



# Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development

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Revision: 5

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# Document Status

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## Revision History

Revision	Release Date	Document Status	Revision Comments	Author
0	10/07/2023	Issued for Use	Project specific Constraints Protocol	J Claridge
1	21/08/2023	Issued for Use	Inclusion of MSES. No change to MNES, constraint categories or protocol steps	J Claridge
2	08/09/2023	Issued for Use	Response to RFI feedback	M Harris
3	07/12/2023	Issued for Use	Response to DCCEEW adequacy review feedback	J Claridge
4	22/03/2024	Issued for Use	Response to DCCEEW adequacy review feedback	J Claridge
5	19/07/2024	Issued for Use	Update of Figure 1 to reflect findings of pre-clearance surveys May – July 2024 (as per Atlas Stage 3 Environmental Constraints Mapping Update Report, Ausecology July 2024). No other changes made.	S Fox

## Document Approval

Approved by	Signed	Date
Jacob Cumpstay Environment Manager		19 July 2024

## Definitions

Term	Definition
<b>Biodiversity values</b>	environmentally sensitive areas, prescribed environmental matters and wetlands.
<b>Constraints checklist</b>	used for quality assurance purposes to ensure all relevant environmental constraints are considered as early in the infrastructure siting process as possible
<b>Constraints maps</b>	<p>created and updated by the Technical Officer, the maps will assist in initial environmental desktop constraints analysis for proposed infrastructure locations. Information includes (as required):</p> <ul style="list-style-type: none"> <li>• Aerial imagery;</li> <li>• Flood plains;</li> <li>• Elevation data (Lidar and/or contours);</li> <li>• Ecological and watercourse/wetland constraints;</li> <li>• Areas of Regional Planning Interest (e.g. Strategic Cropping Land);</li> <li>• Existing infrastructure;</li> <li>• Native title;</li> <li>• Cultural heritage;</li> <li>• Sensitive receptors; and</li> <li>• Landholder status.</li> </ul>
<b>Ecology Survey Report</b>	report detailing the findings of the ecological surveys undertaken as part of the environmental site assessment
<b>Environmentally Sensitive Areas</b>	<p>environmental values include:</p> <ul style="list-style-type: none"> <li>• Category A and Category B environmentally sensitive areas (ESAs) as defined under Schedule 19 of the Environmental Protection Regulation 2019 (EP Regulation);</li> <li>• Category C ESAs where defined in a relevant Environmental Authority.</li> </ul>
<b>Invasive plant</b>	as defined under the <i>Biosecurity Act 2014</i> (QLD).
<b>Linear infrastructure</b>	infrastructure including (but not limited to) gas and water gathering lines, low- and high-pressure gas and water pipelines, roads and tracks, power lines and other service lines.
<b>Low impact petroleum activity</b>	<p>low impact petroleum activities means petroleum activities which do not result in the clearing of native vegetation, earthworks or excavation work that cause either, a significant disruption to the soil profile or permanent damage to vegetation that cannot be easily rehabilitated immediately after the activity is completed.</p> <p>Examples of such activities include but are not necessarily limited to:</p> <ul style="list-style-type: none"> <li>• chipholes</li> <li>• coreholes</li> <li>• geophysical surveys</li> <li>• seismic surveys</li> <li>• soil surveys</li> <li>• topographic surveys</li> <li>• cadastral surveys</li> <li>• ecological surveys</li> <li>• installation of environmental monitoring equipment (including surface water).</li> </ul>

<b>Term</b>	<b>Definition</b>
<b>MNES</b>	<p>matter of national environmental significance under the <i>Environment Protection and Biodiversity Protection Act 1999</i> (Cth).</p> <p>Does not include TECs or threatened species that become listed under the <i>Environment Protection and Biodiversity Protection Act 1999</i> after the date of the Minister's Controlled Action determination for the Project (i.e. 19 May 2023).</p>
<b>MSES</b>	<p>matter of state environmental significance under the <i>Environmental Offset Act 2014</i> (Qld).</p> <p>Does not include species that become listed as threatened, near threatened or special least concern under the <i>Nature Conservation Act 1999 (Qld)</i> after the granting of the relevant Environmental Authority.</p>
<b>Significant disturbance to land</b>	<p>defined in Schedule 12 of the <i>Environmental Protection Regulation 2019</i> (Qld) as land that has been disturbed and human intervention is needed to rehabilitate it to a condition required under the relevant environmental authority, or to the condition it was in immediately before the disturbance.</p>
<b>Site-specific environmental conditions and maps</b>	<p>conditions and restrictions (and associated maps) governing how construction activities on site should be carried out to ensure compliance with Environmental Authority conditions and regulatory requirements.</p>
<b>Strategic cropping area</b>	<p>an area of regional interest defined under the <i>Regional Planning Interests Act 2014</i> (Qld).</p>

# 1 Introduction

## 1.1 Project Background

The Atlas Stage 3 Gas Project is to develop, operate, decommission and rehabilitate up to 151 coal seam gas wells; gas and water gathering systems for the producing wells; access tracks; brine and produced water storages; borrow pits; and ancillary supporting facilities on Authority to Prospect (ATP) 2059, Petroleum Lease (PL) 445, the northern portion of PL209 and parts of PL1037 in the central part of the Surat Basin, Queensland.

The Project Area is entirely within the Brigalow Belt Bioregion and occurs across a boundary between the Taroom Downs subregion in the north and Southern Downs southern downs subregion in the south.

The northern components of the Project Area feature watercourses on floodplains, surrounded by undulating hills. Towards the southern areas of the Project Area the landscape features steeper slopes and outcropping towards the south-eastern boundary. Several watercourses intersect the Project Area, with named watercourses including Woleebee Creek, Conloi Creek, Hellhole Creek and Wandoan Creek.

It is noted that terrestrial and aquatic habitats demonstrated varying levels of degradation, including cattle grazing, clearing, erosion and invasive species and the majority of aquatic habitats surveyed are of limited ecological value.

The main land use within the Project Area is grazing of stock for beef production. Some flood plain areas have been developed for centre-pivot agriculture.

The majority of the Project Area is cleared areas with non-native pastures.

## 1.2 Purpose

The Environmental Protocol for Field Development and Constraints Analysis (the Protocol) provides a framework for identifying, assessing and managing potential impacts to Matters of National Environmental Significance (MNES) and Matter of State Environmental Significance (MNES) associated with development of the Atlas Stage 3 Gas Project.

The Protocol will ensure that infrastructure siting and gas field development takes place in accordance with:

- Federal regulatory requirements – the Environment Protection and Biodiversity Conservation Act 2009 (EPBC Act);
- State regulatory requirements including the Nature Conservation Act 1992 (NC Act);
- Project commitments in the referral and preliminary documentation;
- Relevant management plans including:
  - Atlas Stage 3 Gas Project Significant Species Management Plan (ERM 2023a)
  - Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLAS-EN-PLN-015]
  - Atlas Stage 3 Gas Project Terrestrial and Aquatic Ecology Assessment Report (ERM 2023b).
- Atlas Stage 3 Gas Project Chemical Risk Assessment Report (KCB 2023).

### 1.3 Scope

The Protocol has been developed to ensure that the planning and site selection for infrastructure associated with the Atlas Stage 3 development is undertaken with rigorous consideration of relevant MNES listed under the EPBC Act, MSES as defined in Schedule 2 of the Environmental Offsets Regulation 2014 (EO Regulation), Category A and Category B environmentally sensitive areas (ESAs) as defined under Schedule 19 of the Environmental Protection Regulation 2019 (EP Regulation) and Category C ESAs where defined in a relevant EA. The Protocol applies to Senex's Atlas Stage 3 Gas Project where construction will involve significant disturbance to land. This includes but is not limited to the following CSG infrastructure:

- Well lease pads;
- Access tracks;
- Gas and water gathering systems;
- Brine and produced water storages;
- Ancillary supporting facilities; and
- Borrow pits.

The Protocol also recognises that, in addition to MNES and MSES constraints, landholder, engineering and cultural heritage constraints must also be considered during infrastructure planning. These constraints are assessed through processes aligned with this Protocol and are discussed in more detail in Section 3.



## 2 Constraints Framework

### 2.1 Approach and Protocol Objectives

Senex will apply the following hierarchy of management principles to avoid, minimise and manage land disturbance impacts on MNES and MSES during the planning and implementation of new petroleum activities for the Atlas Stage 3 Gas Project. These are:

1. Avoid – preferentially avoiding direct and indirect adverse environmental impacts;
2. Minimise – minimise direct and indirect adverse environmental impacts through a reduction in the duration, intensity and/or extent of adverse impacts, where these cannot be avoided;
3. Mitigate – implement mitigation and management measures to minimise direct, indirect and cumulative adverse impacts;
4. Restore (remediate and rehabilitate) – actively remediate and rehabilitate impacted areas to promote and maintain long-term recovery.

The Protocol is most relevant during the planning, design and the construction phases of the Atlas Stage 3 Gas Project but is also to be used for the operational and decommissioning / rehabilitation phases of the Project.

Limited Atlas Stage 3 Gas Project infrastructure is proposed within parts of PL1037 (i.e. a single brine storage dam and connections). This limited infrastructure will be sited in previously cleared areas and subject to Senex's *Queensland Environment Protocol for Field Development and Constraints Analysis* [SENEX-CORP-EN-PRC-019].

The Protocol for the Atlas Stage 3 Gas Project specifically addresses the ATP 2059, PL 445 and PL 209 gas tenements and the part of PL 209 that is east of Woleebee Creek. This area is referred to as the 'Field Development Area'.

The Protocol is triggered by the initiation of a work program by the Project Infrastructure Development Team and involves the steps described in Section 3.

### 2.2 Constraint Categories

Constraint categories have been developed that will determine the siting of infrastructure for the Atlas Stage 3 Gas Project as presented in Table 1. A summary of the activities that are permitted in each category are provided in Table 2.

The constraint categories are mapped in Figure 1. Constraint layers will be continually updated with the findings from site ecological surveys (Section 3.3) and any other detailed ecological assessments undertaken as part of ongoing gas field development. Constraint mapping will be stored within Senex's GIS.



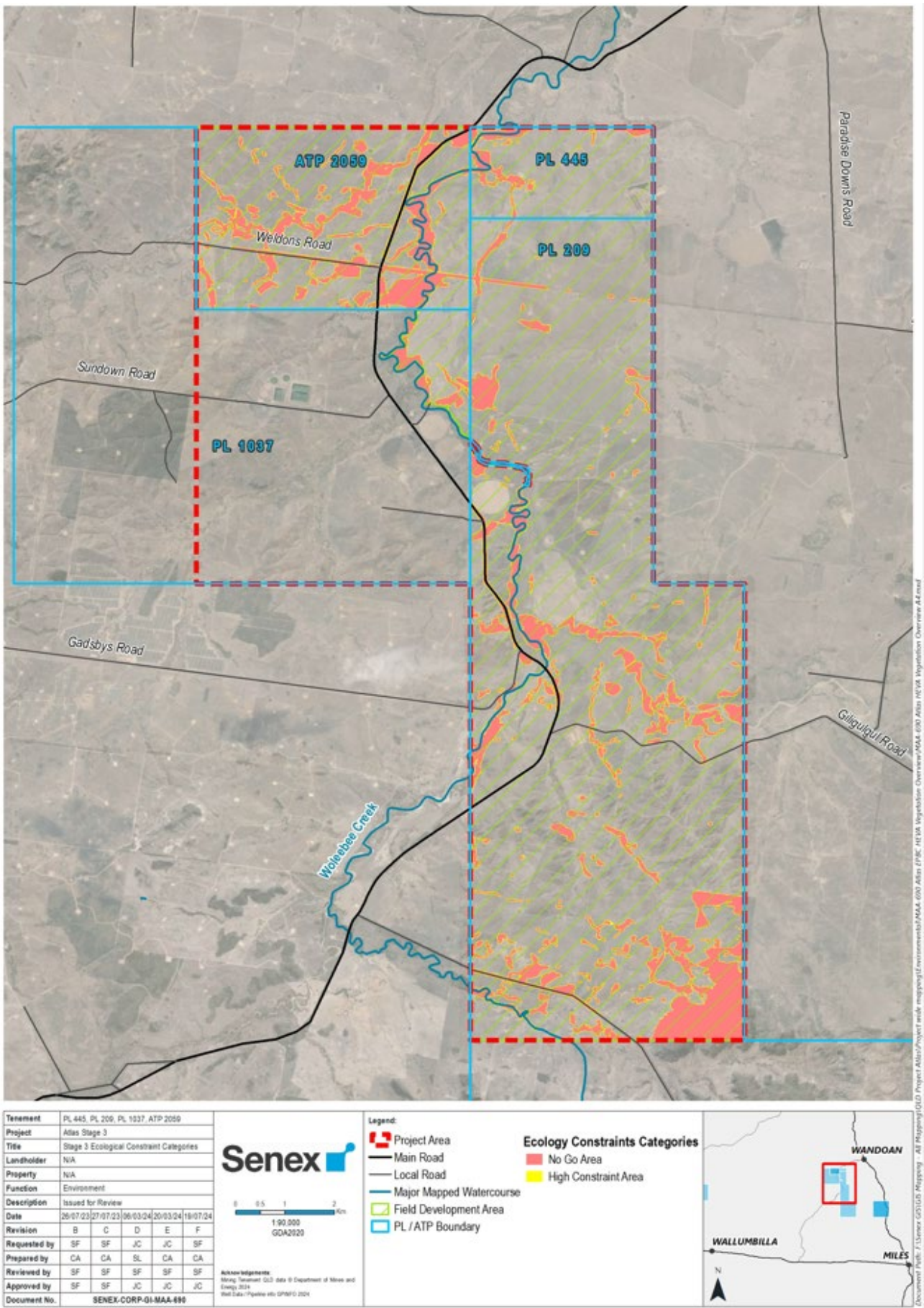


Figure 1 Mapping of Constraint Categories for the Atlas Stage 3 Gas Project

Table 1 – Constraint categories

Constraint category	Activities permitted	Constraints <sup>1</sup>
No-go area	No petroleum activities	<ul style="list-style-type: none"> <li>Threatened Ecological Communities listed in Section 2.5</li> <li>MNES and MSES species habitat listed in Section 2.5 (apart from Koala and Southern Squatter Pigeon dispersal habitat and Echidna habitat), including all areas of remnant vegetation and regrowth areas that meet species habitat definitions.</li> <li>Category A, B and C ESAs<sup>2</sup></li> <li>Ooline plants (10 m buffer) in addition to mapped Ooline habitat</li> <li>If any are found to be present in the Project Area: <ul style="list-style-type: none"> <li>Slender Tylophora plants and a 10 m buffer and</li> <li>Populations<sup>3</sup> of the Dulacca Woodland Snail</li> </ul> </li> </ul>
High constraint area	Low impact petroleum activities <sup>4</sup> , and Linear infrastructure <sup>4</sup>	<ul style="list-style-type: none"> <li>Buffer zone (10 m buffer around all 'No-go areas')</li> <li>Protected plants under the NC Act (if any are found)</li> </ul>
Low constraint area	All petroleum activities <sup>5</sup>	<ul style="list-style-type: none"> <li>Koala and Southern Squatter Pigeon dispersal habitat</li> <li>Echidna (NC Act - Special least concern) habitat</li> <li>Previously cleared areas that have been assessed as not containing MNES or MSES and its habitat</li> </ul>

<sup>1</sup> Disturbance of MNES and MSES will not exceed upper disturbance limits identified in Table 3.

<sup>2</sup> Category A and category B ESAs as defined under Schedule 19 of the EP Regulation and category C ESAs where defined in the relevant EA.

<sup>3</sup> Avoids field verified populations (evidence of presence of any individuals) of the threatened Dulacca Woodland snail (*Adclarkia dulacca*), if it is found to occur within proposed disturbance areas in the Atlas tenements.

<sup>4</sup> Definitions for these activities are provided in the definitions section.

<sup>5</sup> All petroleum activities will be permitted within the low constraints area, however Koala juvenile and non-juvenile trees and seedlings will be avoided unless unavoidable due to other constraints (e.g. environmental features and values, cultural heritage values, geological features, landholder / livestock / agricultural requirements and existing or planned landholder, utility or community infrastructure).

Table 2 – Summary of activities permitted in each constraint category for the Atlas 3 Gas Project

Constraint category	Low impact petroleum activities	Linear infrastructure	Well pads	All petroleum activities
No-go area	No	No	No	No
High constraint area	Yes	Yes	No	No
Low constraint area	Yes	Yes	Yes	Yes

### 2.3 Constraint Mapping

The constraint categories mapping (Figure 1) was created using the constraints identified in Table 1. Constraint data were sourced from government, other open-source datasets, and Senex datasets including ecological survey findings.

Notable ecology field surveys for the development of the initial constraints map were:

- BOOBOOK Ecological Consulting (2022) Broadscale Ecological Assessment Report. Senex Atlas 3 Gasfield Project – Survey of Terrestrial Ecological Values;
- Targeted Ooline survey 31/1-3/2/2022; and
- Freshwater Ecology (2022) Aquatic Ecology Assessment. Senex – Atlas Stage 3 Gas Project.

The habitat mapping, vegetation mapping and other ecological survey data (such as protected flora records) forms the basis of the individual constraint layers for the Project that are used to develop the constraints category mapping. Habitat mapping rules and habitat descriptions are presented in Appendix A.

Using the precautionary principle, the initial habitat mapping has been developed using conservative habitat mapping rules that will be subject to further ground-truthing during the ecology survey which will be completed no more than 12 months prior to the commencement of any clearing or other works. These surveys are referred to in this report as pre-clearance surveys (Section 3.3).

The development of constraint layers is designed to be an iterative process with regular refinement as new data becomes available.

The constraint categories boundaries and maps will be updated should:

- Any MNES threatened species (listed at the time of the decision on the referral – 19 May 2023) not already addressed in Table 3 be found to present within the Project Area;
- New areas of habitat are identified from ground-truthing surveys; or
- MNES habitat is identified not to be present during ground-truthing surveys.

If additional suitable habitat is identified, it will be avoided pursuant to the mitigation hierarchy and constraint categories in Section 2.2.

In addition to MNES and MSES constraints in this document, there are other constraints that are outside the scope of this Protocol that must be considered during infrastructure siting. These constraints include landholder agreements, constructability restrictions, presence of sensitive receptors and cultural heritage (indigenous) requirements.

The development needs will be balanced against all constraints, including the implementation of this Protocol, while ensuring that activities are compliant with all legal obligations.

## **2.4 Habitat Descriptions and Mapping Rules**

For MNES protected under the EPBC Act, two listed threatened ecological communities (TEC) and 22 listed threatened species (19 fauna and 3 flora) were identified as known, likely to occur or potential to occur in the Project Area, due to direct field observations within the Project Area or recent historical records.

Habitat descriptions, survey requirements and mapping rules for MNES and MSES species and communities assessed as 'potential', 'likely' or 'known' to occur are presented in Appendix A and Appendix B.

This information will be used in undertaking further field surveys during the development of the gas field and siting of infrastructure using the constraints protocol in this document.

At the Commonwealth level a Significant Species Management Plan (ERM 2023a) has also been prepared for the Atlas Stage 3 Gas Project that describes how potential impacts to MNES significant communities and species associated with the proposed activities for the Project are managed.

## **2.5 Maximum Disturbance Limits**

Ecological surveys and assessments have been undertaken across the Field Development Area including Ground Truthed Regional Ecosystem (GTRE) mapping, targeted fauna surveys and fauna habitat assessments. The surveys have been conducted to an acceptable level of detail for the purpose of confirming known, likely and potential species and covered the relevant sections of the Field Development Area (Boobook 2022). The surveys comply with the recommendations within the targeted fauna survey guidelines that are relevant to determining known, likely and potential presence of MNES and MSES across the Field Development Area. Additional (pre-clearance) surveys including vegetation (including TEC and threatened flora) and active fauna surveys and habitat assessments will be undertaken as part of this Protocol (Appendix B).

Additionally, the Atlas Stage 3 Gas Project will avoid areas confirmed as TECs, areas of remnant vegetation and potential habitat for threatened species (that includes regrowth vegetation), except for Koala dispersal habitat and Echidna habitat (refer to Table 3). Direct disturbance will not exceed the limits in Table 3.

Table 3 – Threatened species and communities likelihood of occurrence and maximum disturbance limits

Species / Community	EPBC Act Status	NC Act Status	Likelihood of Occurrence	Total Potential Habitat in Field Development Area	Maximum Area of Impact (ha)
<b>Listed Threatened and/or Migratory Birds</b>					
Australian Painted Snipe ( <i>Rostratula australis</i> )	E	E	Potential	69.7 ha	0 ha
Brown Treecreeper (south-eastern) ( <i>Climacteris picumnus victoriae</i> )	V	V	Potential	272.1 ha	0 ha
Diamond Firetail ( <i>Stagonopleura guttata</i> )	V	V	Potential	1,287.4 ha	0 ha
Glossy Black-cockatoo ( <i>Calyptorhynchus lathami lathami</i> )	V	V	Likely	1,003 ha	0 ha
Painted Honeyeater ( <i>Grantiella picta</i> )	V	V	Potential	Not mapped. This nomadic species forages on mistletoe in remnant, regrowth and other non-remnant vegetation, including shadelines and scattered trees and shrubs in cleared areas.	NA
Southern Squatter Pigeon ( <i>Geophaps scripta scripta</i> )	V	V	Potential	164.3 ha of breeding habitat	0 ha
				316.5 ha of dispersal habitat	2.1 ha
Southern whiteface ( <i>Aphelocephala leucopsis</i> )	V	V	Potential	938.5 ha	0 ha
White-throated Needletail ( <i>Hirundapus caudacutus</i> )	V	V	Likely	0 ha mapped as a likely flyover visitor only	NA
<b>Listed Threatened Mammals</b>					
Corben's Long-eared Bat ( <i>Nyctophilus corbeni</i> )	V	V	Potential	259.6 ha	0 ha
Greater Glider (central and southern) ( <i>Petauroides volans</i> )	E	V	Known	528 ha	0 ha
Koala ( <i>Phascolarctos cinereus</i> )	E	E	Known	698.5 ha foraging and breeding habitat	0 ha
				9,072.6 ha dispersal habitat.	530 ha
Northern Quoll ( <i>Dasyurus hallucatus</i> )	E	-	Potential	226.7 ha	0 ha
Short-beaked Echidna ( <i>Tachyglossus aculeatus</i> )	-	SLC	Likely	9,072.6 ha	530 ha



Species / Community	EPBC Act Status	NC Act Status	Likelihood of Occurrence	Total Potential Habitat in Field Development Area	Maximum Area of Impact (ha)
Yellow-bellied Glider (south-eastern) ( <i>Petaurus australis australis</i> )	V	V	Potential	145.9 ha	0 ha
<b>Listed Threatened Reptiles</b>					
Collared Delma ( <i>Delma torquata</i> )	V	V	Potential	259.7 ha	0 ha
Common Death Adder ( <i>Acanthophis antarcticus</i> )	-	V	Potential	259.7 ha	0 ha
Dunmall's Snake ( <i>Furina dunmali</i> )	V	V	Potential	259.7 ha	0 ha
Five-clawed worm-skink ( <i>Anomalopus mackayi</i> )	V	E	Potential	209.6 ha	0 ha
Grey Snake ( <i>Hemiaspis damelii</i> )	E	E	Potential	431.2 ha	0 ha
Yakka Skink ( <i>Egernia rugosa</i> )	V	V	Potential	228 ha	0 ha
<b>Listed Threatened Invertebrates</b>					
Dulacca Woodland Snail ( <i>Adclarkia dulacca</i> )	E	V	Likely	666.3 ha	0 ha
Pale Imperial Hairstreak ( <i>Jalmenus eubulus</i> )	-	V	Likely	180.2 ha	0 ha
<b>Listed Threatened Ecological Communities</b>					
Brigalow TEC	E	-	Known	95.8 ha	0 ha
Poplar Box TEC	E	-	Known	32.3 ha	0 ha
<b>Listed Threatened Flora</b>					
Belson's Panic ( <i>Homopholis belsonii</i> )	V	V	Potential	366.3 ha	0 ha
Ooline ( <i>Cadellia pentastylis</i> )	V	V	Known	118.7 ha	0 ha
Slender Tylophora ( <i>Vincetoxicum forsteri</i> )	E	E	Potential	122.7 ha	0 ha
Winged Nightshade ( <i>Solanum stenopterum</i> )	-	E	Potential	380.8 ha	0 ha

## 2.6 Updating Constraints or the Protocol

Constraint layers will be continually updated with the findings from site ecological surveys (Section 3.3), based on updates identified above and any other detailed ecological assessments undertaken as part of ongoing gas field development.

### 3 Protocol Steps

The Protocol will be initiated through work programs and follow the steps outlined in the figure below and described in the following subsections.

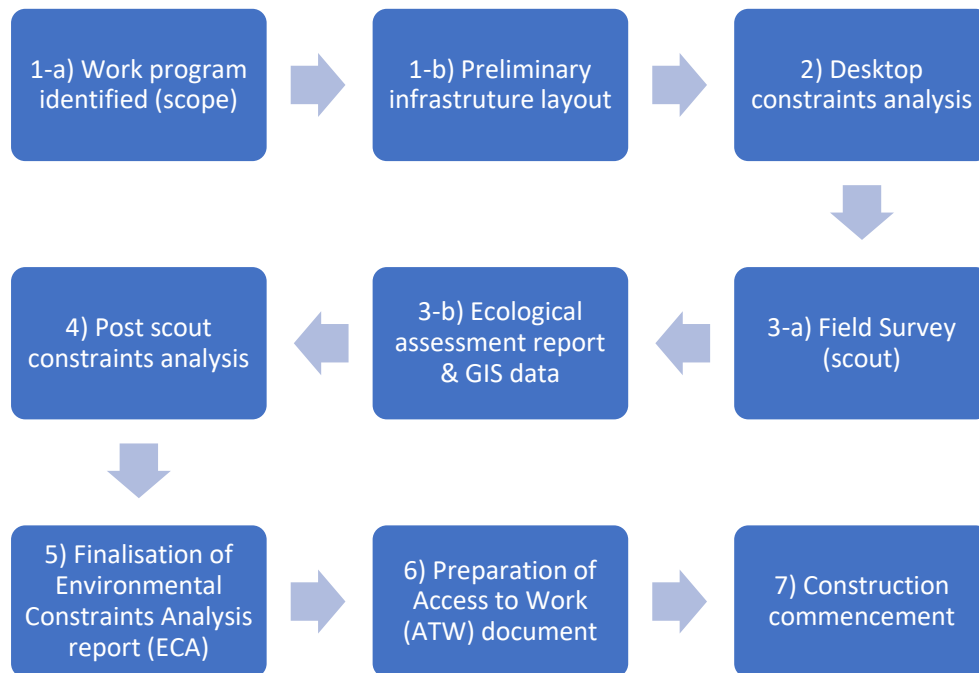


Figure 2 Key steps in the Protocol

#### 3.1 Work Program Identified & Preliminary Infrastructure Layout

Following subsurface technical analysis of the development area, a nominal well spacing will be generated and a preliminary infrastructure layout, comprising proposed CSG wells, linear infrastructure corridors and other supporting infrastructure will be created. The proposed infrastructure layout is typically defined on a per property basis and tagged with a unique workpack identifier. A broader work program is made up of multiple workpacks. The subsequent steps below will be focused and applied on either an individual workpack or broader work program basis, dependent on the specific development being proposed.

#### 3.2 Desktop Constraints Analysis

Post development of a work program, a desktop constraints analysis will be completed. This analysis involves review of available GIS mapping and constraint layers relating to the proposed infrastructure location(s). The GIS mapping layers generally comprise publicly available State and Federal Government data supplemented by site-specific GIS data gathered during survey activities.

The desktop constraints analysis involves:

- Identifying the appropriate external approvals and regulatory permits that the activities must be assessed against;
- Assessing the preliminary well locations and linear infrastructure designs against mapped constraints in the GIS, high resolution aerial imagery and the Protocol; and
- Refining well locations and linear infrastructure corridors to ensure compliance with the Protocol and minimise impacts on known constraints, including mapped MSES and MNES.

To ensure rigorous assessment of all applicable values, the desktop constraints analysis will update spatial constraints data based on the latest available ecology survey findings. The result of the desktop constraints analysis is the production of environmental constraints maps for internal review. These maps include a constraint category map.

Proposed infrastructure will be assessed against the constraints categories to ensure compliance with Table 1 (constraint categories) and Table 3 (total disturbance limits).

Depending on the specific nature of any environmental or other constraint(s) identified during the desktop assessment, the proposed infrastructure location will be revised and the new location selected or design revised to avoid or minimise the impacts on the constraining environmental values. When refining well locations and linear infrastructure, the constraints categories in Table 1 before the consideration of other design requirements.

A preliminary infrastructure layout will be used for the planning of the field surveys outlined in Section 3.3.

The infrastructure design versions, constraints maps and associated notes are retained on file for quality assurance purposes.

### **3.3 Field Surveys (Scouting)**

Once a preferred infrastructure location is defined through the desktop constraints analysis, field surveys are undertaken to confirm the suitability of the location and identify any additional constraints not originally known during the desktop constraints analysis phase. A scouting area will extend a minimum of 30 m beyond the Project infrastructure footprint.

This includes, in general chronological order:

1. Discussions with landholders to identify on-ground constraints (e.g. stock routes) and to confirm preferred location(s)
2. Survey of infrastructure locations by engineering staff to confirm constructability.
3. Environmental surveys of infrastructure locations to ground-truth mapped constraints including protected vegetation, fauna habitat, watercourses, prescribed environmental matters, invasive weeds, areas of regional interest etc.
4. Cultural heritage clearance of infrastructure locations.

As part of the Field Survey phase an on-ground environmental survey by a suitably qualified ecologist is undertaken. This survey is often referred to as a pre-clearance environmental or ecology survey. The pre-clearance survey includes ecological ground-truthing to confirm the likelihood of habitat for threatened fauna, the likelihood of occurrence of threatened flora and fauna, regional ecosystems and ecological communities, prescribed environmental matters, and validation of mapped watercourses. The Ecological Assessment Methodology presented in Appendix B outlines the pre-clearance ecological survey methods.

The ecology survey results are documented in a scope specific ecology report. The pre-clearance survey will be undertaken not more than 12 months prior to clearing activities commence.

Should site surveys identify constraints or constraint boundaries different from the desktop environmental constraints analysis, infrastructure locations in habitat (except for Koala dispersal habitat) will be modified or revised, returning to Step 2 (Section 3.2). The revision of vegetation communities and habitat mapping used in this protocol is described below.

### **3.4 Post-Survey Environmental Constraints Analysis**

The results of the field surveys are used to further refine the proposed infrastructure locations. The ecology survey results including the spatial ecology GIS data is used to:

- Update the constraints category mapping, if required;
- Confirm any disturbance exclusion or “no-go” areas;
- Within high constraint areas, identify individual habitat areas to be avoided, using the prioritisation hierarchy outlined in Section 3.2;
- Within low and high constraint areas preferentially avoid habitat features using the following priority:



- Hollow-bearing trees and large hollow logs
- Koala food trees
- Mistletoe
- Gilgai
- Termite mounds and raptor nests
- Other habitat such as decorticating bark and rock piles.
- Determine whether any secondary approvals (e.g. protected plant clearing permits) need to be secured prior to commencing construction activities; and
- Determine other construction-related environmental requirements and controls such as watercourse crossing design requirements or requirements for on ground spotter/catcher during first disturbance works.

Where there are significant changes to the proposed infrastructure layout additional site surveys may need to be undertaken for the updated infrastructure areas.

Key environmental restrictions for infrastructure siting or construction activities arising from the environmental surveys and desktop constraints analysis feed into the Senex Access to Work documentation which is strictly complied with during construction.

### **3.5 Environmental Constraints Analysis Report**

Upon finalisation of the infrastructure layout, a formal Environmental Constraints Analysis (ECA) Report is prepared documenting:

- That infrastructure siting complies with relevant environmental approval conditions including planning considerations and any disturbance/clearing limits;
- That infrastructure siting complies with requirements of relevant regulations and secondary approvals;
- The extent of disturbance and any impacts on MSES and MNES and that the relevant approval allows for the proposed extent of disturbance; and
- Site-specific or construction-related environmental considerations and controls.

The report includes a list of Site-specific Environmental Conditions and associated maps that are included in the final Access to Work documentation, issued upon sign-off by the Project Manager to relevant staff and contractors prior to commencing construction.

The location of habitat features within the ECA Report will be used by the spotter/catcher in advance of any clearing activities for the infrastructure. Fauna finds during this phase will be reported to the Senex Supervisor.

The ECA Report is used to demonstrate compliance with relevant regulations, as part of the overarching Senex Environmental Compliance Management System.

The ECA Report, together with GIS layers, field survey information and ecological assessment reports will demonstrate compliance with this Protocol.

## 4 Delivery

Key deliverables, timing and roles and responsibilities are detailed in Table 4 below.

Table 4 – Deliverables, roles and responsibilities

Step	Deliverable	Timing (estimate)	Role
1. Desktop constraints analysis	Constraints mapping and completed checklist.	2 weeks	Senex Environmental Adviser
2. Field surveys - environmental	Ecology Survey Report (or similar for other environmental considerations.	0-12 weeks (from completion of landholder discussions and constructability surveys)	Undertaken by Senex and/ or third-party ecologist (suitably qualified ecologist)
3. Post-survey environmental constraints analysis	Key environmental restrictions included in preliminary Environmental Constraints Analysis Report.	2 weeks	Senex Environmental Advisor
4. Environmental constraints reporting	Environmental Constraints Report. Site-specific Environmental Conditions and associated maps for inclusion into final Access to Work documentation.	2 weeks	Senex Environmental Advisor and approved by the Environment Manager

## 5 References

BOOBOOK Ecological Consulting (2022) Broadscale Ecological Assessment Report. Senex Atlas 3 Gasfield Project – Survey of Terrestrial Ecological Values.

ERM (2023a) Senex Atlas Stage 3 Project Significant Species Management Plan.

ERM (2023b) Atlas Stage 3 Gas Project Terrestrial and Aquatic Ecology Assessment Report.

Freshwater Ecology Pty Ltd (2022) Aquatic Ecology Assessment. Senex – Atlas Stage 3 Gas Project.

Klohn Crippen Berger (KCB) (2023) Atlas Stage 3 Gas Project Chemical Risk Assessment Report.

Senex (2023) Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLAS-EN-PLN-015]

# Appendix A – Species Habitat Descriptions and Mapping Rules

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**APPENDIX A**

**HABITAT DESCRIPTIONS**

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
<b>Threatened Ecological Communities</b>					
Brigalow ( <i>Acacia harpophylla</i> dominant and codominant)	E	-	<p>This community occurs within Queensland and New South Wales and is characterised by <i>Acacia harpophylla</i> being either dominant in the tree layer, or co-dominant with other species – notably <i>Casuarina cristata</i>, other species of <i>Acacia</i>, or species of <i>Eucalyptus</i> (Butler 2007, cited in DCCEEW 2023a).</p> <p>In Queensland, Brigalow TEC is identified by 16 REs, 12 of which are present in the Queensland Brigalow Belt Bioregion:</p> <ul style="list-style-type: none"> <li>• RE 11.3.1;</li> <li>• RE 11.4.3;</li> <li>• RE 11.4.7;</li> <li>• RE 11.4.8;</li> <li>• RE 11.4.9;</li> <li>• RE 11.4.10;</li> <li>• RE 11.5.16;</li> <li>• RE 11.9.1;</li> <li>• RE 11.9.5;</li> <li>• RE 11.9.6;</li> <li>• RE 11.11.14; and</li> <li>• 11.12.21</li> </ul>	<p>The Conservation Advice for Brigalow TEC includes some vegetation considered to be non-remnant within Queensland state classifications, specifically brigalow regrowth more than 15 years old, however these areas must be of good condition (less than 50% perennial weeds) to be considered part of the EPBC Act listed TEC.</p> <p>As per the conservation advice (DoE, 2013), patch must include the following key diagnostic characteristics to be considered the Brigalow TEC, and therefore habitat definition rules include:</p> <ul style="list-style-type: none"> <li>• The presence of <i>Acacia harpophylla</i> as one of the most abundant tree species in the patch, either dominant in the tree layer or co-dominant with other species (<i>Casuarina cristata</i>) or other species of <i>Acacia</i> or <i>Eucalyptus</i>); AND</li> <li>• The patch is one of the following QLD bioregions and it meets the description of at least one of the 16 QLD REs determined at the time of the national listing of the TEC, with the QLD Brigalow Belt Bioregion REs including 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 and RE 11.12.21.</li> </ul> <p>A patch must meet the following condition thresholds to be considered Brigalow ecological community:</p>	<p>REs identified within the Project Area are 11.3.1, 11.9.5 and 11.9.5a that meet the condition thresholds as defined in the Approved Conservation Advice for the Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) ecological community (DoE 2013).</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				<ul style="list-style-type: none"> <li>The patch must be 0.5 ha or more in size; AND</li> <li>Exotic perennial plants comprise less than 50% of the total vegetation cover of the patch, as assessed over a minimum sample area of 0.5 ha (100 m by 50 m).</li> </ul> <p>It should be noted that patches that are interconnected with other native vegetation associations have additional conservational value.</p>	
Poplar Box Grassy Woodland on Alluvial Plains	E	-	<p>This community is typically a grassy woodland with a canopy dominated by <i>Eucalyptus populnea</i> and understorey mostly of grasses and other herbs, mostly occurring in gently undulating to flat landscapes and occasionally on gentle slopes on a wide range of soil types of alluvial and depositional origin (Webb et al. 1980).</p> <p>In Queensland Poplar Box Grassy Woodland TEC is identified by five REs:</p> <ul style="list-style-type: none"> <li>11.3.2</li> <li>11.3.17</li> <li>11.4.7</li> <li>11.4.12</li> <li>12.3.10</li> </ul>	<p>Key diagnostic criteria required for areas to be considered Poplar Box TEC as defined under the Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains (DEE 2019) identifies four recognised quality categories that are assessed for determination whether a patch meets the TEC definition:</p> <ul style="list-style-type: none"> <li><b>Minimum patch size of 1ha</b> if <math>\geq 90\%</math> of perennial vegetation cover in the ground layer is native and <math>\geq 30</math> native plant species per patch in the ground layer</li> <li><b>Minimum patch size of 5 ha</b> if <math>\geq 70\%</math> of perennial vegetation cover in the ground layer is native AND <math>\geq 30</math> native plant spp. per patch in the ground layer</li> <li><b>Minimum patch size of 5 ha</b> if <math>\geq 50\%</math> of perennial vegetation cover in</li> </ul>	Only RE 11.3.2 was identified within the Project Area and these areas meet the required key diagnostic criteria to be considered Poplar Box Grassy Woodland TEC.



Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				<p>ground layer is native, and either <math>\geq 20</math> perennial native plant species per patch in the ground layer OR <math>\geq 10</math> mature trees per ha with <math>\geq 30</math>cm diameter-at-breast height</p> <ul style="list-style-type: none"> <li><b>Minimum patch size of 5ha</b> if <math>&lt; 50\%</math> of perennial vegetation cover in ground layer** is native, then the patch must have: <math>\geq 20</math> native plant spp. per patch in the ground layer AND <math>\geq 10</math> mature trees+ per ha with <math>\geq 30</math>cm dbh AND smaller trees+, saplings or seedlings suggestive of periodic recruitment.</li> </ul>	
<b>Threatened Flora</b>					
Austral Toadflax ( <i>Thesium australe</i> )	V	V	A semi-parasitic species that attaches to the roots of a range of grass species, particularly Kangaroo Grass ( <i>Themeda triandra</i> ). The species occurs in open grassy heath dominated by Swamp Myrtle ( <i>Leptospermum myrtifolium</i> ), Small-fruit Hakea ( <i>Hakea microcarpa</i> ), Alpine Bottlebrush ( <i>Callistemon sieberi</i> ), Woolly Grevillea ( <i>Grevillea lanigera</i> ), Coral Heath ( <i>Epacris microphylla</i> ) and <i>Poa</i> spp. (Griffith 1991); Kangaroo Grass grassland surrounded by <i>Eucalyptus</i> woodland; and grassland dominated by Barbed-wire Grass ( <i>Cymbopogon refractus</i> ) (Leigh et al. 1984; Hunter et al. 1999).	-	This species is considered unlikely to occur within the Project Area due to the absence of suitable grassland and heath habitats. Additionally, no records of this species occur in the Project Area or adjoining areas.
Belson's Panic ( <i>Homopholis belsonii</i> )	V	E	It occurs on rocky hills supporting White Box ( <i>Eucalyptus albens</i> ) and in Wilga ( <i>Geijera parviflora</i> ) woodland; flat to gently	General habitat comprises all remnant and regrowth of nominated RE. The species occurs in Poplar Box and Brigalow dominated woodlands (Boobook 2022).	There are limited areas of potential habitat for this species in the form isolated patches of Poplar Box, Belah and Brigalow woodlands or open forests present within the Project Area.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			undulating alluvial areas supporting Belah ( <i>Casuarina cristata</i> ) forest; and soils and plant communities of Poplar Box ( <i>E. populnea</i> ) woodlands. It may also be associated with shadier areas of Brigalow ( <i>Acacia harpophylla</i> ), Myall ( <i>A. melvillei</i> ), and Weeping Myall ( <i>A. pendula</i> ) communities; in Mountain Coolibah ( <i>E. orgadophila</i> ) communities; and on roadsides. Infrequently found in areas which receive irregular or intermittent flooding, and more commonly found at elevations of 342–500 m in Queensland and 200–520 m in NSW.	<p>Belson’s Panic is commonly associated with the REs 11.3.2, 11.3.17, 11.9.5, 11.9.5a 11.9.7 and 11.9.10.</p> <p>Dry woodland habitats on poor soils, including:</p> <ul style="list-style-type: none"> <li>Rocky, basaltic hills supporting <i>Eucalyptus albens</i> and/or <i>Geijera parviflora</i> woodland with assorted shrubs and grasses;</li> <li>Flat to gently undulating alluvial areas supporting <i>Casuarina cristata</i> forest and <i>Acacia harpophylla</i> or <i>G. parviflora</i> (may be subject to intermittent inundation); and</li> <li>Drainage lines supporting <i>C. cristata</i> and sandy country dominated by Cypress Pine-Bloodwood-Ironbark-She-Oak Forest.</li> <li>The distribution of this species overlaps with the EPBC Act-listed TEC Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant).</li> </ul>	
Bluegrass ( <i>Dichanthium setosum</i> )	V	-	Associated with heavy basaltic black soils and red-brown loams with clay subsoils. Often found in moderately disturbed areas. Threats relate to heavy grazing, clearing for pasture improvement and cropping, fire, introduced grasses and road widening. Associated species include White Box ( <i>Eucalyptus albens</i> ), Silver-leaved Ironbark ( <i>E.</i>	-	This species is considered unlikely to occur within the Project Area due to the absence of basalt derived soils and associated species. Additionally, no records of this species occur in the Project Area or adjoining areas.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<i>melanophloia</i> ), Yellow Box ( <i>E. melliodora</i> ), Manna Gum ( <i>E. viminalis</i> ), Amulla ( <i>Myoporum debile</i> ), Purple Wiregrass ( <i>Aristida ramosa</i> ), Kangaroo Grass ( <i>Themeda triandra</i> ), Fine-leaved Tussock-grass ( <i>Poa sieberiana</i> ), Red-leg Grass ( <i>Bothriochloa ambigua</i> ), Pitted Blue-grass ( <i>Bothriochloa decipiens</i> ), <i>Macrozamia stenomera</i> , Small Woolly Burr-medic ( <i>Medicago minima</i> ), Scaly Buttons ( <i>Leptorhynchos squamatus</i> ), <i>Lomandra aff. longifolia</i> , Australian Bugle ( <i>Ajuga australis</i> ), Bogan-flea ( <i>Calotis hispidula</i> ) and <i>Austrodanthonia</i> spp., <i>Dichopogon</i> spp., <i>Brachyscome</i> spp., <i>Vittadinia</i> spp., <i>Wahlenbergia</i> spp. and <i>Psoralea</i> spp.		
Curly-bark Wattle ( <i>Acacia curranii</i> )	V	V	This species is found in dry sclerophyll forests of heath associated with rock pavements. It is commonly found growing on toeslopes and north-facing crests of hills and ranges. They occur on mainly stony soils with an extensive bedrock crop, where they can also be found on sandstone forming red sandy soils.  At Gurulmundi State Forest it occurs in scattered thickets of diverse heath scrub with emergent trees growing in red sandy soils on a deeply weathered and indurated (ironstone) sandstone plateau (DES 2022a).	-	This species is considered unlikely to occur due to the absence of suitable habitat (heath associated with rock pavements on land zone 7) within the Project Area. The nearest confirmed population is approximately 15 km south-southeast of the Project Area near the southern boundary of Gurulmundi State Forest (DES 2022b).
Gurulmundi Fringe-myrtle ( <i>Calytrix gurulmundensis</i> )	V	V	This species is recorded as having an area of occurrence in open shrubland with sparse stunted <i>Eucalypt</i> , <i>Causarina</i> and <i>Acacia</i> spp., Often they are also found in <i>Triodia</i> hummock grasslands with shallow red gravelly soil and on sandstones.	-	This species is considered unlikely to occur due to suitable habitat being absent from the Project Area, despite it being present further south in areas of very different habitat types There is no suitable habitat (heath associated with skeletal soils and rock pavements on land zone 7) within the Project Area. This habitat type and the

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			This species occurs in heathy scrub and shrubby woodland communities, growing on skeletal soils overlying indurated rock pavements on plateau summits.		species are abundant in Gurulmundi State Forest to the south, including twenty-six (26) specimen records within 10 km of the Project Area (DES 2022b).
Hairy Joint Grass ( <i>Arthraxon hispidus</i> )	V	V	Growing in or on the edges of rainforest and in wet Eucalypt forest, often near creeks or swamps (DEWHA 2008). It has been recorded from many locations in north-eastern NSW and southeast Queensland.  There is a lack of suitable rainforest and wet eucalypt forest habitat present within the Project Area.	-	This species is considered unlikely to occur due to suitable habitat being absent from the Project Area. There is an absence of suitable rainforest and wet Eucalypt forest habitat, as well as spring-fed wetlands in the Project Area. Additionally, there are no recent records of this species within the Project Area or in adjoining areas.
Ooline ( <i>Cadellia pentastylis</i> )	V	V	Ooline grows in semi-evergreen vine thickets (SEVT) and sclerophyll vegetation on undulating terrain of various geology, including sandstone, conglomerate and claystone. The species forms a closed or open canopy, as a dominant or commonly with White Box ( <i>Eucalyptus albens</i> ) and White Cypress Pine ( <i>Callitris glaucophylla</i> ), with an open understorey and leaf litter dominating the forest floor. It also occurs in Brigalow, Belah, Poplar Box and Bendee ( <i>Acacia catenulata</i> ) communities.	Ooline typically grows on sandstone, claystone and conglomerate areas in altitudes between 300m and 460m above sea level, with some known to occur at 600 m above sea level.  At state level (QLD) Ooline essential habitat comprises all remnant and regrowth of nominated RE within the Southern Downs bioregion (including the Project Area). More specifically, essential habitat can be mapped in the following REs: <ul style="list-style-type: none"> <li>RE 11.9.4;</li> <li>RE 11.9.5; and</li> <li>RE 11.9.5a.</li> </ul> General habitat comprises remnant and regrowth of nominated RE and adjacent non-remnant areas of nominated preclear RE,	This species is present in the far south-eastern corner of the Project Area (South of Gilgilgul Road). It was observed as retained isolated trees and clumps or in remnant Brigalow woodlands. Ecological surveys in this area identified 35 plants. This species is locally abundant in Brigalow woodland around the plateau in the south-eastern corner of the Project Area. It was observed as isolated trees and clumps or as a common tree in Brigalow woodland in Gurulmundi State Forest, Stones Country Resource Reserve and adjacent properties. Thirty-five (35) specimen records occur within the Project Area and another six (6) records occurred within the 10 km desktop search area (DES 2022b). Based on field surveys, the area of known Ooline occurrence is restricted to a limited portion of the Project Area in the south-east corner, within Brigalow woodlands and adjacent cleared exotic pasture areas as isolated trees. In the Project Area, Ooline occurs in areas of Brigalow woodland and adjacent cleared exotic grassland in the south-east corner.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				<p>within Southern Downs bioregion (Boobook 2022).</p> <p>General habitat for Ooline is typically associated with the following REs: 11.3.1, 11.3.2, 11.3.17, 11.3.25, 11.5.1, 11.9.2, 11.9.7, 11.9.10, 11.10.7, 11.10.11 and non-remnant preclear REs 11.9.5/11.5.5 (80/20), 11.9.10/11.5.5 (60/40).</p> <p>It grows on undulating plains, valley slopes, hillsides and scarps, often in association with Brigalow and SEVT communities (DAWE 2023; DES 2022a) usually on upper or mid-slopes.</p> <p>Semi-evergreen vine thicket, Brigalow, Belah, Poplar Box and Bendee communities. The distribution of this species overlaps with the following EPBC Act-listed TECs:</p> <ul style="list-style-type: none"> <li>• Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions,</li> <li>• Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant), and</li> <li>• White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.</li> </ul>	
Slender Tylophora ( <i>Vincetoxicum forsteri</i> )	E	E	<p><i>Vincetoxicum forsteri</i> has rarely been collected and is known to be present within eight localities in the Dubbo area and Mt Crow, near Barraba in NSW, and "Myall Park" near Glenmorgan in Queensland. Conservation of this species occurs within Goobang National Park, Eura State Forest, Goonoo SF, Pilliga West SF and Coolbaggie</p>	<p>Slender Tylophora can be mapped in open eucalypt forests and woodlands containing <i>Melaleuca uncinata</i>, <i>Eucalyptus fibrosa</i>, <i>E. sideroxylon</i>, <i>E. albens</i>, <i>Callitris endlicheri</i>, <i>C. glaucophylla</i>, <i>Allocasuarina luehmannii</i>, <i>Acacia hakeoides</i>, <i>A. lineata</i>, <i>Myoporum spp.</i>, and/or <i>Casuarina spp.</i></p>	<p>Suitable habitat (dry eucalypt woodland) exists as several small fragments through the Project Area and a larger area in the southeast corner. Suitable habitat includes areas of dry eucalypt woodland, with riparian and wetland eucalypt communities considered unsuitable for this species.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<p>Nature Reserve. <i>Vincetoxicum forsteri</i> inhabits dry scrub, open forest and woodlands associated with <i>Melaleuca uncinata</i>, <i>Eucalyptus fibrosa</i>, <i>E. sideroxylon</i>, <i>E. albens</i>, <i>Callitris endlicheri</i>, <i>C. glaucophylla</i>, <i>Allocasuarina luehmannii</i>, <i>Acacia hakeoides</i>, <i>A. lineata</i>, <i>Myoporum</i> spp., and <i>Casuarina</i> spp. (OEH 2002; Forster et al. 2004).</p> <p>The distribution of this species overlaps with the following EPBC Act-listed TECs:</p> <ul style="list-style-type: none"> <li>• Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant), and</li> </ul> <p>White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.</p>	<p>At state level, general habitat comprises all remnant and regrowth of nominated RE. The species occurs in shrubby dry sclerophyll woodland and forest (Boobook 2022). Slender Tylophora is typically associated with the following REs:</p> <ul style="list-style-type: none"> <li>• RE 11.5.1;</li> <li>• RE 11.5.5; and</li> <li>• RE 11.10.7</li> </ul>	
Winged Pepper-cress ( <i>Lepidium monoplacoides</i> )	E	-	<p>This species grows in open woodland dominated by <i>Allocasuarina luehmannii</i> and/or other eucalypt species, particularly <i>E. largiflorens</i> and <i>E. populnea</i>. The species grows in riparian open forest dominated by <i>Eucalyptus camaldulensis</i> and <i>Casuarina cunninghamiana</i> with a variably dense shrubby understorey of <i>Hymenanthera dentata</i>, <i>Bursaria spinosa</i>, <i>Acacia fimbriata</i>, <i>A. floribunda</i>, <i>Callistemon viminalis</i> and <i>Leptospermum brachyandrum</i>. This species is most abundant in Tussock grasslands fringing riparian open forests.</p> <p>There is a lack of potential habitat in preferred <i>Eucalyptus camaldulensis</i> riparian areas within the Project Area.</p> <p>Areas of known populations of this species are in the Murray-Darling basin on floodplains and other periodically</p>	-	<p>This species is considered unlikely to occur due to suitable habitat being absent from the Project Area. Additionally, there are no recent records of this species within the Project Area or in adjoining areas. the Project Area is far outside the known range of this species.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			waterlogged areas with heavy clay soils (Mavromihalis 2010). The species has a wide distribution through inland NSW and Victoria. The sole records from Queensland are from the Yelarbon area (ALA 2022).		
<i>Xerothamnella herbacea</i>	E	E	<p><i>Xerothamnella herbacea</i> is known from two sites north-east of Chinchilla, a single record from near Theodore and a record near Yelarbon east of Goondiwindi, Queensland. This species occurs within the Condamine, Border Rivers Maranoa–Balonne and Fitzroy (Queensland) Natural Resource Management Regions.</p> <p><i>Xerothamnella herbacea</i> occurs in Brigalow (<i>Acacia harpophylla</i>) dominated communities in shaded situations, often in leaf litter and is associated with gilgais (shallow ground depressions). Soils are heavy, grey to dark brown clays (DEWHA, 2008).</p>	-	This species is considered unlikely to occur due to the lack of recent records of this species within the Project Area or in adjoining areas and no observations were made during field surveys. There are no known occurrences within 50 km of the Project Area. The closest specimen records occur northeast of Chinchilla and in the Arcadia Valley at Lonesome Holding, approximately 85 km east-southeast and 142 km northwest of the Project Area, respectively (ALA 2022).
<b>Threatened and/or Migratory Birds</b>					
Australian Painted Snipe ( <i>Rostratula australis</i> )	E	E	The Australian painted snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. The Australian painted snipe can use modified habitats, such as low-lying woodlands converted to grazing pasture, sewage farms, dams, bores and irrigation schemes, however they do not necessarily breed in such habitats (DAWE 2023).	Australian Painted Snipe inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum <i>Muehlenbeckia</i> or cane grass or sometimes tea-tree ( <i>Melaleuca</i> ). The Australian Painted Snipe sometimes utilises areas that are lined with	Small areas of foraging habitat present within small ephemeral wetlands on drainage lines. These may provide temporary refuge for the species and support occasional transient visitors to the Project Area, when water is present.



Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				<p>trees, or that have some scattered fallen or washed-up timber.</p> <p>Wetland areas with dense low vegetation, muddy banks and shallow water are favourable habitat to the species (Boobook 2022).</p> <p>General habitat is typically associated with wetland REs, including RE 11.3.27f, any mapped wetland areas in other REs and non-remnant vegetation.</p> <p>Australian Painted Snipe requires suitable wetland areas, even in drought conditions. The species loafs on the ground under clumps of lignum, tea-tree and dense brushes.</p> <p><b>Breeding habitat:</b> Shallow wetlands with bare mud and both upper parts of the understorey (i.e., shrubs and tall grasses) and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands. Nests can also occur in and near swamps, cane grass swamps, flooded areas including samphire, grazing land, among cumbungi, sedges, grasses, saltwater couch, saltbush and grass, in ground cover of water-buttons and grasses, at the base of tussocks, and under low saltbush.</p> <p><b>Foraging habitat:</b> Terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They have also been observed in inundated grasslands as well as dams and</p>	

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				bore drains. The species may forage under clumps of tea-trees. <b>Temporary foraging and dispersal habitat:</b> Shallow, ephemeral water bodies, including gilgai.	
Brown Treecreeper (south-eastern) ( <i>Climacteris picumnus victoriae</i> )	V	V	<p>Brown Treecreepers (south-eastern) inhabit open dry eucalypt forest and woodlands, mainly areas that are dominated by stringybarks or other rough-barked eucalypt species. The understorey is usually open and grassy, sometimes with few shrubs. They can also occur in open forest, woodlands and mallee that is subject to periodic inundation. This species is usually absent from areas with a dense shrubby understorey and heavily degraded woodland areas.</p> <p>According to the species' conservation advice (DCCEEW 2023b), habitat critical to the survival of the brown treecreeper (south-eastern) includes areas that have:</p> <ul style="list-style-type: none"> <li>• Relatively undisturbed grassy woodland with native understorey. <ul style="list-style-type: none"> <li>○ Habitat structure should be quite open at ground level so that birds are able to feed on or near the ground and maintain vigilance against predators.</li> <li>○ The required degree of openness is mostly likely to be created by moderate levels of disturbance by fire and/or grazing.</li> </ul> </li> </ul>	<p>General habitat may comprise of Callitris and Eucalypt woodlands; Eucalypt open forest, Eucalypt woodlands. Optimal habitat mapped will include areas of general habitat with ongoing disturbance regimes (i.e., historically Indigenous burning practices) to keep the ground layer from becoming too dense and uniform. Habitat critical to the survival of the species is mapped as:</p> <ul style="list-style-type: none"> <li>• Relatively undisturbed grassy woodland with native understorey.</li> <li>• Large living and dead trees which are essential for roosting and nesting sites and for foraging;</li> <li>• Fallen timber which provides essential foraging habitat and;</li> <li>• Hollows in standing dead or live trees and tree stumps are also essential for nesting.</li> </ul> <p>Brown Treecreeper (south-eastern) habitat is typically associated with REs 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.3.39, 11.5.1, 11.5.5, 11.9.2, 11.9.7, 11.9.10, 11.10.7 and/or 11.10.11.</p>	Patches of suitable <i>Callitris</i> / <i>Eucalyptus</i> woodlands exist along the Eastern boundary of the Project Area, just North and South of Jackson-Wandoan Road. Additionally open Eucalypt forest occurs along the Gurulmundi Road near the Southern boundary of the project area. Small patches of open Eucalypt forest exist both north and south of Weldons Road.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<ul style="list-style-type: none"> <li>Large living and dead trees which are essential for roosting and nesting sites and for foraging;</li> <li>Fallen timber which provides essential foraging habitat; and</li> <li>Hollows in standing dead or live trees and tree stumps are also essential for nesting.</li> </ul>	<p><b>Breeding and roosting habitat:</b> Nesting and roosting occurs in naturally occurring tree cavities in eucalypt species of open dry eucalypt forests or woodlands. Hollows in standing dead or live tree stumps are essential for nesting.</p> <p><b>Foraging habitat:</b> Eucalypt forests and woodlands with an open, grassy understorey. Areas with fallen timber provide greater foraging opportunities. The species forages on the ground and in mature live and dead trees.</p>	
Curlew Sandpiper ( <i>Calidris ferruginea</i> )	CE, Mi, Ma	CE	<p>This species is 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 occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters.</p> <p><b>Breeding habitat:</b> This species does not breed in Australia.</p> <p><b>Foraging habitat:</b> This species forages within mudflats and nearby shallow waters. The species wades in water 15 – 30 mm deep (60 mm deep maximum) in non-tidal areas. In intertidal areas, the species forages at the edge of shallow pools and drains and along sandy shores. Potential foraging habitat exists in the Project Area in the form of dams.</p> <p><b>Roosting habitat:</b> this species roost around intertidal mudflats, in open situations with damp substrate, especially on bare shingle, shell or sand beaches, sandspits and islets in</p>	-	This species is considered unlikely to occur within the Project Area due to wetland habitat being not preferred habitat and unlikely to attract the species. Additionally, no records of this species occur in the broader landscape.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<p>or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh. Species roosts in both fresh and brackish waters.</p> <p>Wetland habitat within the Project Area comprises small ephemeral vegetated swamps and billabongs associated with meandering drainage lines which are unlikely to attract this species.</p>		
Diamond Firetail ( <i>Stagonopleura guttata</i> )	V	V	<p>Found in grassy Eucalypt, Acacia or Casuarina woodlands, including Box-Gum Woodlands and Snow Gum <i>Eucalyptus pauciflora</i> Woodlands, and other lightly timbered habitats including farmland and grassland with scattered trees. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.</p> <p>The species prefers areas with relatively low tree density, few large logs and little litter cover, but high grass cover.</p> <p>According to the species' conservation advice (DCCEEW 2023c), habitat critical to the survival of the diamond firetail includes areas of:</p> <ul style="list-style-type: none"> <li>Eucalypt, Acacia or Casuarina woodlands, open forests and other lightly timbered habitats;</li> </ul>	<p>Habitat mapping for the species consists of <i>Eucalyptus</i>, <i>Acacia</i> or <i>Casuarina</i> woodlands and open forests, lightly timbered habitats including farmland and grassland with scattered trees.</p> <p>Optimal habitat for the Diamond Firetail are comprised of relatively low tree density, few large logs and little leaf cover, but with high grass cover.</p> <p>Habitat for the Diamond Firetail is typically associated with REs 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a 11.9.7, 11.9.10, 11.10.7 and / or 11.10.11.</p> <p><b>Breeding habitat:</b> Nests are globular structures built either in prickly shrubby understorey, or higher up in associated woodlands or open forests, especially under bird of prey nests.</p> <p><b>Roosting habitat:</b> Birds roost in dense shrubs of woodlands or open forests, or in smaller nests built especially for roosting. Regrowth</p>	<p>Suitable habitat includes any <i>Eucalyptus</i> and <i>Acacia</i> woodlands and forests throughout the Project Area including Eucalyptus and Acacia regrowth areas and lightly timbered areas containing paddock trees, only where there is high grass cover or dense shrub cover. The presence of isolated paddock trees in areas of cleared, managed or low grass and shrub cover are unlikely to provide habitat for Diamond Firetail.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<ul style="list-style-type: none"> <li>Low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding; and</li> <li>Drooping she-oak (<i>Allocasuarina verticillata</i>) within the Mt Lofty Ranges.</li> </ul>	<p>areas with wooded vegetation are to be mapped as roosting habitat.</p> <p><b>Foraging habitat:</b> Forages in grassy understorey of Eucalypt, Acacia or Casuarina woodlands and open forest. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season).</p>	
South-eastern Glossy Black-cockatoo ( <i>Calyptorhynchus lathami lathami</i> )	V	V	<p>The Glossy Black-cockatoo are uncommon but widespread. They can be found from Mitchell, Queensland, through eastern New South Wales to East Gippsland, Victoria. This species occupies areas of Eucalypt and she-oak woodlands and are limited to areas that support sufficient she-oak foraging habitat as well as large tree hollows for nesting.</p> <p>The glossy black cockatoo feed almost exclusively on the seeds of she-oaks (<i>Allocasuarina</i> spp. and <i>Casuarina</i> spp.), including:</p> <ul style="list-style-type: none"> <li><i>A. littoralis</i>,</li> <li><i>A. torulosa</i>,</li> <li><i>A. inophloia</i>,</li> <li><i>A. diminuta</i>,</li> <li><i>A. gymnanathera</i>,</li> <li><i>A. verticillata</i>,</li> <li><i>A. luehmannii</i>,</li> <li><i>C. equisetifolia</i>,</li> <li><i>C. cunninghamiana</i>,</li> </ul>	<p>General habitat comprises remnant eucalypt dominated RE that typically include large hollow bearing trees along with remnant and regrowth RE with potential feed trees (<i>Casuarinaceae</i> spp.) (Boobook 2022).</p> <p>Remnant and regrowth habitat for the South-eastern Glossy Black-cockatoo typically consists of REs 11.3.1, 11.3.17, 11.3.19, 11.3.39, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a, 11.9.10, 11.10.7 and / or 11.10.11.</p> <p>Remnant only habitat is typically associated with REs 11.3.2, 11.3.4, 11.3.25, 11.3.27f and / or 11.9.7 as these vegetation communities more commonly form breeding hollows of a suitable size to be utilised by South-eastern Glossy Black-cockatoo. <b>Breeding habitat:</b> Eucalypt woodlands containing large hollows in either living or dead trees. The species is known to nest in <i>Eucalyptus crebra</i>, <i>E. nubile</i>, <i>E. blakelyi</i>, and <i>E. camaldulensis</i>, but may nest in other species.</p> <p>Potential nest hollows for the subspecies have the following traits (Cameron 2006):</p> <ul style="list-style-type: none"> <li>&gt;8 m above ground;</li> </ul>	<p>Potential foraging and breeding habitat exists in the northern, central and southern portions of the Project Area, in the form of Eucalypt woodland and Belah (She-oak) woodland, including Eucalyptus and Acacia regrowth areas and paddock trees (if paddock trees are <i>Allocasuarina</i> spp. and <i>Casuarina</i> spp.). Additionally, some scattered patches exist within the central portion of the Project Area.</p> <p>Potential nest trees occur in remnant eucalypt woodland and forest and in well-developed riparian corridors across the Project Area. Evidence of feeding in the form of chewed <i>Casuarina</i> cones should also be considered evidence of foraging behaviour.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<ul style="list-style-type: none"> <li>• <i>C. glauca</i>, and</li> <li>• <i>C. cristata</i>.</li> </ul> <p>Their reliance on particular species varies between regions and they can show preference for certain trees within a species (DCCEEW 2022a).</p>	<ul style="list-style-type: none"> <li>• Located in branches &gt;30 cm in diameter;</li> <li>• Branch or stem no more than 45° from vertical; and</li> <li>• Minimum entrance diameter of &gt;15 cm.</li> </ul> <p><b>Foraging habitat:</b> The species feeds almost exclusively on sheoak seeds, typically <i>Allocasuarina</i> spp. And <i>Casuarina</i> spp.). Sheoak woodlands and stands of trees consisting of at least one or two species of she-oak feed trees.</p>	
Grey Falcon ( <i>Falco hypoleucos</i> )	V	V	<p>This species prefers arid and semi-arid Australia and frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined watercourses. This species has also been observed in treeless areas, frequenting tussock grassland and open woodland for foraging.</p> <p><b>Breeding habitat:</b> Nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (<i>Eucalyptus camaldulensis</i>) and Coolibah (<i>E. coolabah</i>). The species has also been observed nesting in telecommunication towers.</p> <p><b>Foraging habitat:</b> timbered lowland plains, acacia shrubland crossed by tree-line watercourses, as well as treeless areas, tussock grasslands and open woodlands.</p> <p><b>Roosting habitat:</b> this species is likely to roost in both its breeding and foraging habitat. This</p>	-	<p>This species is considered unlikely to occur within the Project Area due to suitable habitat of Acacia shrubland being absent. Additionally, no records of this species occur in the Project Area or adjoining areas.</p> <p>The Project Area is far from the preferred habitat of this species, <i>Acacia</i> shrubland plains traversed by tree-lined watercourses in the southwest of the State (TSSC 2020). Occurrence in this region would only involve transient individuals.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			species has also been observed roosting on the ground.		
Painted Honeyeater ( <i>Grantiella picta</i> )	V	V	The Painted Honeyeater lives in dry, open forests and woodlands. The species usually occurs in areas with a diversity of flowering and fruiting mistletoe and flowering Eucalypts. This species inhabits riparian woodlands of Black Box and River Red Gum, Acacia dominated woodlands, as well as Paperbarks, Casuarinas, Callitris and Box-Ironbark-Yellow Gum woodlands with a large number of mature trees as these host more mistletoe. It will sometimes occupy trees on farmland and gardens, provided there is a high supply of mistletoe. The species prefers habitat with more mature trees that host more mistletoes, particularly mistletoes in the genus <i>Amyema</i> . It is more common in wider blocks of remnant woodland than in narrower strips.	<p>General habitat includes eucalypt forests / woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, Callitris, and trees on farmland or gardens. Within these habitats, higher number of mature trees with an abundance of mistletoe are preferable.</p> <p>Painted Honeyeater forages on mistletoe in remnant, regrowth and other non-remnant vegetation, including shadelines and scattered trees and shrubs in cleared areas (Boobook 2022).</p> <p>According to the national recovery plan for the species (DAWE 2021), habitat critical to the survival of the Painted Honeyeater includes areas of:</p> <ul style="list-style-type: none"> <li>• Known or likely breeding habitat in Boree/Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) woodlands, box-gum woodlands and box-ironbark forests on the inland slopes of the Great Dividing Range in New South Wales, Victoria and southern Queensland; and</li> <li>• All preferred foraging species within known and likely foraging habitat particularly mistletoes of the genus</li> </ul>	Areas with a high abundance of mistletoe species in either eucalypt or acacia woodlands provide preferable foraging habitat for this species. However, all mistletoe within known and likely foraging habitat growing on forest and woodland eucalypts and acacias is considered critical foraging habitat. Mistletoe is present sparingly in Eucalypt woodlands across the Project Area that could be utilised as habitat for this species. Limited potential habitat of Brigalow woodland is also present.

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				<p><i>Amyema</i> growing on forest and woodland eucalypts and acacias.</p> <p>Habitat mapping is assisted by point locations of publicly available historical records of the species, collated from Wildlife Online and ALA.</p> <p><b>Breeding habitat:</b> Boree/Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) woodlands, box-gum woodlands and box-ironbark forests on the inland slopes of the Great Dividing Range in New South Wales, Victoria and southern Queensland. Forests and woodlands with high quantities of mistletoe and where parasitism rates are high, preferably remnant vegetation. Typically nest in mature trees that have been parasitised with mistletoe, sometimes using the mistletoe as a nesting substrate.</p> <p><b>Foraging and roosting habitat:</b> All preferred foraging species within known and likely foraging habitat particularly mistletoes of the genus <i>Amyema</i> growing on forest and woodland eucalypts and acacias.</p>	
Red Goshawk ( <i>Erythrotriorchis radiatus</i> )	E	E	This species prefers wooded and forested lands of tropical and warm-temperate Australia. Forests of intermediate density, with tall stands or individual trees so that nests are supported, are favoured, or ecotones between habitats of differing densities, e.g. between rainforest and eucalypt forest, between gallery forest and woodland, or on edges of woodland and forest where they meet grassland, cleared land, roads or watercourses. This species	-	This species is considered unlikely to occur within the Project Area due to the highly fragmented nature of the Project Area, therefore lacking suitable habitat areas for roosting and breeding. Additionally, the Brigalow Belt Bioregion is now considered to be outside of the distribution for the species due to recent range contraction towards northern Australia. Woodland in the southeastern corner is connected to an extensive, wooded area of potentially suitable habitat around Gurulmundi and Barakula.



Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<p>avoids very dense and very open habitats. This species has a large home range.</p> <p><b>Breeding and roosting habitat:</b> Breeding habitat is restricted to trees that are taller than 18.5 m and within 1 km of a watercourse or wetland. This species rarely breeds in areas with fragmented vegetation.</p> <p><b>Foraging habitat:</b> Habitat has to be open enough for fast hunting and manoeuvring in flight, but with enough cover for ambushing of prey.</p>		<p>There are no recent records in Queensland south of the Wet Tropics, Einasleigh Uplands, Gulf Plains and North West Highlands Bioregions (MacColl <i>et al.</i> 2021). The Brigalow Belt Bioregion is now considered to be outside the species extent of occurrence (MacColl <i>et al.</i> 2021).</p>
<p>Southern Squatter Pigeon (<i>Geophaps scripta scripta</i>)</p>	V	V	<p>This species inhabits open-forests to sparse, open-woodlands and scrub that are mostly dominated by <i>Eucalyptus</i>, <i>Corymbia</i> or <i>Callitris</i> species, including remnant, regrowth or partly modified vegetation communities that are within 3 km of water bodies (Squatter Pigeon Workshop 2011). Typically, these habitats are on well-draining, gravelly, sandy or loamy soils and have patchy, tussock-grassy understories. This species also prefers to forage and dust-bathe on bare ground under an open canopy of trees (Squatter Pigeon Workshop 2011). Although this species forages and nests on the ground, it roosts in trees. Waterbodies suitable for the subspecies include permanent or seasonal rivers, creeks, lakes, ponds, waterholes and artificial dams.</p>	<p>General habitat is defined as open forests to sparse, open woodlands and scrubs that are:</p> <ul style="list-style-type: none"> <li>• Dominated in the overstory by Eucalyptus, Corymbia, Acacia or Callitris species;</li> <li>• Remnant, regrowth of partly modified vegetation communities; and</li> <li>• Within 3 km of water bodies or courses.</li> </ul> <p>The species favours grassy woodland areas with patchy ground cover. General habitat excludes small, isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road (Boobook 2022).</p> <p>Habitat for the Southern Squatter Pigeon is generally associated with REs 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.7, 11.9.10, 11.10.7 and / or 11.10.11.</p>	<p>There is a lack of foraging, breeding and dispersal habitat in the north of Project Area due to it being largely cleared with dense pastoral grasses, however suitable dry woodland habitats (for foraging and breeding) and dispersal habitats that connect areas used for foraging and breeding remains on and around the plateau in the southern part of the Project Area.</p>

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				<p><b>Breeding and foraging habitat:</b> Open forest to sparse, open woodland or scrub vegetation on land zones 5 and 7. Stony rises on sandy, gravelly soils, within 1 km of a suitable, permanent waterbody (including farm dams and watercourses). Ground cover is considerably patchy consisting of native, perennial tussock grasses and low shrubs or forbs, rarely exceeding 33% of the ground area. The remaining ground area consists of bare patches of gravelly or dusty soil and areas lightly covered in leaf litter and coarse, woody debris. Nests in low depressions in the soil surface next to tussock grasses and sparsely lined with grass. A 100 m buffer is to be applied to existing breeding habitat where remnant and regrowth vegetation occurs.</p> <p><b>Water resources:</b> Waterbodies suitable for the subspecies includes permanent or seasonal rivers, creeks, lakes, ponds and waterholes, and artificial dams. Suitable waterbodies or watercourses must:</p> <ul style="list-style-type: none"> <li>• Have a small patch (&lt; 1 square meter) of bare ground at the water's edge; and</li> <li>• Occur on the lower, gentle slopes and plateaus of sandstone ranges (equivalent to QLD RE Land Zone 10), alluvial clay soils on river or creek flats (represented by QLD RE Land Zone 3) or non-alluvial clay soils on flats or plains which are not associated with current alluvial deposits (represented</li> </ul>	

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				<p>by QLD RE Land Zone 4). Hence, where natural foraging or breeding habitat occurs (i.e., on QLD RE Land Zones 5 and 7).</p> <p><b>Foraging only habitat:</b> Any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by <i>Eucalyptus</i>, <i>Corymbia</i>, <i>Acacia</i> or <i>Callitris</i> species, on sandy or gravelly soils, within 3 km of a suitable, permanent or seasonal waterbody.</p> <p><b>Dispersal habitat:</b> Any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies. This is defined as areas of remnant habitat or regrowth habitat (acacia, eucalypt, mixed regrowth and paddock trees) intersecting a 100 m buffer of mapped breeding and foraging habitat.</p>	
Southern Whiteface ( <i>Aphelocephala leucopsis</i> )	V	V	<p>This species has a wide distribution across much of Australia, including southern Queensland west of the Great Dividing Range. It inhabits a variety of open woodlands and shrublands that have a grassy and/or shrubby understorey and are usually dominated by <i>Acacia</i> and <i>Eucalypt</i> species.</p> <p>According to the species' conservation advice (DCCEEW 2023d), habitat critical to the survival of the Southern Whiteface includes areas of:</p> <ul style="list-style-type: none"> <li>Relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both;</li> </ul>	<p>General habitat consists of a wide range of open woodlands and shrublands where there is an understorey of grasses and/or shrubs, therefore, general habitat may comprise of any woodlands and open forests in the Project Area.</p> <p>Habitat critical to the survival of the Southern Whiteface is mapped as:</p> <ul style="list-style-type: none"> <li>Relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both;</li> <li>Habitat with low tree densities and an herbaceous understorey litter cover</li> </ul>	Species will utilise almost all woodland habitats present within the Project Area, excluding any cleared grazed land dominated by exotic pasture grasses.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<ul style="list-style-type: none"> <li>Habitat with low tree densities and an herbaceous understory litter cover which provides essential foraging habitat; and</li> <li>Living and dead trees with hollows and crevices which are essential for roosting and nesting.</li> </ul>	<ul style="list-style-type: none"> <li>which provides essential foraging habitat; and</li> <li>Living and dead trees with hollows and crevices which are essential for roosting and nesting.</li> </ul> <p>Habitat for the Southern Whiteface is generally associated with REs 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a 11.9.7, 11.9.10, 11.10.7 and / or 11.10.11.</p> <p>Habitat mapping is assisted by point locations of publicly available historical records of the species, collated from Wildlife Online and ALA.</p> <p><b>Breeding and roosting habitat:</b> Open woodlands and shrublands with an understory of grasses or shrubs and tree hollows, in either live or dead standing trees.</p> <p><b>Foraging habitat:</b> This species forages almost exclusively on the ground, with preference for areas with low tree densities and an understory consisting of herbs and leaf litter in open woodlands and shrublands.</p>	
White-throated Needletail ( <i>Hirundapus caudacutus</i> )	V, Mi	V	This species occurs over most types of habitat, but are recorded most often above wooded areas, including open forest, rainforest and heathland, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (Higgins 1999). Whilst rare, they have been recorded on wooded ends of ridges, roosting after dark high in the eucalypt tree canopies (Tarburton, 1993).	<p>This species may occur aerially over any wooded or cleared area, with a preference for wooded landscapes (Boobook 2022).</p> <p>The species generally occurs aerially over wooded areas, open forests and rainforests, farmland (above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks) below tree canopy and in clearings.</p>	Species likely to only fly aerially over the Project Area and in occasional flocks during the migratory period from September to April, following storm fronts. The Project Area does not contain habitat in the form of elevated eucalypt forests or wooded ridges to act as roosting habitat for the species.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				<p>Habitat mapping is assisted by point locations of publicly available historical records of the species, collated from Wildlife Online and ALA.</p> <p><b>Breeding habitat:</b> Does not breed in Australia.</p> <p><b>Foraging habitat:</b> Flies aerially at 'cloud level' and forages over a range of habitats from heavily treed forests to open habitats, including farmland, heathland and mudflats. May forage closer to the ground in open habitats.</p> <p><b>Roosting habitat:</b> Tall mature forests and woodlands, in trees amongst dense foliage and in hollows often associated with ridgelines. May also roost aerially.</p>	
Common Sandpiper ( <i>Actitis hypoleucos</i> )	Mi, Ma	-	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The common sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties.	<p>General habitat comprises permanent and ephemeral wetlands, dams and riparian zones of eucalypt woodlands and open forests. Habitat for the Common Sandpiper in Australia is typically associated with REs 11.3.25 and 11.3.27f, but potential habitat areas may be more widespread following significant rain events and flooding. These REs are both located within the Project Area.</p> <p>Habitat mapping is assisted by point locations of publicly available historical records of the species, collated from Wildlife Online and ALA.</p> <p><b>Breeding habitat:</b> Does not breed in Australia.</p> <p><b>Foraging habitat:</b> Shallow water and on bare soft mud at the edges of wetlands; often</p>	Small areas of foraging habitat present within small ephemeral wetlands, which may provide temporary refuge for the species, within the Project Area.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				<p>where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands. Also forages in billabongs, lakes and dams.</p> <p><b>Roosting habitat:</b> Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks.</p>	
Fork-tailed Swift ( <i>Apus pacificus</i> )	Mi, Ma	-	In Australia, they 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 riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh.	<p>This species is almost exclusively aerial, occurring over any wooded or cleared area. Habitat can be mapped where dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh occur, as well as any cleared areas.</p> <p>Habitat mapping is assisted by point locations of publicly available historical records of the species, collated from Wildlife Online and ALA.</p> <p><b>Breeding habitat:</b> Does not breed in Australia.</p> <p><b>Foraging and dispersal habitat:</b> Remnant, regrowth and non-remnant vegetation (aerial species).</p>	Species likely to only fly aerially over the Project Area and in occasional flocks during the migratory in spring and summer. The species is unlikely to rely on any terrestrial habitat and resources in the Project Area.
Great Sand Plover ( <i>Charadrius leschenaultii</i> )	V, Mi, Ma	V	This species is found majorly within coastal wetlands occurrence when on migration throughout Australia. Records from inland sites are extremely rare and probably reflect vagrant birds blown off course by storms.	-	This species is considered unlikely to occur within the Project Area due to suitable habitat being absent. Additionally, no records of this species occur in the Project Area or adjoining areas. This is a coastal species with no significant occurrences inland. There is no suitable habitat for this species within the Brigalow Belt South Bioregion.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
Latham's Snipe ( <i>Gallinago hardwickii</i> )	Mi, Ma	-	They usually occur in permanent and ephemeral open, freshwater wetlands that have some form of shelter (usually low and dense vegetation) nearby. They generally occupy flooded meadows, seasonal or semi-permanent swamps, or open waters, but various other freshwater habitats can be used including bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. May very rarely occur in small patches of habitat such as roadside ditches and alpine bogs (Higgins & Davies, 1996). They can also be found around irrigation channels and modified habitats at farms. This species sometimes occurs in habitats that have saline or brackish water, such as saltmarsh, mangrove creeks, around bays and beaches, and at tidal rivers.	<p>General habitat comprises permanent and ephemeral wetlands, dams and riparian zones of eucalypt woodlands and open forests.</p> <p>Habitat for the Latham's Snipe in Australia is typically associated with REs 11.3.25 and 11.3.27f, but potential habitat areas may be more widespread following significant rain events and flooding. These REs are both located within the Project Area.</p> <p><b>Breeding habitat:</b> Does not breed in Australia.</p> <p><b>Foraging habitat:</b> Areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g., low, dense vegetation). Species may sometimes feed around coastal grasslands.</p> <p><b>Roosting habitat:</b> On the ground near or in their foraging areas, usually in sites that provide some degree of shelter, e.g., beside or under clumps of vegetation, among dense tea-tree, in forests, beside drainage ditches, roadside puddles or plough marks, among boulders, or in shallow water if cover is unavailable.</p>	Small areas of foraging habitat present within small ephemeral wetlands, drainage lines and farm dams, which may provide temporary refuge for the species, within the Project Area.
Oriental Cuckoo ( <i>Cuculus optatus</i> )	Mi	-	The species is found in forest canopy, open wooded areas and orchards, often in hill country, also in coniferous forest and in birch ( <i>Betula</i> ) above the treeline. The Oriental Cuckoo is a regular migrant to Australia, where it spends the non-breeding season (Sept- May) in coastal regions across northern and eastern Australia as well as offshore islands (DoE 2015).	General habitat comprises of SEVT and wet <i>Eucalyptus</i> , <i>Casuarina</i> and <i>Acacia</i> woodland and open forest. Habitat for the Oriental Cuckoo is typically associated with REs 11.3.1, 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.39, 11.5.1, 11.5.5, 11.9.2, 11.9.4, 11.9.5, 11.9.5a, 11.9.7, 11.9.10, 11.10.7 and / or 11.10.11.	There is limited areas of potential suitable remnant woodlands and non-remnant patches of native vegetation habitat, within the Project Area.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				<p>Important habitat to be mapped for the species includes monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands.</p> <p>Habitat mapping is assisted by point locations of publicly available historical records of the species, collated from Wildlife Online and ALA.</p> <p><b>Breeding habitat:</b> Does not breed in Australia.</p> <p><b>Foraging and roosting habitat:</b> Monsoonal rainforest, vine thickets, wet sclerophyll forest or open <i>Casuarina</i>, <i>Acacia</i>, or <i>Eucalyptus</i> woodlands. Frequently at the edges or ecotones between habitat types.</p>	
Pectoral Sandpiper ( <i>Calidris melanotos</i> )	Mi, Ma	-	<p>In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.</p> <p><b>Breeding habitat:</b> Does not breed in Australia.</p> <p><b>Foraging habitat:</b> Shallow water or soft mud at the edge of wetlands,</p> <p><b>Roosting habitat:</b> Prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.</p>	-	This species is considered unlikely to occur within the Project Area due to wetland habitats associated with riparian woodlands and open forests, being not preferred habitat and unlikely to attract the species. Additionally, no records of this species occur in the broader landscape.
Rufous Fantail	Mi, Ma	-	In east and south-east Australia, the rufous fantail mainly inhabits wet sclerophyll forests,	General habitat comprises riparian zones of eucalypt woodlands and open forests. May	There is some limited potential habitat present in the form of remnant and non-remnant eucalypts



Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
( <i>Rhipidura rufifrons</i> )			often in gullies dominated by eucalypts and usually with a dense shrubby understorey often including ferns. They also occur in subtropical and temperate rainforests. When on passage, they are sometimes recorded in drier sclerophyll forests and woodlands, including spotted gum ( <i>E. maculata</i> ), yellow box ( <i>E. melliodora</i> ), ironbarks or stringybarks, often with a shrubby or heath understorey. Species has been recorded within secondary regrowth habitats, following logging or disturbance in forests or rainforests.	<p>occur as a vagrant in areas of drier woodlands and open forests but does not rely on such habitat.</p> <p>Important habitat to be mapped for the species includes Moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense understorey. When on passage a wider range of habitats are used including dry eucalypt forests and woodlands and Brigalow shrublands.</p> <p>Habitat for Rufous Fantail is typically associated with QLD REs 11.3.25 and / or 11.3.27f, which are both located in the Project Area.</p> <p><b>Breeding habitat:</b> Moist, dense habitats, including mangroves, rainforest, riparian forests and thickets, and wet eucalypt forests with a dense understorey.</p> <p><b>Foraging and roosting habitat:</b> There is no information concerning feeding or roosting sites during species migration.</p> <p><b>Dispersal/migratory habitat:</b> When on passage a wider range of habitats are used including dry eucalypt forests and woodlands, Brigalow shrublands, as well as parks and gardens.</p>	woodlands within the Project Area that may be used by the species during migrations.
Sharp-tailed Sandpiper ( <i>Calidris acuminata</i> )	Mi, Ma	-	Prefers habitat on muddy edges of freshwater wetlands or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and inland hypersaline salt lakes. Can be found at	<p>General habitat comprises permanent and ephemeral wetlands, dams and riparian zones of eucalypt woodlands and open forests.</p> <p>Habitat for the Sharp-tailed Sandpiper in Australia is typically associated with REs 11.3.25 and 11.3.27f, but potential habitat areas may be more widespread following</p>	Small areas of foraging habitat present within small ephemeral wetlands, farm dams and eucalypt woodlands/open forests in riparian zones, which may provide temporary refuge for the species, within the Project Area.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			dams inland. Will often occupy coastal mudflats when ephemeral terrestrial wetlands have dried out.	<p>significant rain events and flooding. These REs are both located within the Project Area.</p> <p><b>Breeding habitat:</b> Does not breed in Australia.</p> <p><b>Foraging habitat:</b> Wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. Also among inundated vegetation of saltmarsh, grass or sedges, sewage ponds, and in hypersaline environments. After rain, they may forage in paddocks of short grass, well away from water. They may forage on coastal mudflats at low tide and move to freshwater wetlands near the coast to feed at high tide.</p> <p><b>Roosting habitat:</b> The edges of wetlands, on wet open mud or sand, in shallow water, or in short sparse vegetation, such as grass or saltmarsh. Occasionally, they roost on sandy beaches, stony shores, on rocks in water, or in mangroves.</p>	
Satin Flycatcher ( <i>Myiagra cyanoleuca</i> )	Mi, Ma	-	Satin Flycatchers inhabit heavily vegetated gullies and watercourses in Eucalypt-dominated forests and taller woodlands, especially wet sclerophyll forest. On migration, they can occur in drier woodlands and open forests. They also occur in eucalypt woodlands with open understorey and grass ground cover.	<p>General habitat comprises riparian zones of eucalypt woodlands and open forests. May occur as a vagrant in areas of drier woodlands and open forests but does not rely on such habitat.</p> <p>Habitat for the Satin Flycatcher can be mapped where eucalypt forests exist, particularly those near wetlands or watercourses. The species occurs in wet sclerophyll forests, dominated by Brown Barrel (<i>Eucalypt fastigata</i>), Mountain Gum (<i>E. dalrympleana</i>), Mountain Grey Gum, Narrow-leaved Peppermint, Messmate or Manna Gum, or occasionally Mountain Ash (<i>E. regnans</i>). Additionally, the species often</p>	There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area .

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				<p>occurs in dry sclerophyll forests and woodlands dominated by eucalypts such as Blakely's Red Gum (<i>E. blakelyi</i>), Mugga Ironbark (<i>E. sideroxylon</i>), Yellow Box, White Box, (<i>E. albens</i>), Manna Gum or stringybarks, including Red Stringybark, (<i>E. macrorhyncha</i>) and Broad-leaved Stringybark, usually with open understorey.</p> <p>Habitat for the Satin Flycatcher is typically associated with REs 11.3.25 and 11.3.27f, but potential habitat areas may be more widespread following significant rain events and flooding. These REs are both located within the Project Area.</p> <p><b>Breeding habitat:</b> Breeding occurs further south and east of the Project Area and so no potential breeding habitat is present.</p> <p><b>Foraging and dispersal habitat:</b> Eucalypt forest and woodlands, at high elevations. Forages in the canopy and subcanopy of trees.</p>	
Yellow Wagtail ( <i>Motacilla flava</i> )	Mi, Ma		<p>Habitat requirements for the yellow wagtail are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves. This species may occur in association with non-remnant vegetation.</p> <p><b>Breeding habitat:</b> Does not breed in Australia.</p>	-	<p>This species is considered unlikely to occur within the Project Area due to a lack of records across southern inland Queensland. Although some potential habitat is present, the lack of records in the region (over 200 km away) suggests this species is unlikely to occur.</p> <p>Potential foraging habitat of waterbodies (predominately farm dams) present within the Project Area.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<b>Foraging and roosting habitat:</b> Has a strong association with water, particularly rock substrates along watercourses, but also lakes and marshes.		
<b>Threatened Mammals</b>					
Corben's Long-eared Bat ( <i>Nyctophilus corbeni</i> )	V	V	This microbat species has a scattered distribution mostly within the Murray-Darling Basin, but with some records outside of this area. The species occupies a variety of inland woodland, including box / ironbark / cypress pine woodlands, Buloke woodlands, Brigalow woodland, Belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee. It is more common in box, ironbark and cypress pine woodland on the western slopes and plains of New South Wales and southern Queensland. Its stronghold seems to be the Pilliga scrub. The species is more abundant in extensive stands of vegetation in comparison to smaller woodland patches and in habitat with a dense, cluttered understorey. It roosts in tree hollows, crevices and under loose bark.	<p>General habitat comprises larger contiguous areas of remnant and regrowth woodland and open forest. The species favours areas with a multilayered shrubby understorey, particular in box / ironbark / cypress-pine vegetation in southern Queensland. Habitat mapping for this species excludes the small, isolated fragments, narrow corridors and the largely cleared landscape north of Gilgilgul Road (Boobook 2022).</p> <p>Habitat for Corben's Long-eared bat is typically associated with REs 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a 11.9.7, 11.9.10, 11.10.7 and / or 11.10.11.</p> <p><b>Breeding habitat:</b> Little information is available on the breeding behaviour and habitat for the species. No information is available on maternity roosts where larger groups may form.</p> <p><b>Foraging and roosting habitat:</b> Forests and woodlands dominated by <i>Allocasuarina luehmannii</i>, <i>Acacia harpophylla</i>, <i>Casuarina cristata</i>, <i>Eucalyptus camaldulensis</i>, and various other types with dead hollow-bearing trees or trees with exfoliating bark. Foraging tends to be located around patches of trees in the landscape. Roosting occurs within dead</p>	There is a small amount of potential foraging habitat present in the form of wooded areas in the south of the Project Area, with connectivity to woodland outside of the Project Area.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				trees including ironbarks, cypress and bullock, and occasionally under peeling bark. <b>Foraging only habitat:</b> Remnant, and regrowth woodlands and low woodlands.	
Large-eared Pied Bat ( <i>Chalinolobus dwyeri</i> )	V	V	Sandstone cliffs and fertile wooded valley habitat within close proximity of each other are considered as habitat critical to the survival of the Large-eared Pied Bat (DCCEEW 2023). Rainforest and moist Eucalypt forest habitats on other geological substrates (viz. rhyolite, trachyte and basalt) at high elevation are also considered to be important for this species (DCCEEW 2023). Some populations of the Large-eared Pied Bat would rely in part on the TEC of Brigalow ( <i>Acacia harpophylla</i> dominant and co-dominant). <b>Foraging and roosting habitat:</b> The species requires a combination of sandstone cliffs to provide roosting sites, especially Box Gum woodlands and river corridors used for foraging. The large-eared pied bat requires the presence of diurnal roosts in order to shelter. Roosts are utilised during the day and also at night. <b>Breeding habitat:</b> the species is known to breed in two known locations, which are not in the vicinity of the Project Area.	-	This species is considered unlikely to occur within the Project Area due the lack of sandstone cliffs, and woodland valley areas for roosting and the nearest record being over 100 km to the north-west of the Project Area.
Ghost Bat ( <i>Macroderma gigas</i> )	V	E	In Queensland the species occurs in 4-5 disjunct populations, north from Rockhampton (TSSC 2016). This species can inhabit a wide range of environments, from arid savanna woodland to tropical savanna woodlands and rainforests. Roosts are in	-	This species is considered unlikely to occur within the Project Area due to the Project Area being outside the known distribution of the species and the nearest record being over 200 km further north (ALA 2022).

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			caves, disused mines, and rock crevices, preferably with a relatively stable temperature and high humidity. During the breeding season, populations are centred around maternity roosts in deep caves. Pairs and small groups disperse widely during the winter non-breeding season, using temporary daytime roosts in caves and rocky overhangs (TSSC 2016). Ghost Bats move between multiple roost sites seasonally and/or as dictated by weather. This species will also use roost sites to consume prey during foraging.		
Greater Glider (southern and central) ( <i>Petauroides volans</i> )	E	E	<p>The Greater Glider is an arboreal nocturnal marsupial, largely restricted to Eucalypt forests and woodlands. 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.</p> <p>Greater Gliders den and nest in tree hollows, with a preference for large hollows (&gt;10 cm in diameter) in living trees, but will also use hollows in dead standing trees. Multiple den trees are used by individuals; up to 20 dens can be used in high quality habitat (DCCEEW 2022b).</p> <p>There is no information available that differentiates foraging, breeding and denning habitat for the species however, for denning</p>	<p>General habitat comprises remnant only woodland within the well-connected riparian corridors along Wandoan Creek and Woleebee Creek in the north of the Project Area, as well as larger contiguous areas of remnant eucalypt woodland and open forest south of Gilgulgul Road. The species requires large hollow-bearing trees in areas with eucalypt feed trees.</p> <p>Habitat mapping for this species excludes the small, isolated fragments and regrowth areas within the Project Area (Boobook 2022).</p> <p>Habitat for Greater Glider is typically associated with REs 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.3.39 11.5.1, 11.5.5, 11.9.2, 11.9.7, 11.9.10, 11.10.7, 11.10.11.</p> <p><b>Breeding, denning and foraging habitat:</b> Connected eucalypt-dominated woodlands containing 2-4 medium to large hollows in live den trees per 2 ha of suitable forest habitat (Eyre 2002). Tree hollows used by Greater Glider (southern and central) in</p>	<p>Potential foraging and denning habitat of tall, mature Eucalypt forests present within the Project Area, specifically along the riparian areas. The species was detected in Queensland Blue Gum (<i>Eucalyptus tereticornis</i>) woodland in the north of the Project Area, in the remnant riparian corridors along Wandoan Creek and Woleebee Creek. The species is likely to occur wherever large trees with hollows occur in woodland connected with these corridors and also in the extensively wooded area in the south of the Project Area.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<p>and nesting it prefers tall mature forests with large tree hollows. The species is absent from regrowth habitats with insufficient hollows.</p> <p>According to the species' conservation advice (DCCEEW 2022b), habitat critical to the survival of the Greater Glider (southern and central) may be broadly defined as:</p> <ul style="list-style-type: none"> <li>• 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;</li> <li>• Smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonisation;</li> <li>• Cool microclimate forest/woodland areas (e.g., protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes);</li> <li>• Areas identified as refuges under future climate changes scenarios; and</li> <li>• 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.</li> </ul>	<p>Queensland typically consists of trees with a diameter at breast height (dbh) greater than 30 cm. The species can be further found in regrowth forests provided sufficient hollows are present.</p> <p><b>Foraging and dispersal only habitat:</b> Foraging and dispersal only habitat includes woodlands and other areas with trees which could be used for gliding and provide a link between areas of breeding, denning and foraging habitat, even if greater than 20 m from these habitats.</p>	

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			Forest areas that are currently unoccupied by the Greater Glider may still represent habitat critical to survival of the species if there is potential for hollow-bearing trees to develop as the forest ages and this could allow future colonisation of the area.		
Yellow-bellied Glider (south-eastern) ( <i>Petaurus australis australis</i> )	V	V	<p>This species is found in Eucalypt dominated woodlands and forests, including both wet and dry sclerophyll forests. They prefer large patches of mature, floristically diverse forests with high proportions of winter-flowering and smooth-barked eucalypts. This species feeds on the sap of a range of <i>Eucalyptus</i> and <i>Corymbia</i> species, as well as some <i>Angophora</i>, <i>Lophostemon</i> and <i>Acacia</i> species (DAWE 2022). Feed tree species preferences vary between regions. It also consumes Eucalypt nectar and pollen, insect, spiders, insect exudates and manna.</p> <p>According to the species' conservation advice (DAWE 2022), habitat critical to the survival of the Yellow-bellied Glider (south-eastern) may be broadly defined as:</p> <ul style="list-style-type: none"> <li>• Large contiguous areas of floristically diverse eucalypt forest, which are dominated by winter-flowering and smooth-barked eucalypts, including mature living hollow-bearing trees and sap trees;</li> <li>• Areas identified as refuges under future climate change scenarios;</li> </ul>	<p>General Habitat comprises larger contiguous areas of remnant only eucalypt woodland and open forest of the nominated RE. The species requires large hollow-bearing trees for dens and preferred feed tree species (selected eucalypts) (Boobook 2022).</p> <p>Yellow-bellied Glider (south-eastern) shelters in hollows found in large, old trees more than one (1) metre in diameter and are a critical habitat feature for this species.</p> <p>Habitat mapping for this species within the Project Area excludes small, isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.</p> <p>Habitat for Yellow-bellied Glider (south-eastern) is typically associated with REs 11.3.25, 11.5.1 and / or 11.10.7.</p> <p><b>Breeding and denning habitat:</b> Eucalypt dominated woodlands and forests with live hollow-bearing trees. Primarily use hollows in living, smooth-barked eucalypts of multiple species. Stags (standing dead trees) account for only two percent of den trees in certain forest types.</p> <p><b>Foraging habitat:</b> The species shows a preference for larger patches of mature growth Eucalypt forests and woodlands that</p>	<p>There is potential foraging and denning habitat present in the form of wooded plateaus in the far south-eastern corner of the Project Area, however no sap feeding scars were detected in the Project Area.</p> <p>No feed trees were detected within the Project Area. The species is unlikely to occur in the cleared and fragmented landscape across the north of the Project Area. The wooded plateau in the southeast is connected to suitably large areas of remnant woodland with potential feed trees.</p>



Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<ul style="list-style-type: none"> <li>Short 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;</li> <li>Habitat corridors required to facilitate dispersal of the subspecies between fragmented habitat patches and/or that enable recolonization or movement away from threats. yellow-bellied gliders (south-eastern) have a glide ratio (horizontal distance/height dropped) of around 2.0, and corridors spanning gaps larger than the distance gliders are likely to be able to travel should be considered critical to the survival. There is not enough evidence to define the canopy and width characteristics of appropriate corridors. In the absence of such information, a precautionary approach should be taken to maximise dispersal by considering all habitat corridors in the species' range to be habitat critical to the survival; and</li> <li>Areas in which some trees have evidence of use for sap extraction by Yellow-bellied Glider (south-eastern).</li> </ul>	<p>are floristically diverse, however the species forages on sap of 13 specific trees species.</p> <p>Foraging and dispersal habitat includes woodlands and other areas with trees which could be used for gliding and provide a link between areas of breeding, denning and foraging habitat</p>	

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
Koala ( <i>Phascolarctos cinereus</i> )	E	-	<p>Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by eucalypt species. It can also occur in <i>Acacia</i>, <i>Melaleuca</i>, or <i>Casuarina</i> dominated communities, provided that there are sufficient food trees in the area. The species occurs in both coastal and inland areas. The Koala is an obligate folivore, with its diet limited to several species of <i>Eucalyptus</i>, <i>Corymbia</i> and <i>Angophora</i> species, and as such is limited to forests and woodlands with sufficient coverage of feed trees. Primary food tree species vary between regions, with preferences for individual trees within a species.</p> <p>Despite their reliance on eucalypt trees for food, they utilise a large variety of trees for shelter and refuge which are also highly important for refuge from predators (and refuge for females and juveniles from males) and thermoregulation.</p> <p>Koalas occupy a range of landscapes, including highly fragmented habitat, isolated paddock trees, roadside vegetation and semi-urban environments. They are able to disperse across highly fragmented and otherwise unsuitable areas.</p>	<p>General habitat comprises all areas of eucalypt dominated remnant and mature regrowth woodland and open forest within the Project Area. The species requires eucalypt feed trees, shelter trees with dense canopies and access to riparian vegetation (Boobook 2022).</p> <p>Habitat for Koala is typically associated with REs 11.3.1, 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.3.39, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a, 11.9.7, 11.9.10, 11.10.7 and / or 11.10.11.</p> <p>Habitat mapping is assisted by point locations of publicly available historical records of the species, collated from Wildlife Online and ALA.</p> <p>Crucial habitat elements include patches and corridors for gene flow.</p> <p><b>Breeding, foraging and refuge habitat:</b> Koala habitat can be broadly defined as any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees.</p> <p><b>Foraging and dispersal habitat:</b> Other vegetation containing at least one koala food tree and shelter trees. The species is known to traverse a matrix of landscape features from remnant and regrowth vegetation to paddock trees, grasslands and semi-urban areas.</p>	<p>Foraging and breeding habitat of Eucalypt forests, and preferred food trees including <i>E. tereticornis</i>, <i>E. populnea</i>, <i>E. crebra</i>, <i>E. longirostrata</i>, <i>E. melanophloia</i>, <i>E. exserta</i> and <i>Corymbia citriodora subsp. variegata</i>, as well as dispersal opportunities, are present within the Project Area. There is foraging and breeding habitat present in the form of Eucalypt dominated woodlands and open forests in the Project Area, particularly along riparian areas.</p>
Northern Quoll ( <i>Dasyurus hallucatus</i> )	E	-	<p>Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding</p>	<p>Essential habitat comprises contiguous areas of woodland and forest within 1 km of rocky scarps (Boobook 2022).</p>	<p>Potential suitable rocky areas for breeding, denning and foraging habitat are limited to the far south-eastern corner of the Project Area in the</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<p>vegetated habitats used for foraging and dispersal. This species occurs in a range of habitats, including open dry sclerophyll forests and woodlands, riparian woodlands, low dry vine thickets, the margins of notophyll vineforests, rainforests, sandy lowlands, beaches, shrublands, grasslands, sugarcane farms, desert and in urban areas. They are most abundant in hilly or rocky areas close to permanent water, however, may also occupy non-rocky lowland habitats.</p> <p>The preferred habitat of rocky areas close to permanent water are very scarce across the Project Area, however, dry sclerophyll forests associated with remnant Eucalypt woodlands are present. Frequent cool burns and the absence of old growth forests (with hollows) or high elevation rugged terrain or rock falls limits the potential habitat available for the species.</p>	<p>General Habitat comprises contiguous areas of remnant and regrowth woodland and forest within 5 km of cliffs and rocky scarps and connected to these refuges by continuous native vegetation (Boobook 2022).</p> <p>Habitat mapping for this species within the Project Area excludes small, isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.</p> <p>Habitat for Northern Quoll is typically associated with REs 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a 11.9.7, 11.9.10, 11.10.7 and / or 11.10.11.</p> <p>Forested uplands with high relief and/or containing abundant rock outcrops may support the species (Oakwood 2008). The nearest recent records are from the Carnarvon Range (ALA 2022).</p> <p><b>Breeding and denning habitat:</b> Structurally complex habitat encompassing some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal, as well as connection to permanent water. Similar non-rocky habitat with tree hollows and hollow logs. Shelter sites include rocky outcrops, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings.</p> <p><b>Foraging and dispersal habitat:</b> Eucalypt forest and woodlands, rainforests, shrubland, grasslands, sandy plains, beaches and desert close to denning habitat and permanent water.</p>	<p>plateau with eucalypt woodland/open forest habitat types.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
<b>Threatened Reptiles</b>					
Collared Delma ( <i>Delma torquata</i> )	V	V	<p>This species normally inhabits eucalypt-dominated woodlands and open-forests in Queensland RE Land Zones. The RE it prefers are ones dominated by Poplar Box (<i>Eucalyptus populnea</i>) on alluvial plains, Lemon-scented Gum (<i>Corymbia citriodora</i>) open forest on coarse-grained sedimentary rocks and Poplar Box/Brigalow (<i>Acacia harpophylla</i>) open forests on fine-grained sedimentary rocks.</p> <p>There is no delineation between breeding, dispersal and foraging habitat for this species. However, microhabitat requirements include presence of rocks, logs and specific mats of leaf litter typically 30-100 mm thick.</p>	<p>General habitat comprises larger contiguous areas of remnant and regrowth woodland and forest. The species requires areas with abundant leaf litter and woody debris or rocks. Microhabitat, including rocks, logs, bark, coarse woody debris, mats and leaf litter (30 – 100 mm thick) is essential for Collared Delma microhabitat.</p> <p>Species records are typically in association with sandy loams, grey and black cracking clays, stony lithosols and basalt derived Podzolics.</p> <p>Habitat for this species includes eucalypt dominated woodlands and open forests and adjacent exposed rocky areas in QLD RE Land Zones 3, 9 and 10. Preferable habitat in areas west of Brisbane typically consists of Red Ash (<i>Alphitonia excelsa</i>), Wattles (i.e., Brisbane Wattle (<i>Acacia fimbriata</i>) and Hickory Wattle (<i>A. concurrens</i>)), Brush Box (<i>Lophostemon confertus</i>), Hovea (<i>Hovea longifolia</i>), and Lantana (<i>Lantana camara</i>). In this area, the preferable ground cover is predominantly native grasses such as Kangaroo Grass (<i>Themeda triandra</i>), Barbed-wire Grass (<i>Cymbopogon refractus</i>), Wiregrass (<i>Aristida sp.</i>) and Lomandra (<i>Lomandra sp.</i>). Habitat mapping for this species within the Project Area excludes SEVT and small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road (Boobook 2022).</p> <p>Habitat for Collared Delma is typically associated with REs 11.3.2, 11.3.4, 11.3.17,</p>	<p>Suitable habitat with abundant litter, rocks and woody debris occurs in the large contiguous area of forest and woodland associated with the escarpment and plateau in the south-eastern corner of the Project Area. The species is unlikely to occur in the northern part of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitat features for this species.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
				11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a 11.9.7, 11.9.10, 11.10.1, 11.10.4, 11.10.7 and / or 11.10.11.	
Dunmall's Snake ( <i>Furina dunmalli</i> )	V	V	<p>This species is found in forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow (<i>Acacia harpophylla</i>), other Wattles (<i>A. buruwii</i>, <i>A. deanii</i>, <i>A. leioclyx</i>), native Cypress (<i>Callitris</i> spp.) or Bull-oak (<i>Allocasuarina luehmannii</i>).</p> <p>It can also occur in various Blue Spotted Gum (<i>Corymbia citriodora</i>), Ironbark (<i>Eucalyptus crebra</i> and <i>E. melanophloia</i>), White Cypress Pine (<i>Callitris glaucophylla</i>) and Bullock open forest and woodland associations on sandstone derived soils.</p> <p>There is no delineation between breeding, dispersal and foraging habitat for this species. Microhabitat features preferred includes fallen timber and ground litter.</p>	<p>General habitat comprises larger contiguous areas of remnant and regrowth woodland and forest. The species favours areas with abundant leaf litter, fallen timber and woody debris. The species may use cracks in alluvial clay soils.</p> <p>Habitat mapping for this species within the Project Area excludes small, isolated fragments, narrow corridors and the largely cleared landscape north of Gilgilgul Road (Boobook 2022).</p> <p>Habitat for Dunmall's Snake is typically associated with REs 11.3.2, 11.3.4, 11.3.17, 11.3.19, 11.3.25, 11.3.27f, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a 11.9.7, 11.9.10, 11.10.7 and / or 11.10.11.</p> <p>Forests and woodlands on deep-cracking black clay and clay loam soils or sandstone derived soils in QLD REs 11.3.1, 11.3.19, 11.3.39, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.5a, 11.10.7, and 11.10.11.</p>	There is some suitable habitat with abundant litter, rocks and woody debris present in the south-eastern corner of the Project Area.
Five-clawed worm-skink ( <i>Anomalopus mackayi</i> )	V	E	<p>This species is associated with deep cracking clays that provide individuals with shelter. Habitat areas include Bluegrass and/or Mitchell Grass dominated grassland and other grasslands categorised as RE 11.3.21; River Red Gum - Coolibah-Bimble/Poplar Box and Weeping Myall grassy woodlands; White Box grassy woodland; Myall woodland, and</p>	<p>General habitat comprises native grasslands and woodlands on alluvial, cracking clay soils or self-mulching, friable basalt soils in QLD REs 11.3.21, 11.3.25, 11.8.5, 11.8.15, 13.3.3, 13.3.4 and associated non-remnants.</p>	Areas of potential habitat include those with an absence of native grasslands with deep, cracking clays. Additionally, potential habitat also includes area of Brigalow woodlands, with coarse woody debris and deep leaf litter cover.

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<p>Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant).</p> <p>There is no delineation between breeding, dispersal and foraging habitat for this species. However, microhabitat requirements include cracking clay soils or self-mulching friable basalt soils and woody debris.</p>		
Grey Snake ( <i>Hemiaspis damelii</i> )	E	E	<p>This species inhabits Brigalow <i>Acacia harpophylla</i> and Belah <i>Casuarina cristata</i> woodlands on dark brown to black cracking clay soils particularly in association with waterbodies, small gullies and ditches, and floodplain environments where the species shelters beneath logs, rocks and soil cracks. The species is also found in Queensland Bluegrass <i>Dichanthium sericeum</i> and/or Mitchell Grass <i>Astrebla</i> spp. grasslands on alluvial plains with cracking clay soils, and Red Sodosol soils on the western downs of Queensland. Closely associated with waterbodies, particularly ephemeral wetlands and floodplains. Shelters in and under soils cracks, rocks, logs, flood debris and abandoned burrows.</p> <p>Forages for frogs in and around temporary water bodies, including small gullies and ditches, ephemeral wetlands, and floodplains. Uses soil cracks and crevices for cover when hunting.</p>	<p>General habitat comprises Brigalow and Belah woodlands, Queensland Bluegrass and Mitchell Grass grasslands on alluvial plains with cracking clay soils and Red Sodosols, and adjacent ephemeral wetlands and other waterbodies, including small gullies. Key attributes of Grey Snake habitat are the floodplains and ephemeral wetlands. Habitat for Grey Snake is typically associated with REs 11.3.1, 11.9.5, 11.9.5a, 11.3.17, 11.3.27f and / or 11.9.10.</p> <p><b>Foraging habitat:</b> Temporary water bodies, including small gullies and ditches, ephemeral wetlands, and floodplains, particularly where soil cracks and crevices are present.</p>	<p>Brigalow and Belah are present within the north and far south-eastern parts of the Project Area.. Species has the potential to occur in Eucalyptus and Acacia regrowth habitats and paddock trees habitats where gullies and floodplains are present, as well as ephemeral wetlands and creek lines where cracking clay soils are present.</p>
Yakka Skink ( <i>Egernia rugosa</i> )	V	V	<p>The Yakka skink is known to occur in open dry sclerophyll forest, woodland and scrub. The core habitat of this species is within the Mulga lands and Brigalow belt south bioregions. It is known from rocky outcrops</p>	<p>General Habitat comprises larger contiguous areas of remnant and regrowth woodland and open forest. The species requires loamy soils with large logs, accumulations of woody debris and/or rocky outcrops.</p>	<p>Suitable habitat with large logs, rocky outcrops and abundant woody debris occurs in woodland on and around the plateau in the south-eastern corner of the Project Area.</p>

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			<p>and sand plain areas with dense ground vegetation.</p> <p>There is no delineation between breeding, dispersal and foraging habitat for this species. However, microhabitat features required for this species include cavities under and between partly buried rocks, logs and tree stumps as well as abandoned animal burrows.</p>	<p>Habitat mapping for this species within the Project Area excludes SEVT and small, isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road (Boobook 2022).</p> <p>Habitat for Yakka Skink is typically associated with REs 11.3.2, 11.3.17, 11.3.19, 11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.7, 11.9.10, 11.10.7 and / or 11.10.11.</p> <p>Open-forests to low-woodlands and scrub in QLD RE Land Zones (LZ) 3, 4, 5, 7, 8, 9 and 10. Colonies have been found in large hollow logs, cavities or burrows under large fallen trees, tree stumps, logs, stick-raked piles, large rocks and rock piles, dense ground-covering vegetation, and deeply eroded gullies, tunnels and sinkholes.</p>	
Fitzroy River Turtle ( <i>Rheodytes leukops</i> )	V	V	<p>The Fitzroy River Turtle is located mainly in rivers that contain large deep pools associated with rocky, sandy or gravel-based substrates, connected by shallow riffles. Areas that the species prefers are associated with higher water clarity and the species Ribbonweed (<i>Vallisneria sp.</i>) is often dominated in the creek beds.</p>	-	<p>This species is considered unlikely to occur within the Project Area due to lack of rivers with large deep pools and rocky or sandy substrates. Project Area is located at the southern-most extent of this species' modelled distribution.</p>
White-throated Snapping Turtle ( <i>Elseya albagula</i> )	CE	CE	<p>The White-throated Snapping Turtle prefers clear, flowing, well-oxygenated waters for its habitat. The species prefers waterways with permanent flowing water, with undercut banks, large woody debris, deep pools (or approximately 6 m deep) and shallow riffle zones.</p>	-	<p>This species is considered unlikely to occur within the Project Area due to the lack of well-flowing rivers with permanently flowing water with large woody debris.</p>
<b>Threatened Fish</b>					

Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
Murray Cod ( <i>Maccullochella peelii</i> )	V	-	This species is considered a main channel specialist but will occur in floodplains when inundated. They prefer complex structural features that slow the flow of water and provide ambush points, including rocks, snags, tree stumps and overhanging vegetation in water deeper than 2.4 m flowing less than 0.2 m/s.  <b>Breeding habitat:</b> Nests in sunken logs, submerged rocks or excavated depressions in clay banks. Eggs and newly hatched larvae (up to 11 days old) are guarded by the male.	-	This species is considered unlikely to occur within the Project Area due to lack of permanent channels with deep water.
<b>Threatened Invertebrates</b>					
Brigalow Woodland Snail ( <i>Adclarkia cameroni</i> )	E	V	Found in remnant Eucalypt and Brigalow woodland associated with the Condamine River floodplain, centred on the area between Dalby and Miles/Condamine (TSSC 2016b). This species does not occur in highly fragmented habitats.  The Brigalow Woodland Snail requires both canopy cover (from trees and/or shrubs) and woody debris among leaf litter to maintain adequate microhabitat humidity levels for breeding and to avoid desiccation (TSSC 2016b). It is likely that the species can aestivate during dry periods, however, the possible extent of these periods is not known. The mobility, and therefore capacity for dispersal, of this species is very limited.	-	This species is considered unlikely to occur within the Project Area due to the highly fragmented nature of the Project Area. Any Eucalypt and Brigalow woodland is present in isolated and fragmented patches, rendering it unsuitable for this species. Additionally, only a portion of the Project Area is within the modelled distribution where the species or species habitat may occur. The Project Area is outside the known distribution and separated from known occurrences by substantial barriers of unsuitable habitat. There are no validated records of the species within 50 km of the Project Area (refer to Appendix I of the EAR).
Dulacca Woodland Snail ( <i>Adclarkia dulacca</i> )	E	E	This species occurs in a small number of isolated populations in the areas between Miles and Dulacca, and south to Meandarra (TSSC 2016c). This species inhabits a variety of remnant and scattered habitats, such as	Essential habitat comprises remnant and regrowth Brigalow woodland and forest, and SEVT. The species favours areas with abundant leaf litter and woody debris.	Potential habitat of fragmented, isolated patches of Brigalow woodlands are present in areas across the Project Area. Species has the potential to occur in Eucalyptus and Acacia regrowth areas and



Species	EPBC Act status	NC Act status	Community or habitat description	Habitat definition rules*	Site specific considerations
			vine thicket and Brigalow woodland patches on rocky outcrops with clay to loam soils, as well as ironbark and <i>Acacia shirleyi</i> woodlands on ridges and <i>Eucalyptus woollsiana</i> woodland. The Dulacca Woodland Snail is also able to exist in areas of brigalow regrowth and even in cleared paddocks but only where logs, woody debris or other suitable microhabitat sites remain (TSSC 2016c). This species can also shelter under loose bark at the base of trees. The Dulacca Woodland Snail requires both canopy cover (from trees and/or shrubs) and rocks or woody debris to maintain adequate microhabitat humidity levels for breeding and to avoid desiccation (TSSC 2016c). It is likely that the species can aestivate during dry periods, however, the possible extent of these periods is not known. The mobility of this species is limited, however, it will move between areas of suitable microhabitat.	<p>General habitat comprises woodland and open forest of the nominated RE that are connected to patches of essential habitat (Boobook 2022).</p> <p>Essential habitat for Dulacca Woodland Snail is typically associated with REs 11.9.4, 11.9.5 and / or 11.9.5a.</p> <p>General habitat for Dulacca Woodland Snail is typically associated with REs 11.3.1, 11.3.4, 11.3.19, 11.5.1, 11.5.5, 11.9.2, 11.9.10, 11.10.7</p>	paddock trees where microhabitat (abundant leaf litter and woody debris) is present.

\* Some habitat definition rules include only those habitats and REs present in the Project Area.

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# Appendix B – Detailed Ecological Assessment

## Methodology

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The purpose of this Ecological Assessment Methodology is to define the ecology survey methods to be applied prior to the commencement of any clearing or other works. These surveys are referred to in this report as pre-clearance surveys.

### 1.0 Vegetation Community Assessment

Baseline assessments of the vegetation communities, including ground-truthed regional ecosystem (GTRE) mapping and threatened ecological community surveys, have been conducted to an acceptable level of detail and covered the relevant sections of the Field Development Area (Boobook 2022). Acceptable survey effort has been applied to classify and map habitat areas for known, likely, and potentially occurring species and communities. The habitat mapping is sufficiently detailed and supported by sufficient coverage of sampling points, however, as the Project will be developed over approximately 5 to 10 years and the pre-clearance surveys will closely inspect each proposed disturbance footprint, there is the potential for vegetation and ecological communities to change at the time the pre-clearance surveys are completed.

The pre-clearance surveys will be completed prior to disturbances in the Project Area to reassess the vegetation, ecological communities and habitat present at the time of disturbance. The ecology survey area will extend a minimum of 30 m beyond the Project infrastructure footprint. The following sections detail the pre-clearance methodology that will be implemented for the Project.

#### 1.1 Regional Ecosystem Assessment

All vegetation within and immediately surrounding (i.e. within the 30 m survey buffer area) each proposed infrastructure footprint will be assessed, including the extent, classification and extent of ground-truth vegetation communities in accordance with the *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland, version 6.0* (Nelder et al. 2022). Where necessary, this will include tertiary and quaternary vegetation assessments, however it is likely that quaternary assessments will suffice in most situations, due to the assessments previously undertaken (Boobook 2022).

Quaternary site assessments will be necessary to verify Regional Ecosystems (REs) and previous vegetation mapping and confirm dominant characteristic species. During quaternary site assessments, the following information will be recorded (Neldner et al. 2022):

- Location;
- Dominant species present;
- Condition status (i.e., remnant, high-value regrowth, regrowth, non-remnant);
- Other notes, which may include land zone, structural codes, ecologically dominant layer (EDL) height, EDL cover, description of extent; and
- Time-encoded digital photographs will be taken as a reference.

Tertiary site assessments will be undertaken where Quaternary site assessments find that the vegetation present is indicative of a different RE to that which is currently mapped or remnant vegetation or High Value Regrowth is present where this is not currently mapped. Tertiary site assessments will be undertaken within a 10 m x 50 m quadrat, recording the following information (Neldner et al. 2022):

- Location;
- Vegetation structure, mean height and percentage cover for each structural layer;
- Species composition of woody species, individual woody species cover by layer and basal area measure of abundance (of woody stems using the Bitterlich stick method);
- Species composition of the dominant or conspicuous species in the ground layer;

- Aspect and slope;
- Soil type;
- Landform;
- Disturbance type and severity;
- RE and remnant status; and
- Time-encoded digital photographs will be taken as a reference.

Condition status for woody vegetation will be evaluated using the definitions of remnant vegetation under the Queensland *Vegetation Management Act 1999* (VM Act):

Remnant: woody vegetation that has not been cleared or vegetation that has been cleared but where the dominant canopy has greater than 70 % of the height and greater than 50 % of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.

High-value regrowth (HVR): areas previously cleared or disturbed (e.g. by wildfire) over 15 years ago and containing woody vegetation floristically and structurally consistent with the RE but typically less than 70 % of the height and less than 50 % density of the RE.

Regrowth or non-remnant: areas previously cleared or otherwise significantly disturbed.

## 1.2 Threatened Ecological Community (TEC) Assessments

Threatened Ecological Community assessments will be undertaken to confirm the presence and condition of TECs identified as known or potential in the Project Area, namely:

Brigalow (*Acacia harpophylla* dominant and co-dominant) – Endangered; and

Poplar Box Grassy Woodland on Alluvial Plains – Endangered.

The results of the regional ecosystem assessment will be used to assess a patch of vegetation against the descriptors and condition thresholds in the relevant Conservation Advice. The relevant TECs, listed above, can be identified in any season and no specific timing of surveys is required to conduct these assessments.

## 1.3 Targeted Threatened Flora Surveys

Targeted flora surveys of all known, likely or potential threatened flora species will be conducted within all proposed disturbance footprints and adjacent (30 m buffer) areas.

These surveys shall be conducted by a suitably qualified person using the random meander method, as detailed by Cropper (1993). All threatened flora species and the locations of all individuals will be recorded and specimens collected of any unknown individuals, or if the species needs to be further confirmed by the Queensland Herbarium.

Where a threatened flora species is detected, a population survey shall be undertaken to determine the extent and density of the population.

## 2.0 Fauna Habitat Assessment

Fauna habitat baseline assessments have been conducted to an adequate level of detail to enable known, likely and potentially present species to be identified and a comprehensive Project impact assessment has been completed (ERM 2023).

Senex has committed to not clearing any areas confirmed as habitat for threatened species (listed in this Constraints Protocol), with the exception of Koala dispersal habitat and Echidna habitat.

The pre-clearance surveys will be completed prior to disturbance in each area and will extend for a minimum of 30 m beyond the proposed infrastructure footprint. The pre-clearance surveys will reassess the habitat present at the time of disturbance in order to refine mapped habitat areas and will also survey and record micro-habitat features and breeding sites to facilitate avoidance and minimisation of impacts to potentially

utilised micro-habitat features and breeding sites. Recorded micro-habitat features will include:

- Hollow-bearing trees;
- Dead standing trees;
- Hollow logs;
- Termite mounds;
- Woody debris;
- Surface rocks;
- Gilgais;
- Soil cracks / cracking clay;
- Rocky outcrops, crevices, overhangs and caves;
- Mistletoes;
- Nests;
- Animal burrows;
- Watercourses, wetlands and dams (including proximity); and
- Any other significant habitat features, or values present, such as dense leaf litter, heavily decorticating bark, dense grass/shrub shelter, seeding grass cover, fruiting plants, nectar and pollen producing plants and koala food trees.

### **3.0 Active Threatened Fauna Surveys**

Active fauna surveys of all known, likely or potential threatened fauna species will be conducted where suitable potential habitat is mapped or found to be present within or within 30 m of a proposed disturbance footprint (refer to the constraints mapping and the habitat descriptions in Appendix A). If any sedentary and limited mobility fauna species (e.g., *Dulacca Woodland Snail*) is recorded outside of its mapped potential habitat, additional surveys will be undertaken where habitat aligns with the habitat in which the new record was found to occur. These areas of new habitat will be added to the species habitat mapping and used to update the constraint layers. Habitat mapping rules will also be reviewed and updated.

Active searches will be completed when disturbance is proposed within 30 m of suitable habitat. The active searches will be in accordance with relevant survey guidelines in effect at the time of the survey or other equivalent survey methodology taking into account the fact that no known, likely or potential species will be considered absent due to non-detection (i.e. all known, likely and potentially present MNES fauna will be assumed to be present). All suitable habitat will be avoided and infrastructure siting and mitigation measures will be designed to minimise the risk of indirect impacts. The active fauna surveys will include the methods detailed in the table below.

Should an unexpected threatened species that was a listed MNES threatened species at the time of the decision on the referral (19 May 2023) be identified during the pre-clearance surveys, Senex's Constraints Protocol and its commitments equally apply.



**Table 1 Active fauna survey methodology**

Method	Target fauna	Description
Active searches	Birds, mammals, reptiles, amphibians and invertebrates	Active searches will be conducted by scanning trees, the ground and habitat features; overturning rocks, logs and other woody debris; searching under peeling bark; raking leaf litter and soil at the base of trees; and flushing birds from dense shrubs and groundcover. Care shall be taken to minimise disturbance to individuals and habitat features at all times.
Scat and sign searches	Birds, mammals, reptiles and invertebrates	Searches for signs, including tracks, scratch marks, scats, bat roosts (in hollows of dead trees and branches for Corben's Long-eared Bat), dens, nests, bones, fur, feathers, burrows, latrine sites, basking sites, foraging diggings, signs of feeding (including orts (chewed she-oak cones) and Yellow-bellied Glider feeding scars), and dead snail shells.
Diurnal bird surveys	Birds	Area searches or transects, recording sightings and calls.
Incidental observations	Birds, mammals, reptiles, amphibians and invertebrates	All fauna observed incidentally within and in close proximity to the proposed disturbance footprint will be recorded.

#### 4.0 References for Detailed Ecological Assessment Methodology

Boobook. (2022). Broadscale Ecological Assessment Report. Senex Atlas 3 Gasfield Project – Survey of Terrestrial Ecological Values. Report prepared for ERM. 14 November 2022.

Cropper, S.C. (1993). *Management of Endangered Plants*. CSIRO Australia, Melbourne.

ERM (2023) Atlas Stage 3 Gas Project Terrestrial and Aquatic Ecology Assessment Report.

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F, Richter, D., Addicott, E.P. and Appelman, C.N. (2022). *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 6.0*. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.





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