE types[9] for the Project site.

4.4 MNES flora species

The PMST search for the Project site identified nine (9) threatened flora species as potentially occurring within a 10 km radius of the Project site. Two MNES flora species, namely *Calytrix gurulmundensis* and *Homoranthus decumbens,* were initially considered likely to occur based on the presence of a suitable patch of myrtaceous shrubland habitat (RE 11.7.5) on the western boundary of the Project site. This shrubland area is quite distinct from the surrounding eucalypt woodlands and is approximately 2 ha in size.

During the July 2023 field surveys, subsequent timed meander surveys were undertaken across the shrubland area of approximately 2 ha in size (refer to **Section 3.2**) and the absence of the two (2) abovementioned MNES flora species was confirmed. As such, they are considered unlikely to occur on the Project site.

A full likelihood of occurrence assessment for all threatened flora species identified through the PMST search is provided in **Appendix C**, and a detailed analysis of habitat associations for both species is presented in **Appendix F**.

4.5 Habitat

Habitat on the Project site is predominantly characterised by regrowth eucalypt woodlands to open woodlands dominated by Narrow-leaved Ironbark (*Eucalyptus crebra*) with stands of Bull Oak (*Allocasuarina luehmannii*) and White Cypress Pine (*Callitris glaucophylla*). Associated microhabitat features include fallen timber, decorticating bark, and very sparse mistletoe. There were very few, if any, trees large enough to support hollows with an average diameter at breast height (dbh) in remnant areas of less than 30 cm.

Habitat types on the Project site based on Ground-Truthed REs (GTREs) include:

- Regrowth open eucalypt woodlands with grassy understorey mixed stands of *Allocasuarina leuhmanii* and *Callitris glaucophylla* (corresponding to regrowth RE 11.5.1). Large parts of this habitat type have been affected to varying degrees by wildfire in December 2022 resulting in a simplified habitat structure at the time of the field assessment in August 2023;
- A small area in the south-west of the Project site of remnant eucalypt woodland with *Eucalyptus crebra*, *E. decorticans*, *Corymbia trachyphloia*, *E. tenuipes*, *C. watsoniana* and *Callitris glaucophylla* and a distinct low tree to tall shrub layer comprising species including *Lysicarpus angustifolius* or *Acacia* spp;
- Remnant myrtaceous shrubland, which corresponds to RE 11.7.5.

[9] As per the Queensland legislation (DoE, 2013).

There is also a small creek immediately to the south of the Project site with burnt out canopy in the west (RE 11.5.1) but supporting large trees including *Corymbia citriodora*, *Angophora leiocarpa* and *Eucalyptus exserta* in a rocky gorge further downstream (RE 11.7.4)(refer to **Figure 4.4**). This area borders the southern boundary of the Project site but is not impacted by the Project.



Fire-damaged vegetation adjoining creek line, mapped as RE 11.7.4



Pooled water in upper section of creek line adjoining southern boundary of Project site

Figure 4.4 Representative photos of Project site



Rocky gorge with large trees to south of Project site



Woodland habitat characteristic of Project site

Figure 4.5 Representative photos of habitat on Project site and surrounds

4.6 Fauna assemblages

A full fauna species list compiled from all fauna surveys across the western half of Girrahween Station (Lot 17AU199 and Lot 16AU38) and additional records sourced from Wildlife Online and Atlas of Living Australia Databases are included in **Appendix B**.

Fauna recorded from the Project are generally common species typical of these types of disturbed environments. A higher diversity of fauna, including woodland birds, frogs and smaller reptiles was recorded from less disturbed areas associated with the unnamed creek running along the southern boundary of the Project site and Bottle Tree Creek (neither of which will be impacted by the Project).

4.7 MNES fauna species

The PMST search for the Project site identified 54 threatened and 12 migratory fauna species as potentially occurring within a 10 km radius of the Project site. A full likelihood of occurrence assessment for all threatened fauna species identified through the PMST search is provided in **Appendix E**.

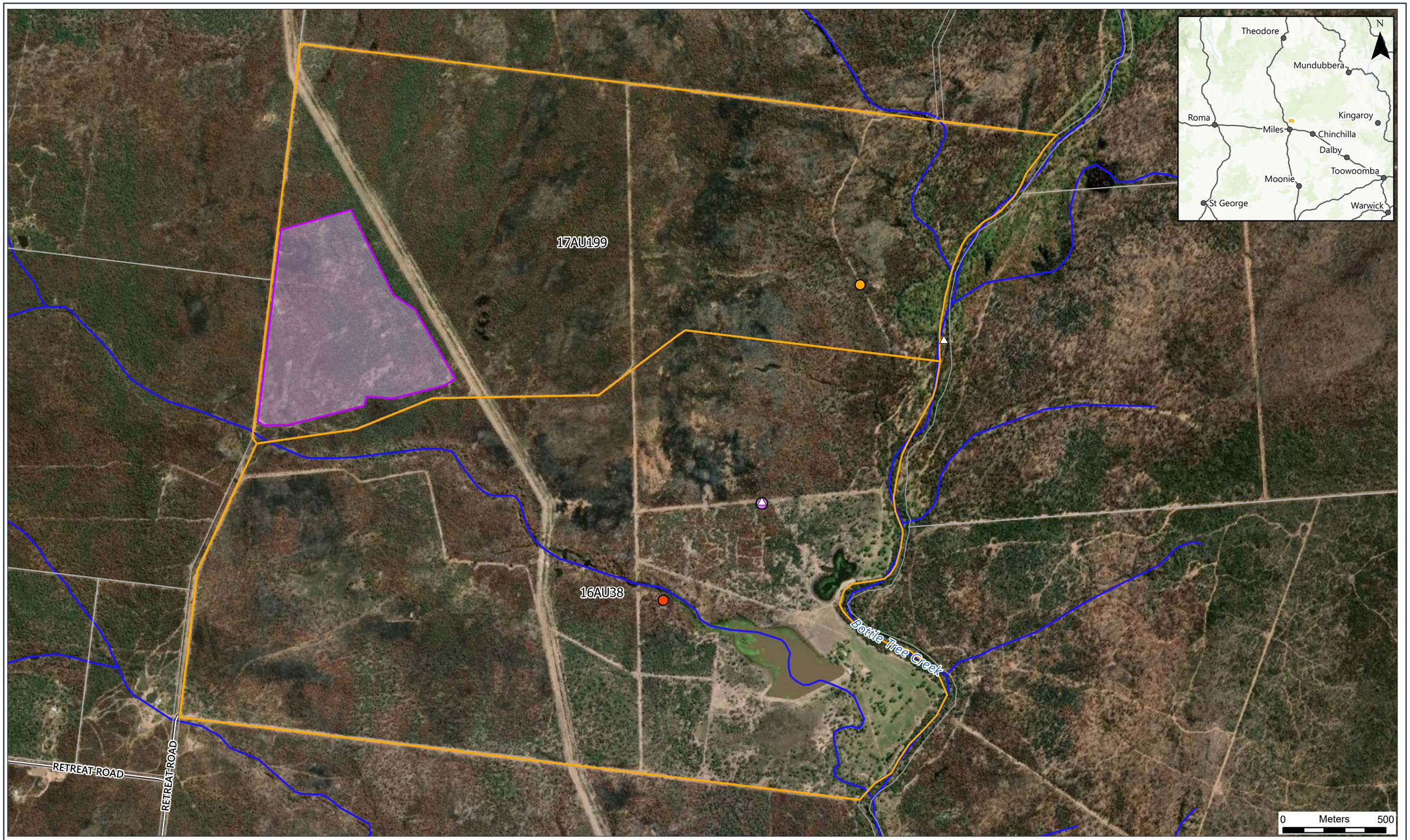
MNES threatened fauna species known or considered likely to occur on the Project site are summarised in **Table 4.2** with records for MNES species shown in **Figure 4.6**. Koala has been included in the assessment due to the presence of 'Locally Important Koala Trees (LIKT)' on the Project site, and due to its classification as *endangered*.

Although the White-throated Needletail is known to occur, it is predominantly an aerial species (Ecosmart, 2023) and therefore has not been included in the significant impact assessments in **Section 6.0**. Similarly, Squatter Pigeon (southern) has been assessed as likely to occur but is considered to be a transient in the SGP (EcoSmart, 2023) and on this basis, Squatter Pigeon has not been included in the significant impact assessments in **Section 6.0**.

Table 4.2 MNES Fauna species known or likely to occur in the Project site

Species Name	EPBC Act Status	Likelihood of Occurrence & Rationale
Mammals		
Nyctophilus corbeni, Corben's Long-eared Bat	Vulnerable	**Known to occur** This species was recorded in 2013 on Girrahween Station, approximately 2 km further east near Bottle Tree Creek. The Project site contains ironbark woodlands and stands of *Callitris* and Bull Oak (*Allocasuarina leuhmanii*) that are likely to provide foraging habitat and possibly some roosting habitat (typically in the form of exfoliating bark rather than tree hollows given the relatively young age of regrowth trees).
Phascolarctos cinereus, Koala	Endangered	**Likely to occur** Not previously recorded from the Project site, however, the closest records are approximately 8 km away and the Project site does contain known browse species (LIKT). The Project site contains eucalypt woodland that is potential foraging and dispersal habitat for Koala.
Petauroides volans volans, Greater Glider (southern and central)	Endangered	**Likely to occur** Not previously recorded from the Project site or surrounds however, the closest records are approximately 8 km to the south-east (associated with Dogwood and Punchbowl Creeks) and the Project site contains *Eucalyptus crebra* which is one of six tree species identified as dominant or co-dominant in the majority of Queensland greater glider habitat (Eyre, 2022). The Project site contains eucalypt woodland that is potential habitat for Greater Glider.
Birds		
Calyptorhynchus lathami lathami, Glossy-black Cockatoo (south-eastern)	Vulnerable	**Known to occur** This species was recorded from areas mapped as remnant RE 11.7.4 associated with the creek on the southern Project site boundary during field surveys conducted for the Supplementary EIS Report in 2013. This species was not recorded at the Project site during field assessments in July 2023, nor was there any evidence of feeding litter (chewed cones or orts) at the base of trees.
Geophaps scripta scripta, Squatter Pigeon (southern)	Vulnerable	**Transient** Squatter Pigeon was not recorded on the Project site or elsewhere on Girrahween Station, despite recent fires and there are only three records within 50 km of the Project site. However, as there are nearby records from Barakula State Forest and dams associated with the Girrahween Homestead are permanent water sources and open eucalypt woodlands with grassy understorey in adjoining areas are potential habitat, it is expected that the Squatter Pigeon will occur as an occasional vagrant or transient species (refer **Appendix G**). Compared with other parts of the species' range where there is often a concentration of records around a particular location, analysis of records within 50 km of the broader Surat Gas Project indicates that the species occurs infrequently, and has generally only been recorded as vagrant or transient individuals rather than breeding pairs. This is despite a significant increase in survey effort as a result of gas development in the region. The nature of the records indicates the absence of a resident population and, as such, Squatter Pigeon has not been included in the significant impact assessments in **Section 6.0**.

Species Name	EPBC Act Status	Likelihood of Occurrence & Rationale
Hirundapus caudacutus, White-throated Needletail	Vulnerable, Migratory	**Known to occur** This species was recorded during field surveys for the Supplementary EIS in 2013. The White-throated Needletail is a predominantly aerial species (EcoSmart 2023) and has not been included in the significant impact assessments in **Section 6.0**.



MNES Species Records

SGP NORTH SOLAR FARM

- Corben's Long-Eared Bat
- Glossy Black-cockatoo
- *Nyctophilus* sp.
- White-throated Needletail
- Road
- Watercourse
- Girrahween Station
- Proposed Solar Farm
- Lot Boundary

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REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:17,500 | **DATE:** 5/06/2024 | **DWG No:** ARR-002_017[C] | **FIGURE 4.2**

GDA2020 MGA Zone 56

Data Source: World Topographic Map: Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Maxar
World Hillshade: Esri, USGS

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5.0 Impact assessment

This section provides an overview of the potential impacts associated with the construction and operation of the proposed SGP North Solar Farm. Assessments of the significance of these impacts on species known or considered likely to occur on the Project site are presented in **Section 6.0**.

5.1 Project disturbance area

The Project site has been selected as a preferred location for development as it is entirely mapped as Category X (non-remnant) on the RVMM and contains predominantly regrowth vegetation that has been subject to historical clearing and disturbance (refer to **Section 4.0**). As a consequence, the vegetation quality is reduced when compared to the surrounding remnant areas. This location is also separated from adjoining remnant areas by an approximately 100 m wide gas pipeline easement to the east and cleared tracks and fence lines to the west, reducing the patch size and fragmenting it from surrounding areas.

The Project site area has been revised following ecological field surveys to avoid remnant vegetation RE 11.5.1 on the north side of the development resulting in a reduction of the total impact area from 69.3 ha to 62.0 ha.

5.2 Vegetation clearing

For the purposes of this assessment, it is assumed that clearing of all of 62.0 ha of land within the Project site will be required to facilitate development of the SGP North Solar Farm, as outlined in **Section 1.3**

- 2.2 ha of remnant vegetation communities, comprising remnant myrtaceous shrubland community (RE 11.7.5), classified as Least Concern under the VM Act;
- 39.4 ha of regrowth eucalypt woodlands, classified as Least Concern; and
- 20.4 ha of non-remnant vegetation (includes sparse / immature regrowth vegetation and some cleared areas).

A summary of clearing of vegetation by RE type is provided in **Table 5.1**. This table also includes an analysis of the cleared area as a proportion of the mapped area of a given vegetation community in the Barakula sub-region.

Table 5.1 Vegetation clearing by RE type

RE	VMA STATUS	TOTAL AREA IN PROJECT SITE (ha)	% IN BARAKULA SUBREGION
Remnant			
11.7.5	Least concern	2.2	<0.1%
Regrowth			
11.5.1	Least concern	39.4	-
Other			
Non-remnant	-	20.4	-
		62.0	-

5.3 Loss of fauna and their habitat

The majority of the Project site has been subject to historical clearing and vegetation is of poor quality when compared to surrounding remnant areas. However, remnant and regrowth vegetation on the Project site does provide some habitat values for diurnal bird species and other local fauna. East-west connectivity between remnant patches has already been impacted by the existing pipeline easement of approximately 100 m wide on the eastern boundary of the Project site. Clearing for the Project site is set back from this easement by around 70 m to 100 m in the northern half of the Project site easement boundary, and approximately 40 m along the southern half of the Project site easement boundary. Good connectivity remains north of the Project site through remnant RE 11.5.1 and south through RE 11.7.4 that contains a riparian corridor along an unnamed waterway.

Increased traffic around the Project site also has the potential to kill or injure fauna on impact. Some ground-dwelling or slow-moving fauna species may be particularly susceptible to these impacts. Fauna utilising habitat such as fallen logs, tree hollows and burrows are most at risk from clearing activities (i.e. arboreal mammals, nocturnal birds, bats, and reptiles). Injured or fleeing fauna may be displaced into adjacent and unsuitable habitats and may be at risk of predation.

5.4 Pest species

The Project site contained surprisingly few weed species despite a long history of cattle access, agricultural use, and the adjoining linear infrastructure corridors. While project activities have the potential to increase the abundance of pest flora and facilitate dispersal of these pest species to previously unaffected areas, generally unrestricted vehicle access throughout the site and surrounding area is an existing condition. Arrow Energy's Biosecurity procedures will be used for the construction of the project and as such, it is considered that the risk of introducing new weeds is relatively low.

Project-related activities may also increase pest fauna abundance in the area surrounding the Project site. This can lead to increased competition with, and predation of, native fauna. In addition, habitat degradation may occur through vegetation trampling (e.g. feral pig wallowing). Creation of new access points into areas of intact vegetation may create pathways for feral fauna species to disperse. Uncontained waste sources may also attract feral fauna such as wild dogs.

Pest species will be managed in accordance with established Arrow Energy management plans.

5.5 Indirect and facilitated impacts

Indirect impacts arising from construction and operation of the SGP North Solar Farm could include:

- Increased dust from vegetation clearing, earthworks and vehicle movements during construction;
- Noise and vibration associated with construction activities;
- Occasional low-level noise from operation of the solar farm substation; and
- Light spill from security lighting.
- Facilitated impacts may also arise as a result of upgrades to Retreat Road by others.

6.0 Significant Impact Assessments

Significant impact assessments have been carried out against the EPBC Act Policy Statement *Significant Impact Guidelines 1.1* (DEWHA, 2013) (the guidelines) for those MNES that are known or considered likely to occur on the Project site. **Section 6.1** to **Section 6.4** present the significant impact assessments by species.

6.1 Corben's Long-eared Bat, *Nyctophilus corbeni* (Vulnerable)

6.1.1 Ecology, habitat and distribution

In Queensland, Corben's Long-eared Bat inhabits a variety of vegetation types but is distinctly more common in box/ironbark/cypress pine woodland vegetation that occurs on the western slopes and plains of the Great Dividing Range. This species is considered naturally rare across its range and has been found to be more abundant in larger remnants with a well-developed understorey (Turbill and Ellis, 2006).

All members of this genus have broad wing and tail membrane surface that allows slow, highly manoeuvrable flight with foraging usually undertaken within several kilometres of their roosting site (Lumsden et al 2002). These bats forage at a low height, close to vegetation and around tree trunks, and also glean invertebrates from surfaces (Turbill and Ellis, 2006). These features suggest that *Nyctophilus* spp. are generally associated with forests, woodlands and tall shrublands that contain an abundance of feeding substrates in the first few metres above the ground and hollow bearing trees that provide suitable roosting conditions. As such, *N.corbeni* is generally considered to be 'clutter-adapted' and forest-dependent (Law et al, 2016).

Summer roosts of male *Nyctophilus* spp. are typically under exfoliating bark, whereas the roosts of females, which form small maternity colonies, are typically in tree hollows. In a study from *Callitris glaucophylla* forests in the Piliga, *N. corbeni* avoided roosting in open, thinned areas as predicted for a closed-space species but actively foraged in both cluttered and uncluttered forests (Law et. al., 2018). Law et al (2016) recorded capture of males up to 4 km from roost sites, with other studies recording males at foraging distances from roost of up to 7 km (Lumsden et al 2011).

6.1.2 Important population

An important population of Corben's Long-eared Bat is not defined for the purposes of the EPBC Act. Consequently, it is relevant to refer to the guidelines, which define an important population of a vulnerable species as being one that is:

- A key source population either for breeding or dispersal;
- Necessary for maintaining genetic diversity; and/or
- Near the limit of the species' range.

There are four (4) records of the Corben's Long-eared bat within a 10 km radius of the Project site. The first one in an area approximately 2 km to the east near Bottle Tree Creek, and an earlier one from 2002 from the Binkey State Forest, which is approximately 10 km to the north-west of the Project site. There are also two records approximately 7 km southeast of the Project site near the junction of Bottle Tree and Dogwood Creeks.

Most species of *Nyctophilus* are thought to be sedentary and the slow, manoeuvrable flight that characterises this genus is not considered conducive to long distance flights (Lumsden, 1994). Foraging is generally undertaken within several kilometres of their roosting site (Lumsden *et al,* 2002). As such, the Project site is likely to contain a population of this species, however, there is nothing to indicate that this population is a key source population or necessary for maintaining genetic diversity, nor is the Project site near the limit of the species' range. As such, any population of Corben's Long-eared Bat in this location is not considered an important population.

6.1.3 Habitat critical to survival

In Queensland, Corben's Long-eared Bat is associated primarily with box/ironbark/cypress pine woodlands, particularly larger remnants with a well-developed understorey. Records within a 100 km radius of the Project site are associated with the following RE types: RE 11.5.1, 11.5.4, 11.5.21, 11.7.4, 11.7.6 and 11.7.7.

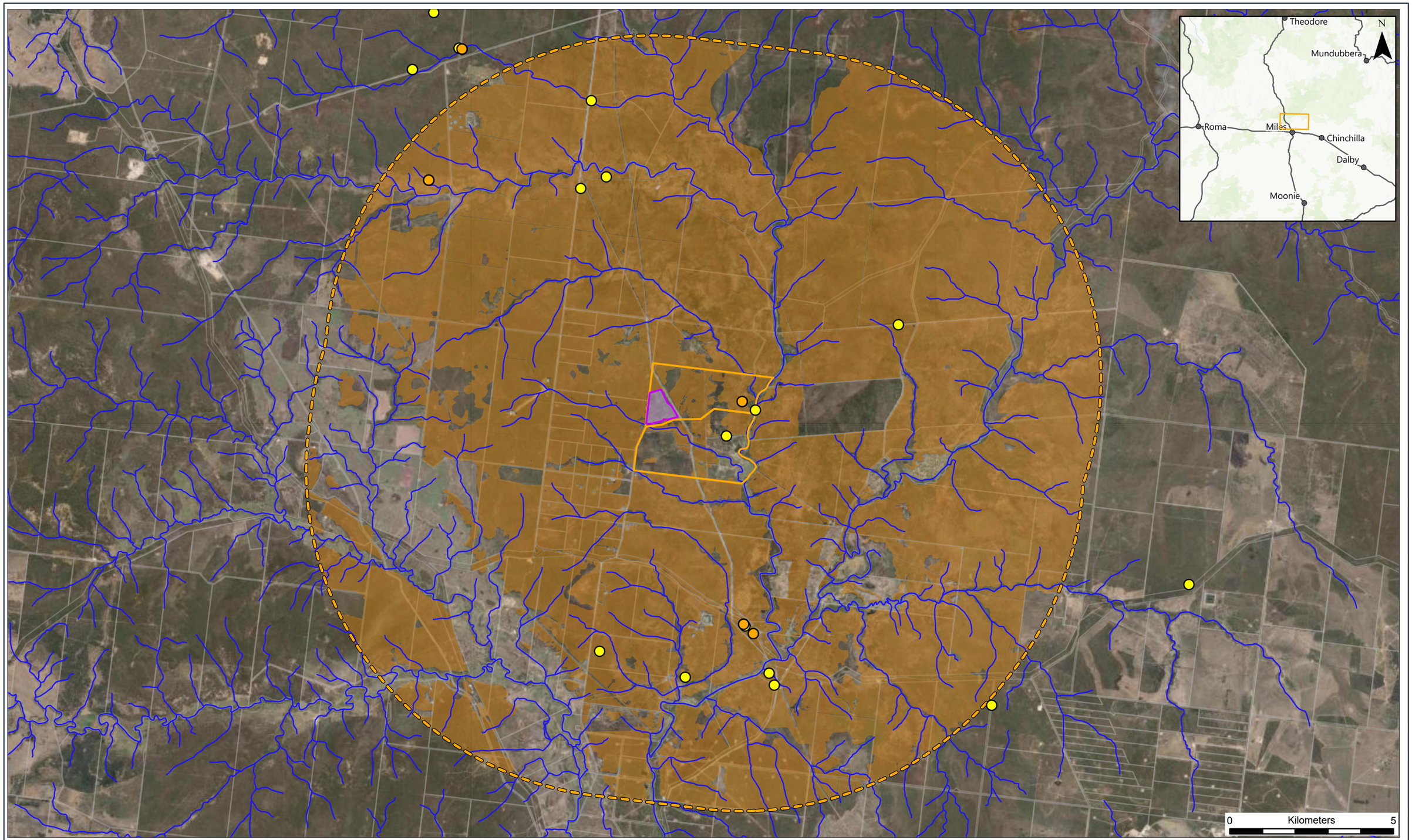
On this basis, the REs listed above have been mapped as 'habitat critical to survival' where they occur as remnant and in patch sizes >10 ha (refer **Figure 6.1**). While there is potential roosting habitat on the Project site (in the form of exfoliating bark rather than tree hollows given the young age of regrowth trees), this species typically prefers closed spaces and avoids more open areas. As such, areas of regrowth RE 11.5.1 have been mapped as potential foraging habitat only due to the regrowth nature of the vegetation, the extent of recent fire damage (refer **Section 6.1.4**), the lack of emergent eucalypts and reduced complexity of the understorey vegetation.

6.1.4 Threats

Habitat loss, change and/or fragmentation is a primary factor contributing to the population decline of Corben's Long-eared Bat. This species is known to occur within forests, woodlands and tall shrubland vegetation. Historically, these habitats were cleared for industrial activities such as forestry, agriculture, and mining (TSSC, 2015; OEH, 2017). Habitat loss, change and fragmentation have flow on effects exacerbating other threatening processes, such as the absence of hollow-bearing trees as either roosting or nesting sites (TSSC, 2015; Lumsden *et al*, 2002). The loss of additional hollow habitat would be detrimental for the conservation of Corben's Long-eared Bat; resulting in increased competition and pressure (TSSC, 2015).

Bushfires threaten Corben's Long-eared Bat through direct mortality and the rapid reduction and change in their habitat and roosting/nesting sites. In Victoria, *Nyctophilus corbeni* is known to prefer long-unburnt, mallee vegetation (DCCEEW, 2015b). Additionally, altered fire regimes or increased fire frequency change the floristic composition and structure of the landscape, thus impacting the availability of appropriate prey for Corben's Long-eared Bats and their ability to use echolocation to communicate and hunt (Jemison *et al*, 2009; OEH, 2017).

As habitat for this species was traditionally cleared for forestry, mining, and agriculture; exposure to agrichemicals (either directly or through bioaccumulation) can be recognised as a key threatening process. However, it must be acknowledged that more data is needed to quantify the level of impact presented by agrichemicals (TSSC, 2015; OEH, 2017).



Threatened Species - Corben's Long-Eared Bat

SGP NORTH SOLAR FARM

- Girrahween Station
- 10 Km Buffer
- Corben's Long-Eared Bat
- *Nyctophilus sp.*
- Habitat Critical to Survival
- Watercourse
- Lot Boundary
- Proposed Solar Farm

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REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:110,000 | **DATE:**5/06/2024 | **DWG No:** ARR-002_019[C] | **FIGURE 6.1**

GDA2020 MGA Zone 56

Data Source: World Topographic Map: Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Earthstar Geographics
World Hillshade: Esri, USGS

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Threatened Species - Corben's Long-Eared Bat

SGP NORTH SOLAR FARM

- Corben's Long-Eared Bat
- *Nyctophilus sp.*
- Watercourse
- 10 Km Buffer
- Girrahween Station (West)
- Proposed Solar Farm
- Lot Boundary
- Potential Foraging Habitat
- Habitat Critical to Survival

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REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:17,500 | **DATE:** 3/12/2024 | **DWG No:** ARR-002_019[C] | **FIGURE 6.1b**

GDA2020 MGA Zone 56

Data Source: World Imagery: Maxar
World Topographic Map:
World Hillshade: Esri, USGS

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6.1.5 Significant impact assessment

The Project will not result in the clearing of any 'habitat critical to the survival' of Corben's Long-eared Bat. The clearing on the Project site will affect regrowth areas of RE 11.5.1 that represent potential foraging habitat. It is the conclusion of this assessment that the development of the Project is unlikely to have a significant impact on Corben's Long-eared Bat. A significant impact assessment for this species is provided in **Table 6.1**.

Table 6.1 Significant Impact Assessment – Corben's Long-eared Bat

Impact Criteria	Response
Lead to a long-term decrease in the size of an important population of a species	**No.** While not physically recorded within the Project site, nearby historical records of the Corben's Long-eared Bat (within 2 km of the Project) indicate that the species may utilise the connected habitat surrounding the Project site. The Project site contains ironbark woodlands and stands of *Callitris* and *Allocasuarina luehmannii* (Bull oak) that are likely to provide foraging habitat. However, any population in this location is not considered an important population. It is considered unlikely that impacts to this habitat would lead to a long-term decrease in the size of the Corben's Long-eared Bat population.
Reduce the area of occupancy of the species of an important population	**No.** The current area of occupancy has not been estimated for Corben's Long-eared Bat however, Project development is unlikely to have any impact on the AOO for this species.
Fragment an existing important population into two or more populations	**No.** The genus *Nyctophilus* is not considered to undertake long distance flights (Lumsden, 1994). Foraging is generally undertaken within several kilometres of their roosting site (Lumsden *et al,* 2002) and concentrated around patches of trees in the landscape (TSSC, 2015). While the Project will represent a cleared gap in the landscape (with a total length of approximately 1.0 km), these distances would be navigable by individual Corben's Long-eared Bat and connectivity will be maintained at the northern and southern ends of the development. As such, it is unlikely that the Project would fragment an existing important population of this species.
Adversely affect habitat critical to the survival of a species	**No**. As this species is typically associated with mature vegetation and well-developed forest, large extents of remnant RE 11.5.1 and RE 11.7.4 across Girrahween Station and the surrounding area (including Barakula and Binkey State Forests) have been mapped as habitat critical for the survival of this species where they occur as remnant and in patches >10ha. Clearing in remnant areas has been avoided, with the majority of the clearing proposed in regrowth eucalypt woodlands subject to historical disturbance which have been mapped as potential foraging habitat only. As such, it is unlikely that the Project will impact on habitat critical for the survival of Corben's Long-eared Bat.

Impact Criteria	Response
Disrupt the breeding cycle of an important population	**No.** There is little available information on the species' reproductive biology (TSSC, 2015). Vegetation on the Project site is predominantly regrowth of up to 30 years in age. Corben's Long-eared Bat prefer roosting in stag trees, hollows and under loose bark (TSSC, 2015). As such, trees on the Project site are not ideal to support roosting for Corben's Long-eared Bat and no impact on breeding habitat would be expected to occur as a result of the Project.
Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline	**No.** The closest record to the Project site exists 2 km east of the site, and records exist in Barakula State Forest and Jarrah State Forest. This suggests that suitable habitat is available in the surrounding area. It is therefore considered unlikely that the Project will modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**No**. Predation by introduced species, such as the feral cat (*Felis catus*) and red fox (*Vulpes vulpes*), has not been observed for Corben's Long-eared Bat and therefore the risk to the species is unknown (TSSC, 2015). Invasive weeds have the ability to change the floristic and structural characteristics of habitat and may increase the flammability of the habitat, amplifying the risk associated with wildfire. Once cleared, the Project site will be maintained as cleared land for the life of the solar farm and no increased impact on fire frequency or intensity would be expected as a result. A Weed and Pest Management Plan (WPMP) and Bushfire Management Plan will be developed and implemented across the Project. This management plan will help to ensure that invasive species are appropriately managed. It is considered unlikely that the Project will result in the establishment of invasive flora and fauna species in the Project site.
Introduce disease that may cause the species to decline	**No.** There are no known diseases listed as threatening process for Corben's Long-eared Bat.
Interfere with the recovery of the species	**No.** While the Project will result in the removal of potential habitat for Corben's Long-eared Bat, the impact is minimal. Therefore, the Project will not interfere with the conservation management outcomes listed in the Conservation Advice for the species (TSSC, 2015).
Determination	Mature vegetation and well-developed forests appear to be a critical habitat component for this species, with remnant areas avoided through site selection. While the Project will result in the

Impact Criteria	Response
	removal of 39.4 ha potential foraging habitat for Corben's Long-eared Bat, it is considered unlikely that the Project will have a significantly impact on Corben's Long-eared Bat due to the abundance of mature vegetation in the surrounding landscape

6.2 Koala, *Phascolarctos cinereus* (Endangered)

6.2.1 Ecology, habitat, and distribution

The koala inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by eucalypts (DCCEEW, 2022c). The koalas' diet is restricted mainly to *Eucalyptus* species; however, it may also consume *Corymbia, Angophora* and *Lophostemon* and at times may supplement its diet with *Leptospermum* and *Melaleuca* (TSSC, 2012b), and as such is limited to forests and woodlands supporting these trees. Despite their reliance on eucalypt trees for food, they can utilise a large variety of trees for shelter and refuge which are also highly important for protection from predators (and refuge for females and juveniles from males) and thermoregulation.

Koalas on the western side of the Great Dividing Range at the western edges of their range are often associated with watercourses, though they are not restricted to them (Melzer et. Al., 2000; Sullivan et. Al., 2003). In the Brigalow Belt South bioregion, Davies et al (2013) found that koalas spent around 40% of their time in riparian areas compared with other habitats.

Koalas have a highly variable home range. Males typically have a larger home range than females with home range size increasing as trees become more widely spaced (Davies et al, 2013). Home ranges overlap although the species is generally solitary. During the breeding season males will attempt to establish dominance over the home ranges of a number of females, and on average, male koalas usually have larger home ranges than females (DAWE, 2022). Koalas generally do not move large distances under most conditions; however, larger movements by dispersing individuals (mostly young males) are reported, including movements of several kilometres over land with little vegetation (DAWE, 2022).

Koala habitat can be broadly defined as:

- Breeding and foraging habitat; any forest or woodland containing locally important koala trees (LIKT) and/or ancillary habitat trees (as identified per bioregion in Youngentob et al, 2021) trees.
- Dispersal habitat; all other areas with or without vegetation including individual paddock trees within 3 km of breeding and foraging habitat.

6.2.2 Habitat critical to survival

Prior to the koala being uplifted from Vulnerable to Endangered under the EPBC Act in February 2022, an assessment of whether a Project contained '*habitat critical to the survival of the species*' was typically completed using the Koala Habitat Assessment Tool which is outlined in the now outdated EPBC Act Referral Guidelines for the Vulnerable Koala (DoE, 2014). Since this update however, the descriptions of suitable *Koala habitat* have become much broader, and now need to consider dispersal habitat for this species that could be utilised by individuals moving between patches of foraging and breeding habitat. Subsequently, the determination of whether a '*habitat is critical to the survival of a species*' (HCSS) has become more complex and is no longer determined using a scoring system. Instead, several key questions should be evaluated during the determination of whether HCSS is present.

The conservation advice for the koala (DAWE, 2022) has incorporated the following factors into how it describes habitat critical to the survival of the species:

- Whether the habitat is used during periods of stress (e.g. flood, drought, or fire);
- Whether the habitat is used to meet essential life cycle requirements (e.g. 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; and
- Any other way in which a habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community under the EPBC Act.

A summary of these key questions and the Project's response to these questions has been provided below in **Table 6.2.** On the basis of this assessment, koala habitat on the Project site has been mapped as potential breeding and foraging habitat which includes regrowth 11.5.1 as well as dispersal habitat consisting of non-remnant areas and RE 11.7.5 (refer to **Figure 6.2**).

Table 6.2 Habitat critical to the survival of the koala determination

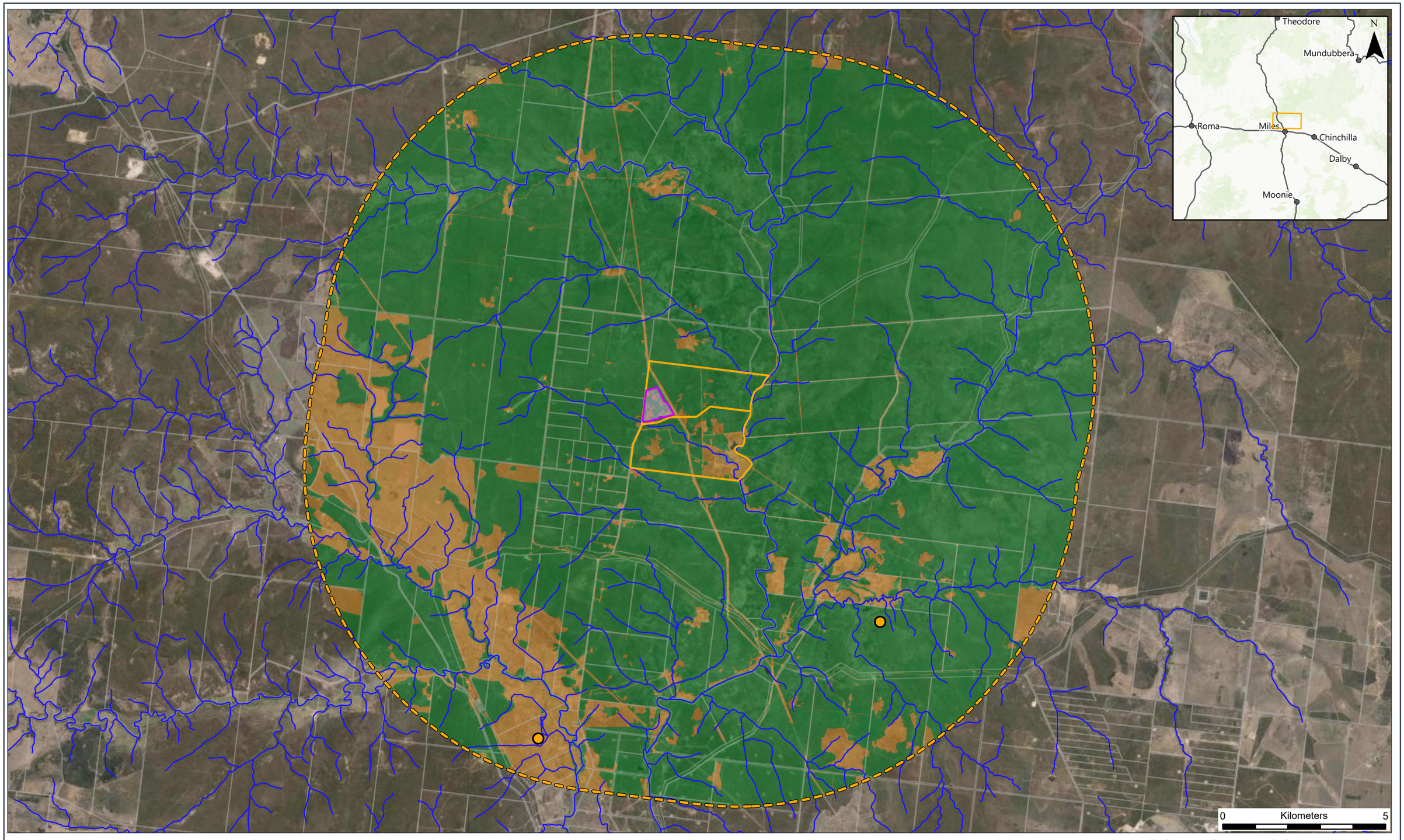
Critical Habitat Considerations	Project Response
Does the Project contain habitat that is used during periods of stress (e.g. flood, drought, or fire)?	**No**. There was no evidence of koalas detected during a walkover survey of the Project site in July 2023, and there are no historical records for this species in this area, with the nearest record approximately 8 km to the south-east. Vegetation within the Project site is generally poor-quality regrowth RE 11.5.1 which has been heavily impacted by historical clearing and recent fire. However, this vegetation does contain LIKT and Ancillary Habitat Trees as defined by Youngentob et al (2021), including: • *Eucalyptus crebra* • *E. populnea* • *E. exserta* • *E. fibrosa; and* • *Acacia salicina.* The small area mapped as RE 11.7.5 is dominated by shrub species and does not support emergent eucalypts. While the presence of LIKT may provide an occasional foraging resource for koala, the poor-quality of the vegetation across the Project site and the recent fire damage means that it is unlikely to represent habitat used during periods of drought and fire (though this could be subject to change over time). Broader survey across the Girrahween property identified that the most likely refuge habitat for koala is associated with Bottle Tree Creek in the east and, to a lesser extent, the tributary to the south though some areas suffered extensive damage in the recent fires.

Critical Habitat Considerations	Project Response
	It is conceivable that the Project site may be used in times of flood though there are higher quality habitats available on both Girrahween and in the broader area.
Does the Project contain habitat that is used to meet essential life cycle requirements (e.g. foraging, breeding, social behaviour, dispersal)?	**Yes.** Vegetation in the Project site is generally poor-quality regrowth RE 11.5.1 which has been heavily impacted by historical clearing and recent fire. This vegetation does contain LIKT as described above which indicates that this area may at a minimum provide an occasional foraging resource for koala and is considered to be 'essential' for life cycle requirements. The non-remnant areas and the small, discrete area mapped as RE 11.7.5 (with an absence of any emergent eucalypts) are dispersal habitat and due to their limited extents and because there is good habitat connectivity in surrounding areas are not considered 'essential' for life cycle requirements.
What is the extent to which the habitat present within the Project site is used by important populations.	**No.** Given that no historical koala records have been identified within the Project site and there was no evidence of use recorded, the current extent to which this suitable habitat is being utilised by koalas is unclear. It is unlikely however, that if a local population is present, that this habitat would not be utilised to some extent.
Does the Project contain habitat that is necessary to maintain genetic diversity and long-term evolutionary development?	**No.** Considering that no historical koala records have been identified within the Project site, and the abundance of adjacent habitat associated with nearby state forests, including Barakula State Forest, Binkey State Forest, and Gurulmundi State Forest, it is unlikely that the habitat within the Project site is necessary to maintain the genetic diversity and long-term evolutionary development of the koala.
Does the Project contain habitat that is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements?	**No.** While the quality of the regrowth on the Project site is poor, it does provide vegetated cover between remnant patches to the east and west. It is not the only vegetation to do so however, and more significant corridors are available to the north and south of the Project site.
Is the habitat within the Project site necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation?	**No.** The nearest records of koala (i.e., within 50 km of the Project site) date from the late 1987 through to 2017 (ALA, 2023 http://www.ala.org.au/). These records indicate that a regional koala population, or several more localised populations, has continued to persist in the environment. As the species already occurs in the broader area, is unlikely that the Project site habitat is necessary to ensure the long-term future of the regional koala population through reintroduction or re-colonisation.

Critical Habitat Considerations	Project Response
Are there any other ways in which the habitat present within the Project site might be critical to the survival of a listed threatened species or a listed threatened ecological community (EPBC Act)?	**No.** Considering the high connectivity of the surrounding vegetation, the limited quality of available habitat and the absence of records within the Project site, it is considered unlikely that the habitat present within the Project site would be critical to the survival of the koala through means not addressed above.

6.2.3 Threats

Key threats to this species include climate change and related impacts, such as the increased intensity and frequency of bushfires. Other threats might also be present, such as unauthorised clearing and degradation of habitat, mortality from vehicle strike and wild dogs attacks, and from diseases affecting the koala, e.g., from the koala retrovirus (KoRV) and Chlamydia (*Chlamydia pecorum*).



Threatened Species - Koala

SGP NORTH SOLAR FARM

- Girrahween Station
- 10 Km Buffer
- Koala
- Dispersal Habitat
- Breeding and Foraging Habitat
- Watercourse
- Lot Boundary
- Proposed Solar Farm

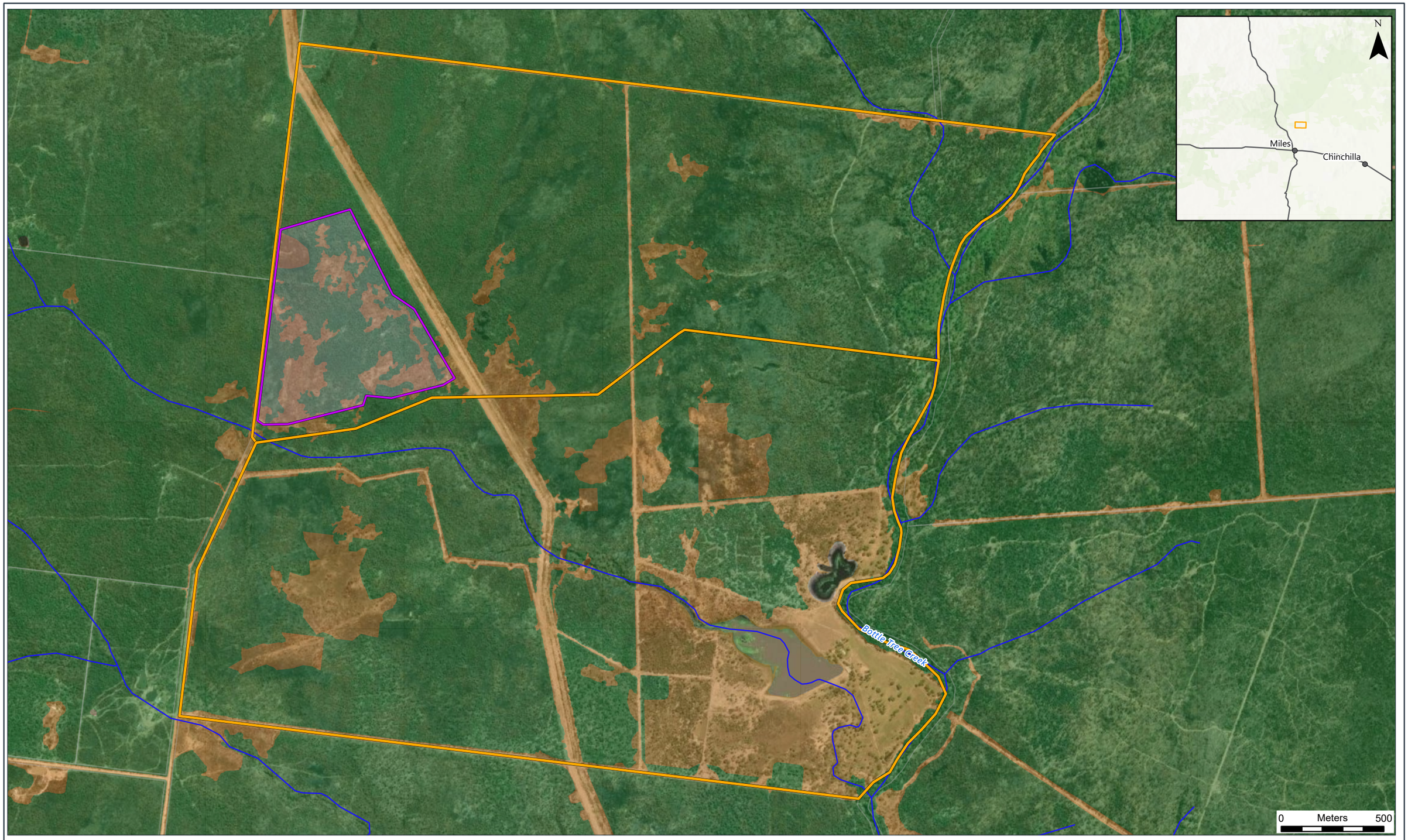
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REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:110,000 | **DATE:** 5/06/2024 | **DWG No:** ARR-002_020[C] | **FIGURE 6.2**

GDA2020 MGA Zone 56

Data Source: World Topographic Map: Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Earthstar Geographics
World Hillshade: Esri, USGS

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Threatened Species - Koala

SGP NORTH SOLAR FARM

- Koala
- Watercourse
- 10 Km Buffer
- Dispersal Habitat
- Breeding and Foraging Habitat
- Lot Boundary
- Girrahween Station (West)
- Proposed Solar Farm

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REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:17,500 | **DATE:** 19/11/2024 | **DWG No:** ARR-002_020[C] | **FIGURE 6.2b**

GDA2020 MGA Zone 56

Data Source: World Imagery: Earthstar Geographics
World Topographic Map:
World Hillshade: Esri, USGS

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6.2.4 Significant impact assessment

The Project will result in the clearing of 39.4 ha of regrowth eucalypt woodland that is considered potential breeding and foraging habitat for koala and 22.6 ha of koala dispersal habitat in non-remnant areas and RE 11.7.5 (shrubland) (refer to **Figure 6.2**). A significant impact assessment for this species from the Project is provided in **Table 6.3**. It is the conclusion of this assessment that the development of the Project is likely to have a significant impact on Koala.

Table 6.3 Significant Impact Assessment – Koala

Impact Criteria	Response
Lead to a long-term decrease in the size of a population	**No.** While not physically recorded within the Project site, nearby records of the koala within 50 km of the Project indicate that a regional population exists within the connected habitat surrounding the Project site, although population numbers are likely to be sparse given the nature of this habitat. Most of this adjacent habitat area consists of remnant vegetation and likely functions as breeding and foraging habitat for the koala. In comparison, the habitat present within the Project site comprises mostly of poor-quality regrowth vegetation communities. Although this vegetation is considered as potential koala habitat, it is considered unlikely that impacts to this habitat would lead to a long-term decrease in the size of the regional koala population.
Reduce the area of occupancy of the species	**No.** The current area of occupancy for the koala has been estimated as 19,428 km^2 (DAWE, 2022). It is unlikely that the Project will reduce the area of occupancy of this species.
Fragment an existing population into two or more populations	**No.** East-west connectivity between remnant patches has already been impacted by the existing pipeline easement of approximately 100 m wide located on the eastern boundary of the Project site. Clearing for the Project will increase the width of this corridor by around 400 m in the north, up to around 1.1 km in the south (refer to **Figure 6.2**). Home ranges for koalas in the Brigalow Belt South region were estimated to be 33 ha (Davies et al, 2013). While the Project will represent a cleared gap in the landscape with a total length of approximately 1.0 km, connectivity will be maintained at the northern and southern ends of the Project site. As dispersing individuals have been recorded moving up to a distance of 10 km, it is anticipated that these distances would be navigable by individual koalas. Part of the habitat mosaic for koala in this landscape is likely to include drainage lines and riparian habitat, with the study by Davies et al (2013) indicating that koalas spend around 40% of their time in these habitats. The preferred riparian corridor associated with the tributary of Bottle Tree Creek to the south of the Project site will not be impacted. It is therefore considered unlikely that the Project would fragment an existing population of this species.
Adversely affect habitat critical to the survival of a species	**Yes**. On the basis of the assessment conducted in **Table 6.2**, habitat critical to the survival of a species is considered to be koala breeding and foraging habitat

Impact Criteria	Response
	mapped in the Project site (refer to **Figure 6.2**). The habitat across the Project site is highly disturbed from historical clearing and recent severe fires. Larger and preferable habitats likely to provide more suitable habitat for the species include the Barakula State Forest and Binkey State Forest, as evidenced by the presence of numerous historical records. However, it is still considered likely that the Project will adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	**No.** Koala reproduction is heavily influenced by seasonality, and the breeding season differs between northern and southern populations (DAWE, 2022). In the north (i.e. the Project site), an estimated 60% of births occur in summer and early autumn, with the remainder being distributed throughout the year (DAWE, 2022). Although the poor-quality regrowth vegetation in the Project site is considered as Koala habitat, it is unlikely that the Project will disrupt the breeding cycle of this species.
Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline	**No.** While existing breeding, foraging and/or dispersal habitat values for the koala will cleared from the Project site, this habitat is considered poor-quality and currently not being utilised[10] regularly by koalas. As such, it is considered unlikely that the loss of habitat within the Project site will cause any local population to decline as other, preferred habitat and food resources will remain available in the surrounding areas.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**No.** Predation of koalas by feral dogs (*Canis lupus*) has been identified as key threatening process for the koala in the species' Conservation Advice (DAWE, 2022). No feral dogs were recorded during field surveys. Invasive weeds have the ability to change the floristic and structural characteristics of a habitat and may increase the flammability of it by amplifying the risk associated with wildfire. Once the Project site is cleared, it will be maintained as cleared land for the life of the Project (i.e., the solar farm) and no increased impact on fire frequency or intensity would be expected as a result. A WPMP and Bushfire Management Plan will be developed and implemented across the Project site. These management plans will help to ensure that invasive species are appropriately managed. It is therefore considered unlikely that the Project will result in the establishment of invasive flora and fauna species in the Project site.
Introduce disease that may cause the species to decline	**No**. KoRV and Chlamydia (*Chlamydia percorum*) have both been identified as threatening diseases to koala and are both present through most existing populations (DAWE, 2022). It is considered unlikely that the Project will introduce these diseases to potentially occurring populations or facilitate the spread of them beyond their current extent.
Interfere with the recovery of the species	**No.** While the Project will result in the removal of habitat for the koala, is it estimated that the impact is negligible. Therefore, the Project will not interfere with the

[10] according to recent surveys and historic records.

Impact Criteria	Response
	conservation management outcomes listed in the National Recover Plan for the species (DAWE, 2022).
Determination	The Project will result in the clearing of 39.4 ha of regrowth eucalypt woodland that is considered potential breeding and foraging habitat for koala (that is HCSS) and 22.6 ha of koala dispersal habitat in non-remnant areas and RE 11.7.5 (shrubland). There is a lack of good-quality habitat and absence of any recent records within the Project site which indicates that this area is not currently being utilised by the species. However, it is still considered likely that the Project will have a significant impact on Koala habitat.

6.3 Greater Glider, *Petauroides volans volans* (Endangered)

6.3.1 Ecology, habitat and distribution

The Greater Glider is an arboreal, nocturnal gliding marsupial, largely restricted to eucalypt forests and woodlands of eastern Australia, between the Windsor Tableland in Northern Queensland to Wombat State Forest in central Victoria (Winter et al., 2004). It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. It is more common in tall, moist montane forests which have an abundance of medium to large hollows. This species prefers forests with a diversity of eucalypt species, including winter flowering species. The tree species favoured by greater gliders varies regionally. They occur at elevations of up to 1,200 m above sea level.

Greater Glider habitat is typically associated with remnant forest and woodland with mature hollow-bearing trees containing one or more of the following feed tree species: *Corymbia citriodora*, *Eucalyptus moluccana*, *E. tereticornis*, *E. crebra*, *C. intermedia* and/or *E. portuensis* (Eyre, 2004; Eyre et al., 2022b).

Tree size is also an important determinant of habitat suitability with trees >30 cm dbh more likely to be used for foraging and canopy trees >50 cm dbh more likely to support hollows suitable for denning/shelter (i.e., large-volume tree hollows with an aperture of 10 cm of greater) (Eyre et al., 2022b; Goldingay, 2012). The availability of suitable hollows (i.e., preference for large volume hollows with an opening >10 cm diameter) is an important determinant of habitat occupancy, with animals requiring at least 2 to 4 den trees for every 2 ha of suitable forest habitat (Eyre et al., 2022b). Multiple den trees are used by individuals; up to 20 dens can be used in high quality habitat (DCCEEW 2022b). Habitat occupancy is also dependent on patch size, with larger patches of suitable habitat (>20 ha) more likely to support the species (Eyre et al., 2022b). With an average home range of <3 ha (Eyre et al., 2022b), forest productivity was a factor influencing the significantly larger home range sizes observed in greater gliders in Queensland's Brigalow Bioregion (Smith et al. 2007).

High quality habitat for the Greater Glider (southern and central) is represented by remnant vegetation, particularly large patches, where the canopy is dominated by eucalypt species and there is an abundance of hollow bearing trees, particularly trees with multiple hollows. They are known to prefer hollows in live trees, particularly those high up in the tree trunk. Areas without a dominance of eucalypt species or where hollow bearing trees are absent are not considered suitable habitat. The species is absent from regrowth habitats with insufficient hollows (DCCEEW, 2022b).

Greater Glider foraging habitat will not include areas of vegetation that are particularly sparse and low (tree height) as Greater Glider does not regularly come to ground and requires suitably tall trees to glide over long distances. For example, based on a glide angles of 31° - 40° (from Taylor and Goldingay 2009), if Greater Glider leapt from the top of a 10 m tall tree it would require a landing tree within a maximum distance of 17 m. Sparse, low canopy cover therefore can restrict movement for the species, which is known to prefer tall trees (DCCEEW, 2022b).

6.3.2 Habitat critical to survival

Based on the species' conservation advice (DCCEEW 2022b), habitat critical to the survival of the Greater Glider (southern and central) may be broadly defined as (noting that geographic areas containing habitat critical to survival needs to be defined by forest type on a regional basis):

- Large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region;
- Smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonisation;
- Cool microclimate forest/woodland areas (e.g., protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes);
- Areas identified as refuges under future climate changes scenarios; and

- Short-term or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas.

Habitat meeting any one of the criteria above is considered habitat critical to the survival of greater glider (southern and central), irrespective of the current abundance or density of greater gliders or the perceived quality of the site. Eucalypt areas currently unoccupied by the greater glider (southern and central) may still represent habitat critical to survival, if the recruitment of hollow-bearing trees as the forest ages could allow the species to colonise these areas and ensure persistence of a subpopulation (DCCEEW 2022b).

The Project site does not currently contain any current suitable Greater Glider habitat. Based on regrowth immature eucalypt woodlands that unlikely to be suitable for foraging (<30 cm dbh) and an absence of canopy trees >50 cm dbh likely to support hollows suitable for denning/shelter. Also the regrowth and non-remnant areas do not contain sufficient numbers of eucalypt trees that could mature over time to support hollow-bearing trees to be considered 'habitat critical to survival' for the species (refer to site photos in **Figure 4.3** and **Figure 4.4**).

On the basis of this assessment, *Greater Glider habitat* on the Project site has mapped the regrowth vegetation of RE 11.5.1 as potential dispersal habitat (refer to **Figure 6.3**).

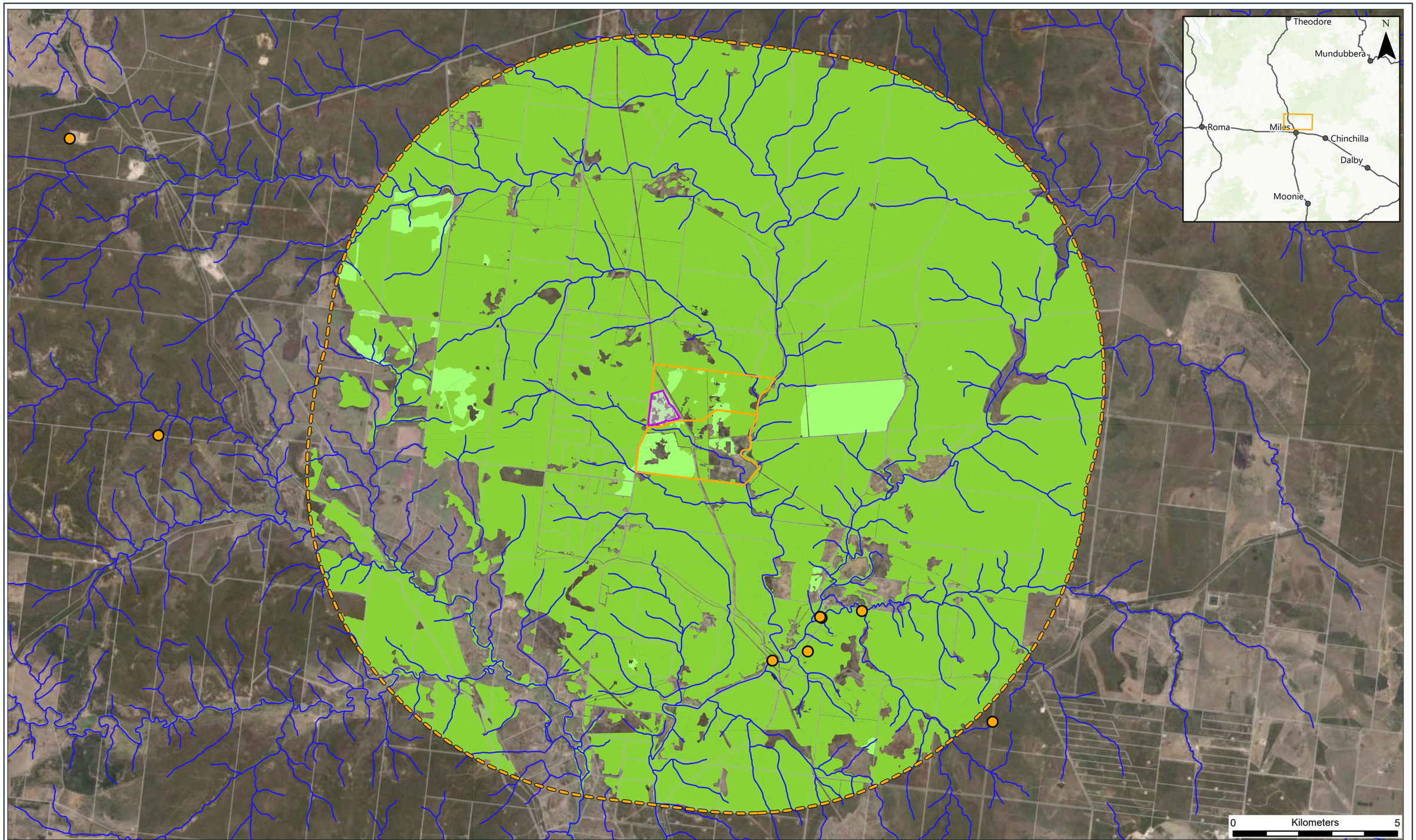
6.3.3 Threats

Key threats to this species include climate change and related impacts, such as the increased intensity and frequency of bushfires and increased temperatures and change to rainfall patterns. Other threats might also be present, such as unauthorised clearing and degradation of habitat and habitat fragmentation, mortality from vehicle strike, hyper-predation by owls and predation by feral cats and red foxes, competition from *Cacatua galerita* (Sulphur-crested Cockatoos) and barbed wire fencing (entanglement)(DCCEEW, 2022b).

6.3.4 Significant Impact Assessment

The Project will result in the clearing of approximately 39.4 ha of regrowth RE 11.5.1 that is considered potential dispersal habitat. Greater Gliders have not been found on the Project site and it has been assessed as not currently containing Greater Glider suitable foraging or denning habitat. This is because potential suitable vegetation communities (regrowth and remnant) lack the required Eucalypt species and/or have been excluded because tree DBH is <30 cm.

It is therefore the conclusion of this assessment that the development of the Project is unlikely to have a significant impact on Greater Glider. A significant impact assessment for this species is provided in **Table 6.4**.



Threatened Species - Greater Glider

SGP NORTH SOLAR FARM

- Girrahween Station
- 10 Km Buffer
- Greater Glider
- Potential Habitat
- Potential Dispersal Habitat
- Watercourse
- Girrahween Station
- Proposed Solar Farm
- Lot Boundary

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GDA2020 MGA Zone 56

Data Source: World Topographic Map: Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Earthstar Geographics
World Hillshade: Esri, USGS

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Threatened Species - Greater Glider

SGP NORTH SOLAR FARM

- Greater Glider
- Watercourse
- 10 Km Buffer
- Potential Habitat
- Potential Dispersal Habitat
- Girrahween Station (West)
- Proposed Solar Farm
- Lot Boundary

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GDA2020 MGA Zone 56

Data Source: World Imagery: Earthstar Geographics
World Topographic Map:
World Hillshade: Esri, USGS

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Table 6.4 Significant Impact Assessment – Greater Glider

Impact Criteria	Response
Lead to a long-term decrease in the size of a population	**No.** Greater Glider has not previously been recorded from the Project site or surrounds with the closest records located approximately 8 km to the south-east (associated with Dogwood and Punchbowl Creeks). The Project site contains limited numbers of regrowth *Eucalyptus crebra* which is one of six tree species identified as dominant or co-dominant in the majority of Queensland greater glider habitat (Eyre, 2022). The Project site mostly contains sparse treed non-remnant areas, regrowth eucalypt woodland and a small area of remnant shrubland vegetation (RE 11.7.5) in the northwest of the site. However, the absence of hollows and an average dbh of <30 cm means that the area is not considered suitable habitat.
Reduce the area of occupancy of the species	**No.** This species is predicated to have an area of occupancy of 15,960 km^2 (Woinarski et al., 2014). The removal of regrowth vegetation from the Project site would not result in a reduction in the area of occupancy for the species.
Fragment an existing population into two or more populations	**No.** The Project site already contains areas of non-remnant vegetation and is mostly regrowth vegetation. No vegetated corridors will be severed. The eastern Project boundary is already close to two gas pipeline easements (PPL153 and PPL163) which represent a cleared width of approximately 100 m. There is good connectivity to the south through a wide patch of vegetation that includes an unnamed watercourse.
Adversely affect habitat critical to the survival of a species	**No.** The Project site is not considered suitable habitat due to the absence of hollows and large trees that would be considered suitable foraging or denning habitat for the species.
Disrupt the breeding cycle of a population	**No.** The Project site does not contain any breeding habitat with the absence of hollows and large trees.
Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline	**No.** The Project site is not considered suitable habitat due to the absence of hollows and large trees that would be considered suitable foraging or denning habitat for the species.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**No.** Invasive species such as Feral Cats and European Red Foxes are common pests encountered in Queensland and are particularly harmful to native threatened mammals. Both of these invasive species are known to occur in the Project Area. Project activities during construction and operation will adopt and follow Biosecurity measures, that will ensure that further invasive species are not introduced into the Project Area.

Impact Criteria	Response
Introduce disease that may cause the species to decline	**No.** There is currently limited evidence of diseases causing detrimental effects on Greater Glider populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.
Interfere with the recovery of the species	There is no formal adopted, or made, Recovery Plan for this species. The Project will not impact on large areas of continuous Eucalypt woodlands to the west or south, which are likely to be habitat for Greater Gliders. This will enable the species to be able to continually traverse the landscape, ensuring genetic viability of the population.
Determination	The Project will result in the removal of 39.4 ha of potential dispersal habitat (refer to **Figure 6.3**) for the Greater Glider. The lack of good-quality habitat and absence of any recent records within the Project site indicates that this area is not currently being utilised by the species. Therefore, the Project is considered unlikely to have a significantly impact on the Greater Glider.

6.4 South-eastern Glossy Black-cockatoo, *Calyptorhynchus lathami lathami* (Vulnerable)

6.4.1 Ecology, habitat and distribution

South-eastern Glossy Black Cockatoos are uncommon but widespread, being found from Mitchell, Queensland through eastern New South Wales to Gippsland in Victoria (DCCEEW, 2022). Their distribution is continuous through the forested parts of the Great Dividing Range but becomes more scattered inland, to as far west as the Riverina in NSW (Garnett et. al., 2011).

South-eastern Glossy Black Cockatoos are hollow nesters, utilising large hollows in both living and dead eucalypt trees. They feed almost exclusively on the seeds of sheoaks (*Allocasuarina* and *Casuarina* spp.), usually relying on one or two species in a region (Higgins, 1999). Alongside their already narrow dietary requirement, birds also show strong preference to individual feed trees and will not feed on many other proximate trees of the same tree species. Feeding reward appears to be the main driver of this preference, with that being composed of the size of cones, the number and weight of seeds contained therein, and their nutritional content (Clout, 1989; North et. al., 2020). Birds extract the seeds from closed cones, leaving characteristic feeding litter (chewed cones or 'orts') under feeding trees (Clout, 1989). They spend up to 88% of their day foraging and feeding, suggesting that the rate of intake is likely to be critical (Clout, 1989).

While the Glossy Black Cockatoo was recorded from areas mapped as remnant RE 11.7.4 on the creek to the south of the Project site in 2013, the species was not recorded during recent field surveys (i.e., field surveys conducted in July 2023). Further, there was no there any evidence of feeding litter (chewed cones or 'orts') around the base of trees observed during meander surveys. The dominant she-oak *Allocasuarina luehmannii* (Bull Oak) is considered an occasional food source for the Glossy Black Cockatoo. As orts may persist in the environment for an extended period (1-2 years)(J. Richard, pers. comm) the absence of any recent records of the Glossy Black Cockatoo within the Project site indicates that this area is not currently being utilised by the species. There is one record of the south-eastern Glossy Black Cockatoo within 5 km south-east of the Project in Barakula Forest.

6.4.2 Important population

An important population of Glossy Black Cockatoo is not defined for the purposes of the EPBC Act. Consequently, it is relevant to refer to the *EPBC Act Significant Impact Guidelines* which define an important population of a vulnerable species as being one that is:

- A key source population either for breeding or dispersal;
- Necessary for maintaining genetic diversity; and/or
- Near the limit of the species' range.

Any population of Glossy Black Cockatoo utilising the Project site would be unlikely to rely heavily on these habitats for the entirety of its resource needs. The subspecies is highly dispersive within areas of suitable habitat, and any individuals using the Project site are likely to occupy a far greater range and occur only sporadically, particularly as Bull Oak (*A. leuhmanii*) is not considered a preferred feed species and is utilised in occasional years. As such, the Project site represents an occasional resource that is unlikely to support a key source population for breeding or dispersal, or one necessary for maintaining genetic diversity.

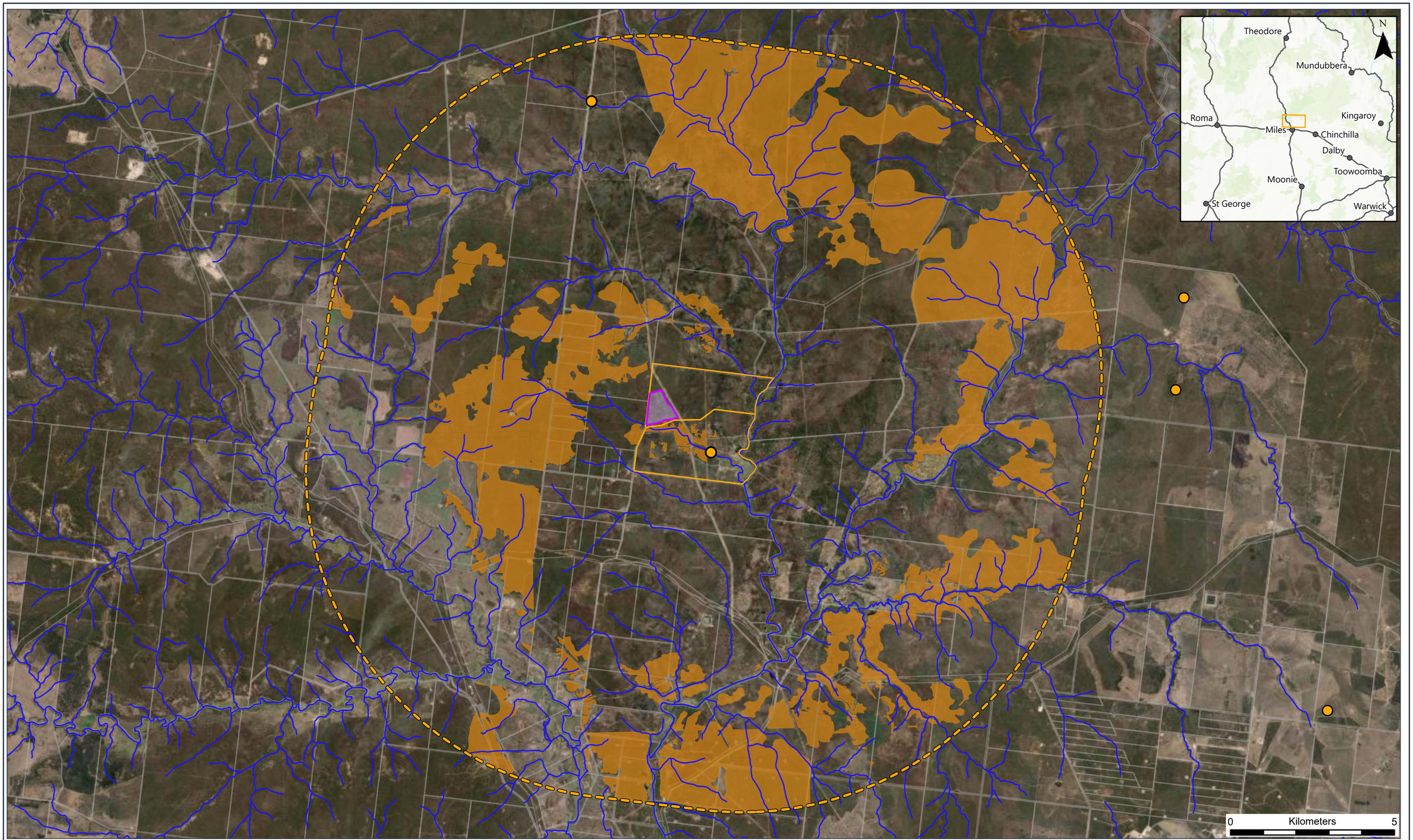
6.4.3 Habitat critical to survival

Conservation advice prepared by the Department in 2022 identifies the following as features of 'habitat critical for survival' for the south-eastern Glossy Black Cockatoo:

- Breeding habitat – nesting only occurs in very old trees with large hollows that may take centuries to form naturally. Potential nest hollows are typically higher than 8 m above the ground, located in branches greater than 30 cm diameter, are relatively flat (i.e., no more than 45 degrees from vertical), and have a minimum entrance diameter greater than 15 cm.
- Foraging habitat – In south-east Queensland, this species shows a preference for *Allocasuarina littoralis* (Black Sheoak) and *Allocasuarina torulosa* (Forest Sheoak). There are also records of them feeding on *A. inophloia* (Stringybark Sheoak), *C. equisetifolia* (Coastal Sheoak) and, to a lesser extent, from *C. cunninghamiana* (River Sheoak) and *C. glauca* (Swamp Sheoak) during limited times of the year (Chapman, 2007).

The dominant she-oak species on the Project site (*A. luehmannii*) is not a preferred feed tree species though it is thought to be an occasional food source in inland NSW and may be used in some years (DCCEEW, 2022). As such, habitat mapping for this species has been adapted from habitat mapping rules prepared by EcoSmart (2023) and adopted by Arrow Energy based on ecological surveys across the broader SGP area (refer to **Figure 6.4**). This includes:

- Remnant and regrowth RE types containing *Casuarina cristata* (RE 11.3.1, 11.3.17, 11.4.3, 11.4.3a, 11.9.5) and *Allocasuarina inophloia* (RE 11.5.4) and are mapped as 'habitat critical to survival'.
- Areas of RE 11.7.4 may contain some *Allocasuarina littoralis* and are mapped as 'habitat critical to survival' Areas south of the Warrego Highway contain more abundant *Allocasuarina littoralis*.
- Areas of regrowth RE 11.5.1 containing *Allocasuarina luehmannii* are mapped as dispersal habitat.



Threatened Species - Glossy Black Cockatoo

SGP NORTH SOLAR FARM

- Girrahween Station
- 10 Km Buffer
- Glossy Black Cockatoo
- Habitat Critical to Survival
- Watercourse
- Lot Boundary
- Proposed Solar Farm

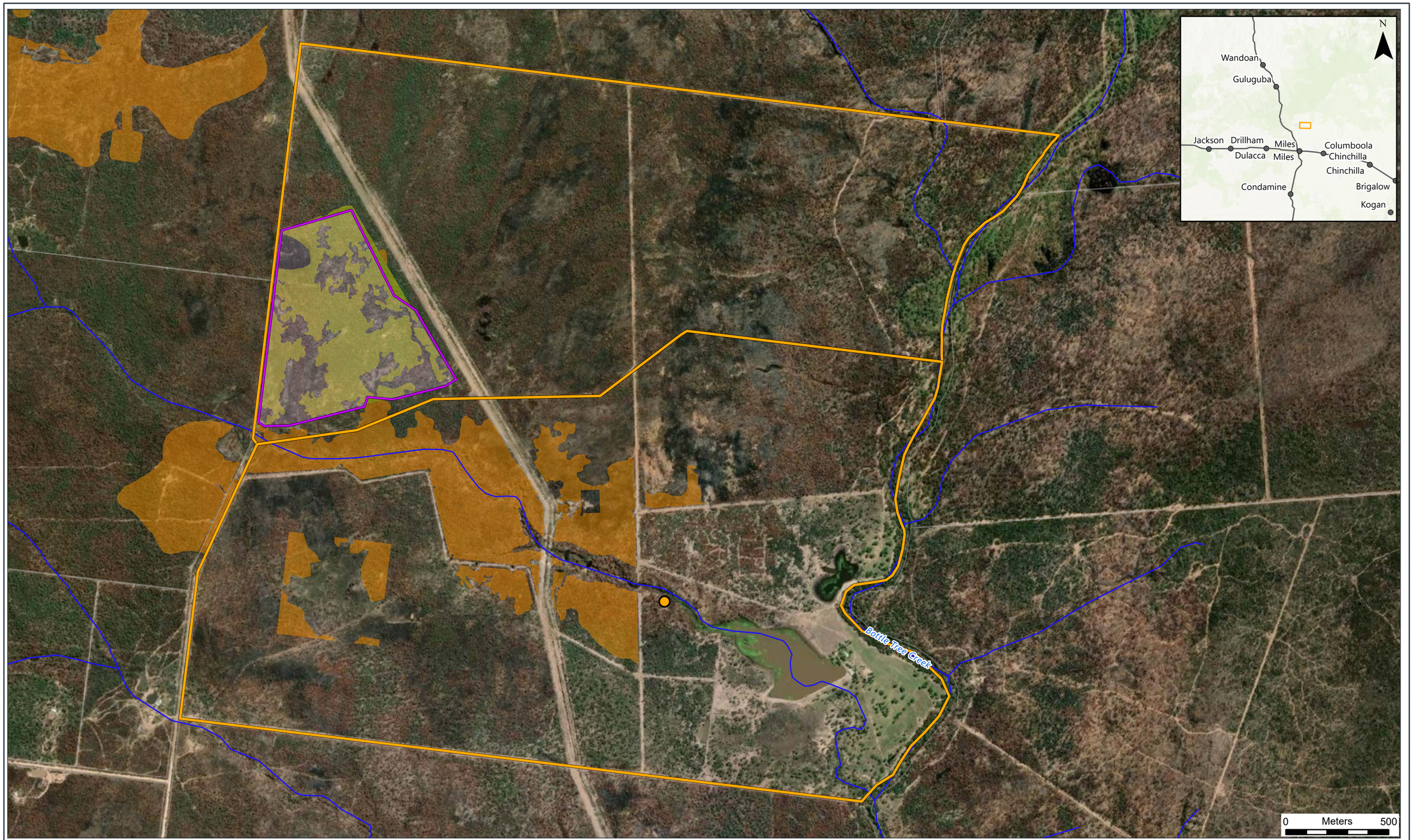
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GDA2020 MGA Zone 56

Data Source: World Topographic Map: Department of Resources, Dept.of Environment and Science, Esri, TomTom, Garmin, FAO, NOAA, USGS
World Imagery: Earthstar Geographics
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Threatened Species - Glossy Black Cockatoo

SGP NORTH SOLAR FARM

Glossy Black-cockatoo
Watercourse
Girrahween Station (West)
Proposed Solar Farm
10 Km Buffer
Dispersal Habitat
Habitat Critical to Survival

Attexo

REVIEWED: KR | **DRAWN:** JT | **SCALE (A3):** 1:17,500 | **DATE:** 3/12/2024 | **DWG No:** ARR-002_021[C] | **FIGURE 6.4b**

GDA2020 MGA Zone 56

Data Source: World Imagery: Earthstar Geographics
World Topographic Map:
World Hillshade: Esri, USGS

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6.4.4 Threats

The main threat causing the decline of the south-eastern Glossy Black Cockatoo is habitat loss, degradation, and fragmentation. Historical land clearance was the main cause of the decline of Glossy Black Cockatoo populations in the past, leading to the loss of both feeding and breeding habitats. Inappropriate fire management may also be a key threat as too frequent or too intense burning may result in feeding habitat being unsuitable for 10 years or more. Conversely, a recent study also shows that habitat that has been unburnt for a long period of time is also lower in quality and is used less by Glossy Black Cockatoos (Delzoppo et. al., 2021).

A major aspect of habitat loss is the loss of large hollow-bearing trees which provide nest sites as large hollows may take centuries to form (Gibbons and Lindenmayer, 2002). When hollow availability is limited, competition for hollows increases which is harmful in itself and may also amplify otherwise minor threats such as nest predation and the transmission of diseases.

6.4.5 Significant impact assessment

While Glossy Black Cockatoo may occasionally occur on the Project site, no direct impacts on habitat for this species are identified as part of the Project. It is the conclusion of this assessment that the development of the Project is unlikely to have a significant impact on the south-eastern Glossy Black Cockatoo. A significant impact assessment for this species is provided in **Table 6.5**.

Table 6.5 Significant Impact Assessment – South-eastern Glossy Black Cockatoo

Impact Criteria	Response
Lead to a long-term decrease in the size of an important population of a species	**No.** The Project site is not considered likely to support an important population of the south-eastern Glossy Black Cockatoo.
Reduce the area of occupancy of the species of an important population	**No.** The current area of occupancy for the south-eastern Glossy Black Cockatoo has been estimated as 40,000 km^2 (Cameron et. al. 2021). It is unlikely that the Project will reduce the area of occupancy of an important population of this species.
Fragment an existing important population into two or more populations	**No.** The movement patterns and ranging behaviour of the Glossy Black Cockatoo are poorly understood (Glossy Black Conservancy, 2010) though it has been suggested that they are seasonal migrants in south-east Queensland, in response to changes in resource availability and breeding requirements (Stock and Wild, 2005). According to the Glossy Black Conservancy (2023), the species is relatively mobile and can travel up to 15 km to feed. While the Project will represent a cleared gap in the landscape (refer to **Figure 6.4**), these distances would be navigable by individual Glossy Black Cockatoos. As such, it is unlikely that the Project would fragment an existing important population of this species.
Adversely affect habitat critical to the survival of a species	**No.** *A. luehmannii* is not considered as an important feed tree, though it has been during some periods in inland NSW (DCCEEW, 2022). As a record of Glossy Black Cockatoo exists less than 5 km south-east of the Project site, and *A. luehmannii* does represent a potential, although not preferred foraging resource, it is considered as a 'dispersal habitat rather than a 'habitat critical for survival' (refer to

Impact Criteria	Response
	Section 6.4.3). It is therefore considered unlikely that the Project will adversely affect habitat critical to the survival of this species.
Disrupt the breeding cycle of an important population	**No.** Vegetation on the Project site is predominantly regrowth of up to 30 years in age, with a maximum dbh of less than 20 cm recorded in remnant areas. As such, trees on the Project site are not of adequate age or size to support nesting hollows for Glossy Black Cockatoos and no impact on breeding habitat for this species would be expected to occur as a result of the Project.
Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline	**No.** The removal of stands of regrowth Bull Oak (*A. leuhmanii*) is unlikely to modify, destroy, remove, isolate or decrease the availability of quality of habitat to the extent that species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**No**. Predation by introduced predators such as feral cats and red fox does not appear to be a major threat (DCCEEW, 2022). Invasive weeds have the ability to change the floristic and structural characteristics of habitat and may increase the flammability of the habitat, amplifying the risk associated with wildfire. Once cleared, the Project site will be maintained as cleared land for the life of the solar farm and no increased impact on fire frequency or intensity would be expected as a result. A WPMP and Bushfire Management Plan will be developed and implemented across the Project. This management plan will help to ensure that invasive species are appropriately managed. It is considered unlikely that the Project will result in the establishment of invasive flora and fauna species in the Project site.
Introduce disease that may cause the species to decline	**No.** Psittacine Beak and Feather Disease (PBFD) is a potentially fatal disease caused by psittacine circovirus, typically transferring between adults, nestlings, and contaminated nest hollows (DCCEEW, 2022). Although Glossy Black Cockatoos are susceptible to PBFD, the threat level is relatively low however, it is possible that intensified competition for nest hollows could result in increased disease transmission. Given the young age of trees in the Project site, it is unlikely that these contribute to the available nesting site resource and as such, their removal is not expected to result in any change to the availability of hollows in the broader area.
Interfere with the recovery of the species	**No.** While the Project will result in the removal of potential habitat for the Glossy Black Cockatoo, the impact is minimal. Therefore, the Project will not interfere with the conservation management outcomes listed in the Conservation Advice for the species (DCCEEW, 2022).
Determination	The Project will result in the removal of 39.4 ha of dispersal habitat (refer to **Figure 6.3**) for the Glossy Black-Cockatoo. The dominance of *Allocasuarina luehmannii* (Bull Oak) and the absence of preferred food trees and nesting hollows, indicates that this area is likely to be a marginal resource for this species. It is therefore considered unlikely that the Project will have a significant impact on the Glossy Black Cockatoo.

7.0 Conclusion

The Project is located in poor-quality regrowth vegetation which has been subject to historical clearing and wildfire impacts (refer to **Section 4.0**). As the concept layout is yet to be defined, for the purposes of this assessment it is assumed that development of the SGP North Solar Farm will require clearing of all 62 ha area of land within the Project site though this is likely to reduce as design progresses (refer **Section 1.3**).

Based on the assessment in this report, it is concluded that development of the proposed SGP North Solar is likely to have a significant impact on Koala (refer to **Section 6.2**). Whilst there is no evidence of Koala habitat usage on the Project site or in the immediate surrounds, the Project will result in the clearing of:

- 39.4 ha of regrowth and remnant eucalypt woodland that is considered potential breeding and foraging habitat for Koala; and
- 22.6 ha of Koala dispersal habitat in non-remnant areas and shrubland of RE 11.7.5.

The clearing of 39.4 ha of regrowth RE 11.5.1 also represents a reduction in the area of:

- potential foraging habitat for Corben's Long-eared Bat which is unlikely to have a significant impact on this species, with the most significant resources located beyond the Project site (refer to **Section 6.1**);
- dispersal habitat for Greater Glider which is unlikely to have a significant impact on this species, with the most significant resources located beyond the Project site (refer to **Section 6.3**); and
- 39.4 ha of dispersal habitat for Glossy Black-cockatoo which is unlikely to have a significant impact on this species, with the most significant resources located beyond the Project site (refer to **Section 6.4**).

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Appendix A

Flora Species List

	Species name	Common name	NC Act[11]	EPBC Act[12]
Flora				
Acanthaceae	*Brunoniella australis*	Blue Trumpet	Least Concern	-
Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed	Least Concern	-
	Alternanthera nana	Hairy Joyweed	Least Concern	-
	Amaranthus macrocarpus	Dwarf Amaranth	Least Concern	-
Apocynaceae	*Parsonsia lanceolata*	Northern Silkpod	Least Concern	-
Asteraceae	*Brachyscome multifida*	Cut-leaf Daisy	Least Concern	-
	Calotis cuneifolia	Burr Daisy	Least Concern	-
	Peripleura hispidula	Fuzzweed	Least Concern	
	Vittadinia tenuissima	Western New Holland Daisy	Least Concern	-
Brassicaceae	*Rorippa eustylis*	-	Least Concern	-
Cactaceae	*Opuntia stricta**	Prickly Pear*	-	-
	*Opuntia tomentosa**	Velvety Tree Pear*	-	-
Campanulaceae	*Wahlenbergia gracilis*	Wahlenbergia	Special Least Concern	-
Capparaceae	*Capparis lasiantha*	Nipan	Least Concern	-
	Capparis mitchellii	Wild Orange	Least Concern	
Casuarinaceae	*Allocasuarina luehmannii*	Bull Oak	Least Concern	-
Celastraceae	*Stackhousia muricata*	-	Least Concern	
Chenopodiaceae	*Dysphania carinata*	Keeled Goosefoot	Least Concern	-
	Einadia hastata	Berry Saltbush	Least Concern	-
	Einadia nutans subsp. nutans	Climbing Saltbush	Least Concern	-
	Maierana microphylla	Small-leaved Bluebush	Least Concern	-
Commelinaceae	*Murdannia graminea*	Murdannia	Least Concern	-
Crassulaceae	*Bryophyllum delagoense**	Mother of Millions*	-	-

[11] Listing under the Queensland *Nature Conservation Act 1992*

[12] Listing under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

	Species name	Common name	NC Act[11]	EPBC Act[12]
Cupressaceae	*Callitris glaucophylla*	White Cypress Pine	Least Concern	-
Cyperaceae	*Carex inversa*	-	Least Concern	-
	Cyperus betchei	-	Least Concern	-
	Cyperus gracilis	Slender Flat Sedge	Least Concern	-
	Cyperus iria	Variable Sedge	Least Concern	-
	Eleocharis blakeana	-	Least Concern	-
	Eleocharis cylindrostachys	-	Least Concern	-
	Fimbristylis dichotoma	Common Fringe-rush	Least Concern	-
	Gahnia aspera	Rough Saw-sedge	Least Concern	-
	Scleria mackaviensis	Tufted Scleria Sedge	Least Concern	-
Elatinaceae	*Elatine gratioloides*	Waterwort	Least Concern	-
Goodeniaceae	*Goodenia delicata*	-	Least Concern	-
	Goodenia disperma	Fan Flower	Least Concern	-
	Goodenia fascicularis	Silky Goodenia	Least Concern	-
Haloragaceae	*Gonocarpus urceolatus*	-	Least Concern	-
Hemerocallidaceae	*Dianella brevipedunculata*	Blue Flax Lily	Least Concern	-
	Dianella revoluta	Blueberry Lily	Least Concern	-
Hypoxidaceae	*Hypoxis hygrometrica var. villosisepala*	Golden Weather-grass	Least Concern	-
Juncaceae	*Juncus aridicola*	Tussock Rush	Least Concern	-
	Juncus remotiflorus	Remote-flowered Rush	Least Concern	-
	Juncus subsecundus	Finger Rush	Least Concern	-
Lamiaceae	*Stachys arvensis**	Staggerweed*	-	-
Laxmanniaceae	*Lomandra filiformis*	Wattle Mat-rush	Least Concern	-
	Lomandra leucocephala	Woolly Mat-rush	Least Concern	-
	Lomandra multiflora	Many-flowered Mat-rush	Least Concern	-
Leguminosae	*Daviesia ulcifolia subsp. stenophylla*	Gorse Bitter Pea	Least Concern	-

	Species name	Common name	NC Act[11]	EPBC Act[12]
	Lotus cruentus	Red-flowered Lotus	Least Concern	-
	*Macroptilium lathyroides**	Phasey Bean*	-	-
	*Medicago polymorpha**	Burr Medic*	-	-
	*Melilotus indicus**	Hexham Scent*	-	-
	Mirbelia pungens	Prickly Mirbelia	Least Concern	
	Senna artemisioides subsp. coriacea	Desert Cassia	Least Concern	-
Loranthaceae	*Amyema biniflora*	Twin-flower Mistletoe	Least Concern	-
	Lysiana exocarpi subsp. *tenuis*	Harlequin Mistletoe	Least Concern	-
Malvaceae	*Hibiscus sturtii var. sturtii*	Hill Hibiscus	Least Concern	-
	Sida cunninghamii	Ridge Sida	Least Concern	-
	Sida trichopoda	Narrow-leaf Sida	Least Concern	-
Mimosaceae	*Acacia blakei* subsp. *blakei*	Blake's Wattle	Least Concern	-
	Acacia crassa subsp. *crassa*	Curracabah	Least Concern	-
	Acacia excelsa subsp. *excelsa*	Ironwood	Least Concern	-
	Acacia leiocalyx subsp. *leiocalyx*	Black Wattle	Least Concern	-
	Acacia stenophylla	Belalie	Least Concern	-
	Acacia triptera	Spur-wing Wattle	Least Concern	-
Myrtaceae	*Angophora leiocarpa*	Rusty Gum	Least Concern	-
	Calytrix tetragona	Common Fringe Myrtle	Least Concern	-
	Corymbia maculata	Spotted Gum	Least Concern	-
	Eucalyptus crebra	Narrow-leaved Ironbark	Least Concern	-
	Eucalyptus exserta	Queensland Peppermint	Least Concern	-
	Eucalyptus fibrosa subsp. nubilis	Broad-leaved Ironbark	Least Concern	-
	Eucalyptus populnea	Poplar Box	Least Concern	-
	Lysicarpus angustifolius	Budjeroo	Least Concern	-
	Melaleuca uncinata	Broom Honeymyrtle	Least Concern	-
	Melaleuca sp.	-	Least Concern	-

	Species name	Common name	NC Act[11]	EPBC Act[12]
	Micromyrtus sessilis	-	Least Concern	-
Orchidaceae	*Cymbidium canaliculatum*	Tiger Orchid	Special Least Concern	-
Phyllanthaceae	*Phyllanthus virgatus*	-	Least Concern	-
Picrodendraceae	*Petalostigma pubescens*	Quinine Tree	Least Concern	-
Pittosporaceae	*Bursaria incana*	Mock Orange	Least Concern	-
Poaceae	*Ancistrachne uncinulata*	Hooky Grass	Least Concern	-
	Aristida calycina var. *calycina*	Dark Wiregrass	Least Concern	-
	Aristida caput-medusae	Many-headed Wiregrass	Least Concern	-
	Aristida jerichoensis var. jerichoensis	Jericho Wiregrass	Least Concern	-
	*Avena sativa**	Common Oats*	Least Concern	-
	Bothriochloa decipiens var. decipiens	Pitted Bluegrass	Least Concern	-
	Calyptochloa gracillima subsp. gracillima	-	Least Concern	-
	Chloris ventricosa	Tall Chloris	Least Concern	-
	Chrysopogon fallax	Golden Beard Grass	Least Concern	-
	Cleistochloa subjuncea	-	Least Concern	-
	Cymbopogon refractus	Barbed-wire Grass	Least Concern	-
	Digitaria breviglumis	Short-glumed Umbrella Grass	Least Concern	-
	Dinebra decipiens var. peacockii	Slender Canegrass	Least Concern	-
	Diplachne fusca var. fusca	Beetle Grass	Least Concern	-
	Enneapogon gracilis	Slender Nineawn	Least Concern	-
	Enteropogon acicularis	Curly Windmill Grass	Least Concern	-
	Enteropogon ramosus	Windmill Grass	Least Concern	-
	Eragrostis elongata	Clustered Lovegrass	Least Concern	-
	Eragrostis lacunaria	Purple Lovegrass	Least Concern	-

	Species name	Common name	NC Act[11]	EPBC Act[12]
	Eragrostis leptostachya	Paddock Lovegrass	Least Concern	-
	Eragrostis parviflora	Weeping Lovegrass	Least Concern	-
	Eragrostis sororia	-	Least Concern	-
	Eragrostis spartinoides	-	Least Concern	-
	Eriachne mucronata	-	Least Concern	-
	Panicum effusum	Hairy Panic	Least Concern	-
	Panicum simile	Two-colour Panic	Least Concern	-
	Paspalidium distans	Shortgrass	Least Concern	-
	Sporobolus caroli	Fairy Grass	Least Concern	-
	Sporobolus scabridus	Rats Tail Grass	Least Concern	-
	Tripogon loliiformis	Five Minute Grass	Least Concern	-
Polygonaceae	*Polygonum aviculare*	Wireweed	Least Concern	-
	Rumex hypogaeus	Rumex	Least Concern	-
Portulacaceae	*Portulaca filifolia*	-	Least Concern	-
Proteaceae	*Grevillea striata*	Beefwood	Least Concern	-
	Hakea purpurea	Needlewood	Least Concern	-
Pteridaceae	*Cheilanthes distans*	Bristly Cloak Fern	Least Concern	-
	Cheilanthes sieberi subsp. *sieberi*	-	Least Concern	-
Ranunculaceae	*Ranunculus sessiliflorus var. pilulifer*	-	Least Concern	-
Rhamnaceae	*Aphitonia excelsa*	Soap Tree	Least Concern	-
Rubiaceae	*Pomax umbellata*	Pomax	Least Concern	-
	Psydrax oleifolia	Psydrax	Least Concern	-
Rutaceae	*Citrus glauca*	Desert Lime	Least Concern	-
	Cyanothamnus bipinnatus	Rock Boronia	Least Concern	-
	Geijera parviflora	Wilga	Least Concern	-
Santalaceae	*Anthobolus leptomerioides*	-	Least Concern	-

	Species name	Common name	NC Act[11]	EPBC Act[12]
Sapindaceae	*Dodonaea triangularis*	Triangle Leaf Hopbush	Least Concern	-
Scrophulariaceae	*Eremophila debilis*	Winter Apple	Least Concern	-
Solanaceae	*Solanum ellipticum*	Potato Bush	Least Concern	-
	Solanum parvifolium	Small-leaved Nightshade	Least Concern	-
	Solanum tetrathecum	-	Least Concern	-
Stylidiaceae	*Stylidium eglandulosum*	Woolly-stemmed Triggerplant	Special Least Concern	-
Verbenaceae	*Glandularia aristigera**	Mayne's Pest*	-	-
Viscaceae	*Viscum bancroftii*	-	-	-
Zygophyllaceae	*Roepera apiculata*	Gallweed	Least Concern	-

*Introduced species

Appendix B

Consolidated Fauna Species List – Girrahween Station (Western)

Species name	Common name	NC Act[13]	EPBC Act[14]
Birds			
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	Least Concern	-
Acanthiza apicalis	Inland Thornbill	Least Concern	
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	Least Concern	-
Acanthiza nana	Yellow Thornbill	Least Concern	-
Acanthiza uropygialis	Chestnut-rumped Thornbill	Least Concern	-
Aegotheles cristatus	Australian Owlet-Nighjar	Least Concern	-
Anas superciliosa	Pacific Black Duck	Least Concern	-
Anhinga novaehollandiae	Australasian Darter	Least Concern	-
Anthus novaeseelandiae	Australasian Pipit	Least Concern	-
Aprosmictus erythropterus	Red-winged Parrot	Least Concern	-
Ardea alba	Great Egret	Least Concern	-
Artamus superciliosus	White-browed Woodswallow	Least Concern	-
Burhinus grallarius	Bush Stone-curlew	Least Concern	-
Caligavis chrysops	Yellow-faced Honeyeater	Least Concern	-
Calyptorhynchus lathami	Glossy Black Cockatoo	Vulnerable	Vulnerable
Centropus phasianinus	Pheasant Coucal	Least Concern	-
Chalcites basalis	Horsefield's Bronze-cuckoo	Least Concern	-
Chalcites osculans	Black-eared Cuckoo	Least Concern	-
Colluricincla harmonica	Grey Shrike-thrush	Least Concern	-
Coracina novaehollandiae	Black-faced Cuckoo-shrike	Least Concern	-
Coracina tenuirostris	Cicadabird	Least Concern	-
Corvus coronoides	Australian Raven	Least Concern	-
Corvus orru	Torrersian Crow	Least Concern	-
Coturnix pectoralis	Stubble Quail	Least Concern	-

[13] Listing under the Queensland *Nature Conservation Act 1992*

[14] Listing under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Species name	Common name	NC Act[13]	EPBC Act[14]
Coturnix ypsilophora	Brown Quail	Least Concern	-
Cracticus nigrogularis	Pied Butcherbird	Least Concern	-
Cracticus torquatus	Grey Butcherbird	Least Concern	-
Cygnus atratus	Black Swan	Least Concern	-
Dacelo novaeguineae	Laughing Kookaburra	Least Concern	-
Dicaeum hirundinaceum	Mistletoebird	Least Concern	-
Elanus scriptus	Letter-winged Kite	Least Concern	-
Elseyornis melanops	Black-fronted Dotterel	Least Concern	-
Entomyzon cyanotis	Blue-faced Honeyeater	Least Concern	-
Eolophus roseicapilla	Galah	Least Concern	-
Eopsaltria australis	Eastern Yellow Robin	Least Concern	-
Eurostopodus mystacalis	White-throated Nightjar	Least Concern	-
Eurystomus orientalis	Dollarbird	Least Concern	-
Falco berigora	Brown Falcon	Least Concern	-
Geopelia humeralis	Bar-shouldered Dove	Least Concern	-
Geopelia placida	Peaceful Dove	Least Concern	-
Gerygone albogularis	White-throated Gerygone	Least Concern	-
Gerygone fusca	Western Gerygone	Least Concern	-
Glossopsitta pusilla	Little Lorikeet	Least Concern	-
Grallina cyanoleuca	Magpie Lark	Least Concern	-
Gymnorhina tibicen	Australian Magpie	Least Concern	-
Haliaeetus leucogaster	White-bellied Sea-eagle	Least Concern	-
Hirundapus caudacutus	White-throated Needletail	Vulnerable	Vulnerable, Migratory
Lichenostomus leucotis	White-eared Honeyeater	Least Concern	-
Lichenostomus melanops	Yellow-tufted Honeyeater	Least Concern	-
Malurus cyaneus	Superb Fairy-wren	Least Concern	-

Species name	Common name	NC Act[13]	EPBC Act[14]
Malurus lamberti	Variegated Fairy-wren	Least Concern	-
Melithreptus albogularis	White-throated Honeyeater	Least Concern	-
Melithreptus brevirostris	Brown-headed Honeyeater	Least Concern	-
Melithreptus gularis	Black-chinned Honeyeater	Least Concern	-
Merops ornatus	Rainbow Bee-eater	Least Concern	-
Microeca fascinans	Jacky Winter	Least Concern	-
Myiagra inquieta	Restless Flycatcher	Least Concern	-
Myiagra rubecula	Leaden Flycatcher	Least Concern	-
Ninox novaeseelandiae	Southern Boobook	Least Concern	-
Nycticorax caledonicus	Nankeen Night-heron	Least Concern	-
Nymphicus hollandicus	Cockatiel	Least Concern	-
Ocyphaps lophotes	Crested Pigeon	Least Concern	-
Pachycephala rufiventris	Rufous Whistler	Least Concern	-
Pardalotus punctatus	Spotted Pardalote	Least Concern	-
Pardalotus striatus	Striated Pardalote	Least Concern	-
Petroica goodenovii	Red-capped Robin	Least Concern	-
Phaps chalcoptera	Common Bronzewing	Least Concern	-
Phalacrocorax varius	Pied Cormorant	Least Concern	-
Platycercus adscitus	Pale-headed Rosella	Least Concern	-
Plectorhyncha lanceolata	Striped Honeyeater	Least Concern	-
Philemon corniculatus	Noisy Friarbird	Least Concern	-
Pomatostomus temporalis temporalis	Grey-crowned Babbler	Least Concern	-
Pyrrholaemus sagittatus	Speckled Warbler	Least Concern	-
Rhipidura albiscapa	Grey Fantail	Least Concern	-
Rhipidura leucophrys	Willie Wagtail	Least Concern	-
Smicrornis brevirostris	Weebill	Least Concern	-

Species name	Common name	NC Act[13]	EPBC Act[14]
Strepera graculina	Pied Currawong	Least Concern	-
Struthidea cinerea	Apostlebird	Least Concern	-
Tachybaptus novaehollandiae	Australasian Grebe	Least Concern	-
Taeniopygia bichenovii	Double-barred Finch	Least Concern	-
Todiramphus sanctus	Sacred Kingfisher	Least Concern	-
Tribonyx ventralis	Black-tailed Native Hen	Least Concern	-
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet	Least Concern	-
Trichoglossus haematodus	Rainbow Lorikeet	Least Concern	-
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet	Least Concern	-
Vanellus miles	Masked Lapwing	Least Concern	-
Amphibians			
Cyclorana alboguttata	Greenstripe Frog	Least Concern	-
Limnodynastes fletcheri	Long-thumbed Frog	Least Concern	-
Limnodynastes terraereginae	Scarlet-sided Pobblebonk	Least Concern	-
Litoria caerulea	Green Treefrog	Least Concern	-
Litoria fallax	Eastern Sedge Frog	Least Concern	-
Litoria latopalmata	Broad-palmed Rocket Frog	Least Concern	-
Litoria peronii	Emerald-spotted Treefrog	Least Concern	-
Litoria rubella	Ruddy Treefrog	Least Concern	-
Neobatrachus sudellae	Meeowing Frog	Least Concern	-
Platyplectrum ornatum	Ornate Burrowing Frog	Least Concern	-
Pseudophryne major	Great Brown Broodfrog	Least Concern	-
*Rhinella marina**	Cane Toad*	-	-
Mammals			
Acrobates pygmaeus	Feathertail Glider	Least Concern	-
Austronomus australis	White-striped Free-tail Bat	Least Concern	-
Canis lupis subsp. familiaris	Dingo	Least Concern	-

Species name	Common name	NC Act[13]	EPBC Act[14]
Chalinolobus gouldii	Gould's Wattled Bat	Least Concern	-
Chalinolobus picatus	Little Pied Bat	Least Concern	-
Macropus giganteus	Eastern Grey Kangaroo	Least Concern	-
Macropus rufogriseus	Red-necked Wallaby	Least Concern	-
Macropus robustus	Wallaroo	Least Concern	-
Mormopterus beccarii	Beccan's Free-tailed Bat	Least Concern	-
Mormopterus sp. 3	-	Least Concern	-
Mormopterus ridei	Eastern Free-tailed Bat	Least Concern	-
Nyctophilus sp.	-	-	-
Nyctophilus corbeni	Corben's Long-eared Bat	Vulnerable	Vulnerable
Nyctophilus gouldi	Gould's Long-eared Bat	Least Concern	-
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	Least Concern	-
Scotoreptens greyii	Little Broad-nosed Bat	Least Concern	-
Vespadelus vulturnus	Little Forest Bat	Least Concern	-
Reptiles			
Anomalopus leuckartii	Two-clawed Worm-skink	Least Concern	-
Ctenotus allotropis	Brown-blazed Wedgesnout Ctenotus	Least Concern	-
Ctenotus spaldingi	Straight-browed Ctenotus	Least Concern	-
Ctenotus taeniolatus	Copper-tailed Skink	Least Concern	-
Cryptophis nigrescens	Eastern Small-eyed Snake	Least Concern	-
Diplodactylus vittatus	Eastern Stone Gecko	Least Concern	-
Diporiphora australis	Tommy Roundhead	Least Concern	-
Eulamprus quoyii	Eastern Water Skink	Least Concern	-
Gehyra dubia	Dubious Dtella	Least Concern	-
Intellagama lesueurii	Eastern Water Dragon	Least Concern	-
Menetia greyii	Common Dwarf Skink	Least Concern	-

Species name	Common name	NC Act[13]	EPBC Act[14]
Lerista fragilis	Eastern Mulch-slider	Least Concern	-
Lygisaurus foliorum	Tree-base Litter Skink	Least Concern	-
Strophurus taenicauda	Golden-tailed Gecko	Near Threatened	-
Varanus tristis	Black-tailed Monitor	Least Concern	-

*Introduced species

Appendix C

Likelihood of Occurrence

Threatened Ecological Communities

Community Name	PMST Search	EPBC Act Status	Associated REs	Habitat and Ecology	Likelihood of Occurrence
Brigalow (*Acacia harpophylla* dominant and co-dominant)	Known to occur	E	In Queensland, the following REs form part of the listed ecological community (DoE, 2013): • RE 11.3.1 • RE 11.4.3 • RE 11.4.7 • RE 11.4.8 • RE 11.4.9 • RE 11.4.10 • RE 11.5.16 • RE 11.9.1 • RE 11.9.5 • RE 11.9.6 • RE 11.11.14 • RE 11.12.21 • RE 12.8.23 • RE 12.9-10.6 • RE 12.12.26	The brigalow ecological community occurs in Queensland and New South Wales. Brigalow (*Acacia harpophylla*) is the dominant or co-dominant species in a range of open forests and woodlands. However, not all vegetation in which brigalow is dominant is part of the listed ecological community (DoE, 2013). The brigalow ecological community has a wide range of vegetation structure and composition that includes species that tend to occur on acidic and salty clay soils (DoE, 2013). In order to be considered the listed ecological community, the vegetation patch must be more than 0.5 ha in size AND exotic perennial plants must comprise less than 50 % of the total vegetation cover of the patch, as assessed over a minimum	**Does not occur** None of the associated RE types occur on the Project site.

Community Name	PMST Search	EPBC Act Status	Associated REs	Habitat and Ecology	Likelihood of Occurrence
				sample area of 0.5 ha (DoE, 2013). The listed ecological community may include regrowth vegetation not included in the Queensland RE mapping, particularly brigalow regrowth more than 15 years old (DoE, 2013).	
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	May occur	E	In Queensland, the following REs form part of the listed ecological community (TSSC, 2011): • RE 11.3.3 • RE 11.3.15 • RE 11.3.16 • RE 11.3.28 • RE 11.3.37	The coolabah-black box woodlands TEC represents occurrences of one type of semi-arid to humid subtropical woodland where *Eucalyptus coolabah* and/or *E. largiflorens* are the dominant canopy species and where the understory tends to be grassy. The listed ecological community is associated with the floodplains and drainage areas of the Darling Riverine Plains and Brigalow Belt South bioregions (TSSC, 2011).	**Does not occur** None of the associated RE types occur on the Project site.
Natural grasslands on basalt and fine-	Likely to occur	CE	In Queensland, this TEC equates with two RE types, namely:	The ecological community generally occurs on flat to low slopes of no more than 5	**Does not occur**

Community Name	PMST Search	EPBC Act Status	Associated REs	Habitat and Ecology	Likelihood of Occurrence
textured alluvial plains of Northern New South Wales and southern Queensland			• RE 11.3.21 • RE 11.3.24	percent (or <1 degree) inclination. As slope increases, grassy woodlands dominated by trees such as *Acacia pendula* (Weeping Myall), *Eucalyptus coolabah* (Coolabah), *E. populnea* (Poplar Box) and *E. melliodora* (Yellow Box) occur. The distribution of the ecological community is strongly reliant on soil type as it is often associated with fine textured, often cracking clays derived from either basalt or quaternary alluvium.	None of the associated RE types occur on the Project site.
Poplar Box Grassy Woodland on Alluvial Plains	Likely to occur	E	In Queensland, the following REs form part of the listed ecological community (DoEE, 2019): • RE 11.3.2 • RE 11.3.17 • RE 11.4.7 • RE 11.4.12 • RE 12.3.10	The ecological community is typically a grassy woodland with a canopy dominated by *Eucalyptus populnea* and understorey mostly of grasses and other herbs. It is located west of the Great Dividing Range, typically at less than 300 m above sea level between latitudes 20°S to 34°S (DoEE, 2019). The community occurs mostly in gently undulating to flat landscapes and occasionally on gentle slopes on a wide	**Does not occur** None of the associated RE types occur on the Project site.

Community Name	PMST Search	EPBC Act Status	Associated REs	Habitat and Ecology	Likelihood of Occurrence
				range of soil types of alluvial and depositional origin (DoEE, 2019). Key diagnostic criteria for inclusion in the listed community are related to structure and condition as set out in the Conservation Advice for this community (DoEE, 2019).	
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Likely to occur	E	In Queensland, the following REs form part of or align with the listed ecological community: • RE 11.2.3 • RE 11.3.11 • RE 11.4.1 • RE 11.5.15 • RE 11.8.3 • RE 11.8.6 • RE 11.8.13 • RE 11.9.4 • RE 11.9.8 • RE 11.11.18	SEVT is considered an extreme form of dry seasonal subtropical rainforest. It occurs in areas with a subtropical, seasonally dry climate on soils of medium to high fertility and is generally characterised by the prominence of trees with microphyll-sized leaves and the frequent presence of swollen-stemmed "bottle trees" (*Brachychiton australis*, *B. rupestris*) as emergent from the vegetation (DERM 2010). Remnant vine thickets are most common on undulating plains on fine-grained sedimentary rocks (frequently shale) and on basalt hills and plains. They are often	**Does not occur** None of the associated RE types occur on the Project site.

Community Name	PMST Search	EPBC Act Status	Associated REs	Habitat and Ecology	Likelihood of Occurrence
				associated with elevated, freely drained sites. While SEVT in the Brigalow Belt South are florisitically diverse and heterogenous, especially in the canopy layer, the floristic diversity is lower than recorded by Fensham (1996) for northern SEVT. *Brachychiton rupestris* is virtually always present as an emergent with other emergent species locally present. The central vine thickets commonly have a shrub understorey, although in places where the canopy is very dense, shrubs may be absent. The herbaceous ground layer is usually sparse or may be absent.	
Weeping Myall Woodlands	Likely to occur	E	In Queensland, the following REs form part of or align with the listed ecological community (TSSC, 2009): • RE 11.3.2 • RE 11.3.28	The ecological community occurs in a range from open woodlands to woodlands in which weeping myall (*Acacia pendula*) is the sole or dominant overstorey species. The community generally occurs on flat areas, shallow depressions or	**Does not occur** None of the associated RE types occur on the Project site.

Community Name	PMST Search	EPBC Act Status	Associated REs	Habitat and Ecology	Likelihood of Occurrence
				gilgais on raised (relict) alluvial plains west of the Great Dividing Range in NSW and Queensland (TSSC, 2009). In order to be included in the listed ecological community a patch must be at least 5 ha in size, dominated (at least 50 % of trees present) by weeping myall, have at least 5 % canopy tree cover or at least 25 dead or defoliated mature weeping myall trees per ha and have either >2 layers of regenerating weeping myall or the tallest layer of weeping myall is 4 m tall and 50 % of vegetative cover comprised of native species (TSSC, 2009).	

Threatened Species

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
Bird species					
Australian Painted Snipe	*Rostratula australis*	E, Mi, Ma	E	Inhabits well-vegetated shallows and margins of wetlands, dams, sewage ponds and other water courses; wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub and open timber (Geering et al., 2007; Pizzey and Knight 1999). Occurs mostly in south-eastern Australia but dispersive in response to rainfall. The species has a broad range of distribution throughout Australia but has a close association with brackish or freshwater terrestrial wetlands, especially temporary ones which have muddy margins. (www.birdlife.org.au)	**Unlikely to Occur.** No historical records exist within 50km of the Project.
Black-breasted Button-quail	*Turnix melanogaster*	V	V	Inhabits leaf-litter in drier rainforests, vine thickets; scrubby woodlands of eucalypts, she-oaks, bottle-brushes, brush box, Brigalow and other Acacias; thickets of lantana on rainforest fringes, hoop pine plantations; grain stubbles (Pizzey and Knight 1999). Its distribution is patchy in southeast QLD to northern NSW (Pizzey and Knight 1999).	**Unlikely to Occur.** Whilst suitable habitat exists within the Project, no historical records occur within 10 - 50km.
Brown Treecreeper (south-eastern)	*Climacteris picumnus victoriae*	V	V	The Brown Treecreeper is endemic to south-eastern AUS from the Grampians in western VIC, through central NSW to the Bunya Mountains in QLD, and from the coast to the inland slopes of the Great Dividing Range. This species occupies dry open eucalypt forests and woodlands. This subspecies mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understory, sometimes with one or more shrub species (SPRAT, 2023).	**Unlikely to Occur.** No historical records exist within 50km of the Project.
Black-faced Monarch	*Monarcha melanopsis*	Mi, Ma	-	The Black-faced Monarch is found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating (www.birdsinbackyards.net).	**Unlikely to Occur.** Whilst suitable habitat exists within the Project, no

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
					historical records occur within 10 - 50km.
Common Sandpiper	*Actitis hypoleucos*	Mi, Ma	-	Shallow, pebbly, muddy or sandy edges of rivers and streams, coastal to far inland; dams, lakes, sewage ponds; margins of tidal rivers; waterways in mangroves or saltmarsh; mudflats; rocky or sandy beaches; causeways, riverside lawns, drains and street gutters (Pizzey and Knight 1999).	**Unlikely to Occur.** No historical records exist within 50km of the Project.
Curlew Sandpiper	*Calidris ferruginea*	CE, Mi, Ma	CR	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (Pizzey and Knight 1999). They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They generally roost on bare dry shingle, shell or sand beaches, sandpits and islets in or around coastal or near-coastal lagoons and other wetlands (SPRAT 2015).	**Unlikely to Occur.** No historical records exist within 50km of the Project.
Diamond Firetail	*Stagonopleura guttata*	V	V	Diamond Firetails occur on the south-east mainland of Australia from south-east QLD to Eyre Peninsula, SA and about 300 km inland from the sea. This species occurs in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees. They tend to prefer areas with relatively low tree density, few large logs, and little litter cover but high grass cover (SPRAT, 2023).	**Possibly Occurring.** Suitable habitat is present within the Project area and historical records occur within 23km (ALA, 2019).
Fork-tailed Swift	*Apus pacificus*	Mi, Ma	-	Almost exclusively aerial species, flying from less than 1 m above the ground. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including	**Possibly Occurring.** Suitable habitat is present within the Project area and historical records occur within 12km (ALA, 2019).

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh (SPRAT 2010).	
Glossy Black-cockatoo	*Calyptorhynchus lathami (lathami)*	V	V	The Glossy Black-Cockatoo is widespread in eastern Australia from Eungella, QLD south to east Gippland VIC. They are highly dependent on the distribution of Allocasurina species and are found in woodland dominated it and in open forests where it forms a substantial middle layer. They are often confined to remnant Allocasurarina patches surrounded by cleared farmlands (www.birdsinbackyards.net).	**Likely to Occur.** Suitable habitat is present within the Project area and recent (<20 years) historical records occur within 2 km (ALA, 2013).
Grey Falcon	*Falco hypoleucos*	V	V	They Grey Falcon's habitat includes lightly treed inland plains; gibber deserts, sandridges, pastoral lands, timbered watercourses; seldom in driest deserts. Resident or nomadic visitor to inland parts of all mainland states (Pizzey and Knight 1999).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Latham's Snipe	*Gallinago hardwickii*	V, Mi, Ma	V	Latham's Snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. This species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern SA. It occurs in permanent and ephemeral wetlands up to 2000m ASL, where they usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). They can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity (SPRAT, 2023).	**Unlikely to Occur.** Whilst records occur within 26 km, there is no suitable habitat is present within the Project.
Oriental Cuckoo	*Cuculus optatus*	Mi	-	Within Australia, this species uses a range of vegetated habitats such as monsoon rainforests, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types (DoE, 2015; Menkhorst et al,. 2017). This cuckoo species feeds arboreal, foraging for invertebrates on loose bark on the trunks and branches of trees, and among the foliage, including in mistletoes. It will forage from the ground, but	**Unlikely to Occur.** Whilst suitable habitat exists within the Project, no historical records occur within 10 - 50km.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				requires shrubs or trees from which it sallies and returns to consume prey items. Caterpillars have been noted as a preferred food source. Oriental Cuckoos tend to forage individually and have only been recorded foraging in pairs when infestations of caterpillars occur (DoE, 2015).	
Painted Honeyeater	*Grantiella picta*	V	V	Habitat includes mistletoes in eucalypt forests, box-ironbark-yellow gum woodlands, paperbarks, casuarinas, mulgas/acacias (Birds Australia, 2010; Pizzey and Knight 1999). Rare migrant/nomad with range extending across eastern Australia (Pizzey and Knight 1999). This species diet consists of mistletoe fruits, but also includes nectar and arthropods, especially in the non-breeding season (SPRAT, 2023).	**Possibly Occurring.** Suitable habitat is present within the Project area and historical records occur within 10 km (ALA, 1997).
Pectoral Sandpiper	*Calidris melanotos*	Mi, Ma	-	This species if found in shallow fresh waters, often with low grass and other herbage; swamp margins, flooded pastures, sewage ponds; occasionally tidal areas and saltmarshes (Pizzey and Knight 1999).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Powerful Owl	*Ninox strenua*	-	V	The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the eastern side of the Great Dividing Range, from south-east QLD to SA. They are found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understories, especially along watercourses. They will sometimes be found in open areas near forests such as farmland, parks, and suburban areas (www.birdsinbackyards.net).	**Unlikely to Occur.** Whilst records occur within 40 km, there is no suitable habitat is present within the Project.
Red Goshawk	*Erythrotriorchis radiatus*	E	E	The Red Goshawk is endemic to Australia where it is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia from western Kimberly to north-eastern NSW, and occasionally on continental islands. It has probably always occurred in central Australia, where three widely-spaced, recent confirmed sightings corroborate earlier, previously doubted records, however no breeding has been recorded in central Australia. This species	**Unlikely to Occur.** Whilst records occur within 46 km, there is no suitable habitat is present within the Project.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. Riverine forests are also used frequently. Such habitats typically support high bird numbers and biodiversity, especially medium to large species which the red goshawk requires for prey (SPRAT, 2023).	
Rufous Fantail	*Rhipidura rufifrons*	Mi, Ma	-	The Rufous Fantail occurs in coastal and near coastal districts of northern and eastern Australia. In eastern Australia they inhabit wet sclerophyll forests often in gullies dominated by eucalyptus species, usually with a dense shrubby understory often including ferns. They also occur in subtropical and temperate rainforests (SPRAT 2017).	**Possibly Occurring.** Suitable habitat is present adjacent to the Project site and historical records occur within 11 km (ALA, 2021).
Satin Flycatcher	*Myiagra cyanoleuca*	Mi, Ma	-	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests (SPRAT, 2010).	**Possibly Occurring.** Suitable habitat is present adjacent to the Project site and historical records occur within 13 km (ALA, 1997).
Sharp-tailed Sandpiper	*Calidris acuminata*	V, Mi, Ma	-	The sharp-tailed sandpiper breeds in northern Siberia but migrates south to winter in Australia and New Zealand. In the non-breeding season they can be found in tidal mudflats, saltmarshes, mangroves; shallow fresh, brackish or saline inland wetlands; floodwaters, irrigated pastures and crops; sewage ponds and saltfields (Pizzey and Knight 1999).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Southern Whiteface	*Aphelocephala leucopsis*	V	V	The southern whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range. There is a broad hybrid zone between the two subspecies extending north from the western edge of the Nullarbor Plain. This species lives in a wide range of open woodlands and shrublands where there is an understory of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. This species is considered to be sedentary,	**Unlikely to Occur.** Whilst suitable habitat exists within the Project site, there are no historical records occur within 10 – 50 km.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				however, atlas records indicate that individuals may more into wetter areas outside of their normal range during drought years (SPRAT, 2023).	
Squatter Pigeon (southern)	*Geophaps scripta scripta*	V	V	The known distribution of the Squatter Pigeon extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville. Their habitat is generally defined as open-forests to sparse, open woodlands and scrub that are mostly dominated by Eucalypts, *Corymbia*, *Acacia* or *Callitris* species. The habitat is generally remnant, regrowth or partly modified vegetation communities and within 3 km of water bodies or courses. Foraging occurs on well-drained, gravelly or loamy soils which support the open-forest to woodland communities with patchy, tussock-grassy understories (SPRAT, 2015).	**Likely to Occur.** Suitable habitat is present in and around the Project site and historical records occur within 15 km (ALA, 1997).
Swift Parrot	*Lathamus discolor*	CE, Ma	E	The Swift Parrot is endemic to south-eastern Australia, breeding in Tasmania and migrating to the Australian mainland. It inhabits eucalypt forests and woodlands, plantations and banksias; street trees, parks and gardens (Pizzey and Knight 1999).	**Unlikely to Occur.** Whilst historical records exist within 50 km, the Project is outside of the known distribution of this species.
White-throated Needletail	*Hirundapus caudacutus*	V, Mi, Ma	V	Almost exclusively aerial from heights of less than 1m up to more than 1000 m above the ground. Most often recorded above wooded areas, including open forest and rainforest and also are commonly recorded over heathland and coastal cliffs (SPRAT, 2010).	**Likely to Occur.** Suitable habitat is present within the Project site and recent (<20 years) historical records occur within 2 km (ALA, 2013).
Yellow Wagtail	*Motacilla flava*	Mi, Ma		Regular summer migrant to coastal Australia, especially Darwin to Broome, but also north-eastern Queensland from November to April. Found in short grass and bare ground, swamp margins,	**Unlikely to Occur.** No historical records exist within 50 km of the Project.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				sewage ponds, saltmarshes, playing fields, airfields, ploughed land and town lands (Pizzey and Knight 1999).	
Fish Species					
Murray Cod	*Maccullochella peelii*	V	V	The Murray Cod was historically distributed throughout the Murray-Darling Basin, which extends from southern QLD, through NSW, the ACT and VIC to SA, with the exception of the upper reaches of some tributaries. This species still occurs in most parts of this natural distribution but to approximately 1000 m above sea level. The species' estimated extent of occurrence, based on areas with an average river width of 50 m, is 660 km2. This species utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW, to slow-flowing, turbid lowland rivers and billabongs (SPRAT, 2023).	**Unlikely to Occur.** Whilst historical records exist within 50 km, the Project does not contain any suitable habitat for this species.
Silver Perch	*Bidyanus bidyanus*	CE	-	The Silver perch are endemic to the Murray-Darling system (including all states and sub-basins). This species formerly utilised a diversity of habitats within the Murray-Darling system and are commonly described as a lowland species that are not found in the cooler upper reaches of rivers. However, numerous reliable accounts exist of Silver Perth penetrating to Cooma (~800 m ASL) on the Murrumbidgee River in large-scale upstream migrants in summer in the early and mid 1900s. This species is consistently reported by anglers and researches to show a general preference for fast-flowing water, including rapids and races, and more open sections of river, throughout the Murray-Darling Basin (SPRAT, 2023).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Invertebrate Species					
Brigalow Woodland Snail	*Adclarkia cameroni*	E	E	The Brigalow woodland snail is endemic to south-east QLD, where is occurs in a small number of remnant and scattered *Acacia*	**Unlikely to Occur.** Whilst records occur within 46 km,

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				harpophylla (brigalow) and eucalypt woodland patches (such as road verges and riparian corridors) on the Condamine River floodplain, especially in the area around Dalby and Chinchilla (Conservation Advice, 2020).	there is limited suitable microhabitat present within the Project site.
Dulacca Woodland Snail	*Adclarkia dulacca*	E	E	The Dulacca woodland snail is endemic to south-east QLD, where it occurs as a small number of isolated and fragmented populations in the area between Miles and Dulacca, and south to Meandarra. This species inhabits a variety of remnant and scattered habitats, such as vine thicket and *Acacia harpophylla* woodland patches on rocky outcrops with clay to loam soils, Eucalyptus species and *Acacia shirleyi* woodlands on ridges, and *Eucalyptus woollsiana* woodlands. These locations are separated by tracks of unsuitable habitat, affecting both dispersal and colonisation events, restricting genetic exchange within the species. This species is also able to exist in areas of brigalow regrowth and even in cleared paddocks but only where logs, woody debris and other suitable microhabitats remain. This species can also shelter under loose bark at the base of trees (SPRAT, 2023).	**Unlikely to Occur.** Whilst records occur within 46 km, there is no suitable habitat is present within the Project site. The creek line on the southern boundary is formed on a rocky substrate and generally lacks leaf litter.
Pale Imperial Hairstreak	*Jalmenus eubulus*	-	V	Jalmenus eubulus is associated with Brigalow (Acacia harpophylla) dominated forests and woodland stands from central QLD to northern NSW. The larvae are monophagous, feeding on Brigalow leaves and are attended by small black ants (Taylor 2014).	**Unlikely to Occur.** Whilst records occur within 46 km, there is no suitable habitat is present within the Project.
Mammal Species					
Corben's Long-eared Bat	*Nyctophilus corbeni*	V	V	In QLD and NSW the South-eastern Long-eared Bat inhabits a variety of vegetation types but it is distinctly more common in Box / ironbark / cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern QLD. This species is more abundant in extensive stands of vegetation in comparison to smaller woodland patches, suggesting its home range is probably large. It appears that old-growth vegetation is a	**Likely to Occur.** This species has been recorded within 2 km near Bottle Tree Creek (ALA, 2013) and suitable habitat is present on the Project site.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				critical habitat component in the VIC distribution. This species has also been found to be much more abundant in habitats that have a distinct tree canopy and a dense, cluttered understory layer (SPRAT).	
Ghost Bat	*Macroderma gigas*	V	V	Ghost bats occur in a wide range of habitats from rainforest, monsoon and vine scrub, to open woodlands in arid areas. These habitats are used for foraging, while root habitat is more specific. Favoured roosting sites of the ghost bat are undisturbed caves or mineshafts which have several openings. Ghost bats occur in tropical regions in Queensland, and along the ventral and northern coast, from Rockhampton north to Cape York (DEHP 2017).	**Unlikely to Occur.** Whilst historical records exist within 50 km, the Project is outside of the known distribution of this species.
Greater Glider (southern and central)	*Petauroides volans*	E	E	The southern and central Greater Glider occurs in eastern Australia, where it has a broad distribution from around Proserpine in QLD, south through NSW and the ACT, to Wombat State Forest in central VIC. This species is largely restricted to eucalypt forests and woodlands of eastern Australia. It is typically found in highest abundance in taller, montane, moist eucalypt forests on fertile soils, with relatively old trees and abundance hollows. It is likely that only a proportion of forest in potential habitat areas is suitable for the species, as the structural attributes of the forest overstorey and forage quality it relies on vary considerably across the landscape (TSSC Conservation Advice, 2022).	**Likely to Occur.** Suitable habitat is present close to the Project area, and there are recent records within 8 km (EcoSmart, 2017).
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	-	The Grey-headed Flying-fox occurs in a range of habitats including subtropical and temperate rainforests, dry and wet sclerophyll forests, Banksia woodland, heaths and Melaleuca swamps (Duncan et al, 1999; NPWS, 2001).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Koala	*Phascolarctos cinereus*	E	E	The Koala is endemic to Australia. The biological species range extends from north-eastern QLD to the south-east corner of SA. Koalas naturally inhabit a range of temperate, subtropical and tropical forests, woodland and semi-arid community's dominated	**Likely to Occur.** Suitable habitat is present within the Project area and historical

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				by Eucalyptus species. Their habitat can broadly be defined as any forest or woodland containing species that are a known Koala food tree, or shrubland with emergent food trees (SPRAT 2017).	records occur within 9 km (ALA, 1987).
Large-eared Pied Bat	*Chalinolobus dwyeri*	E	E	It is found in a variety of dryer habitats, including the dry sclerophyll forests and woodlands to the east and west of the Great Dividing Range. Daytime roosts include caves, mine tunnels and the abandoned, bottle-shaped mud nests of Fairy Martins. In caves it often selects positions close to the cave entrance where individuals huddle together. It is believed to forage for small flying insects below the forest canopy. Its distribution of mostly limited to NSW with a few records in SE Queensland (Strahan, 2002).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Northern Quoll	*Dasyurus hallucatus*	E	-	The northern quoll occurs across much of northern Australia, from south-eastern Queensland to the south-west Kimberley, with a disjunct population in the Pilbara. In the Northern Territory it is restricted to the Top End. The species occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforest, sandy lowlands and beaches, shrubland, grasslands and desert. The habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal (SPRAT 2012).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Yellow-bellied Glider (south-eastern)	*Petaurus australis australis*	V	V	The Yellow-bellied Glider is found in tall mature Eucalypt Forest and they feed on a range of sources including winter-flowering Eucalypts which provide nectar and pollen. They also feed upon the sap of Eucalypts in which they chew V-shaped incisions to collect the sap. Yellow-bellied Gliders den in large tree hollows (NPWS, 2000).	**Unlikely to Occur.** Whilst records occur within 16 km, vegetation in the Project area has been subject to significant historical disturbance and generally lacks mature trees of adequate size. The PPL and tracks represent a significant barrier to

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
					movement by this species which is known to be sensitive to disturbance.
Reptile Species					
Collared Delma	*Delma torquata*	V	V	Under rocks and in soil cracks on heavy, stony and lightly timbered soils near Kenmore, Brookfield and Mt Crosby. Endemic to South-east Queensland. Also found in numerous disturbed habitats throughout Southeast Queensland (Cogger 2000).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Dunmall's Snake	*Furina dunmalli*	V	V	The distribution of the Dunmall's Snake extends from near the QLD border through the Brigalow Belt South and Nandewar bioregions, as far south as Ashford in NSW. In QLD this species occurs primarily in the Brigalow Belt region in the south-eastern interior of QLD. Records indicate sites at elevations between 200-500 m above sea level. The snake is very rare of secretive with limited records existing. It has been recorded at Archokoora, Oakey, Miles, Glenmorgan, Wallaville, Gladstone, Lake Broadwater, Mount Archer, Exhibition Range National Park, roadside reserves between Inglewood and Texas, Rosedale, Yeppoon and Lake Broadwater Conservation Park. It has been found in a broad range of habitats including forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow; and other various Blue Spotted Gum, Ironbark, White Cypress and Bulloak open forests and woodland associations on sandstone derived soils (SPRAT).	**Possibly Occurring.** Suitable habitat is present within the Project area and historical records occur within 36 km (ALA, 2009).
Fitzroy River Turtle	*Rheodytes leukops*	V	V	The Fitzroy River Turtle is found in rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. Preferred areas have high water clarity, and are often associated with Ribbonweed (Vallisneria sp.) beds. Also has an affinity for well-oxygenated riffle zones, moving into deeper pools as the riffle zones cease to flow (SPRAT 2009).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
Five-clawed Worm-skink	*Anomalopus mackayi*	V	E	The distribution of the Five-clawed Worm Skink is patchy in north-eastern NSE and south-eastern QLD. In south-eastern QLD the species is known from the upper Condamine River Floodplain from Warwick in the south to the Jimbour region in the north and bordered by the western edge of the Granite Belt. This species occurs in Bluegrass and/or Mitchell Grass dominated grasslands or mixed grasslands dominated by other grass species, but still categorised as Re 11.3.21. In south-east QLD, the species may also occur in River Red Gum/Queensland Blue Gum/Coolibah/Poplar Box grassy woodland/open forest communities. The species is not likely to be found in soils in which deep cracks do not form, such as hard-setting brown clays or sandy soils (SPRAT, 2022).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Grey Snake	*Hemiaspis damelii*	E	E	Queensland, records are known from near Goondiwindi and the adjacent Darling-Riverine Plain, from the Darling Downs and from the Lockyer Valley. Several isolated records also occur in the Rockhampton area. It favours woodlands, usually on heavier, cracking clay soils, particularly in association with water bodies. They shelter under rocks, logs and other debris as well as in soil cracks (SPRAT 2011).	**Unlikely to Occur.** There are no suitable cracking clay habitats in the Project area and the nearest records are 29 km away (ALA, 2013).
Southern Snapping Turtle	*Elseya albagula*	CE	CR	The Southern Snapping Turtle is only found in the Burnett, Fitzroy, Raglan and Mary River drainages of south-east QLD. It prefers permanent flowing water habitats where there are suitable shelters and refuges like fallen trees. (www.environment.des.qld.gov.au).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Woma	*Aspidites ramsayi*	-	NT	The Woma python can be found in the west and centre of Australia from WA through southern NW and northern SA to southern QLD and northwestern NSW. Its range may be discontinuous. This species was previously common on sandplains with other populations in the south and east found amongst wheatbelt and goldfield areas (www.ala.org.au).	**Unlikely to Occur.** Whilst historical records exist within 46 km, the Project does not contain any suitable habitat for this species.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
Yakka Skink	*Egernia rugosa*	V	V	Endemic to Queensland where its distribution is highly fragmented. Often associated with partly-buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. It is also known to excavate deep burrow systems. The Yakka Skink can persist in cleared habitats if shelter sites such as raked log piles, deep gullies, tunnel erosion/sinkholes and rabbit warrens are available (DEHP 2017).	**Possibly Occurring.** Historical records occur within 11 km (ALA, 1998) however, there is limited suitable microhabitat available for this species.
Plant Species					
Austral Toadflax	*Thesium australe*	V	V	Austral Toadflax occurs in NSW, ACT, QLD and CIV. Its current distribution is sporadic but widespread, occurring between the Bunya Mountains in SE QLD to NE VIC, and as far inland as the southern, central and northern tablelands in NSW and the Toowoomba region. It is a semi-parasitic species found on roots of a range of grass species, notably Kangaroo Grass. It occurs in subtropical, temperate and subalpine climates over a wide range of altitudes. It occurs on soils derived from sedimentary, igneous and metamorphic geology on a range of soils including black clay loams to yellow podzolics and peaty loams. It occurs in shrubland, grassland or woodland, often in damp sites (SPRAT 2018).	**Unlikely to Occur.** Whilst historical records exist within 50 km, the Project is outside of the known distribution of this species.
Belson's Panic	*Homopholis belsonii*	V	E	*Homopholis belsonii*'s distributional range lies within the Brigalow belt QLD, namely the Darling Downs area west of Toowoomba, near Oakey, Jondaryan, Bowenville, etc. The species is also found on the northwest slopes and plains of NSW, north of Warialdra. This grass species is found on poor soils in dry woodlands and at elevations of 200-520 m in NSW and 342-500 in QLD. There are three general types of habitat which support this species a) Rocky, basaltic hills; b) flat to gently undulating alluvial areas; and c) drainage lines. This species is commonly found amongst fallen timber, at the base of trees and shrubs, among branches and leaves of trees hanging low and around fence lines. It is believed to be shade dependent as it almost always occurs in these types of areas (SPRAT Profile).	**Possibly Occurring.** Suitable habitat is present within the Project area and historical records occur within 28 km (ALA, 2009).

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
Bluegrass	*Dichanthium setosum*	V	-	*Dichanthium setosum* has been reported from inland NSW to QLD. There are also reports from WA and TAS. The species is associated with heavy basaltic black soils and red-brown loams with clay subsoils (predominantly cracking clays or alluvium, often in gilgai). It is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. The species may tolerate or benefit from disturbance, otherwise, disturbance is indicative of threatening processes in its habitat (SPRAT Profile).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Curly-bark Wattle	*Acacia curranii*	V	V	Grows in dry sclerophyll forests and semi-arid woodlands across a variety of habitats within western New South Wales and Queensland. It occurs on deeply weathered sandstones forming red sandy soils. The species occurs in widely scattered thickets in patches of diverse heath scrub with emergent trees (WetlandInfo).	**Possibly Occurring.** Suitable habitat is present within the Project area and historical records occur within 23 km (ALA, 1996).
Hairy-joint Grass	*Arthraxon hispidus*	V	V	In NSW and QLD, this species is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland. In the SE QLD Bioregion, *A. hispidus* has also been recorded growing around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests, and also with bog mosses in mound springs (QLD - Species Profile)	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
Ooline	*Cadellia pentastylis*	V	V	Ooline occurs on the north-west slopes of NSW and in central and southern QLD where it is found within the 500 mm and 750 mm rainfall isohyets. This species is of considerable biogeographic interest as it is a relic of an extensive rainforest vegetation that covered much of Australia in the past. This species grows in semi-evergreen vine thickets and sclerophyll vegetation on undulating terrain of various geology, including sandstone, conglomerate and claystone. It forms a closed or open canopy, as a dominant or commonly with White Box and White Cypress Pine, with an open	**Unlikely to Occur.** Whilst records occur within 3 km, there is no suitable habitat is present within the Project.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				understory and leaf litter dominating the forest floor (SPRAT Profile).	
Queensland Western White Gum	*Eucalyptus argophloia*	V	CR	*Eucalyptus argophloia* occurs on flat to undulating country at 300 - 340 m above sea level. It prefers deep, dark, heavy clay soils, often with strong gilgai development. It has been recorded growing in brigalow woodland and forest communities associated with Belah, Poplar Box and Inland Grey Box (www.wetlandinfo.des.qld.gov.au)	**Unlikely to Occur.** Whilst historical records exist within 50 km, the Project is outside of the known distribution of this species.
Winged Pepper-cress	*Lepidium monoplocoides*	E	-	*Lepidium monoplocoides* is widely distributed on the inland plains of south-eastern Australia, occurring from northern NSW to western Victoria, with an old record from south-eastern SA. The species occurs in the Murray Darling Depression, Diverina, Darling Riverine Plains and Cobar Peneplain Bioregions. This species occurs in open, sparsely vegetated sites in a range of habitats on heavy clay or clay-loam soils, usually on sites that are seasonally flooded or prone to waterlogging, in arid to semi-arid areas with an average rainfall range of 200-450 mm per year. Vegetation communities in which the species occurs include grasslands, wetlands and floodplain woodlands dominated by *Eucalyptus coolabah* and *Eucalyptus largiflorens*, and chenopod shrublands dominated by *Atriplex*, *Maireana* and/or *Nitraria* species. Locations where this species occurs tend to be ephemeral, and it may be an opportunistic species able to take advantage of seasonally available habitat (National Recovery Plan).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
	Calytrix gurulmundensis	V	V	*Calytrix gurulmundensis* is restricted to south-eastern QLD where it is known from Gurulmundi, Guluguba and Barakula areas, north-west of Toowomba. This species has been recorded in open shrubland with sparse, stunted *Eucalyptus*, *Casuarina* and *Acacia* spp. and in *Triodia* hummock grassland with scattered shrubs. The habitat at Gurulmundi State Forest is consistent with QLD RE 11.7.5. At this site, grader activity is suggested to have moved the species	**Unlikely to Occur.** This species was initially assessed as 'Possibly Occurring' due to the presence of RE 11.7.5 however, the Project site and it was not detected

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
				along tracks so that its distribution covers an area of several square kilometres (SPRAT Profile).	during subsequent meander surveys in suitable habitat. Existing records are typically associated with ridgetops or sideslopes near the tops of hills, with all above 350 m elevation (refer **Appendix F**).
	Denhamia parvifolia	V	V	*Denhamia parvifolia* occurs from Eidsvold to Kingaroy, and near Chinchilla. The species occurs within Allies Creek State Forest and Koko State Forest. This species is found in vine forests and semi-evergreen vine thickets, commonly on basalt-derived, brown or red soils above 300m in altitude. It is also occasionally found in ecotone areas with open forests (QLD - Species Profile).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
	Homoranthus decumbens	E	V	*Homoranthus decumbens* occurs in QLD where it is restricted to Barakula State Forest near Chinchilla. This population consists of approximately 50 plants. This species occurs on flat country on deep sandy soils with lateritic pebbles, in heath and shrubby woodland. Regional Ecosystems likely to support this species include 11.7.5, 11.7.5a, 11.7.5b and 11.5.21 (SPRAT Profile).	**Unlikely to Occur.** This species was initially assessed as 'Possibly Occurring' due to the presence of RE 11.7.5 however, it was not detected during subsequent meander surveys in suitable habitat. Existing records are typically associated with areas above 350 m elevation (refer **Appendix F**).

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Likelihood of Occurrence
	Vincetoxicum forsteri	E	E	*Vincetoxicum forsteri* has rarely been collected and is known from eight localities in the Dubbo area and Mt Crow near Barraba in NSW, and "Myall Park" near Glenmorgan in QLD. This species is also conserved within Goobang National Park, Eura State Forest, Goonoo State Forest, Pilliga West State Forest and Coolbaggie Nature Reserve. This species grows in dry scrub, open forest and woodlands and overlaps with the distribution of the Brigalow and White Box-Yellow Box-Blakely's Red Gum Threatened Ecological Communities (Approved Conservation Advice, 2008).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
	Westringia parvifolia	V	V	*Westringia parvifolia* is known from four collections near Yelarbon, Inglewood and Woondiwindi in south-west QLD and from near Yetman in northern NSW. This species grows with Baker's Mallee (*Eucalyptus bakeri*) and Green Malle (*E. viridis*) and between clumps of Spinifex on sandy and stony soils (SPRAT, 2022).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.
	Xerothamnella herbacea	E	E	*Xerothamnella herbacea* is known from two sites north-east of Chinchilla, a single record from near Theodore and a record near Yelarbon east of Goondiwindi, QLD. This species occurs in Brigalow dominated communities in shaded situations, often in leaf litter and is associated with gilgais (SPRAT, 2022).	**Unlikely to Occur.** No historical records exist within 50 km of the Project.

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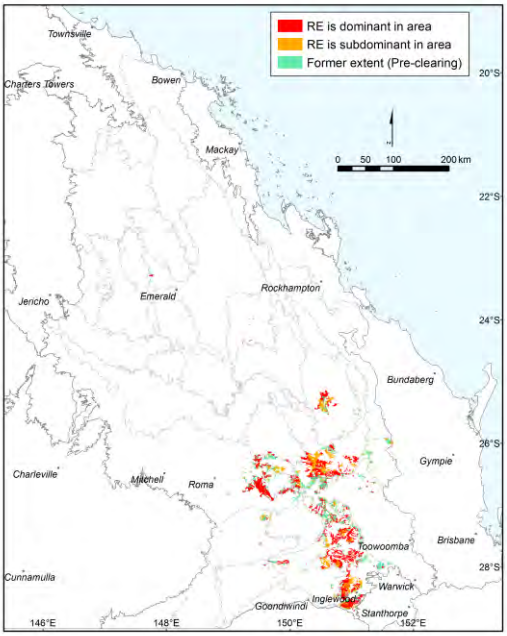
Appendix D

RE Technical Descriptions

Technical Description

Regional ecosystem: 11.5.1

Eucalyptus crebra and/or E. populnea, Callitris glaucophylla, Angophora leiocarpa, Allocasuarina luehmannii woodland on Cainozoic sand plains and/or remnant surfaces





David Jermyn

Pre-clearing area (ha), remnant area (ha) and per cent remaining:	**623,606**	**421,942**	**68%**

Species_recorded: **Total: 250; woody: 68; ground: 216; Avg. spp./site: 31.9; std dev.: 10.8, 16 site(s)**

Basal area: **Avg./site: 14.3 m²/ha, range: 6.5 - 27 m²/ha, std. deviation: 4 m²/ha, 19 site(s)**

Structural formation: **Woodland: 68%; open-woodland: 21%; open-forest: 11%, 19 site(s)**

Representative_sites **16583, 16584, 16646, 16655, 16657, 16672, 16711, 16726, 16815, 16951, 16963, 24568, 28749, 28752, 28900, 30741, 30744, 30818, 40989.**

Stratum: Tree 1

Height avg. = 21.1m, range 17-28m, 19 sites

Crown cover avg. = 27.9%, range 7.9-75.0%, 19 sites

Dominant species (relative cover, frequency): Eucalyptus crebra (74, 79%), Angophora leiocarpa (52, 42%), Allocasuarina luehmannii (22, 26%), Callitris glaucophylla (21, 37%)

Frequent species (cover, frequency): Eucalyptus crebra (18, 79%), Angophora leiocarpa (14, 42%), Callitris glaucophylla (5, 37%), Allocasuarina luehmannii (11, 26%), Corymbia clarksoniana (11%), Eucalyptus tereticornis (2, 11%), Allocasuarina littoralis (1, 5%), Corymbia trachyphloia (5%), Eucalyptus populnea (5%), Eucalyptus woollsiana (5, 5%)

Stratum: Tree 2

Height avg. = 10.4m, range 6.5-27m, 18 sites

Crown cover avg. = 20.6%, range 2.0-44.0%, 18 sites

Dominant species (relative cover, frequency): Allocasuarina luehmannii (59, 63%), Callitris glaucophylla (40, 53%), Eucalyptus crebra (34, 58%), Angophora leiocarpa (25, 37%)

Frequent species (cover, frequency): Allocasuarina luehmannii (12, 63%), Eucalyptus crebra (6, 58%), Callitris glaucophylla (12, 53%), Angophora leiocarpa (4, 37%), Corymbia clarksoniana (11%), Eucalyptus chloroclada (2, 11%), Eucalyptus tereticornis (11%), Acacia crassa (8, 5%), Acacia crassa subsp. crassa (5%), Acacia neriifolia (5%), Allocasuarina littoralis (15, 5%), Corymbia dallachiana (5%), Eucalyptus populnea (2, 5%), Melaleuca decora (1, 5%)

Stratum: Tree 3

Height avg. = 4.6m, range 2-7m, 6 sites

Crown cover avg. = 11.8%, range 5.0-20.0%, 6 sites

Dominant species (relative cover, frequency): Callitris glaucophylla (53, 21%), Allocasuarina luehmannii (16, 26%)

Frequent species (cover, frequency): Allocasuarina luehmannii (3, 26%), Callitris glaucophylla (6, 21%), Eucalyptus crebra (1, 16%), Acacia neriifolia (3, 11%), Acacia caroleae (14, 5%), Acacia conferta (1, 5%), Acacia crassa (2, 5%), Acacia leiocalyx subsp. leiocalyx (5, 5%), Bursaria incana (5%)

Stratum: Shrub 1

Height avg. = 2.8m, range 0.4-6.5m, 18 sites

Crown cover avg. = 9.2%, range 1.0-28.0%, 18 sites

Dominant species (relative cover, frequency): Allocasuarina luehmannii (33, 79%), Callitris glaucophylla (27, 42%), Jacksonia scoparia (20, 21%), Acacia leiocalyx subsp. leiocalyx (20, 37%), Acacia conferta (14, 32%)

Frequent species (cover, frequency): Allocasuarina luehmannii (4, 79%), Callitris glaucophylla (2, 42%), Acacia leiocalyx subsp. leiocalyx (1, 37%), Acacia conferta (1, 32%), Jacksonia scoparia (1, 21%), Acacia semilunata (3, 16%), Eucalyptus crebra (1, 16%), Acacia crassa (2, 11%), Acacia ixiophylla (3, 11%), Acacia neriifolia (2, 11%), Denhamia cunninghamii (11%), Dodonaea triangularis (11%), Geijera parviflora (2, 11%), Myoporum acuminatum (11%), Notelaea microcarpa (6, 11%), Olearia elliptica (11%), Opuntia tomentosa (11%), Petalostigma pubescens (11%), Acacia caroleae (2, 5%), Acacia crassa subsp. crassa (2, 5%), Acacia everistii (5%), Acacia polybotrya (5%), Alphitonia excelsa (1, 5%), Angophora leiocarpa (1, 5%), Asperula geminifolia (1, 5%), Capparis canescens (5%), Cassinia laevis (5%), Corymbia tessellaris (5%), Euphorbia indet. (5%), Exocarpos cupressiformis (5%), Glossocardia bidens (5%), Glycine clandestina var. clandestina (5%), Hakea lorea (2, 5%), Hibbertia indet. (5%), Homoranthus melanostictus (11, 5%), Hovea angustissima (5%), Leucopogon biflorus (5%), Leucopogon indet. (3, 5%), Leucopogon muticus (5%), Maireana microphylla (5%), Melaleuca decora (7, 5%), Melichrus adpressus (7, 5%), Melichrus urceolatus (1, 5%), Ozothamnus diosmifolius (5%), Parsonsia eucalyptophylla (5%), Pittosporum angustifolium (1, 5%), Senna artemisioides subsp. zygophylla (5%), Solanum indet. (5%), Styphelia viridis (5%)*

Stratum: Shrub 2

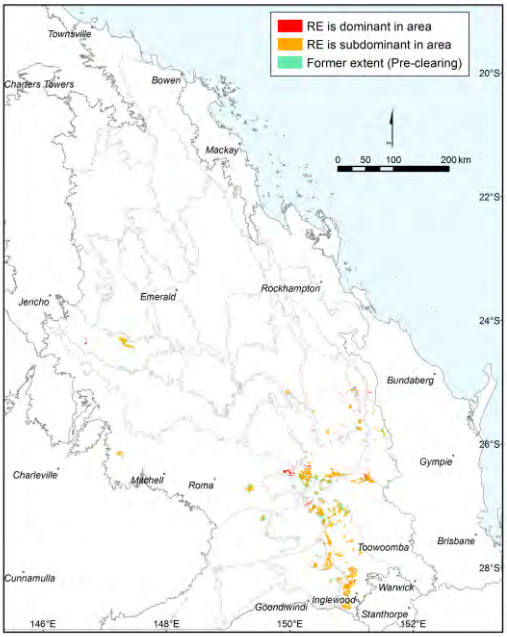
Height avg. = 1.5m, range 1.2-1.8m, 3 sites

Crown cover avg. = 11.3%, range 4.0-21.0%, 3 sites

Frequent species (cover, frequency): Acacia conferta (3, 11%), Acacia crassa (1, 11%), Alphitonia excelsa (11%), Styphelia viridis (1, 11%), Acacia deanei (5%), Acacia excelsa (1, 5%), Acacia ixiophylla (1, 5%), Acacia leiocalyx subsp. leiocalyx (5%), Acacia lineata (15, 5%), Acacia semilunata (1, 5%), Allocasuarina luehmannii (1, 5%), Boronia bipinnata (1, 5%), Cryptandra longistaminea (1, 5%), Daviesia genistifolia (5%), Denhamia cunninghamii (5%), Dodonaea triangularis (2, 5%), Leucopogon blakei (1, 5%), Leucopogon muticus (1, 5%), Melaleuca decora (6, 5%), Opuntia tomentosa (5%), Persoonia terminalis subsp. recurva (2, 5%)*

Technical Description — Regional ecosystem: 11.7.5

Shrubland on natural scalds on deeply weathered coarse-grained sedimentary rocks





Pre-clearing area (ha), remnant area (ha) and per cent remaining: **73,770** **63,026** **85%**

Species_recorded: **Total: 84; woody: 39; ground: 52; Avg. spp./site: 18.2; std dev.: 6.9, 5 site(s)**

Basal area: **Avg./site: 3.6 m²/ha, range: 1.0 - 9 m²/ha, std. deviation: 3 m²/ha, 4 site(s)**

Structural formation: **Shrubland: 50%; open-woodland: 17%; open-heath: 17%; dwarf shrubland: 17%, 6 site(s)**

Representative_sites **13964, 16670, 16673, 16722, 16836, 51976.**

Stratum: Emergent

Height avg. = 5.5m, range 3-9m, 4 sites

Crown cover avg. = 5.0%, range 2.0-10.0%, 4 sites

Dominant species (relative cover, frequency): Eucalyptus panda (54, 33%), Eucalyptus virens (50, 33%)

Frequent species (cover, frequency): Eucalyptus panda (4, 33%), Eucalyptus virens (1, 33%), Acacia crassa (3, 17%), Eucalyptus bakeri (4, 17%), Eucalyptus exserta (2, 17%), Eucalyptus sideroxylon subsp. improcera (2, 17%), Eucalyptus sideroxylon subsp. sideroxylon (17%)

Stratum: Tree 1

Height avg. = 12.1m, range 3.2-21m, 2 sites

Crown cover avg. = 23.0%, range 19.0-27.0%, 2 sites

Frequent species (cover, frequency): Acacia barakulensis (1, 17%), Acacia julifera subsp. julifera (1, 17%), Amyema miquelii (17%), Corymbia trachyphloia subsp. trachyphloia (2, 17%), Eucalyptus crebra (19, 17%), Eucalyptus tenuipes (23, 17%)

Stratum: Tree 2

Height avg. = 6.0m, 1 site

Crown cover avg. = 3.0%, 1 site

Frequent species (cover, frequency): Amyema miquelii (17%), Corymbia watsoniana subsp. watsoniana (2, 17%), Eucalyptus crebra (2, 17%)

Dominant species: Relative cover (mean of cover of species / total cover of all species in that stratum for all values > zero) and frequency (percent of total sites) ordered by decreasing relative abundance. Up to five most dominant species with frequency > 20% listed for each stratum, (only comprehensive sites used for ground stratum).

Frequent species: Cover (mean of all values > zero) and frequency (percent of total sites) of all species occurring in more than 5% of sites ordered by decreasing frequency. Ground layer species % (of comprehensive sites) are listed as either graminoid or forb.

Naturalised species have an asterisk (*) after the name. indet. after listed name = indeterminate species or genus

Stratum: Shrub 1

Height avg. = 1.7m, range 0.9-2.2m, 6 sites

Crown cover avg. = 36.5%, range 3.0-60.0%, 6 sites

Dominant species (relative cover, frequency): Melaleuca uncinata (75, 50%), Acacia caroleae (23, 33%)

Frequent species (cover, frequency): Melaleuca uncinata (25, 50%), Acacia caroleae (3, 33%), Acacia buxifolia subsp. pubiflora (17%), Acacia johnsonii (5, 17%), Acacia lauta (17%), Acacia leichhardtii (17%), Amyema gaudichaudii (17%), Boronia glabra (17%), Brachyloma daphnoides (17%), Calytrix gurulmundensis (18, 17%), Calytrix tetragona (8, 17%), Corymbia trachyphloia subsp. trachyphloia (1, 17%), Corymbia watsoniana subsp. watsoniana (17%), Eucalyptus tenuipes (9, 17%), Grevillea floribunda subsp. tenella (5, 17%), Hakea lorea subsp. lorea (2, 17%), Hibiscus heterophyllus (1, 17%), Jacksonia rhadinoclona (3, 17%), Lysicarpus angustifolius (17%), Melaleuca decora (2, 17%), Melaleuca diosmatifolia (5, 17%), Melaleuca nodosa (5, 17%), Triplarina paludosa (17%), Xanthorrhoea johnsonii (17%)

Stratum: Shrub 2

Height avg. = 0.6m, range 0.4-0.8m, 2 sites

Crown cover avg. = 30.0%, range 25.0-35.0%, 2 sites

Dominant species (relative cover, frequency): Calytrix tetragona (79, 33%), Hakea purpurea (10, 33%)

Frequent species (cover, frequency): Calytrix tetragona (23, 33%), Hakea purpurea (3, 33%), Acacia caroleae (2, 17%), Harmogia densifolia (1, 17%), Kunzea opposita var. opposita (4, 17%), Micromyrtus sessilis (17%)

Stratum: Ground

Height avg. = 0.5m, range 0.3-0.5m, 4 sites

PFC avg. = 18.0%, range 6-32%, 4 sites

Dominant species (relative cover, frequency): Triodia mitchellii (71, 40%), Triodia scariosa (46, 40%), Aristida benthamii (13, 40%), Boronia bipinnata (1, 40%), Laxmannia gracilis (1, 60%)

Frequent species (cover, frequency): GRAMINOIDS: Aristida benthamii (1, 40%), Triodia mitchellii (10, 40%), Triodia scariosa (16, 40%), Amphipogon caricinus var. caricinus (20%), Amphipogon strictus (3, 20%), Aristida jerichoensis var. jerichoensis (4, 20%), Aristida jerichoensis var. subspinulifera (20%), Cymbopogon obtectus (20%), Cymbopogon refractus (20%), Dimorphochloa rigida (20%), Entolasia stricta (20%), Eremochloa bimaculata (20%), Fimbristylis dichotoma (20%), Gahnia aspera (20%), Lepidosperma laterale (20%), Panicum simile (20%), Paspalidium indet. (20%), Scleria sphacelata (20%), Tripogon loliiformis (20%)
FORBS: Laxmannia gracilis (60%), Boronia bipinnata (40%), Goodenia delicata (40%), Pimelea linifolia subsp. linifolia (40%), Acacia caroleae (20%), Acacia johnsonii (2, 20%), Amyema gaudichaudii (20%), Brunonia australis (1, 20%), Calytrix tetragona (1, 20%), Cheilanthes sieberi (20%), Dampiera adpressa (20%), Daviesia acicularis (20%), Dianella brevipedunculata (20%), Dianella longifolia var. longifolia (20%), Drosera burmanni (20%), Hakea purpurea (20%), Hibbertia acicularis (1, 20%), Homoranthus decumbens (20%), Homoranthus melanostictus (8, 20%), Lomandra filiformis (20%), Lomandra leucocephala subsp. leucocephala (20%), Mirbelia aotoides (1, 20%), Mirbelia pungens (1, 20%), Olax stricta (20%), Platysace ericoides (20%)

Appendix E

Desktop Search Results

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -26.4924
Longitude: 150.2076
Distance: 50
Email: matthew.whitehouse@attexo.com.au
Date submitted: Monday 25 Mar 2024 14:52:32
Date extracted: Monday 25 Mar 2024 15:00:03

The number of records retrieved = 40

Disclaimer
Information presented on this product is distributed by the Queensland Government as an information source only. While every care is taken to ensure the accuracy of this data, the State of Queensland makes no statements, representations or warranties about the accuracy, reliability, completeness or suitability of any information contained in this product.
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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.

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: 25-Mar-2024

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	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	54
Listed Migratory Species:	12

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:	20
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:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	39
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1200 - 1300km upstream from Ramsar site	In feature area
Narran lake nature reserve	300 - 400km upstream from Ramsar site	In feature area
Riverland	1100 - 1200km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1300 - 1400km upstream from Ramsar site	In feature area

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	Buffer Status
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area	In buffer area only
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community likely to occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community likely to occur within area	In buffer area only
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area	In buffer area only
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature 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	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Grantiella picta](#) Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Neophema chrysostoma](#) Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
[Stagonopleura guttata](#) Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Turnix melanogaster](#) Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area	In buffer area only
FISH			
[Bidyanus bidyanus](#) Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
[Maccullochella peelii](#) Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
MAMMAL			
[Chalinolobus dwyeri](#) Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area	In feature area
[Dasyurus hallucatus](#) Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In buffer area only
Macroderma gigas			
Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In feature 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 known to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
PLANT			
Acacia curranii			
Curly-bark Wattle [3908]	Vulnerable	Species or species habitat known to occur within area	In feature area
Acacia handonis			
Hando's Wattle, Percy Grant Wattle [14928]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Arthraxon hispidus			
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Cadellia pentastylis			
Ooline [9828]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calytrix gurulmundensis [24241]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dichanthium queenslandicum King Blue-grass [5481]	Endangered	Species or species habitat may occur within area	In buffer area only
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eucalyptus argophloia Queensland White Gum, Queensland Western White Gum, Lapunyah, Scrub Gum, White Gum [19748]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Homopholis belsonii Belson's Panic [2406]	Vulnerable	Species or species habitat may occur within area	In feature area
Homoranthus decumbens a shrub [55186]	Endangered	Species or species habitat known to occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Polianthion minutiflorum [82772]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhaponticum australe Austral Cornflower, Native Thistle [22647]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Westringia parvifolia [4822]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Xerothamnella herbacea [4146]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area	In feature area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat known to occur within area	In feature area
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat may occur within area	In buffer area only
SNAIL			
Adclarkia cameroni Brigalow Woodland Snail [83886]	Endangered	Species or species habitat known to occur within area	In feature area
Adclarkia dulacca Dulacca Woodland Snail [83885]	Endangered	Species or species habitat known to occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area	In buffer area only
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Anseranas semipalmata			
Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
[Lathamus discolor](#) Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In buffer area only
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In buffer area only
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Stones Country	Resources Reserve	QLD	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Atlas Stage 3 Gas Project	2022/09410		Assessment	In buffer area only
Atlas to Reedy Creek Pipeline	2023/09585		Assessment	In buffer area only
Coal Seam Gas Field Development for Natural Gas Liquefaction Park, Curtis Island	2008/4059		Post-Approval	In buffer area only
Construction of the Central Surat Rail Project	2013/6729		Completed	In buffer area only
Development of Existing Coal Seam Gas Fields	2008/4398		Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Surat Basin Coal Project, 25 km south of Wandoan, QLD	2017/8116		Completed	In buffer area only
The Range Project	2011/5860		Completed	In buffer area only
Controlled action				
Cameby Downs Coal Mine Expansion	2009/4966	Controlled Action	Completed	In buffer area only
Construct and operate 447km high pressure gas transmission pipeline	2009/4976	Controlled Action	Post-Approval	In feature area
Construction and operation of Nathan Dam and associated water delivery infrastructure	2008/4313	Controlled Action	Post-Approval	In buffer area only
Construction of a high pressure buried gas pipeline, Kogan to Gladstone, QLD	2009/5029	Controlled Action	Post-Approval	In buffer area only
Dulacca Renewable Energy Project, Dulacca QLD	2018/8368	Controlled Action	Post-Approval	In buffer area only
Expansion of Coal Seam Gas Fields	2009/4974	Controlled Action	Post-Approval	In feature area
Expansion Of Coal Seam Gas Operations	2010/5344	Controlled Action	Post-Approval	In feature area
Future Gas Supply Area Project	2012/6357	Controlled Action	Completed	In buffer area only
Ironbark Coal Seam Gas Project	2011/6091	Controlled Action	Completed	In buffer area only
North Surat Coal Project- Collingwood	2012/6236	Controlled Action	Completed	In buffer area only
North Surat Coal Project- Taroom	2012/6237	Controlled Action	Completed	In buffer area only
Queensland Curtis LNG Project - Pipeline Network	2008/4399	Controlled Action	Post-Approval	In buffer area only
Santos GLNG Gas Field Development Project, QLD	2012/6615	Controlled Action	Post-Approval	In buffer area only
Wandoan Coal Mine and Infrastructure Project	2008/4284	Controlled Action	Post-Approval	In buffer area only
Wandoan Coal Project - Coal Seam Methane Water Supply South	2008/4287	Controlled Action	Post-Approval	In feature area
Not controlled action				

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Cameby Downs Coal Mine, construction, operation & decommissioning	2007/3465	Not Controlled Action	Completed	In buffer area only
Cameby Downs Continued Operations Project, Qld	2018/8304	Not Controlled Action	Completed	In buffer area only
Chinchilla Weir Discharge and Pipeline Project	2011/6000	Not Controlled Action	Completed	In buffer area only
Construct and operate 112km long underground gas transmission pipeline	2008/4358	Not Controlled Action	Completed	In buffer area only
Delga Solar Farm, 1039 Gadsbys Road, Woleebee, Qld	2019/8411	Not Controlled Action	Completed	In buffer area only
Dulacca Solar Farm	2019/8607	Not Controlled Action	Completed	In buffer area only
High Voltage Transmission line Development	2007/3230	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Kogan - Braemar Transmission Line	2004/1850	Not Controlled Action	Completed	In buffer area only
Project Atlas CSG Project, between Wollumbilla and Wandoan, Qld	2018/8329	Not Controlled Action	Completed	In buffer area only
Proposed Coal Seam Gas Development & Associated Infrastructure	2008/4456	Not Controlled Action	Completed	In buffer area only
Surat Basin Railway	2008/3944	Not Controlled Action	Completed	In buffer area only
Warhook Solar Farm, near Miles, Qld	2019/8456	Not Controlled Action	Completed	In buffer area only
Warrego Highway Upgrade Program, Dalby to Miles overtaking lanes, Qld	2016/7802	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Columboola Solar Farm, 9kms north-east of Miles, Queensland	2017/7962	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Construction and operation of gas pipeline	2005/2254	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Referral decision				
Development of an underground longwall coal mine	2011/6129	Referral Decision	Completed	In buffer area only

Bioregional Assessments

[Resource Information]

SubRegion	BioRegion	Website	Buffer Status
Maranoa-Balonne-Condamine	Northern Inland Catchments	BA website	In feature area

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.

Please feel free to provide feedback via the Contact us page.

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Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -26.4924
Longitude: 150.2076
Distance: 50
Email: matthew.whitehouse@attexo.com.au
Date submitted: Monday 25 Mar 2024 14:52:32
Date extracted: Monday 25 Mar 2024 15:00:03

The number of records retrieved = 40

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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	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	8
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		1
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V	V	21
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	1
animals	birds	Estrildidae	*Stagonopleura guttata*	diamond firetail		V	V	2
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		1
animals	insects	Lycaenidae	*Jalmenus eubulus*	pale imperial hairstreak		V		3
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		V	V	29
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	10
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		E	E	5
animals	mammals	Vespertilionidae	*Nyctophilus corbeni*	eastern long-eared bat		V	V	7
animals	reptiles	Boidae	*Aspidites ramsayi*	woma		NT		2
animals	reptiles	Diplodactylidae	*Strophurus taenicauda*	golden-tailed gecko		NT		125/3
animals	reptiles	Elapidae	*Furina dunmalli*	Dunmall's snake		V	V	1
animals	reptiles	Elapidae	*Hemiaspis damelii*	grey snake		E	E	6
animals	snails	Camaenidae	*Adclarkia cameroni*			V	E	2
animals	snails	Camaenidae	*Adclarkia dulacca*	Dulacca woodland snail		E	E	4
plants	land plants	Asteraceae	*Rutidosis glandulosa*			NT		1/1
plants	land plants	Asteraceae	*Rutidosis lanata*			NT		26/24
plants	land plants	Celastraceae	*Apatophyllum teretifolium*			NT		1/1
plants	land plants	Celastraceae	*Denhamia parvifolia*			V	V	1/1
plants	land plants	Leguminosae	*Acacia barakulensis*			V		11/10
plants	land plants	Leguminosae	*Acacia curranii*	curly-bark wattle		V	V	4/4
plants	land plants	Leguminosae	*Acacia wardellii*			NT		9/9
plants	land plants	Myrtaceae	*Calytrix gurulmundensis*			V	V	15/12
plants	land plants	Myrtaceae	*Eucalyptus argophloia*	Queensland western white gum		CR	V	1/1
plants	land plants	Myrtaceae	*Eucalyptus curtisii*	Plunkett mallee		NT		2/2
plants	land plants	Myrtaceae	*Eucalyptus pachycalyx subsp. waajensis*			E		10/9
plants	land plants	Myrtaceae	*Eucalyptus sideroxylon subsp. improcera*			V		8/8
plants	land plants	Myrtaceae	*Homoranthus decumbens*			V	E	4/4
plants	land plants	Myrtaceae	*Homoranthus papillatus*	mouse bush		CR		1
plants	land plants	Myrtaceae	*Melaleuca groveana*			NT		2/2
plants	land plants	Myrtaceae	*Micromyrtus carinata*	Gurulmundi heath-myrtle		E		21/17
plants	land plants	Myrtaceae	*Micromyrtus patula*			E		3/3
plants	land plants	Orchidaceae	*Aphyllorchis anomala*			NT		1
plants	land plants	Poaceae	*Homopholis belsonii*	Belson's panic		E	V	9/9
plants	land plants	Rhamnaceae	*Cryptandra ciliata*			NT		4/4
plants	land plants	Rutaceae	*Philotheca sporadica*			NT	V	1
plants	land plants	Solanaceae	*Solanum stenopterum*			V		2/2
plants	land plants	Surianaceae	*Cadellia pentastylis*	ooline		V	V	33/6

CODES

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

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

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

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

Appendix F

Habitat association analysis for *Calytrix gurulmundensis* and *Homoranthus decumbens*

Calytrix gurulmundensis Associations

An analysis of the RE, elevation and landscape position associated with existing records for *Calytrix gurulmundensis* indicates that the majority are on ridgetops or on sideslopes near the tops of hills. While a distinct area of RE 11.7.5 (a known vegetation community association) was confirmed on the Project site, it is not associated with any ridges or steep side slopes. Subsequent timed meander surveys confirmed that *Calytrix gurulmundensis* does not occur within mapped RE 11.7.5 on the Project site.

Table 8.1 RE associations, elevation, and landscape position for *Calytrix gurulmundensis* records

Locality/ population	Current RE	Elevation (m)	Landscape position
Binkey State Forest	11.7.6	390 m	Ridge.
Binkey State Forest	11.5.21/11.7.4/ 11.5.4	350 m	Ridge.
Gurulmundi State Forest	11.7.5	460-470 m	Multiple records on ridge and slightly downslope.
Gurulmundi State Forest	11.7.5	440-450 m	Slightly downslope of ridge.
Gurulmundi State Forest	11.10.1/11.7.6/ 11.7.7	420-430 m	Upper catchment of L Tree Creek.
Gurulmundi State Forest	11.7.5	450-460 m	Downslope of ridge adjacent to Gurulmundi Road.
Gurulmundi State Forest	11.10.1-11.7.2	430-440 m	Downslope of ridge.
Gurulmundi State Forest	11.10.1/11.7.2	440-450 m	Downslope of ridge.
Gurulmundi State Forest	11.7.7/11.7.4/ 11.5.1	470-480 m	Downslope of ridge adjacent to Gurulmundi Road.
Gurulmundi State Forest	11.7.7/11.7.4/ 11.5.1	480 m	Ridge. In and around Wildflower Road.
Gurulmundi State Forest	117.7/11.7.4/ 11.5.1	440-450 m	Downslope of ridge.
Gurulmundi State Forest	11.10.1/11.7.2	440-450 m	Downslope of ridge. Upper catchment of Hellhole Creek.
Gurulmundi State Forest	117.7/11.7.4/ 11.5.1	460-470 m	Ridge.
Woleebee Road	11.7.6/11/5.21	370-380 m	Close to ridgeline.
Barakula State Forest	11.5.1/11.5.21	350-360 m	Downslope of ridge
Barakula State Forest	11.7.6/11.7.7	380-390 m	Downslope of ridge.
Barakula State Forest	11.7.5	400 m	Multiple records on ridge.
Barakula State Forest	11.7.5	400 m	Single record on ridge adjacent to Waaje Wildflower Road.
Barakula State Forest	11.7.4c/11.7.7/ 11.7.6	400-410 m	Downslope of ridge.

Homoranthus decumbens Associations

Specimen records for *Homoranthus decumbens* were also analysed for environmental associations including RE, elevation and landscape position and other associated species. The few records of this species that are available predominantly come from in or near the Waaje Wildflower Area of Barakula State Forest and thus have similar landscape descriptions including sandy soils on flat aspects or a plateau with an underlying sandstone geology and were all associated with a single polygon of RE 11.7.5. Associated species listed with the specimens differed but were descriptive of species expected in RE 11.7.5. While a distinct area of RE 11.7.5 (the vegetation community associated with the Waaje population) was confirmed on the Project site, it does not take the form of a sandy plateau atop a hill or ridge. Subsequent timed meander surveys confirmed that *Homoranthus decumbens* does not occur within mapped RE 11.7.5 on the Project.

Two disjunct records also suggest a second sub-population my exist further south in Barakula State Forest on Landzone 5, still over 30km from the Project site. The RE these specimens are found within is a mixed polygon of RE 11.5.21/11.5.1 which fit the description of eucalypt woodland associated with one of the records and were on elevations slightly higher than immediate surroundings. Whilst RE 11.5.1 occurs in the Project site, the only RE on Landzone 5 that has been suggested as potential habitat for this species is RE 11.5.21 (DCCEEW, 2023) which does not occur on the Project site. Additionally, no *Homoranthus* spp. have been noted across the Project site within the known RE 11.5.1.

Table 8.2 RE associations, elevation, and landscape position for *Homoranthus decumbens* records

Locality/ population	Current RE	Elevation (m)	Landscape position
Barakula State Forest (North of Waaje Wildflower Area)	11.7.5	410 m	Fine sandy soil. Flat aspect. Shared RE polygon with main Waaje population.
Barakula State Forest (Waaje Wildflower Area)	11.7.5	410 m	Top of sandy jump-up plateau. Underlying sandstone geology.
Barakula State Forest (Waaje Wildflower Area)	11.7.5	410 m	Multiple specimens. Wildflower Area.
Barakula State Forest (Waaje Wildflower Area)	11.7.5	410 m	Sandy soils.
Barakula State Forest (Waaje Wildflower Area, Scientific Area)	11.7.5	410 m	Deep, pale, sandy-loam over sandstone. Flat aspect
Barakula State Forest (Central, West)	11.5.21/ 11.5.1	350 m	Two specimens. No landscape information available.
Barakula State Forest	-	-	Specimen information withheld.

Appendix G

Technical memorandum – Squatter Pigeon

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Technical Note/Memo

To: Paul Finn, Arrow Energy

From: Mark Sanders

Date: 10 October 2024

Re: Squatter Pigeon values within the Surat Gas Project area

Background

Previous likelihood assessments for the occurrence of Squatter Pigeon within the Surat Gas Project (SGP) area by EcoSmart Ecology determined the species as 'transient'. The transient category was specifically created by EcoSmart Ecology to account for species such as the Squatter Pigeon. Transient species typically:

- Are highly mobile, almost exclusively birds, and able to cover large distances in a short period of time.
- Can sporadically and unpredictably appear in atypical locations (outside known ranges) or in atypical habitats.
- Due to the above, they are unlikely to establish, breed or use the assessment area in any manner that would support the broader population of the species.

By 'Transient', we have in mind dispersing or nomadic individuals which move between patches of suitable foraging or breeding habitat. According to DCCEEW (2024), Squatter Pigeons have 'dispersal habitat' which is generally not ideal for the species' foraging or breeding needs. As a result, 'Transient' individuals may have a similar ecological role to 'vagrants'. Vagrants, as recognized by the IUCN (IUCN 2018) and DCCEEW, are excluded from calculations of area of occupancy and extent of occurrence (DCCEEW, n. d.). Consequently, if vagrant records are not used in these calculations, they should also be excluded from offset or residual impact assessment.

The 'Transient' category does not deny the possibility of future records, especially considering the size of the SGP and vagile ability of the Squatter Pigeon, otherwise the more traditional 'unlikely' category could be applied. Neither does the traditional category of 'possible' work; to do so would invoke offset

requirements. Without any traditional likelihood categories seemingly useful, the novel category of 'transient' was erected[1].

The Assessment

As per industry practice, EcoSmart Ecology inspected various databases to establish the abundance and location of Squatter Pigeon records within 50 km of the SGP. This was repeated for this memo using the Atlas of Living Australia (which includes Wildnet records) and 'ebird'. Consistent with Department of Environment, Science and Innovation (DESI) practice (DESI, 2024), returned records (32 in total) were filtered to exclude those prior to 1975 or without date. For the purpose of the likelihood assessment, inaccurate records (i.e., precision >2000 m) were retained. Table 1 below lists all records matching this criteria within and surrounding the SGP.

Table 1. All post 1975 Squatter Pigeon records within the SGP and surrounding 50 km buffer

Year	No individuals	RE[2]	Distance from SGP (km)	Notes
WITHIN THE SGP				
1997	Not recorded	11.7.6	NA	roadside
2012	2	11.7.7	NA	roadside
OUTSIDE THE SGP				
1997	Not recorded	Non-remnant	31.8	
1999	1	Non-remnant	7.8	
2013	1	11.9.5/9.10	3.5	Record accuracy low, close to roadside
2016	Not recorded	Non-remnant	0.4	roadside
2016	1	11.7.7/7.5	24.9	roadside
2019	Not recorded	Non-remnant	5.7	roadside
2020	1	11.5.1/7.4	15.9	roadside
2021	1	11.5.1	11.1	roadside
2022	1	11.10.1/7.5/5.20	48.8	roadside

[2] Based on ground-truthed mapping for records within the SGP and Queensland Herbarium RE mapping (v13.1) for those outside

The data highlights the scarcity of Squatter Pigeons over the past 50 years, with only two sightings within the SGP and an additional nine in the surrounding area. This is despite a marked increase in ecological research in the region, particularly driven by Arrow and other coal seam gas proponents. Notably, all but one of these records involve single birds, with no sightings of pairs or groups that might indicate breeding activity. Furthermore, there are no clusters of sightings suggesting regular occurrence or consistent habitat use. Taken together, this suggests the Squatter Pigeon is rare in and around the SGP, with most occurrences involving solitary birds. This pattern aligns with our classification of the

[1] We refrained from designating these types of species/records as 'vagrant' due to the incumbent definition which does not consider unpredictable records in *atypical habitat* within a species range.

species as 'Transient,' meaning they are not part of an established population and are unlikely to be repeat visitors.

Squatter Pigeon habitat is typically classified as "open eucalypt woodland" or "savanna" (Higgins and Davies 1996; TSSC 2015). This can also include modified landscapes, such as thinned forests or cleared grazing lands. Woodland and savanna habitats generally have a canopy cover of less than 30% (Neldner *et al.* 2023), and Squatter Pigeons rarely inhabit forests with a dense canopy. When the species is recorded in forest REs, it is usually associated with tracks or roadways, as shown in Table 1 above. In our view, this has led to an overemphasis in the literature of the significance of certain REs, such as 11.7.6 and 11.7.7, which are not representative of typical Squatter Pigeon habitat.

Based on available RE mapping, the Squatter Pigeon records in and around the SGP are associated with five Regional Ecosystem (RE) types. All of these, with the exception of RE11.5.1, have a closed canopy cover which exceeds that typical of Squatter Pigeon habitat (i.e., <30%). These records then, are associated with atypical Squatter Pigeon habitat. Habitat use is consistent with momentary movement through the landscape utilising canopy gaps (roadsides) in habitats otherwise unlikely to be used for foraging or breeding purposes.

Table 2. The Regional Ecosystems associated with Squatter Pigeon records in and surrounding the SGP

RE*	No records	Benchmark Canopy Cover (%)
11.5.1	2	25
11.7.6	1	40
11.7.7	2	40
11.9.5	1	52
11.10.1	1	30

* based on the dominant RE for heterogeneous RE mapping; non-remnant habitat excluded

Conclusion

The evidence above has demonstrated:

1) Squatter Pigeon records within and surrounding the SGP are sporadic and infrequent. Their occurrence is unpredictable and there is no evidence of repeated occurrence or resident birds, and
2) When occurring in remnant vegetation, most records are associated with atypical habitat. When occurring in remnant forest habitats birds are almost always observed along roadsides.

For these reasons the Squatter Pigeon conforms with our established category of 'Transient'. To suggest they are unlikely would be misleading. To suggest they are 'possible' could over-emphasise the ecological value of habitats within the SGP for the species.

Importantly, the above demonstrates remnant habitat used by Squatter Pigeon within the SGP is unlikely to constitute protected wildlife habitat – as defined by the *Environmental Offset Regulation 2014* – as it is unlikely used for anything but momentary foraging or roosting. It is also highly unlikely the SGP or habitats within are currently used for breeding purposes.

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