



Atlas Stage 3 Gas Project

Terrestrial and Aquatic Ecology
Assessment Report

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22 March 2024

Atlas Stage 3 Gas Project

Terrestrial and Aquatic Ecology Assessment Report



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ACRONYMS AND ABBREVIATIONS

Name	Description
ALA	Atlas of Living Australia
APLNG	Australia Pacific LNG Pty Limited
ATP	Authority to Prospect
ATW	Access to Work
AU	Assessment Unit
Biosecurity Act	<i>Biosecurity Act 2014</i>
CE	Critically Endangered
DAF	Department of Agriculture and Fisheries
DAMS	Development Assessment Mapping System
DES	Department of Environment and Science
DEHP	Department of Environment and Heritage Protection
DEHWA	Department of Environment, Water, Heritage and the Arts
DIWA	Directory of Important Wetlands in Australia
DCCEEW	Department of Climate Change, Energy the Environment and Water
DoEE	Department of Environment and Energy
DoR	Department of Resources
DNRM	Department of Natural Resources and Mining
EA	Environmental Authority
EIS	Environmental Impact Statement
E/EN	Endangered
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESA	Environmentally Sensitive Areas
Fisheries Act	<i>Fisheries Act 1994</i>
GDE	Groundwater Dependent Ecosystem
HDD	Horizontal Directional Drill
HES	High Ecological Significance
HEV	High Ecological Value
LC	Least Concern
MSES	Matter of State Environmental Significance
NC Act	<i>Nature Conservation Act 1992</i>
NC	No Concern
OC	Of Concern
PA	<i>Planning Act 2016</i>
PL	Petroleum Lease
PMST	Protected Matters Search Tool
PPE	Personal Protective Equipment
PR	Planning Regulation 2017
RE	Regional Ecosystem
RPZ	Riparian Protection Zone

ACRONYMS AND ABBREVIATIONS

SDAP	State Development Assessment Provisions
SEVT	Semi-Evergreen Vine Thicket
SIG 1.1	Significant Impact Guidelines 1.1 - Matters of National Environmental Significance
SLC	Special Least Concern
SPA	<i>Sustainable Planning Act 2009</i>
SPRAT	Species Profile and Threats Database
SRI	Significant Residual Impact
SRI Guideline	<i>Queensland Environmental Offsets Policy – Significant Residual Impact Guideline 2014</i>
TEC	Threatened Ecological Community
TSSC	Threatened Species Scientific Committee
V/VU	Vulnerable
VM Act	<i>Vegetative Management Act 1999</i>
Water Act	<i>Water Act 2000</i>
WO	Wildlife Online
WoNS	Weeds of National Significance

EXECUTIVE SUMMARY

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Senex Energy Pty Ltd (Senex) to document the terrestrial and aquatic ecological values to support the development of approvals documentation for the Atlas Stage 3 Gas Project (the Project, and the 'proposed action') in the Surat Basin in southern-central Queensland. This Ecological Assessment Report (EAR) will be used to support the preparation and submission of approval documentation.

The Project will involve up to 151 new gas wells and associated well site facilities; gas and water gathering systems for the producing wells; access tracks for operational purposes; brine and produced water storages; borrow pits; and ancillary supporting facilities. The Project Area is based upon Petroleum Lease (PL) 445, the northern part of PL 209, Authority to Prospect (ATP) 2059 (Petroleum Lease Application 1127) and parts of PL 1037.

The term 'Project Area' in this report is the Field Development Area (FDA) discussed in the Preliminary Documentation summary report. The disturbance footprint, where direct impacts will occur will be up to 530 ha.

The gas field will be progressively developed over a period of approximately 5 – 10 years. The average maximum production rate of the Project is expected to be approximately 60 terajoules per day, although variable potential production rates may be higher at times. Field development is planned to move generally from the north towards the south over the life of the Project.

This EAR documents the assessment of terrestrial and aquatic ecological values within the Project Area with a focus on the

impacts to MNES and matters of state environmental significance (MSES). The EAR documents potential risks to biodiversity values and approaches to minimise the risk through avoidance, mitigation, and management measures.

Both terrestrial and aquatic ecological values of the Project Area were assessed using information obtained from desktop sources and field surveys conducted by suitably qualified ecologists in accordance with relevant government guidelines. Desktop sources included available mapping products and species database records. The outcomes of the desktop assessment and field surveys were analysed to inform a likelihood of occurrence assessment relating to listed threatened species and ecological communities.

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 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 (stream orders 2 - 5) intersect the Project Area, with named watercourses including Woleebie Creek, Conloi Creek, Hellhole Creek and Wandoan Creek. Terrestrial and aquatic habitats demonstrated varying levels of degradation, including cattle grazing, clearing, erosion and invasive species and most aquatic habitats surveyed are of limited ecological value. Across all sample sites, aquatic macrophyte diversity was poor with the highest diversity recorded in a billabong adjacent to Wandoan Creek.

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. Most of the Project Area is cleared with 9.5% mapped as remnant vegetation and as such 90.5% of the Project is classified cleared areas with non-native pastures.

Potential impacts to MNES and MSES were assessed against the following guidelines:

- MSES: Queensland Environmental Offsets Policy – Significant Residual Impact Guideline (Department of Environment [DoE], 2014) (SRI Guideline); and

- MNES: Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (Department of Environment, Heritage, Water, and the Arts [DEHWA], 2013) (SIG 1.1).

MNES Ecological Findings

For MNES protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), two listed threatened ecological communities (TEC), six listed threatened species (five fauna, one flora) are known or likely to occur within the Project Area, 16 species (14 fauna, two flora) are considered potentially occurring, one migratory (but not threatened) species that is likely to occur and six migratory species are potentially occurring, due to direct field observations and habitat assessments within the Project Area or recent historical records.

The TECs are Brigalow (*Acacia harpophylla* dominant and co-dominant) and Poplar Box Grassy Woodland on Alluvial Plains.

The listed threatened species known or likely to occur in the Project Area include Ooline (*Cadellia pentastylis*), Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW, and the ACT), Greater Glider (central and southern) (*Petauroides volans*), South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*), Dulacca Woodland Snail (*Adclarkia dulacca*) and White-throated Needletail (*Hirundapus caudacutus*).

The listed threatened species that are considered potentially occurring in the Project Area include included Belson's Panic (*Homopholis belsonii*), and Slender Tylophora (*Vincetoxicum forsteri*), Australian Painted Snipe (*Rostratula australis*), Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*), Collared Delma (*Delma torquata*), Corben's Long-eared Bat (*Nyctophilus corbeni*), Diamond Firetail (*Stagonopleura guttata*), Dunmall's Snake (*Furina dunmalli*), Five-clawed Worm-skink (*Anomalopus mackayi*), Grey Snake (*Hemiaspis damelii*), Northern Quoll (*Dasyurus hallucatus*), Painted Honeyeater (*Grantiella picta*), Southern Whiteface (*Aphelocephala leucopsis*), Southern Squatter Pigeon (*Geophaps scripta scripta*), Yakka Skink (*Egernia rugosa*), and Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*).

The listed migratory species included the White-throated Needletail (*Hirundapus caudacutus*) and Fork-tailed Swift (*Apus pacificus*).

Additionally, the Request for Information (RFI) listed several species to be included in the assessments; most of these species are considered unlikely to occur. These species include Bluegrass (*Dichanthium setosum*), *Calytrix gurulmundensis*, Curly-bark Wattle (*Acacia curranii*), and Brigalow Woodland Snail (*Adclarkia cameroni*).

MSES Ecological Findings

For MSES protected under the *Nature Conservation Act QLD 1992* (NC Act), the Project Area was found to contain Regulated Vegetation as well as NC Act listed threatened species protected wildlife habitat as follows:

- Regulated Vegetation that is Category B - Endangered and Of Concern Regional Ecosystems [RE];
- Regulated Vegetation that is Category C – high value regrowth;
- Regulated Vegetation that is Category R – Great Barrier Reef riverine vegetation;
- Regulated Vegetation that is Essential Habitat;
- Regulated Vegetation that is within the defined disturbance of a watercourse;
- Protected wildlife habitat for vulnerable, endangered, or special least concern listed flora and fauna species which included:
 - Dulacca Woodland Snail (*Adclarkia dulacca*);
 - Fork-tailed Swift (*Apus pacificus*);

- Golden-tailed Gecko (*Strophurus taenicauda*);
- Greater Glider (southern and central) (*Petauroides volans*);
- Koala (*Phascolarctos cinereus*);
- Ooline (*Cadellia pentastylis*);
- Pale Imperial Hairstreak (*Jalmenus eubulus*);
- Short-beaked Echidna (*Tachyglossus aculeatus*);
- South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*);
- White-throated Needletail (*Hirundapus caudacutus*).

Potential Impacts

Potential impacts, though proportionally small in relation to the Project Area, considered as part of the Project include the following:

- Clearing of native vegetation and habitat for threatened and migratory species and threatened ecological communities;
- Introduction and/or spread of weed species;
- Disturbance or displacement to fauna species from foraging or roosting habitat, or breeding places;
- Degradation of threatened species habitats or threatened ecological communities as a result of dust, erosion or accidental release of hazardous materials;
- Habitat fragmentation;
- Inhibiting the ability of ecological communities or species to adapt and survive predicted climate change effects (for example through impeding migration pathways or inhibiting access to refuge areas); and
- Fauna injury during construction activities and movement of machinery/vehicles.

KCB (2024) have determined that no impacts to Groundwater Dependent Ecosystems are likely as a result of the Project.

Mitigation and Management Measures

Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land). Prior to undertaking activities that have potential to result in significant disturbance to land, an ecological survey to confirm on-ground habitat values will be undertaken by a suitably qualified person.

Further mitigation measures that will be implemented to mitigate impacts resulting from the Project include:

- Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001];
- Atlas Stage 3 Gas Project Significant Species Management Plan;
- Implementing the Senex Queensland Fauna and Stock Management Procedure [SENEX-CORP-EN-PRC-021];
- Weed and pest management measures through the implementation of the Senex Biosecurity Management Plan Queensland Operations [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023];

- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-015];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];
- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-014];
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017];
- Delineation of 'no-go' areas clearly indicated for avoidance;
- Restricting access tracks to only low-level traffic with restricted speed;
- Erosion and sediment control measures;
- Dust management; and
- Appropriate storage and handling of fuel, oil and chemicals and appropriate spill response equipment.

Significant Impact Assessment Outcomes

The significant impact assessments undertaken in accordance with SIG 1.1 assessed the potential impacts as well as the implemented mitigation and management measures, to determine whether the Project would result in any significant residual impacts to likely or known MNES.

MNES Significant Impact Assessment Outcomes:

Significant impact assessment outcomes for MNES TECs in the Project Area are as follows:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) is present as 17 patches totalling 95.8 ha (<1%) of the Project Area, all of which will be avoided by the Project; and
- Poplar Box Grassy Woodland on Alluvial Plains is present as 10 patches totalling 32.3 ha (<0.4%) of the Project Area, all of which will be avoided by the Project.

The significant impact assessment outcomes for listed threatened and/or migratory MNES that have been assessed as known or likely to occur:

- Dulacca Woodland Snail (*Adclarkia dulacca*) totalling 666.3 ha of habitat within the Project Area, will be avoided through careful design of the Project such that any direct disturbance to habitat for the species will be avoided by the Project;
- South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*) totalling 1,003 ha of habitat within the Project Area, will be avoided through careful design of the Project such that any direct disturbance to habitat for the species will be avoided by the Project;
- Greater Glider (southern and central) (*Petauroides volans*) totalling 528 ha of habitat within the Project Area, will be avoided through careful design of the Project such that any direct disturbance to habitat for the species will be avoided by the Project;
- Koala (*Phascolarctos cinereus*) totalling 698.5 ha of foraging and breeding habitat within the Project Area, will be avoided through careful design of the Project such that no foraging and breeding habitat for the species will be cleared. A total of 9,072.6 ha of Koala dispersal habitat occurs within the Project Area and impact upon this habitat will be minimised through careful design of the Project such that any direct disturbance to habitat for the species will not exceed 530 ha and the ability for Koalas to disperse across the landscape will not be impeded; and
- Habitat for Ooline (*Cadellia pentastylis*) is made up of 118.7 ha of habitat consisting of relatively narrow remnant and regrowth patches in the far south of the Project Area, all of which will be avoided by the Project. Senex has committed to avoiding all individual plants (should any be found to occur within the proposed disturbance footprints). Additional targeted flora surveys will be conducted within and immediately surrounding (e.g., 30 m buffer) the disturbance footprint

during the pre-clearance surveys to ensure that if any individual plants are present, they will be avoided. The Project will also be preferentially located within previously cleared areas.

It is noted that the White-throated Needletail (*Hirundapus caudacutus*) is known to occur within the Project Area, however it is likely only to be an aerial flyover visitor due to the lack of suitable roosting areas in the Project Area. Therefore, no habitat will be directly or indirectly impacted for this species. Further, the White-throated Needletail along with the Fork-tailed Swift were identified as listed migratory species known and likely to occur respectively. As with the White-throated Needletail, the Fork-tailed Swift was concluded to be an aerial flyover visitor only and so both migratory species were concluded to not be at risk of a significant impact from the Project.

MSES Significant Impact Assessment Outcomes:

Based on the assessment conducted in this EAR, there was concluded to be no Significant Residual Impact (SRI) to MSES, based on an assessment against the SRI Guidelines, for the following reasons;

- Regulated Vegetation that is Category B – Regulated Vegetation that is Category B is present as 10 patches totalling 334.8 ha (<3.5%) of the Project Area, all of which will be avoided. Therefore no SRI will result;
- Regulated Vegetation that is Category C – Regulated Vegetation that is Category C is present as 4 patches (potentially of RE 11.9.5) totalling 38.4 ha (<0.4%) of the Project Area, all of which will be avoided. No SRI will result;
- Regulated Vegetation that is Category R – Regulated Vegetation that is Category R totals 595.4 ha (<6.2%) of the Project Area, all of which will be avoided. No SRI will result;
- Regulated Vegetation that is Essential Habitat – Regulated Vegetation that is Essential Habitat totals 96.3 ha (<1%) of the Project Area, all of which will be avoided. No SRI will result;
- Regulated Vegetation that is within the defined disturbance of a watercourse – all of which will be avoided. Thus, no SRI will result;
- Protected wildlife habitat for listed fauna – for species known or likely to occur, there will be no SRI because no potential habitat for each fauna species will be cleared, with the exception of Koala dispersal habitat and Short-beaked Echidna habitat. This represents a relatively small proportion of the total habitat available for each in the Project Area:
 - Dulacca Woodland Snail (*Adclarkia dulacca*) (666.3 ha habitat – 0 ha of total habitat will be disturbed);
 - Greater Glider (*Petauroides volans*) (528 ha habitat – 0 ha of total habitat will be disturbed);
 - Koala (*Phascolarctos cinereus*) (698.5 ha preferred breeding and foraging habitat and 9,072.6 ha general dispersal habitat – 0 ha of total preferred foraging and breeding habitat and up to 530 ha or 5.8% of total general dispersal habitat will be disturbed);
 - Pale Imperial Hairstreak (*Jalmenus eubulus*) (180.2 ha habitat – 0 ha of total habitat will be disturbed);
 - Short-beaked Echidna (*Tachyglossus aculeatus*) (9,772 ha habitat – up to 530 ha or 5.4% of total habitat will be disturbed);
 - South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*) (1,003 ha habitat – 0 ha of total habitat will be disturbed); and
 - White-throated Needletail (*Hirundapus caudacutus*) (no habitat mapped as aerial flyover visitor only to the Project Area).

Protected wildlife habitat for listed flora – for the only threatened flora species known or likely to occur in the Project Area, Ooline, there will be no SRI because there will be no direct disturbance within the 118.7 ha of mapped habitat. Additional targeted flora surveys will be conducted within and immediate

surrounding (e.g., 30 m buffer) the disturbance footprint as part of the preclearance surveys as part of the application of the Project's mitigation measures to ensure that if any individual Ooline plants are present they can be avoided. Additionally, as stated, the Project will be completely located within previously cleared areas.

Environmentally Sensitive Areas (ESA)

There are no Category A ESA within the Project Area. Category B ESA within the Project Area are ground-truthed endangered RE (Biodiversity Status), which consists of patches of the following Regional Ecosystems (RE): 11.3.17, 11.9.5, 11.9.5a and 11.9.10. Category C ESA within the Project Area include ground-truthed remnant and regrowth vegetation within government mapped areas of 'essential habitat' or 'essential regrowth habitat', and Of Concern RE (Biodiversity Status), which comprises the following REs: 11.3.2, 11.3.4, 11.3.25, 11.3.27f and 11.9.7. It is noted that there will be no clearing within any ESA as a result of the Project.

Concluding Remark

As the vast majority (90.5%) of the Project Area is cleared and managed for agricultural land uses, the Project will generally be able to avoid direct impacts to MNES and MSES species and naturally vegetated habitat areas. Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat. The Project's mitigation measures, including Senex's Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] will be used to guide infrastructure siting, minimise direct and indirect disturbances and ensure the Project's total direct disturbance footprint is limited to 0 ha impact to MNES and MSES habitats that are not already cleared.

As detailed in the MNES and MSES impact assessments provided in Appendix F and Appendix G respectively, the Project has been assessed against the relevant Commonwealth and State guidelines and it has been determined that, with the implementation of the proposed controls and mitigation measures, the Project is unlikely to result in any significant direct or indirect impacts to any MNES or MSES.

The Atlas Stage 3 Gas Project will be serviced by the Atlas to Reedy Creek (ARC) Pipeline which is the subject of a separate referral under the EPBC Act (EPBC 2023/09585). An assessment of cumulative impacts for both the ARC Pipeline and the Atlas Stage 3 Gas Project, determined that these projects would not result in a significant cumulative impact on any MNES.

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Senex Energy Pty Ltd (Senex) to document the terrestrial and aquatic ecological values to support the development of approvals documentation for the Atlas Stage 3 Gas Project (the Project, and the 'proposed action') in the Surat Basin in southern-central Queensland. This report is herein referred to as the Ecology Assessment Report (EAR).

Senex, on behalf of its subsidiaries Senex Assets Pty Ltd and Senex Assets 2 Pty Ltd, proposes to develop, operate, decommission, and rehabilitate new coal seam gas wells and associated infrastructure on Petroleum Lease based upon PL 445, the northern part of PL 209, Authority to Prospect (ATP) 2059 [Petroleum Lease Application (PL(A)) 1127] and parts of PL 1037 in the central part of the Surat Basin, Queensland. The term 'Project Area' used hereafter refers to the area within which the Project will occur (although the mapped 'Project Area' excludes the area west of Woleebee Creek in PL 1037 in which a new brine storage will be sited close to the existing Atlas CSG Project water treatment facility). It is noted that this assessment has included consideration of the new brine storage proposed west of Woleebee Creek. The term 'Project Area' in this report equates to the 'Field Development Area' discussed in the Preliminary Documentation. The up to 530 ha area where direct impacts will occur within the Project Area, will be referred to as the disturbance footprint.

Ecology field surveys and assessment of ecological values were conducted by ecological specialists, with BOOBOOK Ecological Consulting Pty Ltd (BOOBOOK) and Attexo Group Pty Ltd (Attexo) completing the terrestrial component (BOOBOOK, 2022; Attexo, 2023) and Freshwater Ecology Consulting Pty Ltd (Freshwater Ecology) conducting the aquatic component (Freshwater Ecology, 2022).

The Project was referred to the Commonwealth Department of the Climate Change, Energy, Environment and Water (DCCEEW) on 17 November 2022. A request for further information (RFI) was made by DCCEEW to make a controlled action decision on 19 January 2023. Senex responded to this RFI on 27 April 2023. On 12 May 2023, DCCEEW issued a notice of suspension of the Referral Decision Timeframe Period to 19 May 2023. On 19 May 2023, the Project (the action) was deemed a controlled action, to be assessed by Preliminary Documentation (PD). On 6 June 2023, a RFI pursuant to the PD was issued.

This report has been updated to account for the matters of national environmental significance (MNES) listed threatened species and communities (Sections 18 & 18A of the EPBC Act) within the RFI for the PD. The RFI also requires Senex to 'be aware of any changes to the distribution of listed threatened species and ecological communities, and information available in the Species Profile and Threats (SPRAT) Database. Senex must ensure that a recent Protected Matters Search Tool (PMST) report has been generated and considered before finalising the draft PD.' Since this report is an attachment to the PD, this EAR has been updated to account for the species listed in the RFI for the PD, and those which have been listed on contemporary PMST searches that account for potential changes in likely and known species distributions and/or EPBC Act listing events.

1.1 Project Area Context

The Project Area consists of the ATP 2059 (PL(A) 1127), PL 445, PL 209 (northern portion) and PL 1037 (parts thereof) development blocks and includes parts of 28 cadastral land parcels comprising private and leasehold lands along with road reserves and easements. The approximately 9,772 hectare (ha) Project Area is within an established gas-producing region. The Project Area extends 10 to 25 km southwest of Wandoan and is accessed via Jackson-Wandoan Road, Gurulmundi Road, Giligulgul Road and local roads. The Project Area is within the boundary of Western Downs Regional Council, southern inland Queensland.

The Project Area is within the Brigalow Belt Bioregion and straddles a diffuse boundary between Subregion 25 (Taroom Downs) in the north and Subregion 26 (Southern Downs) in the south (Sattler and Williams 1999). ATP 2059 (PL(A) 1127) and PL 445 are entirely within Taroom Downs. The northern quarter of PL 209, south to the Woleebee Creek and Conloi Creek floodplains, is also within Taroom Downs, with the remainder in Southern Downs. The Project Area and context is presented on Figure 1-1 and Figure 1-2.

1.2 Purpose of the Ecological Assessment Report

The purpose of this EAR is to document the assessment of the terrestrial and aquatic ecological values within the Project Area, and in turn identify risks to biodiversity values as well as avoidance, mitigation, and management measures to minimise impacts to biodiversity values. This EAR will support the development of the design, construction and operation of the Project and the approval applications required under Queensland State legislation and the EPBC Act.

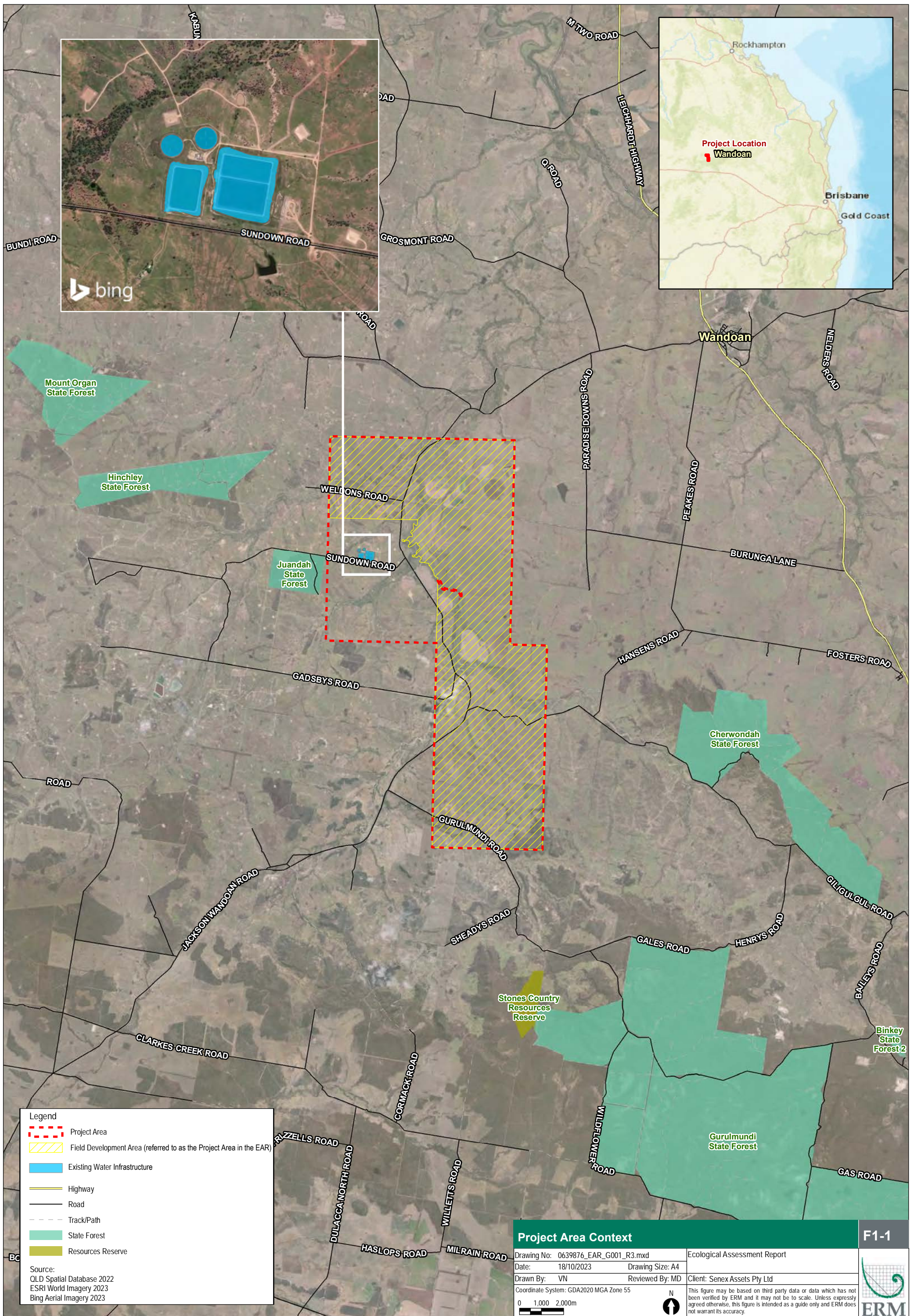
This EAR has been updated to account for listing events under the EPBC Act the subsequent PD RFI and up to the point of submission as an attachment to the draft PD to DCCEEW for adequacy review prior to publication for public comment.

1.3 Objectives

The scope of the EAR includes the assessment of terrestrial and aquatic species and habitats associated with the Project Area, with particular focus on the following:

- Identify the potential presence of listed threatened communities and species and their associated habitat in the Project Area, based on desktop and field collected information pursuant to the conversation status and known or modelled distributions at the time of writing;
- Describe and map ecologically significant flora and fauna habitats, including MNES and Matters of State Environmental Significance (MSES), based on desktop and field verified information;
- Evaluate the ecological significance (values and constraints) of the Project Area;
- Assess the potential impacts of the Project on the ecological values in the Project Area, including specific conservation significant species that may be at risk from the Project; and
- Provide recommendations for avoidance, mitigation, and management of potential impacts to maintain the ecological values in the Project Area.

While the current assessment focuses on Project-specific impacts to MNES, consideration has also been given to cumulative impacts of the Atlas Stage 3 Gas Project (the Project) and the ARC Pipeline (the subject of a separate referral under the EPBC Act).

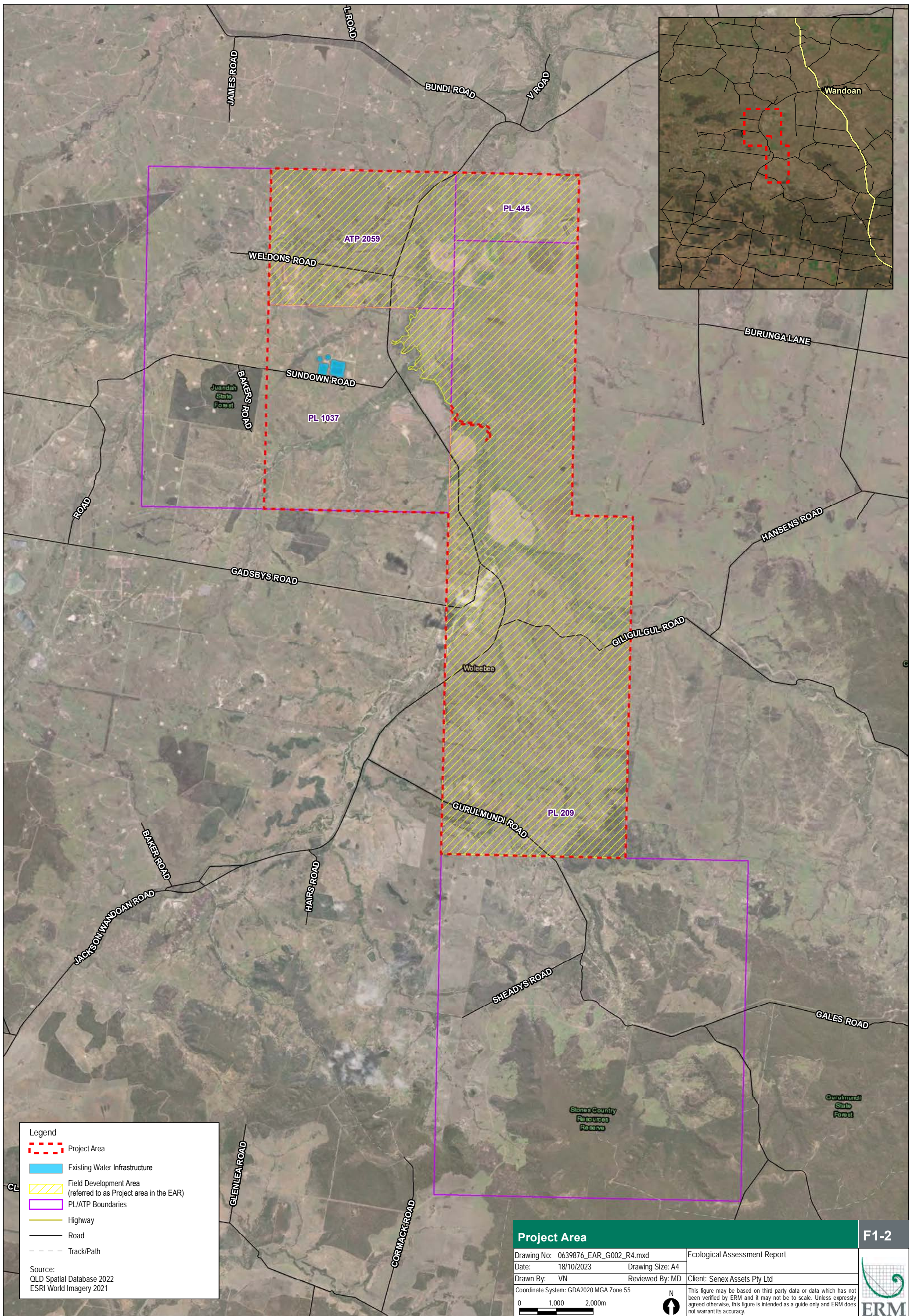


Legend

- Project Area
- Field Development Area (referred to as the Project Area in the EAR)
- Existing Water Infrastructure
- Highway
- Road
- Track/Path
- State Forest
- Resources Reserve

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2023
 Bing Aerial Imagery 2023

Project Area Context		F1-1
Drawing No: 0639876_EAR_G001_R3.mxd	Ecological Assessment Report	
Date: 18/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> 0 1,000 2,000m </div>	<div style="display: flex; align-items: center; justify-content: center;"> N </div>	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>



Legend

- Project Area
- Existing Water Infrastructure
- Field Development Area (referred to as Project area in the EAR)
- PL/ATP Boundaries
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Project Area		F1-2
Drawing No: 0639876_EAR_G002_R4.mxd		Ecological Assessment Report
Date: 18/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
0 1,000 2,000m 		N
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

1.4 Project Description

The Project (proposed action) will involve up to 151 gas wells and associated well site facilities; gas and water gathering systems for the producing wells; access tracks for operational purposes; brine and produced water storages; borrow pits; and ancillary supporting facilities.

The Project Area is based upon PL 445, the northern part of PL 209, ATP 2059 (PL(A) 1127) and parts of PL 1037 (including the part that is east of Woleebee Creek). Figure 1-2 shows the relative location of each tenement. The Project Area excludes the part of the Project Area where the yet unconfirmed site for a new up to 300 ML Atlas Stage 3 brine storage will be located west of Woleebee Creek within previously cleared parts of eastern PL 1037. This storage will be proximate to the existing water management facilities including the existing 100 ML of brine storage and planned additional ≤ 200 ML of brine storage for Atlas CSG Project which are not part of the Project (noting the Atlas CSG Project referral (EPBC 2018-8329) included allowance for up to 300 ML of brine storage). The proposed ≤ 300 ML Atlas Stage 3 brine storage is part of the Project, and it is accepted this storage will be located away from any significant environmental values. The new Atlas Stage 3 brine storage location in PL 1037 will be located within a cleared area that has been subject to earlier ecology assessments for Senex's existing Atlas CSG Project (EPBC 2018-8329) and final siting will be subject to Senex's Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] (as detailed in Section 1.4.6) to ensure impacts to significant environmental values are avoided.

An application to convert ATP 2059 to a PL under the *Queensland Petroleum and Gas (Production and Safety) Act 2004* was lodged with the Queensland Government, PL(A) 1127. The term ATP 2059 in this report therefore includes any renewal, replacement, substitution, consolidation, subdivision, variation or extension of the ATP 2059 tenement. The EA for ATP 2059 currently permits standard exploration activities. When the PL(A)1127 over this area is granted, an EA will be issued for the production activities. This EA will be required prior to the commencement of production activities on the new PL(A)1127. PL 445 and PL 209 were purchased from Australia Pacific LNG Pty Limited (APLNG) in late 2021. The Environmental Authorities for these PLs were transferred to Senex in early 2022 as part of the purchase. Development of these PL areas by APLNG has received approval under the Commonwealth EPBC Act in 2011 as part of APLNG's approval over a larger area 'to develop, construct, operate and decommission the coal seam gas field component of the Australia Pacific LNG Project in the Walloons gas fields within the Surat Basin in south central Queensland' (EPBC 2009/4974). However, the EPBC Act does not provide for the partial transfer of a component of a larger project to a new proponent. As such, Senex has completed additional assessments and developed this EAR to support the EPBC Act and Queensland State approvals. It is noted that the scale of the project (e.g. density of wells) previously approved within PL 445 and the northern portion of PL 209 as part of APLNG's larger project remains the same or less intense. The gas resource in southern portion of PL 209 is deeper than in the north and within geological strata with greatly reduced permeability. The commercial viability of extracting gas from this area is uncertain and Senex currently has no plans to develop this area.

The gas field will be progressively developed over a period of approximately 5 – 10 years. The average maximum production rate of the Project is expected to be approximately 60 terajoules per day, although variable potential production rates may be higher at times. Field development is planned to move generally from the north towards the south over the life of the Project.

1.4.1 Production Wells

Wells will generally be spaced 500 – 750 m apart. The up to 151 planned wells will be designed, constructed, decommissioned, and rehabilitated in accordance with the Queensland Code of Practice for constructing and abandonment of petroleum wells and associated bores in Queensland (Department of Natural Resources, Mines and Energy (Version 2), 16 December 2019). The code outlines mandatory requirements and good practice to achieve long term well integrity and appropriately reduce the risk of environmental harm.

Well sites will generally be constructed in an area of approximately 80 m by 70 m allowing the initial drilling and completion of the well (installing surface facilities). The layout and size of well sites will vary depending on the size and type of drilling rig, the program for completion of the well and the surrounding environment. Typically, 0.6 ha is required although smaller areas may be utilised where topography and vegetation cover allow. In some cases, up to approximately 1 ha is required to accommodate site constraints. Wells pads are designed and located based on flood modelling to avoid areas of concentrated flow such as gullies and waterways. Some well pads may require cut batter and fill batter that will have a local or minor impact to runoff on sloping land.

Well construction will involve a drill rig and other equipment such as drill fluid pumps, storage and processing and storage for water supply, fuel, and chemicals. Following initial drilling and commissioning of the well, sites will be partially rehabilitated, leaving an area of approximately 60 m by 60 m allowing an adequate area for workover rig operations.

Options for the management of residual drilling material to be used for the Project include onsite and offsite options. Where onsite management options are proposed, this will be undertaken in accordance with state approvals which require for the assessment of quality, potential impacts and implementation of management measures.

Following the well drilling phase, the wells will be completed, and a pump installed to dewater the production reservoir. Separate connections will be provided at the well head for the gas and water streams. It is expected that produced water will be pumped to the surface by a downhole progressive cavity pump and connected from the wellhead tubing.

The standard well site facility will be fenced and generally consist of:

- A wellhead gas and water metering package;
- Gas and water separation equipment;
- Initially, natural gas power generation package to provide power for the electric motor driving the downhole pump (noting that it is possible that in future years wells may be powered by alternative sources including solar, hybrid and distributed power);
- Fuel and instrument gas scrubber to power the generator and supply gas to instruments;
- Sand/particulate filter separator for water and gas streams; and
- Surface pressure piping constructed of steel to the required specification and connection to gathering system.

It will generally take up to 6 months to dewater each production well sufficiently for gas to flow; approximately 18 months to reach peak production. Once depleted of gas, wells will be progressively decommissioned and rehabilitated throughout the Project life. Decommissioning of individual wells is not expected to occur until after the well has been producing for at least 15 years but could be much longer (anticipated to be decommissioned between 20 and 50 years). The targeted maximum production rate is estimated to be between 300 – 950 thousand standard cubic feet (Mscf) per well per day.

In total the disturbance footprint required during construction of the 151 wells will total up to approximately 100 ha and after construction will occupy up to approximately 60 ha. All the areas to be utilised have been previously cleared. At the completion of the project all well pads will be rehabilitated to the condition of the adjoining land. An example of the Project infrastructure is provided in Photograph 1.1 to Photograph 1.3.



Photograph 1-1: Right of way at pipe installation stage showing temporary disturbance



Photograph 1-2: Intersection of two rights of way post construction showing no impedance to fauna dispersal



Photograph 1-3: Typical coal seam gas well infrastructure showing small footprint and no barrier to fauna dispersal

1.4.2 Gathering System

Gas and water from the wellsite facilities will be transported via the gas and water gathering system. The buried gathering system will enable gas at low pressure and water to flow through separate buried High-Density Polyethylene (HDPE) pipelines, up to 650 mm outer diameter.

To install the gathering lines, 18 m wide right of way (RoW) will require some vegetation to be removed, a trench to be excavated, pipeline laid, the trench backfilled, and RoW reinstated (a 24 m wide RoW will be required during construction for approximately 15 km of major trunk lines). In accordance with the Environmental Authority (EA) the RoW will be reinstated and re-profiled to a level consistent with surrounding soils, original contours and established drainage lines so as not to impede surface water flows. Where possible, RoWs will be aligned with existing roads/tracks, fence or power lines or other linear infrastructure to minimise disturbance to native vegetation and overall impact on land users. In general, the RoWs will be rehabilitated except for a 6 m wide access tracks earthen access tracks which will be maintained along the RoW for ongoing operational access.

The gas gathering system will typically operate at 70 – 400 kilopascal gauge (kPag) (with a Maximum Allowable Operating Pressure of 615 kPag). The water gathering system will typically operate at 140 – 700 kPag (with a maximum operating pressure of approximately 1350 kPag).

Water will be transported to water processing facilities and gas to gas processing facilities through the gathering system.

The Project will avoid impacting riparian vegetation through design and will be applying the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001]. The Project includes the following construction methodology for crossings of watercourses:

- Horizontal Directional Drill (HDD) gathering system crossings of Woleebee Creek within PL 1037 to avoid impacts to the watercourse;
- Several HDD are being considered for gathering system crossings of Woleebee Creek and other drainage features in PL 209; and

- Several HDD are being considered for gathering system crossings of Woleebee Creek, Wandoan Creek and other drainage features in ATP 2059.

HDD may be used to avoid impacts to watercourses and adjacent MNES habitat however there are a range of issues that limit its use more widely, including the nature of the subsurface soil and bedrock materials at a proposed crossing and the ecological values potentially impacted adjacent to the riparian crossing. The potential issues will be assessed on a site-by-site basis during the Project operations. In any case, Senex have committed to avoidance of all TECs and MNES habitat (with the exception of Koala and Southern Squatter Pigeon dispersal habitat which is all in previously cleared areas).

After post-construction rehabilitation, the disturbance footprint for the gas and water gathering system will utilise up to approximately 80 ha. At the completion of the Project, any areas not required to remain as access tracks for the use of the landholder, will be rehabilitated by re-contouring disturbed areas to match the surrounding land.

1.4.3 Water Management

Groundwater will be abstracted (pumped) from CSG production wells to depressurise the target production of coal seams. It is expected that the action will generate produced water up to a maximum rate of 6.5 ML per day.

The water management process for the produced water is expected to involve:

- New pre-engineered above ground tanks and/or purpose-built earthen dams with impervious liners and leakage detection/collection systems, which may be established on PL 209. However, to minimise impacts and improve operational efficiency, some of the water will be transferred to centrally located aggregation and brine storages that are already established for the Atlas CSG Project (EPBC 2018/8329) (these facilities are not part of the Project).
- The existing Water Treatment Facility (WTF) on PL 1037 established for the Atlas CSG Project (EPBC 2018/8329) (the WTF is not part of the Project) will treat water from the Project. Subject to water production rates and other field development characteristics, an additional WTF may also be constructed on PL 209. This additional WTF is part of the Project. If required an additional WTF is required, it will be sited using the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] to ensure that there will be no significant impact to any listed MNES threatened species or TEC. As part of the WTF site selection risk assessment process potential impacts to MNES surface water values will be evaluated.
- Brine from the water treatment process will be stored in a new brine storage dam (up to 300 ML) which will be developed on PL 1037 and is part of the Project. Additional brine storage (up to 300 ML) may also be required on PL 209 if a WTF is established there. Further brine treatment options including concentration via solar evaporation may be used and result in a concentrated slurry or solid salt product.

In total, approximately 30 ha of brine storage and approximately 30ha of water storage will be established on previously cleared land for the Project.

The brine and water storage will be located in areas that avoid floodplains, shallow groundwater systems and other environmentally sensitive locations. Site preparation will involve removal of topsoil, excavation and compaction of subsoil and placement of impermeable/low permeability layers with leak detection/collection systems. All storages infrastructures which is considered regulated structures under the EA for the Project will be required to meet the Manual for assessing consequence categories and hydraulic performance of structures (DES 2016). An application for one or more regulated structures must, where the location of the regulated structure is known, include a copy of the most recent consequence assessment undertaken for that regulated structure as per the Guideline for Structures which are dams or levees constructed as part of environmentally relevant activities (DES 2022).

For a dam to be considered a regulated dam, it must be determined to be in the 'significant' or 'high' consequence category, and a detailed dam design report must be submitted to Queensland Department of Environment, Science and Industry (DESI) following granting of the EA or as part of an EA Application. The following will apply with respect to any regulated dams required for the Project:

- Senex will design and construct dams in accordance with relevant legislation and Queensland standards and DESI guidelines;
- An independent third-party will be engaged to certify dams to ensure design, construction and hydraulic performance meet the design plan;
- Dams will be constructed under the supervision of a suitably qualified and experienced person and in accordance with the relevant DESI schedule of conditions relating to dam design, construction, inspection, and mandatory reporting requirements; and
- Senex will implement a seepage monitoring program for water storage dams, where required. The seepage monitoring program will identify infrastructure and procedures that are in place to detect loss of containment as early as possible.

Any low-hazard dams required for CSG water storage will be designed in accordance with accepted engineering standards. The dams will be designed with a floor and sides comprising material capable of containing the water for the life of the project.

1.4.4 Temporary Accommodation Facilities

It is expected that temporary accommodation facilities will be required for construction and drilling activities. These facilities would be assembled onsite using prefabricated modular units with basic amenities such as modular sewage treatment plants and water tanks. It is expected that the temporary accommodation facilities would occupy up to approximately 20 ha of previously cleared land.

1.4.5 Other Ancillary Facilities and Incidental Petroleum Activities

It is expected that the following additional facilities and activities will be required to support construction and operations:

- Laydown, stockpile, and site office areas (up to approximately 45 ha of previously cleared land);
- Borrow pits (up to approximately 11 ha of previously cleared land);
- Power/communication lines (overhead or underground);
- Plant and equipment service and maintenance facilities and workshops;
- Construction support, warehousing, and administration buildings;
- Fuel and chemical storage;
- Washdown facilities;
- Ancillary infrastructure such as communications infrastructure, water supply and holding tanks and dams and energy supply;
- Groundwater monitoring bores installed to ensure the early detection of potential groundwater impacts in the alluvium and underlying geological formations resulting from CSG production;
- Environmental monitoring equipment and management controls; and
- Ecological, topographic, cadastral, geological, geophysical, and geotechnical surveys.

1.4.6 Pre-construction/Pre-clearing Activities

Senex have developed the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] to guide site selection to ensure impacts upon environmental values are avoided and minimised.

The protocol includes the following steps:

- Desktop environmental constraints analysis;
- Site surveys including environmental and cultural heritage clearance surveys (where required, additional species-specific targeted field-based surveys are undertaken) – findings are documented within a standardised Biodiversity Values Report;
- Post-survey environmental constraints analysis (which includes location refinements to further avoid and minimise impacts to field validated values, identification of no-access areas, identify site specific mitigation measures and controls); and
- Environmental constraints reporting (confirming siting complies with relevant approvals including disturbance limits and secondary approvals, quantifying any unavoidable impacts and identifying required mitigation measures).

1.4.7 Clearing and Civil Works

Most of the Project Area has been subject to extensive disturbance with approximately 90.5% being cleared of remnant native vegetation. Of the maximum ground disturbance area of up to 530 ha (4.3%) for the entire action, Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land).

Before the drill rig is mobilised to site, the drill site and access tracks are prepared through:

- Avoidance of timbered areas in nearly all cases. However, where individual trees/woody vegetation is present and unavoidable, it will be cleared within the well lease and access tracks and stored at the edge of disturbed areas for later use in rehabilitation. Recoverable timber hollows, larger rocks and other features will be stored for later microhabitat rehabilitation. Grasses and other ground covers will then be graded from the well pad footprint; and
- Topsoil removal using earthmoving equipment. This is stockpiled to one side of the lease and/or access track for later use in rehabilitation. Final earthmoving equipment preparations, such as site levelling are then completed.

Other civil works will be required for other infrastructure such as brine storage, water storage, temporary accommodation facilities, laydown areas, stockpile and site office areas, and other infrastructure.

All clearing and civils work will be undertaken in accordance with following management plans:

- Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001];
- Atlas Stage 3 Gas Project Significant Species Management Plan;
- Implementing the Senex Queensland Fauna and Stock Management Procedure [SENEX-CORP-EN-PRC-021];
- Weed and pest management measures through the implementation of the Senex Biosecurity Management Plan Queensland Operations [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023];
- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLAS-EN-PLN-015];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];

- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-014]; and
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017].

1.4.8 Ongoing Maintenance and Operations

The gas field will be progressively developed over a period of between approximately 5 – 10 years. Once all wells are producing, activities will transition to maintenance and operation of the existing infrastructure. This will include visual inspection and maintenance of well, gathering and water infrastructure equipment. All wells will also be monitored remotely with field staff responding through well visits as changes to normal operations are detected.

The well bore itself will generally be serviced by a workover rig approximately every three years, although some wells are expected to require more frequent servicing depending on performance.

The gathering system and access tracks will also be regularly monitored by field staff as they undertake well inspections and maintenance works (e.g., re-grading). In the unlikely event maintenance of gathering systems (in the form of pipeline maintenance) is required, ground disturbance and partial trenching will be experienced.

Rehabilitated areas will also be regularly monitored and maintained in accordance with the Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018] and the requirements of the EA.

All maintenance and operational work will be undertaken in accordance with following management plans:

- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLAS-EN-PLN-015];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];
- Atlas Stage 3 Gas Project Significant Species Management Plan;
- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-014]; and
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017].

1.4.9 Decommissioning and Remediation

A maximum ground disturbance area of up to 530 ha (4.3%) for the Project is expected. Rehabilitation of some initial construction disturbances will commence early in the action and continue progressively so that a much smaller proportion will be occupied at any point in time. In almost all cases, surface infrastructure and temporary construction footprints will be located in previously cleared and disturbed areas.

Once operations have ceased, infrastructure will be decommissioned unless retention and transfer of ownership of assets is agreed with the landholder. Disturbed areas will be rehabilitated in accordance with the Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018] and the requirements of the EA. Rehabilitation will be undertaken progressively as disturbed land is no longer required for operational purposes in accordance with the relevant EA. This will include reprofiling disturbed land to original contours, re-establishment of surface drainage lines, re-establishment of ground cover vegetation and ensuring the rehabilitated land is safe and stable. Where the landholder and regulatory authority agree in writing, infrastructure such as access tracks and dams may be retained onsite for landholder use.

2. LEGISLATION AND POLICY CONTEXT

This EAR has been undertaken with consideration of Commonwealth, State and Local regulatory frameworks and associated legislation. Table 2-1 summarises the relevant legislation and policies to this EAR.

Table 2-1: Key Legislation and Policies

Act/Policy	Administering Authority	Purpose
Commonwealth Legislation		
<i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	Department of Climate Change, Energy, Environment and Water (DCCEEW)	This Act administers the protection of the environment within Australia – protecting MNES, which include: <ul style="list-style-type: none"> ■ World heritage properties; ■ National heritage properties; ■ Wetlands of international importance; ■ Threatened species and ecological communities; ■ Migratory species; ■ Commonwealth marine areas; ■ The Great Barrier Reef Marine Park; ■ Nuclear Actions (include. Uranium mines); and ■ Water Resources.
EPBC Act Environmental Offsets Policy 2012	DCCEEW	This Policy applies where a significant residual impact on an MNES is expected to occur as a result of the proposed development. The policy provides guidance on the role of offsets and when a proposed offset is considered suitable.
State Legislation		
<i>Environmental Protection Act 1994</i>	Department of Environment, Science and Industry (DESI)	EA applications for petroleum activities are assessed under this Act, which considers the impact of proposed projects to environmental values, including biodiversity values. Environmentally Sensitive Areas (ESA) are listed under the subordinate Environmental Protection Regulation 2008. ESAs include three categories i.e. A, B and C, reflecting the hierarchy of their importance to nature conservation. The EA Application Requirements for Petroleum Activities (Department of Environment and Heritage Protection [DEHP], 2013) provide for protection zones around these ESAs i.e.: <ul style="list-style-type: none"> ■ Primary Protection Zone – an area within 200 m of the boundary of a Cat A, B or C ESA; and ■ Secondary Protection Zone – an area within 100 m of the boundary of a Cat A or B ESA. The assessment identifies the biodiversity values and assesses the impact of the project on those values.
<i>Nature Conservation Act 1992 (NC Act)</i>	DESI	The Act and Regulations provides a framework for the creation and management of protected areas and protection of native species. It includes designation of threatened species status and provides for protected plant trigger areas.

Act/Policy	Administering Authority	Purpose
<i>Vegetation Management Act 1999 (VM Act)</i>	Department of Resources (DoR)	The VM Act is the regulatory framework for the management of vegetation using the Regional Ecosystem (RE) classification system. It regulates the broad scale clearing of vegetation, with the intent of conserving remnant vegetation, preventing the loss of biodiversity, maintaining ecological processes and allowing for sustainable use. There are clearing exemptions for some work activities.
<i>Biosecurity Act 2014 (and Regulation)</i>	Department of Agriculture and Fisheries (DAF)	This Act provides for the management of biosecurity risks in Queensland. The Act provides measures to safeguard Queensland economy, environment, agricultural and tourism industries and way of life from pests, diseases and contaminants. Restricted matters are assigned a category (or categories) from 1 to 7, with each category placing restrictions on the dealings with the matter.
<i>Environmental Offsets Framework (Environmental Offsets Act 2014 and Regulation, Environmental Offsets Policy Version 1.7)</i>	DESI	An environmental offset condition may be imposed under various State assessment frameworks for an activity that will or is likely to have a significant residual impact on a prescribed environmental matter that is a MSES. There is a guideline to assist in determining whether or not a significant residual impact is likely.
<i>Petroleum and Gas (Production and Safety) Act 2004</i>	DoR	The purpose of the Queensland <i>Petroleum and Gas (Production and Safety) Act 2004</i> is to regulate the exploration, production, and safety aspects of petroleum and gas activities in the state of Queensland, Australia. The Act provides a legal framework for the responsible development and operation of the petroleum and gas industry while ensuring the protection of public safety, the environment, and the rights of landholders.
<i>Fisheries Act 1994 (Fisheries Act)</i>	DAF	The Fisheries Act provides the principal legislative framework for the regulation around fishing activities and areas that are fish habitat within a given area. This outlines how activities are to be conducted given the importance of the habitat for fish. All waters are protected against degradation by direct or indirect impacts associated with development activities. Measures designed to protect fisheries resources include the declaration of fish habitat areas, protection of marine plants and designation of waterways for fish passage.
<i>Water Act 2000 (Water Act)</i>	DoR	The Water Act provides the framework for the planning and sustainable use and management of groundwater and surface water in Queensland. It also sets up conditions and controls the activities that may impact upon water resources and quality. The Department of Resources Watercourse Identification Map identifies watercourses and drainage features mapped under the Water Act.

2.1 Convention on Conservation of Nature in the South Pacific (Apia Convention)

The Convention of Conservation of Nature in the South Pacific (Apia Convention) is a multilateral environmental agreement, which was signed in Apia, Samoa in 1976 and came into effect in June 1990. The purpose of the Apia convention is to commit the relevant Parties to take action for the conservation, utilisation and development of the natural resources of the South Pacific region through careful planning and management for the benefit of present and future generations.

In order to pursue the objective of the Convention the Parties:

- Undertake to create protected areas to safeguard representative samples of natural ecosystems, superlative scenery, striking geological formations and regions and objects of aesthetic, historic, cultural or scientific value;
- Commit to not alter national parks so as to reduce their area except after the fullest investigation; their resources are not to be subject to commercial exploitation; hunting and collection of species are to be prohibited and provision is to be made for visitors;
- Agree to maintain lists of indigenous fauna and flora in danger of extinction and to give such species as complete protection as possible; and
- Provision may be made as appropriate for customary use of areas and species in accordance with traditional cultural practices.

Senex considers the action is not inconsistent with the Convention of Conservation of Nature in the South Pacific. The action is not proposed in protected areas, conservation reserves or national parks. The project has assessed both the listed threatened species of national importance and those listed under the *Nature Conservation Act 1992* to determine what protection measures are necessary to safeguard them whilst undertaking the action, including migratory species which are likely or known to utilise the area. The project prohibits the hunting, killing, capture or collection of any indigenous flora and fauna and includes training for staff on the importance of listed threatened species and the management plans in place for their protection. Additionally, the proposed action was found to be unlikely to cause significant impacts to any listed threatened communities or species or listed migratory species. These findings and the ability of the proposed action to be developed with minimal impact upon the site's ecological communities, species and systems confirm that the proposed action will not be inconsistent with Australia's obligation under the Apia Convention.

2.2 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between multiple governments (including Australia, effective 1976) to ensure the international trade in wildlife does not threaten wild populations of flora and fauna. In total, there are approximately 30,000 flora species and 5,600 fauna species listed under CITES. In Australia, the CITES Management Authority is the DCCEEW. CITES primarily deals with the international trade of endangered and threatened species of wildlife and plants, aiming to prevent their exploitation for commercial purposes. Gas extraction involved with the Project, while it may have environmental impacts, is not directly related to the trade of such species.

The Commonwealth and Queensland regulatory framework is designed to ensure environmental sustainability, and the Project is therefore subject to strict environmental impact assessments and mitigation measures as evidenced in this report, the SMP and EMP. Through the Constraints Protocol, potential harm to local wildlife is minimised, thereby aligning with the principles of CITES. Through further assessments and proactive conservation efforts, the Project is expected to be in compliant with international conservation agreements and safeguards the region's unique biodiversity. The proposed action does not involve international or any other trade in wildlife and Senex supports the complete suite of domestic measures Australia has adopted for improved conservation and tighter restrictions on trade of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) listed species.

3. ASSESSMENT METHODOLOGY

3.1 Overview

This Section outlines the methodology implemented to collect data to describe the ecological values in the Project Area, inform avoidance measures, and assess likely impacts so that appropriate management and mitigation measures can be proposed. Overall, the assessment consisted of a desktop review to identify values that may be present, and which then helped to guide the development and implementation of a field survey and sampling program to describe on-ground conditions and to assess the known, likely, and potential occurrence of ecological values within the Project Area.

This EAR has used information gathered from the following sources:

- BOOBOOK Ecological Consulting Terrestrial Ecology Report (refer to Appendix C);
- Freshwater Ecology Aquatic Ecology Report (refer to Appendix D); and
- Attexo Group Threatened Flora Survey and Report (refer to Appendix E).

3.2 Desktop Review

Several desktop sources were reviewed to identify ecological values that may occur within the Project Area as listed in Table 3-1. A search area containing the Project Area and a 10 km buffer was used for the database searches. The Protected Matters Search Tool (PMST) and Wildlife Online (WO) results were cross-checked using Atlas of Living Australia (ALA) database locations of records in the context of the actual Project Area boundary.

This desktop review adheres to the requirements of the EPBC Act to undertake a desktop review of available information to identify species, that may be impacted by the Project. This desktop review, through the likelihood of occurrence analysis detailed in Section 3.4, and located in Appendix B provides information on species known, likely or with the potential to occur within the Project Area, based on species records, the availability of suitable habitat, breeding, roosting, denning and foraging sites for fauna, wetlands for waterbirds, and habitat for flora.

Desktop review for the first revision of this report was undertaken pursuant to the conservation status of species current at the time of writing. The report has been updated in accordance with the DCCEEW request for further information after the controlled action decision on 19 May 2023. The PMST has been checked weekly to account for any potential changes in likely or known species distributions, and any listing events under the EPBC Act that will result in consideration of any new conservation advices in relation to listing events.

Additional searches of species records (ALA, 2022; DES, 2022a) were made of well surveyed areas (Gurulmundi State Forest, Cherwondah State Forest) within the Western Downs Regional Council area and, separately, of records within Southern and Central Queensland of each threatened species considered as potentially occurring within the Project Area. These datasets provided a baseline for subsequent the field assessment.

Table 3-1: Databases Reviewed for Desktop Analysis

Information Source	Name	Data Description
DCCEEW	Protected Matters Search Tool (PMST)	The search tool provides predictive results of MNES based on mapping of known and potential species distribution, habitat, ecological communities, and wetlands. The outputs are based on modelling results and do not necessarily reflect known records of species or communities. The features highlighted by the search are considered further through a likelihood of occurrence assessment (see Appendix B). The PMST results can be found in Appendix A. Search area: 10 km buffer around the Project Area.
DoR	Regional Ecosystem (RE) Version 12.2 mapping	This product maps remnant vegetation communities across Queensland and identifies communities listed as endangered, of concern or least concern status.
DoR	Property Maps of Assessable Vegetation mapping (published 16 September 2021)	This product provides certified property scale maps indicating where landholders can clear regrowth in 'Category X' areas without further approval and areas where approval is required for clearing regulated vegetation. The PMAV provides a property scale regulated vegetation map which replaces the statewide regulated vegetation map published by DoR.
Queensland Government	MSES mapping	This product maps areas of MSES as defined under the QLD State Planning Policy.
DoR	Queensland Globe	A Google Earth based product that allows viewing of spatial data and imagery covering Queensland.
DESI	WO	A database that contains records of wildlife sightings including threatened flora and fauna species (protected under the NC Act) that have been provided to the agency by Government departments and external organisations. The WO results can be found with the PMST results, in Appendix A.
ala.org.au	ALA	Australia national biodiversity database (supported by the National Collaborative Research Infrastructure Strategy, CSIRO). Database contains records accessed through an interactive spatial portal. Threatened species are searched to identify known records in proximity to the Project Area.
Darling Downs Regional Council	Darling Downs Regional Plan 2013	The <i>Darling Downs Regional Plan 2013</i> provides information relating to biodiversity, and wetland and waterway corridors.

Information Source	Name	Data Description
DCCEEW	Species Profile and Threats Database (SPRAT)	The SPRAT profiles and associated conservation advice documents were consulted for the following reasons: They provide detailed information for the Likelihood of occurrence assessment on: <ul style="list-style-type: none"> ■ Species distribution; and ■ Habitat information including species-specific requirements. The conservation advice documents are particularly important for assessing Threatened Ecological Communities (TECs) found in field surveys, against the listed TEC guidelines.
BOOBOOK	Previous Ecological Surveys	Previous ecological surveys in the Senex Atlas gasfield were also considered as part of the analysis for the Project Area (BOOBOOK 2014, 2020, 2021a, 2021b, 2022a; ERM 2018).
Attexo	Previous Ecological Survey	Threatened flora surveys in the Senex Atlas gas field were also considered as part of the analysis for the Project Area (Attexo 2023).

A desktop review of publicly available databases including PMST and ALA, was conducted to identify the species occurrence records within either the Project Area, a 10 km buffer of the Project Area or the nearest record outside of the buffer. All flora and fauna species listed in the Likelihood of Occurrence table were included in this desktop review. The species were researched in the ALA database, with a 10 km buffer of the Project Area. Any species occurring within the Project Area, or the buffer area were listed, with spatial record identification provided in the respective figures. Where the species was not identified within the buffer area, this was noted and the nearest record to the Project Area was listed, irrespective of the date of record. The information gathered from this desktop review for all species included:

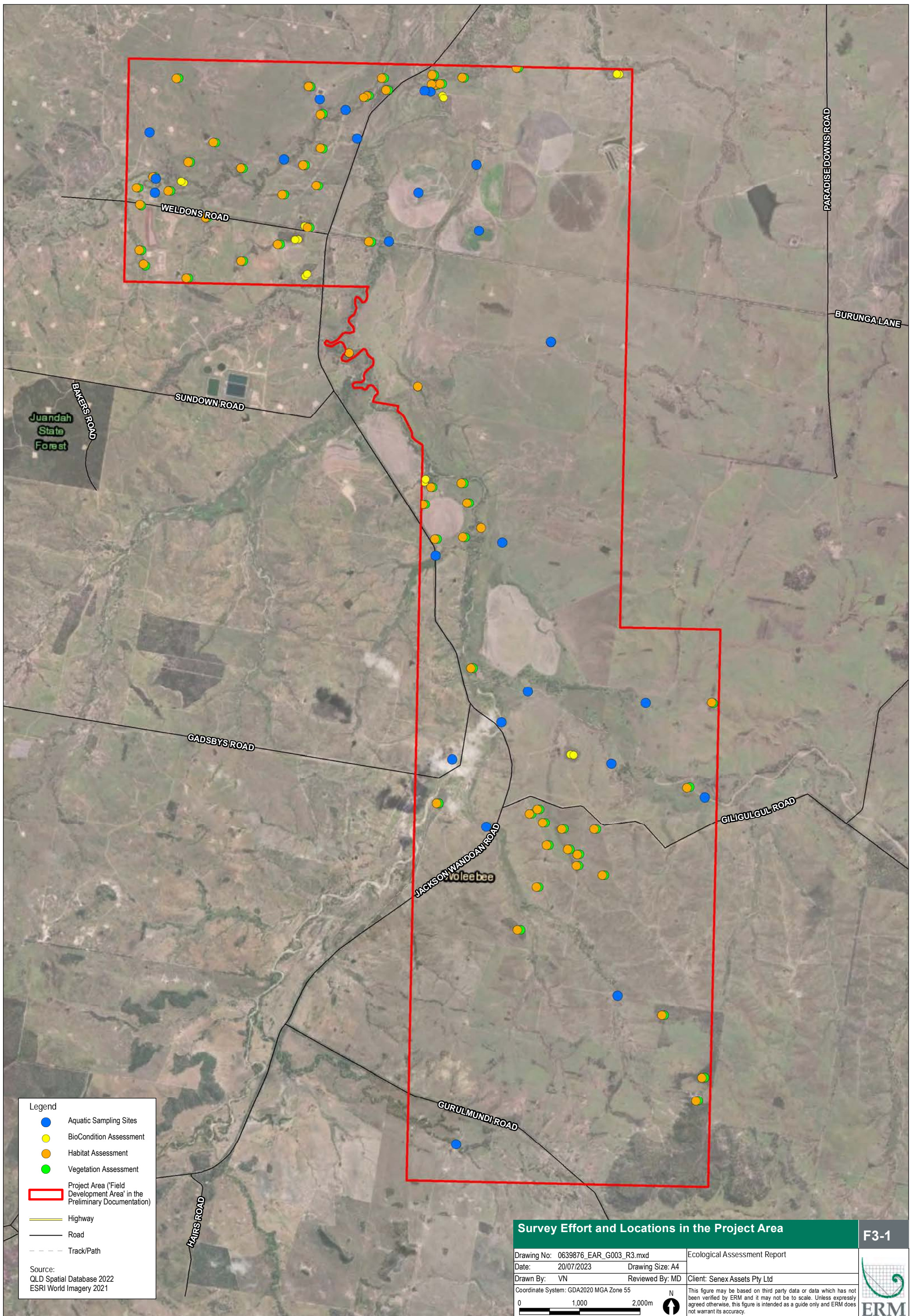
- The occurrence ID number;
- The date of the record;
- Distance from the Project Area, including direction; and
- A habitat description of where the record was found.

Records of threatened species in the broader region are identified in Appendix H.

3.3 Field Surveys

BOOBOOK Ecological Consulting undertook terrestrial field ecological surveys via targeted vehicle based and foot traverses of the Project Area, over the periods of 14 – 18th March 2022, 22 – 25th March 2022; 30 April – 5th May 2022, and 9 – 13th June 2022. Aquatic field ecological surveys were undertaken by Freshwater Ecology over an eight-day period (14 – 21st March 2022). Attexo Group undertook targeted Ooline and threatened flora surveys via vehicle based and foot traverses of the Project Area, over the periods 31st January – 3rd February 2023. The results from all terrestrial and aquatic surveys have been incorporated into this EAR. The locations of surveys undertaken over the survey periods are shown in Figure 3-1.

It is acknowledged that field surveys undertaken prior to listing events and/or SPRAT likely or known species distribution changes may not have necessarily accounted for, or targeted species that were not listed or considered likely to be present. Nonetheless general survey methodologies designed to detect the presence of species or groups of species correlating with certain habitat types are likely to detect any MNES/MSES animals or plants present within the survey areas. As such, a retrospective review has been undertaken to correlate field data with the contemporary status of relevant MNES species and communities.



Legend

- Aquatic Sampling Sites
- BioCondition Assessment
- Habitat Assessment
- Vegetation Assessment
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Highway
- Road
- Track/Path

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Survey Effort and Locations in the Project Area		F3-1
Drawing No: 0639876_EAR_G003_R3.mxd	Ecological Assessment Report	
Date: 20/07/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> <div style="margin-left: 5px;"> N ↑ </div> </div>	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.	

3.3.1 Personnel

Terrestrial field ecological surveys were conducted by suitably qualified BOOBOOK personnel Michael Cunningham (Senior Ecologist), Courtney Andrew (Graduate Ecologist) and Rosamund Aisthorpe (Botanist). All aspects of the project including field survey and reporting were conducted under the supervision of Craig Eddie (Principal Ecologist). Aquatic field ecological surveys were conducted by suitably qualified Freshwater Ecology personnel, led by Dr Timothy Howell. Targeted threatened flora surveys were conducted and led by suitably qualified Attexo personnel Chris Beavon (Principal Ecologist) and Kye Chamberlain (Professional Ecologist) (CVs for all personnel are included as part of Appendix H).

3.3.2 Terrestrial Ecology Field Survey Methodology

3.3.2.1 Vegetation Assessments

Baseline botanical surveys were undertaken to describe dominant flora and vegetation community structure within the Project Area. Ground-truthing of the RE vegetation communities (DES, 2022g) within the Project Area was undertaken using the quaternary level of data collection as described by Neldner *et al.* (2022).

Vegetation community assessments were undertaken within 50 m x 20 m plots (0.1 ha) within representative locations within the Project Area. Vegetation community polygons were verified in accordance with Queensland RE description and Biodiversity Status as per the latest updates of the Regional Ecosystem Description Database (REDD) (DES, 2021) and TEC criteria (DAWE, 2022b; Threatened Species Scientific Committee [TSSC], 2013; 2019) (BOOBOOK, 2022). The locations of vegetation and habitat survey sites are displayed in Figure 3-1, which is also included in Appendix A of BOOBOOK (2022b), attached to this EAR as Appendix C.

RE polygons were assigned to remnant or non-remnant status as defined by the *Vegetation Management Act 1999* (VM Act) (Queensland Herbarium, 2021).

Remnant vegetation is considered to have a canopy cover of over 50% and a height over 70% of the benchmark criteria of minimally disturbed vegetation of a given RE.

Areas mapped as TEC follows the specified minimum size criteria for each listed vegetation community (TSSC 2013, 2019); for the Brigalow TEC the minimum size is 0.5 ha and for the Poplar Box TEC the minimum size is 5 ha (or 1 ha if in the highest quality condition, as defined by the EPBC Act Conservation Advice). The patch size used in the assessment against the minimum size criteria included all areas where a patch extended beyond the boundary of the Project Area. No minimum size has been specified for SEVT (McDonald, 2010) however for this EAR, no patches of this TEC were located in the Project Area.

Ground-truthed areas of advanced regrowth vegetation were assigned to the floristically equivalent RE for assessment of potential ESA status.

3.3.2.2 BioCondition Assessment

BioCondition assessments were used to evaluate ecological functionality of vegetation in the Project Area. These assessments applied the methodologies described by Eyre et al. (2015). This involved the following:

- Establishment of a 100 m x 50 m plot for measurements relating to canopy layer structure and diversity;
- 100 m transect to measure canopy cover;
- 50 m x 10 m subplot for measuring plant richness in shrub and ground layers;
- 50 m x 20 m subplot for measuring coarse woody debris; and
- Five 1 x 1 m quadrats to estimate ecological components of ground cover within the assessment area.

These values were used as indicators of ecosystem function relative to minimally disturbed benchmark sites (Queensland Herbarium, 2021). Eight BioCondition assessments were undertaken to determine ecological condition of the major vegetation types in the northern part of the Project Area. These BioCondition assessments were made within remnant and regrowth of each vegetation type present within the Project Area.

BioCondition assessments involved the collection of the following information:

- General habitat description and RE type;
- Median height for canopy, emergent and sub-canopy strata;
- Slope position/slope degree and slope aspect;
- Tree species richness (within 100 m x 50 m plot);
- Native plant species richness (within 50 m x 10 m plot);
- Non-native plant cover (within 50 m x 10 m plot);
- Total length of coarse woody debris (length >10 cm diameter and >0.5 m long within 50 m x 20 m plot);
- Number and average diameter at breast height (DBH) of large Eucalypt and non-eucalypt trees (within 100 m x 50 m plot);
- Recruitment of canopy species (within the 100 m x 50 m plot);
- Tree and shrub canopy cover (within 100 m transect);
- Ground cover within 1 m x 1 m plots (native perennial grass and organic litter cover in the ground layer); and
- Disturbances (severity, last event and observation type) (BOOBOOK, 2022).

Number of large trees – large tree DBH thresholds were used according to RE benchmarks, where benchmarks were not available >30 cm DBH for eucalypts and >20 cm DBH for non-eucalypt trees were used as the qualifying criteria.

BioCondition scores were calculated by comparing in situ values from each survey site, with the corresponding RE benchmark (Queensland Herbarium, 2021). Sub-scores were calculated for each site, scores close to 0 indicate sites that are ecologically 'dysfunctional' and scores closer to 1 indicate increasing functional integrity. BioCondition surveys and score calculations were done in accordance with Eyre *et al.* (2015)

3.3.2.3 Flora Species Survey

Targeted threatened species searches were undertaken for EPBC Act and NC Act listed (August 2022) threatened flora within the Project Area (refer to Section 3.3.4 for the survey adequacy). Additional targeted flora surveys for threatened flora species will be undertaken during the pre-clearance surveys where impact to habitat values for these species is unavoidable, as outlined in the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001]. Survey effort completed to support this EAR included detailed habitat assessments, recording the condition and structure of all areas of vegetation across the site. This data has been used to assess the suitability of broad habitat types and vegetation communities to support listed threatened flora species and to map potential habitat for any that have been assessed as known, likely or potential to occur in the Project Area.

Where listed threatened species were found, the species, location and number of individuals were recorded. Many areas of vegetation beyond identified focus survey points were not visited but were mapped from viewpoints and imagery and assigned an appropriate level of confidence.

Significant weed species, Weeds of National Significance (WoNS) and *Biosecurity Act 2014* Restricted Matters, were also recorded as part of the assessment (BOOBOOK, 2022d).

Targeted threatened flora surveys were conducted from 31 January to 3 February 2023. Findings are included in Appendix E.

3.3.2.4 Fauna Species Survey

Targeted threatened species searches were undertaken for EPBC Act and NC Act listed (August 2022) threatened and/or migratory fauna within the Project Area. This involved both incidental and targeted searches in accordance with species specific survey guidelines. Incidental searches consisted of opportunistic active searches in suitable habitat while traversing the Project Area (BOOBOOK, 2022d). Targeted faunal survey techniques included timed active searches, recordings of bat calls using Anabat recorders, and spotlighting for arboreal mammals. Targeted species surveys involved the following:

- Anabat echolocation bat call detection was undertaken in two locations over two nights (8 trap nights), in the northern part of the Project Area, targeting suitable habitat for Corben's Long-eared Bat (*Nyctophilus corbeni*) (BOOBOOK, 2022d); and
- Spotlighting surveys were made in two sites, in riparian woodland along Wandoan Creek and in similar vegetation along Woleebee Creek, within the Project Area. Each spotlighting consisted of a two-hour, approximately 2 km meandering transect through habitat suitable for arboreal mammals covering all vegetation strata along the route (BOOBOOK, 2022d).

Refer to the survey adequacy assessment in Section 3.3.4. Additional active fauna searches for threatened species will be undertaken during the pre-clearance surveys, as outlined in the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001].

3.3.2.5 Fauna Habitat Assessment

Data were collected for fauna habitat features to inform the likelihood of occurrence and significant impact assessments for EPBC Act and NC Act listed fauna species (BOOBOOK, 2022d). These data were collected within the same plots surveyed as part of the vegetation assessments, including proposed infrastructure areas within non-remnant vegetation.

The parameters measured during habitat assessments included:

- Context with regard to landscape features (connectivity, proximity to water);
- Condition (weeds, evidence of disturbance, invasive species);
- Breeding and roosting habitat features (hollows, nests, caves);

- Foraging sources (flowering tree species, termite mounds);
- Microhabitat presence (woody debris, leaf litter specifically important for small mammals and reptiles);
- Wetland presence (presence of aquatic vegetation, water depth); and
- Signs of threatened species (such as scats, scratches, and tracks).

These results of such habitat assessments, along with the vegetation community assessments were used to inform the habitat mapping for EPBC Act and NC Act listed threatened and/or migratory species within the Project Area.

3.3.2.6 Environmentally Sensitive Areas

Government mapped ESA include protected estates, such as State Forests and Resource Reserves, as well as ecological features, such as endangered and of concern vegetation communities, mapped essential habitat for threatened species and ground-truthed habitat for EVNT species listed under the NC Act.

Ecological ESA identified in the desktop assessment (DES, 2022d) were ground-truthed in the field to verify the existence and extent of these features. Ground-truthing of vegetation also identified additional areas of ESA (endangered and of concern vegetation communities).

3.3.3 Aquatic Ecology Field Survey Methodology

The aquatic ecology sampling was undertaken by Freshwater Ecology from the 14 – 21st of March 2022. Sampling was conducted under General Fisheries Permit No. 207913, scientific user permit for non-protected areas WISP18336317, and Animal Ethics Approval No. CA 2020/02/1352, held by Freshwater Ecology. A summary of the aquatic survey methods is presented in this EAR, with the full details of these sampling methods and locations provided in the aquatic ecology report in Appendix D.

Thirty-two sites assessed across the Project Area (Figure 3-1) and the sampling techniques used were in line with the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy* (DES, 2018b). Assessments undertaken included:

- Aquatic habitat assessment (all 32 sites);
- In situ water quality assessment (24 sites);
- Macrophytes assessment (30 sites);
- Macroinvertebrate assessment (15 sites);
- Backpack electrofishing (13 sites);
- Fyke netting (large nets) (six sites); and
- Visual observation.

3.3.3.1 Aquatic habitat assessment

Aquatic habitat assessments were undertaken following the Australian River Assessment System (AusRivAS) protocols (DNRM, 2001). The assessments were undertaken by Dr Timothy Howell from Freshwater Ecology who is an AusRivAS accredited ecologist (CV attached as part of Appendix H). The habitat assessments included:

- Substrate composition;
- Flow, water depth and wetted width, noting if surface water was connected or comprised of one or more disconnected pools in the channel;
- Channel morphology;
- Physical habitat features, such as large woody debris, undercut banks and aquatic plants;

- Riparian vegetation cover and condition;
- Any notable disturbances including bank erosion, cattle access to waterway and barriers associated with nearby road crossings or dams; and
- Other on-site observations, such as presence of filamentous or benthic algae, surface scums, unusual sediment deposits, or fish kills.

Additional habitat inventory was completed at each site and included a general description of the environmental features and composition within, and immediately surrounding each site was undertaken at each monitoring location to assist in the interpretation of ecological data.

Aquatic habitat was assessed in accordance with *Queensland Australian River Assessment System (AUSRIVAS) Sampling and Processing Manual* (Department of Natural Resources and Mining [DNRM], 2001). Habitat bioassessment score datasheets (DNRM, 2001) were used to numerically score nine criteria, which were then allocated to one of four categories (excellent, good, moderate and poor). The sum of the numerical rating from each category produced an overall habitat condition assessment score (Table 3-2).

Table 3-2: Aquatic Habitat Bioassessment Scores

Habitat Category	Category Score Range			
	Excellent	Good	Fair	Poor
Bottom substrate/available cover	16–20	11–15	6–10	0–5
Embeddedness	16–20	11–15	6–10	0–5
Velocity/depth category	16–20	11–15	6–10	0–5
Channel alteration	12–15	8–11	4–7	0–3
Bottom scouring & deposition	12–15	8–11	4–7	0–3
Pool/riffle, run/bend ratio	12–15	8–11	4–7	0–3
Bank stability	9–10	6–8	3–5	0–2
Bank vegetative stability	9–10	6–8	3–5	0–2
Streamside cover	9–10	6–8	3–5	0–2
Total score for the Site	111–135	75–110	39–74	0–38

3.3.3.2 Surface water quality

In situ water quality data was recorded using multiparameter water quality meters. Calibrations were regularly checked in the field and all sample collections were completed in accordance with the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy* (DES, 2018) and AS/NZ 5667.6:1998 Guidance on sampling of rivers and streams (AS/NZS 1998).

The parameters assessed are presented in Table 3-3. Water quality testing was undertaken in conjunction with macroinvertebrate sampling to assist with the interpretation of results.

Table 3-3: In Situ Water Quality Measurement Parameters

Parameter	Units	Measurement Precision
Water temperature	°C	± 0.1
pH	pH units	± 0.1
Dissolved oxygen	% Saturation	± 1
Electrical conductivity	µS/cm	± 1
Turbidity	NTU	± 0.1

3.3.3.3 Aquatic Flora

Macrophyte surveys were completed following fish and macroinvertebrate surveys. All macrophyte species at each sampling site were recorded. Species were identified using Stephens & Dowling (2002), Sainty & Jacobs (2003) and MacDonald & Haslam (2016). The relative site coverage of each macrophyte species was recorded (E – extensive, M – moderate, S – some and L – little).

Macrophyte species were categorised by growth form in accordance with definitions provided in Sainty and Jacobs (2003), as follows:

- Free floating – Species that are normally unattached and float on the surface but may become attached and rooted in drying mud when water levels drop.
- Floating attached – Species that are rooted in the substrate but normally have at least the mature leaves floating on the water surface.
- Submerged– Species rooted in the substrate or free-floating submerged.
- Emergent – Species rooted in the bank substrate with stems, flowers, and most of the mature leaves projecting above the water surface.

No free floating or submerged macrophytes were recorded.

3.3.3.4 Aquatic Macroinvertebrates

Freshwater macroinvertebrates were sampled in accordance with the Monitoring and Sampling Manual: Environmental Protection (Water) Policy (DES, 2018).

A 250-micron (µm) mesh dip net fitted to a triangular frame (250 mm x 250 mm x 250 mm) was used to collect samples by first disturbing the benthos and sweeping the net through the water. The sample was evenly distributed into sorting trays and field (live) picking was completed for each sample for a minimum of 30 minutes and a maximum of one hour. Picked macroinvertebrates preserved in a 70% methylated spirits solution.

In the laboratory, macroinvertebrates were sorted, identified to the family taxonomic level and relative abundance enumerated. Samples were identified to family level with the exception of lower phyla (e.g., porifera, nematoda), oligochaetes (freshwater worms) and acarina (freshwater mites). Chironomids were identified to sub-family level in accordance with standard AusRivAS protocols (DNRM, 2001).

Enumeration and identification of macroinvertebrate samples was conducted by Susan Jones, an experienced AusRivAS accredited taxonomist. Sorting, enumeration and data entry was cross-checked by a second ecologist for 10% of the samples.

3.3.3.5 Fish

Fish surveys were conducted at each monitoring location in line with the approach outlined in the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy* (DES, 2018).

Backpack electrofishing was undertaken in waterways containing sufficient water. Sampling was carried out over a site reach spanning at least 100 m (where sufficient water was available), with care being taken to sample all macro and microhabitat types.

All electrofishing was undertaken in compliance with the Australian Code of Electrofishing Practice (NSW Fisheries, 1997) with the minimum power setting used to effectively attract and stun the fish.

Unbaited box trapping is a passive fish sampling technique that targets small bodied pelagic and benthic species. Five to 10 unbaited box traps were strategically placed at all sites for between 30 minutes and 2 hours.

3.3.3.6 Turtles

A number of sites were assessed as having sufficient water to potentially support turtles. Two fyke nets (one large and one small) were set overnight at each site sampled for turtles as well as two cathedral traps. The nets and traps were baited with tinned sardines with the cod end suspended above the water line with ropes to prevent drowning of air breathing animals. Nets were set in the late afternoon and were checked early the following morning.

3.3.3.7 Platypus

The habitat at each site was assessed for the suitability for supporting platypus. The criteria used to assess each site are shown in Table 3-4 and included water permanency, volume of water present, water quality, microhabitat diversity, submerged macrophytes, foraging habitat and burrowing habitat (Grant, 2007).

Table 3-4: Platypus Habitat Suitability Criteria

Suitability	Reason
Good	Sections dominated by deeper pools with steep undercut banks, overhanging vegetation and flowing water. Water is known, or likely, to be permanent. These areas are considered likely to be frequented by platypus.
Average	A mix of deeper pools and stretches of shallower water (<0.5 m). Some pools of water may be semi-permanent, possibly drying during severe drought. Undercut banks and overhanging vegetation is frequent, though water may be turbid. Platypus should not be excluded from these areas, though the likelihood that they could occur is lower than in 'good' habitat. These sections may not permanently support platypus through periods of prolonged drought.
Poor	Sections with shallow water; widely separated or no deep pools. Water flow is likely to be less frequent, possibly drying on a regular basis. Undercut banks and overhanging vegetation is infrequent. Poor sections are unlikely to permanently support platypus but may provide access between good and average quality habitat.

3.3.3.8 Frogs

Sampling of frogs was restricted to opportunistic visual encounter surveys and call surveys. These were undertaken during general aquatic ecology surveys. At each site suitable habitat searched for any frogs present. No frogs were heard calling, and no tadpoles were recorded.

3.3.4 *Survey Adequacy Review*

Desktop searches and subsequent baseline ecology surveys were performed prior to listing events and distribution changes for some species, which have now been accounted for in this report. A survey adequacy review has been undertaken for the completed surveys to date, as shown in Table 3-5. Additional ecological assessment surveys will be completed during pre-clearance surveys as described in the Senex Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] to ensure no significant impacts to MNES occur.

Table 3-5: Fauna and Flora Survey Adequacy Assessment

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
Listed Threatened Birds						
Australian Painted Snipe (<i>Rostratula australis</i>)	E, EN	<p>Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017).</p> <p>Searches are recommended through suitable wetland or watercourse areas, with detected via sighting and flushing at dawn and dusk.</p> <p>Targeted stationary observations – 10 hours for 5 days.</p> <p>Land-based area searches or line transects – 10 hours for 3 days.</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including bird nests, roosting sites, gilgai and potential foraging habitat.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>The Project Area contains small areas of foraging habitat within small ephemeral wetlands on drainage lines. No <i>Rostratula australis</i> were observed during the survey efforts. Surveys were conducted for all threatened birds at each habitat assessment point. The survey effort implemented partially met the guidelines for Australian Painted Snipe, as a census of all birds observed was completed at each habitat assessment point. However, no flushing surveys were conducted.</p> <p><i>The survey efforts partially meet the survey guidelines. This species was assessed as being potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied	Yes
Brown Treecreeper (south-eastern) (<i>Climacteris picumnus victoriana</i>)	V, VU	<p>Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including bird nests,</p>	<p>57 habitat assessments were conducted in eucalypt forests and woodlands and surveys were conducted for all threatened birds at each habitat assessment point. No</p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>threatened under the EPBC Act (DEWHA, 2017).</p> <p>There are no targeted survey guidelines for this species. Active searches or transects whilst recording any sightings and calls within suitable habitat is recommended. Suitable habitats include; open dry eucalypt forests and woodlands with some form of shrubby/ grassy or open understorey. Active searches for microhabitat features include; hollows within living or dead standing trees/ tree stumps.</p>	<p>roosting sites, hollow bearing logs, live trees and stags, leafy and woody litter and potential food plants.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area</p>	<p>individuals were observed during the survey efforts.</p> <p><i>As the species does not have targeted survey guidelines, and active searches were undertaken within suitable habitats whilst meandering the Project Area, the survey efforts are considered sufficient. This species was assessed as being potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>principle is being applied</p>	
Diamond Firetail (<i>Stagonopleura guttata</i>)	V, VU	<p>Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017).</p> <p>There are no targeted survey guidelines for this species. Active searches or transects whilst recording any</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including bird nests, roosting sites, grassy ground cover and potential food plants.</p>	<p>Four field surveys were conducted between March and June, with 57 habitat assessments conducted, including within eucalypt forests and woodlands. Surveys were conducted for all threatened birds at each habitat assessment point. No individuals were observed during the survey efforts.</p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		sightings and calls within suitable habitat is recommended. Suitable habitats include; grassy eucalypt, acacia, or casuarina woodlands, other suitable habitat include open forests, mallees or natural temperate grasslands. Active searches for microhabitat features include; globular structured nests within the shrubby understorey of woodland areas.	Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area	<i>As the species does not have targeted survey guidelines, and active searches were undertaken within suitable habitats whilst meandering the Project Area, the survey efforts are considered sufficient.</i> <i>This species was assessed as being potential to occur as per the Likelihood of Occurrence in Appendix B.</i>		
Painted Honeyeater (<i>Grantiella picta</i>)	V, VU	Targeted species survey guidelines: Painted honeyeater (<i>Grantiella picta</i>) (Rowland, J., 2012). Area searches (during breeding season being August – February) involve systematically searching for birds and signs of their presence (e.g., nesting habitat), as well as listening for their calls, throughout the Project Area (DEWHA, 2010). Surveys for this species should be conducted	57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including bird nests, roosting sites, grassy ground cover and potential food plants including Mistletoe. Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.	Four field surveys were conducted between March and June, outside of the optimal survey timeframes for the species (August – February). Surveys were conducted for all threatened birds at each habitat assessment point. The species was not recorded during field surveys. Surveys were conducted in eucalypt forest and woodlands, with particular focus on the presence and abundance of Mistletoe and other food trees. Mistletoes were recorded during field surveys however they	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>on foot and targeted foraging and breeding habitat, which includes woodlands where mistletoes are abundant, and, when they are in fruit (Watson, 2012).</p> <p>There is currently no published information on detection probabilities for painted honeyeater. However, the recommended level of effort below is based on published data from systematic surveys of the species (Oliver et al. 2003; Barea and Watson 2007). This suggest effort may be provided reasonable opportunities to detect painted honeyeater, during optimal survey conditions, if suitable habitat is present within the project Area.</p> <p>Important to note that detectability of this species in the breeding season differs from the non-breeding season. In the non-breeding season, birds show up in</p>		<p>were considered uncommon across the Project Area.</p> <p><i>The survey efforts partially meet the survey guidelines as surveys were conducted outside of the optimal survey timeframes.</i></p> <p><i>This species was assessed as being potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>		

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>random areas outside core habitat ranges (usually in association with fruiting mistletoes) either singly or in small groups.</p> <p>Area searches minimum effort is 4 hours over 4 days.</p>				
South-eastern Glossy Black-cockatoo (<i>Calyptorhynchus lathami lathami</i>)	V, VU	<p>Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017).</p> <p>There are no targeted survey guidelines for this species. Active searches or transects whilst recording any sightings and calls within suitable habitat is recommended. Suitable foraging habitat includes eucalypt woodlands with <i>Allocasuarina</i> spp. or <i>Casuarina</i> spp. seeds. Active searches for microhabitat features include large hollows in both living and dead eucalypt trees.</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including hollows in hollow bearing trees (live and stags) and potential food plants.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>Surveys were conducted in eucalypt forest and woodlands, with particular focus on the presence and abundance food trees and hollow bearing trees (live and dead standing). Active searches for signs of recent feeding evidence in the form of chewed cones at each habitat assessment survey point that contained known food tree species. Food trees in the Project Area included Belah (<i>Casuarina cristata</i>) and Bull-oak (<i>Allocasuarina luehmannii</i>). Potential nest trees containing suitably sized hollows were observed in remnant eucalypt woodland and forests across the Project Area. The survey effort for active searches to locate evidence of foraging and nest trees was sufficient to meet the survey guidelines.</p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>Most detectable during the first and last two hours of daylight.</p> <p>Minimum survey effort:</p> <ul style="list-style-type: none"> ■ 5 hours over one day of active searches or transects on foot in foraging habitat. ■ 20 hours over four days of active searches for signs of recent feeding and nests. 		<p>Surveys were also conducted for all threatened birds at each of the 57 habitat assessment points. Although not recorded during field surveys, the species has previously been recorded within 100 m of the Project Area.</p> <p><i>Diurnal bird surveys were not conducted during the field surveys.</i></p> <p><i>Active searches were undertaken throughout the extensive survey period, and 57 habitat assessments were conducted, with particular focus on detecting species habitat features. The survey efforts partially meet the survey guidelines for the Glossy Black-cockatoo (south-eastern), through meeting active search requirement for nest trees and evidence of feeding. The survey effort for targeted observations partially met requirements through the completion of bird surveys at each habitat assessment point, as well as recording of incidental observations during the survey period. This species was assessed as being likely to occur as per the Likelihood of Occurrence in Appendix B</i></p>		

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
Southern Whiteface (<i>Aphelocephala leucopsis</i>)	V, VU	<p>Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017).</p> <p>There are no targeted survey guidelines for this species. Active searches or transects whilst recording any sightings and calls within suitable habitat is recommended. Suitable habitats include; open woodlands and shrublands that have a grassy or shrubby understorey usually dominated by Acacia or Eucalypt spp. Active searches for microhabitat features include; tree hollows in either living or dead eucalypt or acacia trees.</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including hollows in hollow bearing trees (live and stags), grassy ground cover and potential food plants.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>There are no targeted survey guidelines for the Southern Whiteface. Bird surveys were undertaken throughout the extensive survey period, and 57 habitat assessments were conducted, with particular focus on detecting species habitat features including hollow-bearing trees in eucalypt forests and woodlands.</p> <p>A census of all birds observed was completed at each habitat assessment point. The species was not recorded during field surveys.</p> <p><i>As the species does not have targeted survey guidelines, and active searches were undertaken within suitable habitats whilst meandering the Project Area, the survey efforts are considered sufficient.</i></p> <p><i>This species was assessed as being potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied	Yes
Southern Squatter Pigeon (<i>Geophaps scripta scripta</i>)	V, VU	<p>Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant</p>	<p>Surveys were conducted for Southern Squatter Pigeon throughout the Project Area in patches of grassy understorey of eucalypt woodlands,</p>	Yes, as surveys were adequate to determine the presence of potential habitat and	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>threatened under the EPBC Act (DEWHA, 2017).</p> <p>Area searches or transect surveys in suitable habitat. Flushing surveys also likely to be useful.</p> <p>Area searches or transect surveys for 15 hours over 3 days in areas less than 50 ha. Flushing surveys for 10 hours over 3 days.</p>	<p>vegetation to detect habitat features including nests and grassy ground cover.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>grasslands adjacent to woodlands and shrublands and areas close to permanent bodies of water (most typically farm dams, watering holes and ephemeral waterways).</p> <p>Surveys for birds were conducted for all threatened birds at each habitat assessment point. The survey effort implemented partially met the guidelines for the Southern Squatter Pigeon, as a census of all birds observed was completed at each habitat assessment point, however no flushing surveys were conducted.</p> <p>The species was not recorded during survey efforts.</p> <p><i>As no flushing surveys were undertaken, the survey efforts partially meet the survey guidelines for Southern Squatter Pigeon through completion of bird surveys at each habitat assessment point. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>the precautionary principle is being applied</p>	
White-throated Needletail (<i>Hirundapus caudacutus</i>)	V and Mi, VU	Species Profile and Threats Database:	57 x Habitat assessments within 50 m x 20 m (0.1 ha)	Incidental searches were conducted for all threatened birds, as well as bird	Yes, as surveys were adequate to determine	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p><i>Hirundapus caudacutus – White throated needletail (DCCEEW, 2019).</i></p> <p>There are no targeted survey guidelines for this species however DCCEEW have advice of surveying efforts. The species occurs at great elevations, being primarily aerial, when flying at lower altitudes are readily detectable. Systematic surveys are difficult due to the species mobility and ability to cover immense distances in a day. Any surveys must be conducted between October and April in northern and eastern Australia, and between December and March in south-eastern Australia.</p>	<p>plots, including infrastructure areas and non-remnant vegetation to detect habitat features including hollows in hollow bearing trees (live and stags). Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>surveys at each of the 57 habitat assessment points. Systematic surveys are considered difficult as the species is almost exclusively aerial. Four field surveys were conducted between March and June, overlapping with the optimal survey timeframes for the White-throated Needletail.</p> <p>The White-throated Needletail was not observed during field investigations for the current Project, however, was observed within the Project Area during subsequent field surveys for Senex on 24 November 2022 (Cunningham, M pers. comm.). A flock of eight birds were observed flying low near Weldon's Road.</p> <p><i>There are no targeted survey guidelines, however, survey efforts are deemed sufficient for White-throated Needletail, through completion of bird surveys at each habitat assessment point. This species was assessed as being known to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>the presence of potential habitat and the precautionary principle is being applied</p>	

Listed Migratory Species (Birds)

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
Common Sandpiper (<i>Actitis hypoleucos</i>)	Mi and Ma, SLC	<p>Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017).</p> <p>Observation using telescope from vantage points overlooking suitable foraging or roosting habitat at appropriate periods of the tidal cycle. Transect surveys by boat around offshore islands, lake shores, coastlines and rivers. Aerial surveys of foraging habitat in large or remote study areas at the appropriate period of the tidal cycle.</p> <p>Recommended survey timing is December to February (DEE, 2017).</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including rock and grassy ground cover.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>The Project Area lacks preferred habitat for the species, alike coastal or wetland habitats. The Project Area does contain potential habitat in the form of farm dams, however during survey efforts no individuals were observed.</p> <p><i>There are no species-specific targeted survey guidelines, however, survey efforts are deemed only partially sufficient, via incidental searches and bird surveys completed at each of the 57 habitat assessments throughout the Project Area due to the timing of surveys being conducted in March, when the species may have started departing Australian foraging habitats. This species was assessed as being potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied	Yes
Fork-tailed Swift (<i>Apus pacificus</i>)	Mi and Ma, SLC	<p>Draft referral guidelines for 14 birds listed as migratory species under the EPBC Act (DoE, 2015).</p> <p>No survey guidelines specific to the Fork-tailed Swift –</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation.</p>	<p>The species distribution is within the Project Area however, no individuals of the species were observed during the survey efforts. Incidental searches were conducted for all threatened birds.</p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>however, recommended to focus survey efforts from high vantage points.</p> <p>This species is found across a range of habitats (non-breeding habitats only), from inland plains to wooded areas. It is exclusively aerial.</p>	<p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>Four field surveys were conducted between March and June, overlapping with the migratory timeframe (October to Mid-April) for the species.</p> <p>Surveys were conducted within areas of habitat that are suitable for the species, including woodlands. The species is more known to occur within coastal ecosystems such as heathlands, or riparian woodlands near coastal zones.</p> <p><i>There are no targeted survey guidelines, however, survey efforts are deemed sufficient for Fork-tailed Swift, via incidental searches and bird surveys completed at each of the 57 habitat assessments throughout the Project Area. This species was assessed as being likely to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>principle is being applied</p>	
Latham's Snipe (<i>Gallinago hardwickii</i>)	Mi and Ma, SLC	<p>Draft referral guidelines for 14 birds listed as migratory species under the EPBC Act (DoE, 2015).</p> <p>The survey guidelines (Department of the</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat</p>	<p>The Project Area encompasses preferred foraging habitat for the species, albeit limited within ephemeral wetlands, drainage lines and farm dams.</p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>Environment and Energy, 2017) recommend the following methods and survey effort for the Latham's snipe, bird surveys in suitable habitat:</p> <ul style="list-style-type: none"> ■ Surveys should be conducted during the day and consist of area searches or line transects in suitable habitat (i.e., wetland or other waterbodies and their surrounding vegetation (Department of the Environment and Energy, 2020). ■ Surveys should be conducted for Latham's snipe between October and February when the species arrives and depart in Australia. 	<p>features including grassy ground cover.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>Farm dams provide potential habitat; however, the survey efforts did not observe any individuals of the species.</p> <p>Surveys were conducted for all threatened birds at each habitat assessment point. The survey effort implemented partially met the guidelines, as a census of all birds observed was completed at each habitat assessment point.</p> <p>Four field surveys were conducted between March and June, outside of the optimal survey timeframe (October to February) for the species.</p> <p><i>As the field surveys were conducted outside of the optimal survey timeframe, the Survey efforts do not meet the survey guidelines for Latham's Snipe. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>principle is being applied</p>	
Rufous Fantail (<i>Rhipidura rufifrons</i>)	Mi and Ma, SLC	<i>Draft referral guidelines for 14 birds listed as migratory species under the EPBC Act (DoE, 2015).</i>	57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure	The Project Area had limited suitable habitat typical of the species. Surveys were still conducted in areas that	Yes, as surveys were adequate to determine the presence of potential habitat and	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		No survey guidelines specific to the Rufous fantail – however it is recommended that surveys to be conducted in breeding habitat is an area survey, preferably a two-hectare survey in 20 minutes, over sufficient survey plots to estimate a density, and hence the population size across the proposed development area. Surveys should be undertaken in an appropriate season – spring or summer in southern Australia.	areas and non-remnant vegetation. Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.	presented woodland habitat; however, the species was not recorded. Bird surveys were conducted for all threatened birds at each of the 57 habitat assessment points. The survey effort implemented partially met the guidelines, as a census of all birds observed was completed at each habitat assessment point. <i>There are no targeted survey guidelines, however, survey efforts are deemed sufficient, via incidental searches and bird surveys completed at each of the 57 habitat assessments throughout the Project Area. This species was assessed as being potential to occur as per the Likelihood of Occurrence in Appendix B.</i>	the precautionary principle is being applied	
Satin Flycatcher (<i>Myiagra cyanoleuca</i>)	Mi and Ma, SLC	Draft referral guidelines for 14 birds listed as migratory species under the EPBC Act (DoE, 2015). The referral guideline for 14 birds listed as migratory species under the EPBC Act prescribes the following	57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation. Incidental searches were conducted during opportunistic active searches	There is limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area. Bird surveys were conducted for all threatened birds at each of the 57 habitat assessment points. The survey effort implemented partially met the guidelines, as a census of all	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>survey methods for the species:</p> <ul style="list-style-type: none"> ■ Bird surveys: 2 ha survey in 20 minutes over sufficient survey plots to estimate a density, and hence the population size across the Project Area; and ■ Standardised timed periods. Surveys must be conducted during when the species is on its northern passage between February and May. 	in suitable habitat whilst traversing the Project Area.	<p>birds observed was completed at each habitat assessment point. No individuals were observed during the field survey efforts.</p> <p>Four field surveys were conducted between March and June, within the optimal survey timeframe (February – May) for the species.</p> <p><i>The survey efforts partially meet the survey guidelines as targeted bird surveys were not undertaken, however incidental searches and bird surveys completed at each of the 57 habitat assessments throughout the Project Area partially meet guidelines. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>		
Sharp-tailed Sandpiper (<i>Calidris acuminata</i>)	Mi and Ma, SLC	<p>Survey guidelines for Australia’s threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (DEWHA, 2017).</p> <p>Observation using telescope from vantage points overlooking suitable foraging</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation including grassy ground cover.</p> <p>Incidental searches were conducted during opportunistic active searches</p>	<p>Small areas of foraging habitat are 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.</p> <p>Bird surveys were conducted for all threatened birds at each of the 57</p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>or roosting habitat at appropriate periods of the tidal cycle.</p> <p>Transect surveys by boat around offshore islands, lake shores, coastlines and rivers.</p> <p>Aerial surveys of foraging habitat in large or remote study areas at the appropriate period of the tidal cycle.</p>	<p>in suitable habitat whilst traversing the Project Area.</p>	<p>habitat assessment points. The survey effort implemented partially met the guidelines, as a census of all birds observed was completed at each habitat assessment point. No individuals were observed during the field survey efforts.</p> <p><i>The survey efforts only partially meet the targeted survey guidelines, as recommended survey methods specified in the guideline were not undertaken during field surveys. However incidental searches and bird surveys completed at each of the 57 habitat assessments throughout the Project Area partially met guidelines This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>		

Listed Threatened Mammals

Corben's Long-eared Bat (<i>Nyctophilus corbeni</i>)	V, VU	<p>Survey guidelines for Australia's threatened bats (DEWHA).</p> <p>The eastern greater long-eared bat should be</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including hollows in hollow bearing trees (live</p>	<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. Suitable habitat in the Project Area is associated with larger patches of</p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary</p>	<p>Yes</p>
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Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>surveyed using capture techniques.</p> <ul style="list-style-type: none"> Passive acoustic detection – Bat detectors can be used to identify areas used by long-eared bats, even if they cannot be identified to species level. Acoustic detection can then be followed up with an appropriate level of trapping. <p>Trapping – Mist nets and harp traps should be placed in woodland, mallee and forest, given that the species forages below the tree canopy, often to ground level. Equipment should be placed both in open fly-ways and within cluttered vegetation.</p>	<p>and stags) and potential food plants.</p> <p>Spotlighting surveys in two locations, in riparian woodland along Wandoan Creek and Woleebee Creek, at one hour after sunset, for 2 hours over a 2 km meandering transect.</p> <p>Anabat recorders deployed overnight in two locations. Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>remnant eucalypt and acacia woodlands.</p> <p>Although Anabat recorders were used during field surveys, it is not possible to reliably distinguish Corben's Long-eared Bat on calls, therefore trapping is required to detect Corben's Long-eared Bat.</p> <p>The species was not recorded during field surveys, and no <i>Nyctophilus spp.</i> were recorded on the Anabats deployed.</p> <p>Capture techniques, as specified in the guidelines, were not conducted during field surveys.</p> <p><i>The survey efforts do not meet the targeted survey guidelines for Corben's Long-eared Bat. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B</i></p>	<p>principle is being applied</p>	
Greater Glider (central and southern) (<i>Petauroides volans</i>)	E, EN	Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (DES, 2018).	Spotlighting surveys in two locations, in riparian woodland along Wandoan Creek and Woleebee Creek, at one hour after sunset, for	Potential foraging and denning habitat of tall, mature Eucalypt forests present within the Project Area, specifically along the riparian areas. The species was recorded during field	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>Requires two 30-person minute spotlight searches of 100 x 100 m survey site across multiple nights. This can include spotlighting up one side of the 100 x 100 m area and then spotlighting back the other side of the 100 x 100m area.</p> <p>Scat and sign search can coincide with the systematic diurnal active searches, within 50 x 50 m quadrates of the survey site.</p> <p>Survey Guidelines for Australia's Threatened Mammals (DSEWPC, 2011).</p> <p>Bright moonlight aids in detecting greater gliders.</p> <p>Spotlighting should be at least two 200 m transects per 5 ha sites. It is also recommended there be 100 m between survey transects.</p>	<p>2 hours over a 2 km meandering transect.</p> <p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including hollows in hollow bearing trees (live and stags) and potential food plants.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>surveys, in seven locations across the Project Area. These locations included 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.</p> <p>Spotlighting surveys have been conducted during the right period in suitable habitat for the greater Glider (southern and central).</p> <p><i>The survey efforts partially meet the survey guidelines for Greater Glider (southern and central) as spotlighting searches need to be conducted in potential habitats within the southern portion of the Project Area. This This species was assessed as being known to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	principle is being applied	
Koala (<i>Phascolarctos cinereus</i>)	E, EN	Terrestrial Vertebrate Fauna Survey Guidelines	Spotlighting surveys in two locations, in riparian woodland along Wandoan	The species was not directly sighted during field surveys, however indirect evidence in the form of potential	Yes, as surveys were adequate to determine the presence of	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>for Queensland (DES, 2018).</p> <p>Requires two-person, 30-minute spotlight searches of 100 x 100 m survey site. This can include spotlighting up one side of the 100 x 100 m area and then spotlighting back the other side of the 100 x 100 m area.</p> <p>Scat and sign search can coincide with the systematic diurnal active searches, within 50 x 50 m quadrates of the survey site.</p> <p>EPBC Act referral guidelines for the vulnerable koala (DoE, 2014).</p> <p>Survey effort must be determined on a case-by-case basis.</p> <p>Direct observations:</p> <ul style="list-style-type: none"> ■ Direct observation surveys should be undertaken between August and January for peak activity. 	<p>Creek and Woleebee Creek, at one hour after sunset, for 2 hours over a 2 km meandering transect.</p> <p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including potential food trees and riparian vegetation.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>scratch marks on trees were recorded in several locations across the Project Area.</p> <p>Spotlighting surveys have been conducted during the right period in suitable habitat for the Koala. A total of 57 habitat assessments were conducted across the Project Area, concluding both 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.</i> are present within the Project Area.</p> <p>Four field surveys were conducted between March and June, outside the optimal survey timeframe (August to January) for the Koala.</p> <p>Diurnal searches, camera trapping detection dogs and call playback were not undertaken during field surveys.</p> <p><i>The survey efforts partially meet the survey guidelines for the Koala. This species was assessed as being likely to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>potential habitat and the precautionary principle is being applied</p>	

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<ul style="list-style-type: none"> ■ Strip transects which involve diurnal distance sampling and density searches. ■ Nocturnal spotlighting for smaller sites to determine presence and density. ■ Call Playback; ■ The use of detection dogs; and ■ Camera trapping in areas where fresh scats and/or scratching have been detected. <p>Indirect observations:</p> <ul style="list-style-type: none"> ■ Scats – Spot Assessment Technique (SAT) which involves looking at food trees for presence of koala scats. ■ Scats – Regularised Grid Based Spot Assessment Technique; ■ Scats— Koala optimised Rapid Assessment Methodology; and 				

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<ul style="list-style-type: none"> ■ Faecal standing crop assessment; and ■ Scratchings. 				
Northern Quoll (<i>Dasyurus hallucatus</i>)	E, SLC	<p>Survey Guidelines for Australia's Threatened Mammals (DSEWPC, 2011).</p> <p>Cage trapping is the most effective method for detecting this species and is best conducted through May to August (10 cage traps for four consecutive nights spaced in an area of 5 hectares – replication necessary for larger areas). However, in large survey areas, Elliott trapping surveys are also recommended (25 Elliott traps for four consecutive nights).</p> <p>Additional or complementary techniques to survey for this species include daytime searches for potentially suitable habitat resources, such as areas associated</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including rocky habitats, hollows in hollow bearing trees (live and stags) and logs, termite mounds, grassy ground cover and potential food plants.</p> <p>Spotlighting surveys in two locations, in riparian woodland along Wandoan Creek and Woleebee Creek, at one hour after sunset, for 2 hours over a 2 km meandering transect.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</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 plateau with eucalypt woodland/open forest habitat types.</p> <p>Spotlighting surveys were undertaken in two locations within the Project Area; however, the species was not recorded during field surveys.</p> <p>Trapping methods were not utilised during the field surveys.</p> <p><i>The survey efforts partially meet the survey guidelines for the Northern Quoll as trapping methods including camera trapping were not conducted due to areas of potential habitat along gullies, ridges containing potential habitat will not be impacted by the Project. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>with a gully or a ridge and potential den sites.</p> <p>Remote cameras in potentially suitable habitat are also recommended for sampling in remote areas.</p> <p>Hair tubes and spotlighting are also suggested as potential surveying methods for this species.</p> <p>EPBC Act referral guideline for the endangered northern quoll <i>Dasyurus hallucatus</i> (DoE, 2016).</p> <p>Recommended camera trapping is outlined as transects of ten baited remote motion sensor cameras spaced at least 100 m intervals for four nights is recommended. For linear habitat critical to the survival of the species (e.g., gorges, major drainage lines, breakaways less than 100 m wide), 1 camera per 100 linear metres is recommended. When using</p>				

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		remote cameras for targeted survey they must be deployed to enable estimates of population size, habitat use and importance.				
Short-beaked Echidna (<i>Tachyglossus aculeatus</i>)	-, SLC	There are no species-specific guidelines for surveying of this species. Searches should be conducted in habitat assessments and whilst trans versing the landscape.	Spotlighting surveys in two locations, in riparian woodland along Wandoan Creek and Woleebee Creek, at one hour after sunset, for 2 hours over a 2 km meandering transect. 57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including termite mounds, burrows and rock crevices. Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.	The Project Area pertains habitat features that are typical of the species. The species was not recorded during field surveys. <i>There are no targeted survey guidelines, however, survey efforts are deemed sufficient, via incidental and spotlighting searches, and 57 habitat assessments throughout the Project Area. This species was assessed as being likely to occur as per the Likelihood of Occurrence in Appendix B.</i>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied	Yes
Yellow-bellied Glider (south-eastern) (<i>Petaurus australis australis</i>)	V, VU	Terrestrial Vertebrate Fauna Survey Guidelines	Spotlighting surveys in two locations, in riparian woodland along Wandoan	There is potential foraging and denning habitat present in the form of wooded plateaus in the far south-	Yes, as surveys were adequate to determine the presence of	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>for Queensland (DES, 2018).</p> <p>Feeding mark searches on trees are an effective way to identify this species. This is because these gliders use their teeth to incise tree bark for feeding. A list of tree species the yellow-bellied glider prefers is found in the guidelines.</p> <p>Call playback is another method that can detect this species. This method involves conducting playback on two occasions over different nights in a survey area. This is then followed by a 5-minute listening period for un-elicited calls.</p>	<p>Creek and Woleebee Creek, at one hour after sunset, for 2 hours over a 2 km meandering transect.</p> <p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including hollows in hollow bearing trees (live and stags) and logs, and potential food trees.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>eastern corner of the Project Area, however no feed trees were recorded in the Project Area.</p> <p>Spotlighting searches were undertaken in two locations within the Project Area</p> <p>The species was not observed during field surveys, however suitable foraging habitat was located, and records within 10 km of the Project Area, meant the species is considered with potential to occur.</p> <p><i>The survey efforts partially meet the survey guidelines for the Yellow-bellied Glider (south-eastern) as call playback was not undertaken. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>potential habitat and the precautionary principle is being applied</p>	
Listed Threatened Reptiles						
Collared Delma (<i>Delma torquata</i>)	V, VU	<p>Survey guidelines for Australia's threatened reptiles.</p> <p>Effective survey methods include:</p>	<p>Timed surveys for 20 minutes at selected habitat assessment locations.</p> <p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure</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.</p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<ul style="list-style-type: none"> ■ One-off hand searches (including raking through leaf litter) in appropriate habitats; ■ Turning rocks and logs / timber; and ■ Pitfall trapping using six 4-10 L buckets and funnel traps along a 15 m fence during late spring to summer. <p>Draft referral guidelines for the nationally listed Brigalow Belt Reptiles.</p> <p>Effective survey methods include:</p> <ul style="list-style-type: none"> ■ Tile grids – grids of 50 ties places at 5 m intervals in suitable habitats; ■ Minimum of 2 gids per site less than 2 ha in size, one grid per 2 hectares for sites up to 40 ha and 20 grids per 2 hectares for sites greater than 40 ha. 	<p>areas and non-remnant vegetation to detect habitat features including burrows, leaf and woody litter, rock and grassy ground cover. Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>Trapping techniques were not used during field surveys.</p> <p>Four field surveys were conducted between March and June, outside the optimal survey timeframe (late spring to summer) for the Collared Delma.</p> <p><i>The survey efforts partially meet the survey guidelines for the Collared Delma as trapping methods were not conducted. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>principle is being applied</p>	

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
Common Death Adder (<i>Acanthophis antarcticus</i>)	-, VU	<p>Targeted Species Survey Guidelines – Common Death Adder (DES, 2012).</p> <p>Effective survey methods include:</p> <ul style="list-style-type: none"> ■ Nocturnal vehicle transects – conducted on roads and tracks with limited vegetation and debris. Driving at a constant speed of ~10 km/hour with the driver and passengers scanning the road for animal movements / basking. Transects should be repeated multiple times. ■ ~500 km or all suitable roads surveyed multiple times, spread over at least 2 nights for 2 survey periods. ■ Pitfall and funnel trapping – In areas of thick leaf litter and/or low dense shrub cover, within suitable habitat. > 100 pitfall and 100 	<p>Timed surveys for 20 minutes at selected habitat assessment locations.</p> <p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including burrows, leaf and woody litter, rock and grassy ground cover.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>Vehicle transects and pitfall trapping techniques were not used during field surveys.</p> <p><i>The survey efforts partially meet the survey guidelines for the Common Death Adder. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		funnel trap nights per hectare.				
Dunmall's Snake (<i>Furina dunmalli</i>)	V, VU	<p>Survey guidelines for Australia's threatened reptiles.</p> <p>Draft referral guidelines for the nationally listed Brigalow Belt Reptiles.</p> <p>This species has no targeted survey guidelines. Recommended methods are active searching of sheltering sites (under large objects on the ground such as rocks, logs or human-made debris), pitfall trapping, or road driving at night (particularly after wet weather). However, all of these methods are likely to yield low returns. Photo vouchers should be forwarded to the state fauna authority and appropriate state museum for positive identification and databasing of the record. A scale clip preserved in ethanol would</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including leaf and woody litter, rock and grassy ground cover.</p> <p>Spotlighting surveys in two locations, in riparian woodland along Wandoan Creek and Woleebee Creek, at one hour after sunset, for 2 hours over a 2 km meandering transect.</p> <p>Timed surveys for 20 minutes at selected habitat assessment locations.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>There is some suitable habitat with abundant litter, rocks and woody debris present in the south-eastern corner of the Project Area.</p> <p>Incidental searches were conducted during habitat assessments and whilst spotlighting through the Project Area. No individuals were spotted during the survey efforts.</p> <p>Vehicle transects and pitfall trapping techniques were not used during field surveys.</p> <p><i>The survey efforts partially meet the recommended survey guidelines for Dunmall's Snake. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		also be of use as a genetic sample.				
Five-clawed Worm-skink (<i>Anomalopus mackayi</i>)	V, EN	<p>Survey guidelines for Australia's threatened reptiles</p> <p>Burrowing species are usually recorded by turning objects under which they shelter, or in pitfall traps.</p> <p>The Five-clawed Worm-skink can be recorded by turning rocks or fallen timber on the ground, as well as raking the soil surface layer.</p> <p>Targeted searches for the species are completed using:</p> <ul style="list-style-type: none"> ■ A series of pitfall trap lines each comprising six 10 litre buckets spread along a 15-metre fence. However, the species is more likely to burrow between the soil and the bucket; and ■ Deploy artificial structures, including hay bales over a long period 	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including leaf and woody litter, rock and grassy ground cover.</p> <p>Spotlighting surveys in two locations, in riparian woodland along Wandoan Creek and Woleebee Creek, at one hour after sunset, for 2 hours over a 2 km meandering transect.</p> <p>Timed surveys for 20 minutes at selected habitat assessment locations.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>Areas of potential habitat are limited on the site, with an absence of native grasslands with deep, cracking clays.</p> <p>Incidental searches were conducted during habitat assessments and whilst spotlighting through the Project Area. No individuals were spotted during the survey efforts.</p> <p>Pitfall trapping techniques and deployment of artificial structures were not conducted during field surveys.</p> <p><i>The survey efforts partially meet the recommended survey guidelines for Five-clawed Worm-skink. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>(> 6 months) and periodically checking underneath.</p> <p>Draft referral guidelines for the nationally listed Brigalow Belt reptiles</p> <p>The Five-clawed Worm-skink is an elongate species of skink with very short fore and hindlimbs. It is only likely to be confused with the Two-clawed Worm-skink, <i>Anomalopus leuckartii</i>; the two species come into close contact along the western edge of the North-western Slopes of NSW. The Five-clawed Worm-skink can be distinguished by having three toes on the front foot, whereas <i>A. leuckartii</i> has two; however, determination of these characters can be difficult.</p> <p>Minimum survey effort:</p> <p>Sufficient time is required to thoroughly search the area by day and to spotlight by</p>				

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>night. The minimum survey effort required includes):</p> <ul style="list-style-type: none"> ■ A minimum of three survey days and nights; and ■ At least one replicate survey employing all the recommended techniques, if the species has not already been detected. 				
Golden-tailed Gecko (<i>Strophurus taenicauda</i>)	-, NT	<p>Habitat selection by two focal species; golden-tailed gecko and glossy black-cockatoo (Chris R. Pavey., et al 2016):</p> <p>The golden-tailed gecko is predominately arboreal. Individuals are most commonly found at night on the trunks and outer branches of trees but are also sometimes observed on the ground amongst leaf-litter or ground debris. It shelters during the day beneath loose bark in standing trees, particularly</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including hollows, leaf and woody litter.</p> <p>Spotlighting surveys in two locations, in riparian woodland along Wandoan Creek and Woleebee Creek, at one hour after sunset, for 2 hours over a 2 km meandering transect.</p> <p>Timed surveys for 20 minutes at selected habitat assessment locations.</p>	<p>Searches were conducted during habitat assessments and whilst spotlighting through the Project Area. No individuals were spotted during the survey efforts.</p> <p><i>The survey effort is deemed adequate and meets guidelines for minimum effort searching for the species through 57 habitat assessments, two spotlighting locations (2 hours at each location), and incidental searches. This species was assessed as being likely to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		under dead bark on small saplings, and in tree hollows. They have also been found in a cryptic, "stretched-out" posture on relatively exposed branches of shrubs by day.	Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.			
Grey Snake (<i>Hemiaspis damelii</i>)	E, EN	<p>Conservation Advice for <i>Hemiaspis damelii</i> (Grey Snake).</p> <p>Survey guidelines for Australia's threatened reptiles.</p> <p>Targeted species survey guidelines Grey Snake <i>Hemiaspis damelii</i></p> <p>Effective survey methods include:</p> <ul style="list-style-type: none"> Nocturnal vehicles transect – on roads and tracks with limited vegetation and debris, particularly on warm/humid nights. Transects are to be completed multiple times at a constant driving speed (10 km/hr) 	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including gilgai, leaf and woody litter and burrows.</p> <p>Spotlighting surveys in two locations, in riparian woodland along Wandoan Creek and Woleebee Creek, at one hour after sunset, for 2 hours over a 2 km meandering transect.</p> <p>Timed surveys for 20 minutes at selected habitat assessment locations.</p> <p>Incidental searches were conducted during opportunistic active searches</p>	<p>Brigalow and Belah are present within the north and far south-eastern parts of the Project Area. Ephemeral wetlands and creek lines are also present along with cracking clay soils in some areas.</p> <p>Despite 57 habitat assessments, timed surveys, spotlighting and incidental searches, the species was not recorded during field surveys.</p> <p>Nocturnal vehicle transects, diurnal searches, pitfall and funnel trapping were not conducted during the field survey.</p> <p><i>The survey efforts partially meet the recommended survey guidelines for the Grey Snake. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>with driver/passengers scanning the road for crossing or basking animals. Survey effort is adequate when surveying ~250 km (or all suitable roads multiple times) over two nights, with two surveys undertaken;</p> <ul style="list-style-type: none"> ■ Passive nocturnal search – searching areas around suitable cracking clay and gilgai habitat. Fallen logs, vegetation in and around water bodies, soil cracks and rocks are to be scanned within a 100 x 100 m plot, with 2 plots per 5 ha and surveying each plot for 60 minutes. Two 30 person-minute searches over two survey periods; ■ Active diurnal search – searches targeting shelters and microhabitat sites in or 	<p>in suitable habitat whilst traversing the Project Area.</p>			

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>adjacent to suitable habitat between mid-morning and mid-afternoon; and</p> <ul style="list-style-type: none"> ■ Pitfall and funnel trapping – more than 50 pitfall and 50 funnel trap nights per hectare is required to adequately survey using pitfall and funnel trapping techniques. Trapping to be placed in or adjacent to clay or gilgai habitat, particularly following rainfall events. 				
Yakka Skink (<i>Egernia rugosa</i>)	V, VU	<p>Targeted species survey guidelines Yakka skink, <i>Egernia rugosa</i> (Ferguson, 2014).</p> <p>Survey guidelines for Australia's threatened reptiles.</p> <p>Draft referral guidelines for the nationally listed Brigalow Belt reptiles AND SPRAT profile</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including leaf / woody litter, rock and rock outcrops.</p> <p>Spotlighting surveys in two locations, in riparian woodland along Wandoan Creek and Woleebee Creek,</p>	<p>Dry sclerophyll forests and vegetation within the Brigalow belt south bioregion is present within the Project Area. 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> <p>Survey efforts involved searching for this species via spotlighting, 57 habitat assessments, timed surveys and incidental searches. However,</p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>Searching microhabitats, such as carefully turning woody debris, rocks and artificial debris, raking the soil surface or leaf litter beneath trees and looking beneath peeling bark for reptiles or their sloughs.</p> <p>Recommended 20 minutes searching per hectare.</p> <p>Search 20% of suitable habitat when 50 ha or more (e.g., 10 ha per 50 ha); OR 40% when less than 50 ha present (e.g., 2 ha per 5 ha of suitable habitat).</p> <p>Recommended survey methods:</p> <ul style="list-style-type: none"> ■ Elliot trapping around burrows; ■ Spotlighting surveys by shining a torch down the burrows at night; ■ Distant observation with binoculars; ■ Searching for burrow systems and communal defecation sites is the 	<p>at one hour after sunset, for 2 hours over a 2 km meandering transect.</p> <p>Timed surveys for 20 minutes at selected habitat assessment locations.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>the species was not recorded during the field surveys.</p> <p>Nocturnal vehicle transects, diurnal searches, pitfall and funnel trapping were not conducted during the field survey.</p> <p>The survey effort was insufficient to cover the extent of suitable habitat within the Project Area (e.g., recommendation for 20 minute search per hectare for detection of Yakka Skink).</p> <p><i>The survey efforts partially meet the recommended survey guidelines for the Yakka Skink. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>		

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>most reliable method of detection.</p> <p>Sufficient time is required to thoroughly search the area by day and to spotlight by night. The minimum survey effort required includes:</p> <ul style="list-style-type: none"> ■ A minimum of three survey days and nights ■ At least one replicate survey employing all of the recommended techniques if the species has not already been detected. 				

Listed Threatened Invertebrates

Dulacca Woodland Snail (<i>Adclarkia dulacca</i>)	E, EN	<p>Conservation Advice for <i>Adclarkia dulacca</i>, <i>Dulacca Woodland Snail</i>.</p> <p>Consultation Document on Listing Eligibility and Conservation Actions <i>Adclarkia dulacca</i> (<i>Dulacca woodland snail</i>)</p> <p>Surveys should be conducted during summer months particularly those</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation to detect habitat features including leaf and woody litter, and rocky outcrops.</p> <p>Incidental searches were conducted during opportunistic active searches</p>	<p>Four field surveys were conducted between March and June, aligning with the optimal survey time for the Dulacca Woodland Snail. Rainfall occurred during survey periods, restricting access to some locations. Targeted active searches for this species were planned however not completed due to abundant rainfall, restricting access to potential habitat at the time of planned surveys.</p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.</p>	<p>Yes</p>
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Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>with storms and rain (October to March).</p> <p>Species is nocturnal and night surveys are preferable, however daylight searches can be equally effective.</p> <p>Minimum survey effort for the Dulacca Woodland Snail is two person hours targeting areas of preferred snail microhabitat. Survey effort should include turning logs and raking accumulated leaves in forest debris. The presence of dead shells, particularly juveniles and sub-adults indicate living adults in the area.</p>	<p>in suitable habitat whilst traversing the Project Area.</p>	<p><i>The survey efforts partially meet the recommended survey guidelines for the Dulacca Woodland Snail. This species was assessed as being likely to occur as per the Likelihood of Occurrence assessment in Appendix B.</i></p>		
Pale Imperial Hairstreak (Butterfly) (<i>Jalmenus eubulus</i>)	-, EN	<p><i>There are no species-specific guidelines for surveying of this species.</i></p> <p><i>A survey of the Pale Imperial Hairstreak butterfly Jalmenus eubulus in New South Wales (Taylor R., 2014).</i></p> <p>Searches should be conducted in habitat</p>	<p>57 x Habitat assessments within 50 m x 20 m (0.1 ha) plots, including infrastructure areas and non-remnant vegetation.</p> <p>Incidental searches were conducted during opportunistic active searches in suitable habitat whilst traversing the Project Area.</p>	<p>Project Area is within the distribution for the species. There is suitable habitat associated with Brigalow woodland within the Project Area.</p> <p>Incidental searches were conducted during habitat assessments throughout the Project Area. No individuals were recorded during the survey efforts.</p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		assessments and whilst trans versing the landscape. Surveys should be focused on Brigalow foliage from the ground level to 4 m in height. Optimal survey times are following heavy rains (typically during the late summer months).		<i>There are no targeted survey guidelines, however, survey efforts are deemed adequate, via incidental searches and 57 habitat assessments throughout the Project Area. This species was assessed as being likely to occur as per the Likelihood of Occurrence in Appendix B.</i>		

Listed Threatened Flora

Belson's Panic (<i>Homopholis belsonii</i>)	V, EN	<p>Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DEHP, 2020)</p> <p>Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available.</p> <p>The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed.</p>	<p>Boobook field surveys:</p> <p>57 vegetation community assessments within 50 m x 20 m plots (0.1 ha) within representative locations in all identified RE and regrowth vegetation types within the Project Area.</p> <p>The following BioCondition assessments were conducted:</p> <ul style="list-style-type: none"> ■ A 100 m x 50 m plot for canopy cover layer structure and diversity; ■ A 100 m transect to measure canopy cover; 	<p>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.</p> <p>Despite surveys efforts, this species was not recorded at any time during the survey periods.</p> <p>Surveys were undertaken during appropriate flowering and seeding times for this species (February to May).</p> <p><i>No species-specific survey guidelines however, the meander surveys conducted as per the State Guidelines for Protected Plants are</i></p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.</p>	<p>Yes</p>
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Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.</p>	<ul style="list-style-type: none"> ■ A 50 m x 10 m subplot for measuring plant richness in shrub and ground layers; ■ A 50 m x 20 m subplot for measuring coarse woody debris; and ■ Five 1 x 1 m quadrats to estimate ecological components of ground cover within the assessment area. <p>57 habitat quality assessments that also aimed to identify presence/absence of listed flora species, and suitable habitat for listed flora species.</p> <p>Opportunistic searches during all field traverses across the Project Area.</p> <p><u>Attexo field surveys:</u></p> <p>Meandering transects at 100 – 200 m intervals by foot where trees and shrubs were visibly dense.</p> <p>Traversing Project Area by vehicle (where access was</p>	<p><i>considered to be of a reasonable effort.</i></p> <p><i>The survey was considered to be to be of a reasonable effort and suitable for confirming potential presence. This species was conservatively assessed as having the potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>		

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
			available) where trees and shrubs were not present.			
Ooline (<i>Cadellia pentastylis</i>)	V, VU	<p>Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DEHP, 2020)</p> <p>Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available.</p> <p>The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed.</p> <p>Flowering between October and December in Queensland; however, occasionally extends into early April. Fruiting from November to December.</p> <p>There are no specific survey guidelines for this species, however information such as</p>	<p>Boobook field surveys:</p> <p>57 vegetation community assessments within 50 m x 20 m plots (0.1 ha) within representative locations in all identified RE and regrowth vegetation types within the Project Area.</p> <p>The following BioCondition assessments were conducted:</p> <ul style="list-style-type: none"> ■ A 100 m x 50 m plot for canopy cover layer structure and diversity; ■ A 100 m transect to measure canopy cover; ■ A 50 m x 10 m subplot for measuring plant richness in shrub and ground layers; ■ A 50 m x 20 m subplot for measuring coarse woody debris; and ■ Five 1 x 1 m quadrats to estimate ecological 	<p>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.</p> <p>Attexo flora surveys were conducted over 4 days in late January and early February.</p> <p><i>No species-specific survey guidelines however, meander surveys as per the State Guidelines for Protected Plants considered adequate effort. This species was assessed as being known to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	Yes	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		its approved conservation advice was consulted before field surveys.	<p>components of ground cover within the assessment area.</p> <p>57 habitat quality assessments that also aimed to identify presence/absence of listed flora species, and suitable habitat for listed flora species.</p> <p>Opportunistic searches during all field traverses across the Project Area.</p> <p><u>Attexo field surveys:</u></p> <p>Meandering transects at 100 – 200 m intervals by foot where trees and shrubs were visibly dense.</p> <p>Traversing Project Area by vehicle (where access was available) where trees and shrubs were not present.</p> <p>Binoculars used to identify Ooline from a distance where necessary.</p>			
Slender Tylophora (<i>Vincetoxicum forsteri</i>)	E, EN	Flora Survey Guidelines – Protected Plants NC Act	<p><u>Boobook field surveys:</u></p> <p>57 vegetation community assessments within 50 m x</p>	Suitable habitat (dry eucalypt woodland) exists as several small fragments through the Project Area	Yes, as surveys were adequate to determine the presence of potential habitat and	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>(Flora Survey Guidelines) (DEHP, 2020)</p> <p>Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available.</p> <p>The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed.</p> <p>There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.</p>	<p>20 m plots (0.1 ha) within representative locations in all identified RE and regrowth vegetation types within the Project Area.</p> <p>The following BioCondition assessments were conducted:</p> <ul style="list-style-type: none"> ■ A 100 m x 50 m plot for canopy cover layer structure and diversity; ■ A 100 m transect to measure canopy cover; ■ A 50 m x 10 m subplot for measuring plant richness in shrub and ground layers; ■ A 50 m x 20 m subplot for measuring coarse woody debris; and ■ Five 1 x 1 m quadrats to estimate ecological components of ground cover within the assessment area. <p>57 habitat quality assessments that also aimed to identify presence/absence</p>	<p>and a larger area in the southeast corner.</p> <p>Despite surveys efforts, this species was not recorded at any time during the survey periods.</p> <p>Surveys were also undertaken during appropriate flowering and seeding times for this species in March.</p> <p><i>No species-specific survey guidelines however, the meander surveys conducted as per the State Guidelines for Protected Plants considered to be of a reasonable effort.</i></p> <p><i>The survey was considered to be to be of a reasonable effort and suitable for confirming potential presence.</i></p> <p><i>This species was assessed as being potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>	<p>the precautionary principle is being applied.</p>	

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
			<p>of listed flora species, and suitable habitat for listed flora species.</p> <p>Opportunistic searches during all field traverses across the Project Area.</p> <p><u>Attexo field surveys:</u></p> <p>Meandering transects at 100 – 200 m intervals by foot where trees and shrubs were visibly dense.</p> <p>Traversing Project Area by vehicle (where access was available) where trees and shrubs were not present.</p>			
Thomby Range Wattle (<i>Acacia wardellii</i>)	-, NT	<p>Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DEHP, 2020)</p> <p>Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available.</p>	<p><u>Boobook field surveys:</u></p> <p>57 vegetation community assessments within 50 m x 20 m plots (0.1 ha) within representative locations in all identified RE and regrowth vegetation types within the Project Area.</p> <p>The following BioCondition assessments were conducted:</p>	<p>Project Area is within the distribution for the species. Potential habitat of dry Eucalypt woodlands occurs within the Project Area.</p> <p>Despite surveys efforts, this species was not recorded at any time during the survey periods.</p> <p>Surveys were also undertaken during appropriate flowering and seeding times for this species in March.</p> <p><i>No species-specific survey guidelines however, meander surveys as per the</i></p>	Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.	Yes

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>Flowering between February to May.</p> <p>The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed.</p> <p>There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.</p>	<ul style="list-style-type: none"> ■ A 100 m x 50 m plot for canopy cover layer structure and diversity; ■ A 100 m transect to measure canopy cover; ■ A 50 m x 10 m subplot for measuring plant richness in shrub and ground layers; ■ A 50 m x 20 m subplot for measuring coarse woody debris; and ■ Five 1 x 1 m quadrats to estimate ecological components of ground cover within the assessment area. <p>57 habitat quality assessments that also aimed to identify presence/absence of listed flora species, and suitable habitat for listed flora species.</p> <p>Opportunistic searches during all field traverses across the Project Area.</p> <p><u>Attexo field surveys:</u></p>	<p><i>State Guidelines for Protected Plants considered adequate effort. This species was assessed as being potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>		

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
			<p>Meandering transects at 100 – 200 m intervals by foot where trees and shrubs were visibly dense.</p> <p>Traversing Project Area by vehicle (where access was available) where trees and shrubs were not present.</p>			
Winged Nightshade (<i>Solanum stenopterum</i>)	-, EN	<p>Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines) (DEHP, 2020)</p> <p>Meander surveys to be conducted when and where the species is present. This is based on undertaking surveys during flowering (if applicable) and where habitat is available.</p> <p>Flowering in February and March, fruiting in March, May and July.</p> <p>The search must be continued (timed) until no new plant species has been recorded for 30 minutes, or when the entire site/habitat has been surveyed.</p>	<p>Boobook field surveys:</p> <p>57 vegetation community assessments within 50 m x 20 m plots (0.1 ha) within representative locations in all identified RE and regrowth vegetation types within the Project Area.</p> <p>The following BioCondition assessments were conducted:</p> <ul style="list-style-type: none"> ■ A 100 m x 50 m plot for canopy cover layer structure and diversity; ■ A 100 m transect to measure canopy cover; ■ A 50 m x 10 m subplot for measuring plant 	<p>Project Area is within the distribution for the species. There is a suitable habitat associated with Poplar Box and Casuarina woodland within the Project Area.</p> <p>Despite surveys efforts, this species was not recorded at any time during the survey periods.</p> <p>Surveys were also undertaken during appropriate flowering times for this species in March.</p> <p><i>No species-specific survey guidelines however, meander surveys as per the State Guidelines for Protected Plants considered to be of a reasonable effort.</i></p> <p><i>The survey was considered to be to be of a reasonable effort and suitable for confirming potential presence. This species was assessed as being</i></p>	<p>Yes, as surveys were adequate to determine the presence of potential habitat and the precautionary principle is being applied.</p>	<p>Yes</p>

Target Species	Status (EPBC and NC Act)	Survey Guidelines and Requirements	Sampling Technique/ Effort	Comment on Survey Adequacy	Surveys Suitable for Impact Assessments	Additional surveys to be Conducted as Part of Pre-clearance Surveys
		<p>There are no specific survey guidelines for this species, however information such as its approved conservation advice was consulted before field surveys.</p>	<p>richness in shrub and ground layers;</p> <ul style="list-style-type: none"> ■ A 50 m x 20 m subplot for measuring coarse woody debris; and ■ Five 1 x 1 m quadrats to estimate ecological components of ground cover within the assessment area. <p>57 habitat quality assessments that also aimed to identify presence/absence of listed flora species, and suitable habitat for listed flora species.</p> <p>Opportunistic searches during all field traverses across the Project Area.</p> <p><u>Attexo field surveys:</u></p> <p>Meandering transects at 100 – 200 m intervals by foot where trees and shrubs were visibly dense.</p> <p>Traversing Project Area by vehicle (where access was available) where trees and shrubs were not present.</p>	<p><i>potential to occur as per the Likelihood of Occurrence in Appendix B.</i></p>		

3.4 Likelihood Of Occurrence

A likelihood of occurrence assessment was undertaken and informed by the field survey results and desktop sources. Desktop sources identified a number of flora and fauna species listed under the EPBC Act (i.e., PMST search) and NC Act (WO records) that have previously been recorded or predicted to occur within a 10 km buffer of the Project Area. The PMST and WO results are attached as Appendix A. The buffered area is from here on referred to as the 'adjoining areas'. The 10 km buffer was chosen as this is the standard buffer distance utilised and adopted for the EPBC Act referral process.

The likelihood of occurrence approach refines the desktop generated list using site-specific information and specific-species habitat information obtained from field surveys. Desktop sources are indicative only and likelihood rankings, particularly regarding the presence of specific habitat requirements, are conservative. The assessment ranks the likelihood of the species occurring within the Project Area through analysis of species distribution information, nearest known records and the presence of specific habitat attributes as identified through the desktop analysis and field surveys. The criteria applied are outlined in Table 3-6.

According to the MNES terminology, suitable habitat are areas or a location which has the potential to provide necessary resources needed for the maintenance of a population. This includes the presence of desired habitat features for a species whereby activities such as breeding, nesting, and foraging contributes to the maintenance of the population. Suitable habitat can also include habitat critical to the survival of the species, whether denoted by the relevant species guidelines (such as conservation advice, recovery plans or scientific literature), or by the definition provided by SIG 1.1.

Potential habitat for a species is areas or a location which have the potential to host a species for a limited amount of time or to support an ecological function (such as foraging or dispersal) that is not restricted to that area. Habitat may be considered suitable for a species, but not preferred, where there are some desired features but not all, and so a population may not be maintained; may have poor connectivity to known suitable habitat; or may be known to be disturbed.

Habitat and distribution information for MNES is sourced from SPRAT profiles and/or Conservation Advice where available, supplemented by other primary sources (e.g., published literature). Species records were sourced from WO and/or ALA.

Recent records within the adjoining areas are defined as less than 20 years.

Impact assessments have been undertaken for species and TECs confirmed as known or considered to be likely to or potentially occur in the Project Area (Section 8). Given the disturbed nature of the landscape and in the context of the proposed activities, the risk of impact to 'potential' species is considered low, so assessment of impact for threatened species has focussed on confirmed species and those assessed as likely to occur.

To assist with the likelihood of occurrence assessment regarding the Brigalow Woodland Snail and Dulacca Woodland Snail, a statement from Craig Eddie (Principal Ecologist) is provided in Appendix I.

The full likelihood of occurrence assessment is attached as Appendix B.

Table 3-6: Likelihood of Occurrence Criteria

	Preferred habitat exists	Suitable habitat exists ²	Habitat does not exist ³
Recent ¹ records within the Project Area	Known	Known	Known
Recent records in the Locality ⁴	Likely	Potential	Unlikely
No records within the Locality, but the Project Area is within known distribution	Potential	Unlikely	Unlikely
No records in the Locality, and the Project Area is outside of distribution	Unlikely	Unlikely	Unlikely

1. Recent records are those that have been recorded in the last 20 years.
2. Habitat may be considered suitable, but not preferred because: some desired habitat features may be present, but not all; habitat may have poor connectivity; or habitat may be known to be disturbed.
3. Based on sources reviewed and/or field survey results.
4. 'Locality' refers to a 10 km² buffer around the Project Area and is inclusive of the Project Area.

3.5 Threatened Species and Communities Habitat Mapping

Habitats for those listed threatened and/or migratory species and threatened communities known, likely or with potential to occur have been mapped based on ground-truthed vegetation communities and defined habitat preferences and conditions (as observed from field surveys). The mapped habitats have been used to inform impact assessments. Mapping of 'potential' habitat has also been undertaken for those species and communities with potential to occur. Field surveys were developed to verify desktop information and vegetation boundaries. Data collected from the field surveys was used to determine the habitat mapping for listed threatened and/or migratory species and threatened communities from the likelihood of occurrence. This effort of habitat mapping and vegetation verification was further informed by data obtained from desktop sources (e.g., SPRAT profiles and/or Conservation Advice where available, supplemented by other primary sources as required).

Overall, field-verified vegetation and habitat mapping has been prepared based on a collation of the following datasets and field information:

- Ground-truthed vegetation assessments and aerial imagery observations to delineate vegetation boundaries and describe vegetation characteristics; and
- Regrowth mapping prepared from the ground-truthed field observations and recent aerial imagery.

Habitat and vegetation community mapping was prepared to reflect as accurately as possible actual ground conditions (based on data collected from 2022 field surveys). This habitat mapping used the RE definitions to describe floristic definitions and structural classification into community types from field investigations, with the vegetation and habitat mapping results produced by determining vegetation boundaries and floristic composition based on ground-truthed data collection and observations.

3.6 Survey Conditions

3.6.1 Terrestrial Surveys

The weather during the terrestrial survey period was mild and wet with a total of 425.8 mm rainfall recorded from January to May (Bureau of Meteorology, 2022). This is significantly higher than the long term (1912-2021) median value of 204.2 mm (BOOBOOK, 2022d). As such, wet weather caused impact to the field survey schedule and the soil remained moist with some areas waterlogged throughout the survey periods. Abundant plant growth occurred during the period of initial surveys, which then turned to withering and haying off in the later survey period (BOOBOOK, 2022d).

3.6.2 Aquatic Surveys

Rainfall in November 2021 through to February 2022 had monthly rainfalls significantly higher than the mean rainfall for those months (1912 – 2022). As a result, the rainfall is more likely to have saturated the area and increased the surface water availability when the field surveys were completed in comparison to a typical year.

3.6.2.1 In situ Water Quality

The *in situ* water quality parameters recorded for sites containing surface water in March 2022 included:

- Water temperatures- ranged from 20.7 – 32.8°C during the late wet sampling period;
- Dissolved oxygen (DO)- fluctuated between sites ranging from 9.1 – 200 % saturation;
- pH of surface water- ranged from weakly to strongly alkaline (7.3 – 9.4);
- Electrical conductivity- ranged from 198 to 2,540 µs/cm;
- Turbidity- was widely variable across all sites ranging from 11.9 to 620 NTU; and
- Further information on water quality is described in Section 4.3 in Appendix D.

3.7 Limitations and Assumptions

The field and desktop assessments undertaken provides an overview of the ecological values that exist within the Project Area. As described, surveys were undertaken in several sections of the Project Area to gain a detailed understanding of the types of species and habitat features that occur. Detailed field surveys were completed mainly in the wet/post-wet season, due the large amount of rain present. Sampling sites were distributed across the Project Area to obtain a spread of survey locations that were well distributed across areas where disturbances are expected to occur. The spread of sites was suitable for supporting the subsequent consideration and assessment of potential direct and indirect impacts.

The absence of a species from a database list or observational studies does not confirm its absence from the Project Area. The lack of existing records from databases is more likely to indicate a low historic sampling effort in the region, as opposed to an absence of threatening processes and species. To overcome these limitations, the likelihood of occurrence takes a precautionary approach and identifies species that have potential to occur (considering habitat features), to assess potential impacts accordingly.

Conditions during the survey periods were generally suitable for detection and identification of threatened flora. Due to this predictive mapping of threatened flora and fauna occurrence are conservative estimates of occurrence that assume species presence within areas of potentially suitable habitat (BOOBOOK, 2022d).

4. ENVIRONMENTAL VALUES

The following Sections present the ecological values of the Project Area based on the findings from the desktop review and field survey efforts. General information of the Project Area within the landscape context and classification and descriptions of the vegetation communities and broad habitats are presented in Section 4.2 and 4.3. Information specific to MNES and MSES is presented in Sections 4.4 and 5.1, respectively. While detailed descriptions of values are provided, a brief summary of MNES and MSES is included at the beginning of each Section.

4.1 Project Area Overview and Context

The Project Area occurs within the Brigalow Belt bioregion. 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 (stream orders 2– 5) intersect the Project Area. Named watercourses include:

- Woleebee Creek runs south – north through the Project Area on the western boundary of PL 445 and PL 209;
- Conloi Creek feeds into Woleebee creek from the southeastern boundary of the Project Area;
- Hellhole Creek runs from the south through the southwestern boundary of the Project Area south of Gurulmundi Road, feeding into Woleebee Creek; and
- Wandoan Creek runs from the northwestern boundary, meandering to the northern boundary of the Project Area, west of Jackson – Wandoan Road.

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 subregion in the south.

Landscapes in the Taroom Downs portion are dominated by meandering watercourses traversing broad alluvial plains flanked by rolling rises on fine-grained sediments, with a few scattered patches of colluvial sand deposits. Elevation in this area varies from 250 m above sea level on Woleebee Creek at the northern limit of the Project Area, up to 350 m on peaks to the southeast, with the bulk of the Taroom Downs portion on flats and gentle slopes below 300 m above sea level.

Landscapes in the Southern Downs portion include similar landforms, but with alluvial sediments restricted to gullies along of streamlines and increasing topographic relief to the south, rising to a rocky scarp and plateau in the extreme southeast. Elevation in the Southern Downs portion of the Project Area rises from around 265 m on Woleebee Creek to 420 m on the plateau in the extreme southeast. The Project Area is entirely drained by streams that flow north to the Dawson River, within the Fitzroy Basin.

The northern part of the Project Area is extensively cleared of native vegetation and converted to non-remnant pasture dominated by native and introduced grasses, notably Buffel Grass (*Cenchrus ciliaris*) and Sabi Grass (*Urochloa mossambicus*). This includes the entire Taroom Downs portion and the northern half of the portion in Southern Downs subregion. Riparian woodland dominated by Queensland Blue Gum (*Eucalyptus tereticornis*) with some fringing areas of Poplar Box (*Eucalyptus populnea*), Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*), follows the winding course of major watercourses through this landscape. These narrow woodland corridors are disturbed by thinning, regrowth, grazing, tracks, weeds, gaps and edge effects causing death of some peripheral trees. However, these corridors have high faunal habitat values, in particular for arboreal mammals and birds, due to features such as an abundance of large trees with hollows occurring on alluvial soils near water sources and ephemeral wetlands in floodplain depressions or cut-off oxbows from changes in stream path. The corridors along Wandoan Creek and Woleebee Creek form part of an extensive dendritic network of riparian woodland with connectivity north to the Dawson River at Taroom but isolated from other large woodland patches to the east, south and west. In the rolling downs beyond the watercourses, remaining fragments of woodland are small, scattered, isolated and disturbed.

The southern part of the Project Area, within Southern Downs subregion, includes similar but less continuous riparian woodland corridors along Hellhole Creek, Woleebee Creek and its tributaries. This area also includes many small, disturbed fragments of Brigalow and Belah woodland on the rolling downs. A more substantially wooded area occurs around the plateau in the extreme southeast with Brigalow and Belah forest, Mountain Coolibah (*Eucalyptus orgadophila*) woodland and open forest of Narrow-leaved Ironbark (*Eucalyptus crebra*).

Stands of Ooline (*Cadellia pentastylis*) up to 35 m high occur in Brigalow woodland on the footslopes and midslopes in this area. This forest and woodland includes fringing areas of regrowth and in some areas is disturbed by fire, light grazing, weeds, tracks and fence lines. Nonetheless, this area shows high ecological integrity and overall low levels of disturbance. This area is tenuously connected with a much larger area of forest beyond the Project Area, to the south and east, and it is on the periphery of the very extensive forested area around Barakula State Forest.

Significant ongoing threats to biodiversity within the Project Area include further loss of remnant and regrowth vegetation in an area that is already extensively cleared; potential loss of connectivity among areas of remnant and regrowth vegetation, especially through disruption of riverine corridors by tracks, powerlines and other linear infrastructure; loss of ecological integrity of vegetation patches through edge effects around fragments and along narrow corridors, death of larger trees without corresponding recruitment, disturbance of understorey vegetation, and invasion by weeds and pastoral grasses.


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. An approval to develop pipeline and gasfield infrastructure and to extract coal seam gas within this area (PL 209) was granted to APLNG incorporated as a component of the much broader Walloons gas fields (DSEWPaC, 2009a). Major pipelines and high-voltage powerlines pass through the Site to supply adjacent industrial and agricultural infrastructure.


4.2 Terrestrial Ecology and Habitat Values


The Project Area has been classified into five broad habitat types, defined based on vegetation community type, structure, and is based on ground-truthed mapping using the RE verification method. These habitat types have then been considered as respective foraging, breeding, roosting, denning, dispersal, and movement functions for listed threatened and/or migratory species that are known, likely or have the potential to occur within the Project Area. This ground-truthed habitat mapping has been informed by these five habitat types, and subsequently used to identify areas of habitat for listed threatened species. It is noted that some species will have certain species-specific habitat requirements within each habitat type, for example some reptiles might have microhabitat requirements within Eucalypt woodlands that restrict them to certain portions of that habitat type. This was also further verified through ground-truthing during the field surveys.

The habitats in the Project Area are mostly in moderate to low condition, with signs of degradation and fragmentation due to cattle grazing, erosion, and the presence of introduced flora species. A summary of these habitat types, along with their vegetation community classifications and attributes, are provided in Table 4-1 and their location across the Project Area is shown in Figure 4-1.


Table 4-1: Terrestrial Broad Habitat Types and Vegetation Communities in the Project Area


Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
<p>Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>).</p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following REs:</p> <ul style="list-style-type: none"> ■ 11.3.1— <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest, with or without scattered emergent <i>Eucalyptus</i> spp. ■ 11.9.5— <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest to woodland on fine-grained sedimentary rocks; and ■ 11.9.5a— <i>Acacia harpophylla</i> predominates and forms a continuous canopy (10-18 m high). Other tree species such as <i>Eucalyptus populnea</i>, <i>Casuarina cristata</i>, <i>Cadellia pentastylis</i> and <i>Brachychiton</i> spp. <p>The Project Area contains 209.5 ha of this habitat type and vegetation community.</p>		<ul style="list-style-type: none"> ■ Belson's Panic ■ Collared Delma ■ Corben's Long-eared Bat ■ Diamond Firetail ■ Dulacca Woodland Snail ■ Dunmall's Snake ■ Fork-tailed Swift (aerial only) ■ Grey Snake ■ Koala ■ Northern Quoll ■ Ooline ■ Oriental Cuckoo ■ Painted Honeyeater ■ South-eastern Glossy-black Cockatoo ■ Southern Whiteface ■ White-throated Needletail (aerial only) ■ Yakka Skink

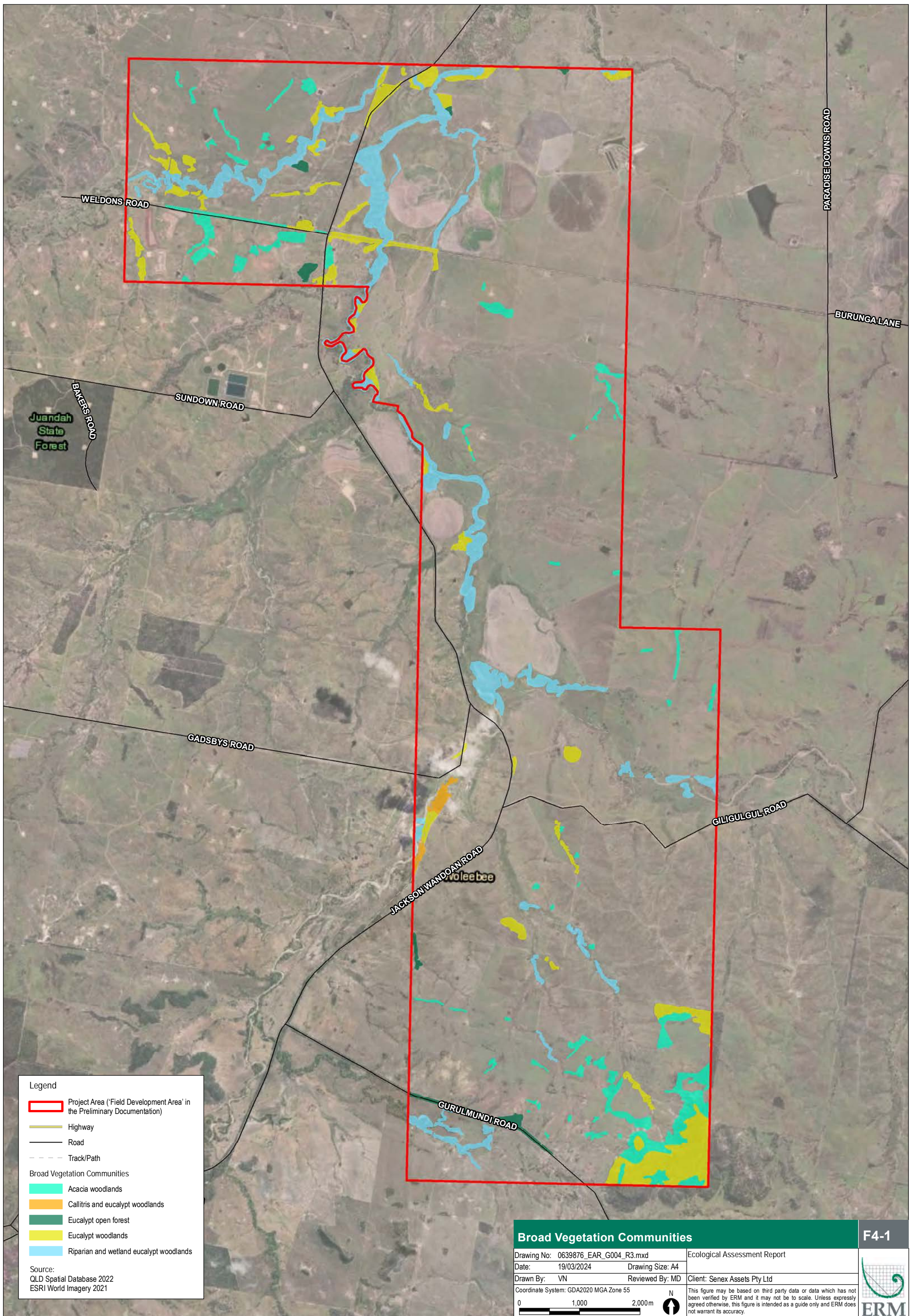
Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
<p>Callitris and Eucalypt dominated woodlands.</p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following RE:</p> <ul style="list-style-type: none"> 11.3.19— <i>Callitris glaucophylla</i>, <i>Corymbia spp.</i> and/or <i>Eucalyptus melanophloia</i> woodland on Cainozoic alluvial plains. <p>The Project Area contains 14.2 ha of this habitat type and vegetation community.</p>		<ul style="list-style-type: none"> ■ Brown Treecreeper ■ Collared Delma ■ Corben's Long-eared Bat ■ Diamond Firetail ■ Dulacca Woodland Snail ■ Dunmall's Snake ■ Fork-tailed Swift (aerial only) ■ Greater Glider (southern and central) ■ Koala ■ Northern Quoll ■ Oriental Cuckoo ■ South-eastern Glossy-black Cockatoo ■ Southern Squatter Pigeon ■ Southern Whiteface ■ White-throated Needletail (aerial only) ■ Yakka Skink

Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
<p>Eucalypt dominated woodlands mainly of <i>Eucalyptus crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>.</p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following REs:</p> <ul style="list-style-type: none"> ■ 11.3.2— <i>Eucalyptus populnea</i> woodland on alluvial plains; ■ 11.3.4— <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains; ■ 11.3.17— <i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains; ■ 11.3.39— <i>Eucalyptus melanophloia</i> and/or <i>E. chloroclada</i> woodland to open woodland. ■ 11.10.7— <i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rock; ■ 11.5.1— <i>Eucalyptus crebra</i> and/or <i>E. populnea</i>, <i>Callitris glaucophylla</i>, <i>Angophora leiocarpa</i>, <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces; ■ 11.5.5— <i>Eucalyptus melanophloia</i>, <i>Callitris glaucophylla</i> woodland on Cainozoic sand plains and/or remnant surfaces. Deep red sands; 		<ul style="list-style-type: none"> ■ Belson's Panic ■ Brown Treecreeper ■ Collared Delma ■ Corben's Long-eared Bat ■ Diamond Firetail ■ Dulacca Woodland Snail ■ Dunmall's Snake ■ Fork-tailed Swift (aerial only) ■ Greater Glider (southern and central) ■ Grey Snake ■ Koala ■ Northern Quoll ■ Ooline ■ Oriental Cuckoo ■ Painted Honeyeater ■ Slender Tylophora ■ South-eastern Glossy-black Cockatoo ■ Southern Squatter Pigeon ■ Southern Whiteface ■ White-throated Needle-tail (aerial only) ■ Yakka Skink ■ Yellow-bellied Glider (south-eastern)

Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
<ul style="list-style-type: none"> ■ 11.9.2— <i>Eucalyptus melanophloia</i> +/- <i>E. orgadophila</i> woodland to open woodland on fine-grained sedimentary rocks; ■ 11.9.7— <i>Eucalyptus populnea</i>, <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks; ■ 11.10.7— <i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks; and ■ 11.10.11— <i>Eucalyptus populnea</i>, <i>E. melanophloia</i> +/- <i>Callitris glaucophylla</i> woodland on coarse-grained sedimentary rocks. <p>The Project Area contains 292.6 ha of this habitat type and vegetation community.</p>		

Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
<p>Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>.</p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following REs:</p> <ul style="list-style-type: none"> ■ 11.3.25— <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines; and ■ 11.3.27f— Freshwater wetlands with <i>Eucalyptus coolabah</i> and/or <i>E. tereticornis</i> open woodland to woodland fringing swamps. <p>The Project Area contains 364.0 ha of this habitat type and vegetation community.</p>		<ul style="list-style-type: none"> ■ Australian Painted Snipe ■ Brown Treecreeper ■ Collared Delma ■ Common Sandpiper ■ Corben’s Long-eared Bat ■ Diamond Firetail ■ Dunmall’s Snake ■ Fork-tailed Swift (aerial only) ■ Greater Glider (southern and central) ■ Grey Snake ■ Five-clawed worm-skink ■ Koala ■ Latham’s Snipe ■ Northern Quoll ■ Ooline ■ Oriental Cuckoo ■ South-eastern Glossy-black Cockatoo ■ Rufous Fantail ■ Satin Flycatcher ■ Sharp-tailed Sandpiper ■ Southern Squatter Pigeon ■ Southern Whiteface

Habitat Type and Vegetation Community	Photographic Example	Potential Threatened Species Habitat
		<ul style="list-style-type: none"> ■ White-throated Needletail (aerial only) ■ Yellow-bellied Glider (south-eastern)
<p>Eucalypt open forest dominated by <i>E. populnea</i>.</p> <p>This habitat type corresponds to areas with the floristic structural characteristics of the following RE:</p> <ul style="list-style-type: none"> ■ 11.9.10— <i>Eucalyptus populnea</i> open forest with a secondary tree layer of <i>Acacia harpophylla</i> and sometimes <i>Casuarina cristata</i> on fine-grained sedimentary rocks. <p>The Project Area contains 29.5 ha of this habitat type and vegetation community.</p>		<ul style="list-style-type: none"> ■ Belson's Panic ■ Brown Treecreeper ■ Collared Delma ■ Corben's Long-eared Bat ■ Diamond Firetail ■ Dulacca Woodland Snail Koala ■ Dunmall's Snake ■ Fork-tailed Swift (aerial only) ■ Greater Glider (southern and central) ■ Grey Snake ■ Northern Quoll ■ Oline ■ Oriental Cuckoo ■ Painted Honeyeater ■ South-eastern Glossy-black Cockatoo ■ Southern Squatter Pigeon ■ Southern Whiteface ■ White-throated Needletail (aerial only) ■ Yakka Skink



Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Highway
- Road
- Track/Path

Broad Vegetation Communities

- Acacia woodlands
- Callitris and eucalypt woodlands
- Eucalypt open forest
- Eucalypt woodlands
- Riparian and wetland eucalypt woodlands

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Broad Vegetation Communities		F4-1
Drawing No: 0639876_EAR_G004_R3.mxd	Ecological Assessment Report	
Date: 19/03/2024	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> <div style="margin-left: 5px;"> </div> </div>	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>	

The Project Area also includes areas of non-native and regrowth vegetation that could not be assigned a native vegetation community or broad habitat type due to an absence of required floristic composition or structural elements to be defined as such. These areas contain low habitat values, providing habitat to some of the MNES species that are considered known, likely or with the potential to occur in the Project Area. Due to the low ecological values in these areas, only some MNES species are potentially present in these areas. These areas of regrowth and non-native vegetation communities have been identified and described in Table 4-2 and shown on Figure 4-2.

Table 4-2: Low Ecological Value Land within the Project Area

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>Cleared exotic pasture used for grazing.</p> <p>This broad habitat type is the predominate type found throughout the Project Area. The dominant introduced grasses are notably Buffel Grass (<i>Cenchrus ciliaris</i>) and Sabi Grass (<i>Urochloa mossambicus</i>). The Project Area contains 7,924.0 ha of this low ecological value land type.</p> <p>Cleared exotic pasture is unlikely to provide suitable foraging, breeding or refuge resources for MNES species with the exception of occasional and isolated Ooline trees, Fork-tailed Swift (aerial only) and White-throated Needletail (aerial only). These areas of cleared pasture have the potential to be used occasionally by Koalas as they move across the ground, however the value of these cleared areas for dispersing animals is reduced due to the lack of suitable shelter trees used as refuge by dispersing individuals.</p> <p>Cleared exotic pastures are unlikely to provide adequate habitat for MNES species to occur, due to the dominance of exotic pasture grasses, driving species out of the area. MNES are unlikely to occur where exotic flora is abundant.</p> <p>Cleared exotic pastures are unlikely to provide adequate habitat for threatened snails (e.g., <i>Dulacca Woodland Snail</i>) as this species requires both an overstorey of trees and shrubs and on-ground timber cover for survival and egg-laying, as well as to maintain high levels of relative humidity at the substrate level. Cleared exotic pastures used for grazing are unlikely to provide an adequate overstorey of trees and shrubs required for the species survival.</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ Ooline ■ Koala (dispersal habitat only) ■ White-throated Needletail (aerial only)
<p>Irrigated pastures and cropping.</p> <p>This broad habitat type features all irrigated pastures and cropping that are primarily used for agricultural purposes. The Project Area contains 554.4 ha of this low ecological value land type.</p> <p>These pastures are predominantly located in the north-eastern portion of the Project Area, as well as one defined area in the centre of the Project Area. These areas are subject to continued modification and management for agricultural purposes, including planting with pasture grasses and crops that are irrigated. This includes areas that are currently irrigated with centre-pivots and areas of cropping land that area actively managed for crop production.</p> <p>Irrigated pastures and cropping areas are unlikely to provide suitable foraging, breeding or refuge resources for MNES species due to land disturbance and habitat clearing for grazing and agriculture. Disturbance by grazing and livestock are unlikely to allow MNES fauna to occupy the area. Additionally, cleared pastures for irrigation and cropping do not contain suitable habitat trees, shrub layers, adequate ground cover with native flora, or microhabitat to enable foraging, breeding or refuge habitats (i.e., for threatened snails, reptiles, mammals and birds). Although this, Fork-tailed Swift and White-throated Needletail have the potential to fly over cleared</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat only)

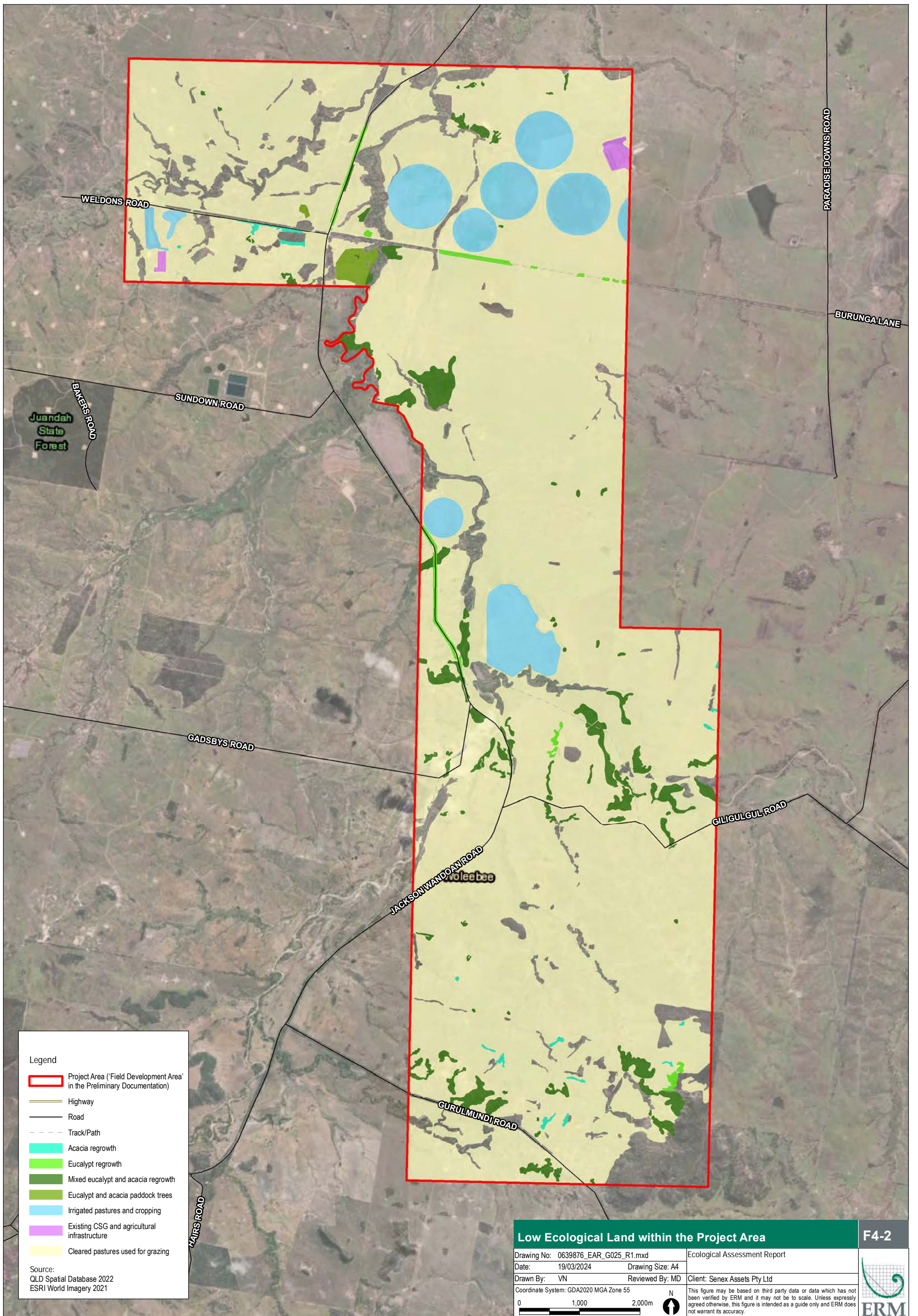
Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>pastures, however it is unlikely these species will land and use these pastures for foraging or roosting as they are both aerial foraging species who may occasionally fly over the Project Area.</p> <p>The value of these areas for dispersing Koalas is recognised, however they are limited due to the absence of any trees that could be used as shelter by Koalas when they move across the ground. Some of the larger centre-pivot irrigated areas are 1km across, so there is a potential that a Koala could cross these areas during dispersal.</p>	
<p>Acacia regrowth.</p> <p>The Project Area contains 14.5 ha of this low ecological value land type.</p> <p>Sapling or young juvenile Acacia regrowth vegetation that does not provide refuge, breeding or forage resource for threatened species and this therefore not considered to be habitat critical to the survival of any MNES species, or constitute any MNES TEC. An immature tree is any native woody vegetation (other than a mature tree or habitat tree) that generally 2-4 m in height.</p> <p>Immature trees do not contain hollows used for refuge or breeding for MNES species. Hollows occur in old growth trees (typically 100 years or more of growth), therefore, immature trees do not contain the valuable hollows for MNES species such as Greater Glider and Corben’s long-eared bat that have a reliance on hollows for breeding and daytime roosts. To be considered suitable habitat for hollow-breeding birds and arboreal mammals, an abundance of hollow-bearing trees are required per hectare, and as hollows do not form in immature trees, it is highly unlikely this habitat type sustains breeding, foraging or refuge habitat for arboreal mammals.</p> <p>Immature Acacia regrowth does not contain sufficient canopy cover, shrub layer or ground cover suitable as habitat for MNES species. Acacia regrowth is unlikely to provide foraging habitat for Greater Glider (southern and central) and Koala, as both species have a strong preference for Eucalypt species. Additionally, it is unlikely that Acacia regrowth to provide habitat for Squatter pigeon, given the disconnected nature of the vegetation along with distance to waterbodies.</p> <p>The Acacia regrowth provides habitat for the Glossy black-cockatoo as the species exclusively feeds on sheoak seeds (<i>Allocasuarina</i> spp. and <i>Casuarina</i> spp.). Although these areas are dominated by acacia regrowth, these areas still have the potential to contain foraging trees, and as such, there may be marginal foraging habitat for Glossy black-cockatoo within Acacia regrowth.</p> <p>The Acacia regrowth provides potential habitat for the Diamond firetail as the species forages on grass seeds, leaves and insects within areas of high grass cover. The species is known to forage on both native and exotic grass species. The grass layer of this habitat types is dominated by exotic grasses, and as such, the species may utilise this area for foraging.</p> <p>The Acacia regrowth may also provide habitat for the Dulacca woodland snail. This species can inhabit Acacia regrowth where abundant leaf litter, logs, woody debris, and other suitable microhabitat are present.</p>	<ul style="list-style-type: none"> ■ Glossy Black-cockatoo (south-eastern) ■ Diamond Firetail ■ Dulacca Woodland Snail ■ Grey Snake ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat)

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>Acacia regrowth may provide habitat for the Grey Snake. The mapped Acacia regrowth is slightly intersected or bordered by small gullies (albeit few and not in all Acacia regrowth areas) which may provide suitable habitat for the Grey Snake where regrowth is near small gullies and floodplains are present. There is potential for cracking clay soils which may provide suitable habitat for the Grey Snake.</p> <p>Areas of Acacia regrowth have an absence of eucalypt trees that provide foraging and breeding habitat for Koala. This habitat type may provide dispersal opportunities for Koala, given the species can move along the ground. The value of these areas of immature Acacia regrowth in the Project Area are limited, however, given the young age and low height of the shrubs and trees in these areas providing limited to no opportunities for shelter and roost trees used by dispersing animals.</p>	
<p>Eucalypt regrowth.</p> <p>The Project Area contains 35.6 ha of this low ecological value land type.</p> <p>Sapling or young juvenile Eucalypt regrowth vegetation that does not provide refuge, breeding or forage resource for threatened species and this therefore not considered to be habitat critical to the survival of any MNES species, or constitute any MNES TEC. An immature tree is any native woody vegetation (other than a mature tree or habitat tree) that is two meters or more in height.</p> <p>Immature trees do not contain hollows used for refuge or breeding for MNES species. Hollows occur in old growth trees (typically 100 years or more of growth), therefore, immature trees do not contain the valuable hollows for MNES species such as Greater Glider and Corben's long-eared bat. Additionally, to be considered suitable habitat for hollow-breeding birds and arboreal mammals, an abundance of hollow-bearing trees is required per hectare, and as hollows do not form in immature trees, it is highly unlikely this habitat type sustains breeding, foraging or refuge habitat for arboreal mammals.</p> <p>Eucalypt regrowth provides habitat Glossy black-cockatoo as the species feeds exclusively on sheoak seeds (<i>Allocasuarina spp.</i> and <i>Casuarina spp.</i>). Given these areas are dominated by <i>Eucalyptus spp.</i>, there is still a chance of <i>Allocasuarina spp.</i> and <i>Casuarina spp.</i> presence within this habitat type, and as such, Eucalypt regrowth may provide marginal foraging habitat for the species.</p> <p>The Acacia regrowth provides potential habitat for the Diamond firetail as the species forages on grass seeds, leaves and insects within areas of high grass cover. The species is known to forage on both native and exotic grass species. The grass layer of this habitat types is dominated by exotic grasses, and as such, the species may utilise this area for foraging.</p> <p>Eucalypt regrowth may also provide habitat for the Dulacca woodland snail. This species can inhabit ironbark (<i>Eucalyptus spp.</i>) and gum-topped box (<i>Eucalyptus woollsiana</i>) regrowth where abundant leaf litter, logs, woody debris, and other suitable microhabitat are present. As a conservative approach, Acacia woodland is mapped as Dulacca woodland snail habitat as the presence/absence of microhabitat (leaf litter and woody debris) is not confirmed.</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat) ■ Glossy Black-cockatoo (foraging habitat) ■ Diamond Firetail (foraging habitat) ■ Dulacca Woodland Snail ■ Grey Snake ■ Southern Squatter Pigeon (dispersal habitat only when within 100 m of mapped breeding and foraging habitat)

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>Eucalypt regrowth may provide habitat for the grey snake. The mapped Eucalypt regrowth is slightly intersected or borders by small gullies (albeit few and not in all Acacia regrowth areas) which may provide suitable habitat for the species where regrowth is near small gullies and floodplains are present.</p> <p>When within 100 m of Southern Squatter Pigeon breeding and foraging habitat, patches of this Eucalypt regrowth area provides dispersal habitat.</p> <p>Immature Eucalypt regrowth does not contain sufficient canopy cover, shrub layer or ground cover suitable as habitat for MNES species. Furthermore, reptiles are unlikely to utilise immature regrowth vegetation as these species require dense ground vegetation, large hollow logs and fallen trees for refuge.</p> <p>These areas of young eucalypt regrowth do not form an intact vegetation community that can be defined as an open forest or woodland, which is used by Koalas as foraging and breeding habitats. The eucalypt trees in these areas are young and provide limited value for koala foraging. They also provide limited shelter and roosting opportunities for dispersing individuals due to the generally low tree heights.</p>	
<p>Mixed acacia and eucalypt regrowth.</p> <p>The Project Area contains 280.1 ha of this low ecological value land type.</p> <p>A combination of immature Acacia regrowth and immature Eucalypt regrowth as described above. These areas also lack the size class structure and age to be classified as open forest or woodland communities or occur in very narrow linear strips of regrowth and disturbed vegetation in road corridors or easements. Where this vegetation type occurs in roadside vegetation, they are in narrow strips ranging from 15-30 m in width and are subject to edge effects associated with altered light, nutrient and grazing regimes, limiting the development of these strips into an intact and structurally complex habitat type.</p> <p>As these areas have been subject to historical and current disturbance from clearing for roads or agricultural land uses, they lack the large, mature eucalypt trees that form hollows to support those MNES species that require these features for breeding and roosting such as greater glider and Corben’s long-eared bat. Habitat complexity in the shrub and ground layers are also very low, with minimal shelter, foraging and breeding opportunities for woodland birds and reptiles. In some locations the ground layer contains no coarse woody debris and is subject to disturbance from exotic grass cover and cattle grazing.</p> <p>There is some value in areas of mixed acacia and eucalypt regrowth for dispersing koalas, with shelter opportunities provided for individuals as they disperse across the landscape.</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat) ■ Glossy Black-cockatoo (foraging habitat) ■ Diamond Firetail (foraging habitat) ■ Dulacca Woodland Snail ■ Grey Snake ■ Southern Squatter Pigeon (dispersal habitat only when within 100m of mapped)

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>Mixed acacia and eucalypt regrowth provides habitat for Glossy black-cockatoo as the species exclusively feeds on sheoak seeds (<i>Allocasuarina spp.</i> and <i>Casuarina spp.</i>). Given these areas are dominated by regrowth <i>Acacia spp.</i> and <i>Eucalyptus spp.</i>, there is still a chance of <i>Allocasuarina spp.</i> and <i>Casuarina spp.</i> presence within this habitat type, and as such, mixed regrowth may provide marginal foraging habitat for the species.</p> <p>The Acacia regrowth provides potential habitat for the Diamond firetail as the species forages on grass seeds, leaves and insects within areas of high grass cover. The species is known to forage on both native and exotic grass species. The grass layer of this habitat types is dominated by exotic grasses, and as such, the species may utilise this area for foraging.</p> <p>Mixed acacia and eucalypt regrowth may provide habitat for the Dulacca woodland snail. The species can inhabit Brigalow regrowth where abundant leaf litter, logs, woody debris, and other suitable microhabitat are present. As a conservative approach, mixed regrowth is mapped as Dulacca woodland snail habitat as the presence/absence of microhabitat (leaf litter and woody debris) is not confirmed.</p> <p>Mixed Acacia and Eucalypt regrowth does not contain suitable ephemeral wetland environments for the grey snake, however Brigalow regrowth within the Project Area does occur on floodplains. Acacia and Eucalypt regrowth is intersected by, and/or borders small gullies (albeit few and not in all Acacia and Eucalypt regrowth areas) which may provide suitable habitat for the species where regrowth is near small gullies and floodplains are present. There is potential for cracking clay soils which may provide suitable habitat for the grey snake.</p> <p>When within 100 m of Southern Squatter Pigeon breeding and foraging habitat, patches of this mixed Acacia and Eucalypt regrowth area provides dispersal habitat.</p>	<p>breeding and foraging habitat)</p>
<p>Eucalypt and acacia paddock trees.</p> <p>The Project Area contains 30.9 ha of this low ecological value land type.</p> <p>These areas are defined by areas of isolated, scattered and small groups of paddock trees, with a combination of mature eucalypts and <i>Acacia harpophylla</i> (Brigalow) trees with separation between each tree (or small group of 2-3 trees) ranging from 40-90 m. The shrub layer is completely absent and managed in these areas through continued grazing and agricultural practices and the ground layer is composed of exotic pasture grasses.</p> <p>The ability for species that rely on hollows, such as Greater Glider and Corben's long-eared bat, to utilise these areas is restricted due to the separation distance between adjacent remnant habits and the paddock trees being larger than the glide distance for this species. Habitat values for birds, including hollow-dependent species is also limited due to the lack of foraging habitat and complexity in the shrub and ground layers providing suitable resources for feeding and shelter.</p> <p>Coarse woody debris, large logs and rocks are also absent from these areas, providing no habitat for listed threatened reptiles.</p>	<ul style="list-style-type: none"> ■ Fork-tailed Swift (aerial only) ■ White-throated Needletail (aerial only) ■ Koala (dispersal habitat) ■ Glossy Black-cockatoo (foraging habitat) ■ Diamond Firetail (roosting habitat) ■ Dulacca Woodland Snail

Low Ecological Value Land within the Project Area	Threatened Species Potentially Present
<p>Additionally, it is unlikely that eucalypt and acacia paddock trees to provide habitat for Squatter pigeon, given the disconnected nature of the vegetation along with distance to waterbodies.</p> <p>Koalas may traverse this habitat type, during dispersal across the ground and may use the paddock trees for shelter or daytime roosts. These areas have been classified as dispersal habitat for Koalas, however as the isolated paddock trees do not constitute a eucalypt open forest or woodland they do not provide the foraging and breeding resources for this species.</p> <p>Eucalypt and acacia paddock trees provides habitat for the Glossy black-cockatoo as the species exclusively feeds on sheoak seeds (<i>Allocasuarina spp.</i> and <i>Casuarina spp.</i>). Whilst this habitat type is dominated by <i>Eucalyptus spp.</i> and <i>Acacia spp.</i> paddock trees, the presence of <i>Allocasuarina spp.</i> and <i>Casuarina spp.</i> cannot be ruled out. Therefore, Eucalypt and Acacia paddock trees may provide potential foraging habitat for Glossy black-cockatoo.</p> <p>Eucalypt and acacia paddock trees potentially provides roosting habitat in the form of nests in trees for the Diamond firetail.</p> <p>Eucalypt and acacia paddock trees may provide habitat for the Dulacca Woodland Snail. This species can inhabit cleared paddocks where suitable logs, woody debris or other suitable microhabitat features remain. As microhabitat presence/absence within this habitat type cannot be confirmed, paddock trees are mapped as Dulacca Woodland Snail habitat as a conservative approach.</p> <p>Eucalypt and acacia paddock trees may provide habitat for the Grey Snake where habitat borders a small gully.</p> <p>When within 100 m of Southern Squatter Pigeon breeding and foraging habitat, patches of this Eucalypt and Acacia paddock trees provides dispersal habitat.</p>	<ul style="list-style-type: none"> ■ Grey Snake ■ Southern Squatter Pigeon (dispersal habitat only when within 100m of mapped breeding and foraging habitat)
<p>Existing CSG and Agricultural Infrastructure.</p> <p>The Project Area contains 22.8 ha of this low ecological value land type.</p> <p>This includes existing CSG and agricultural infrastructure. These areas are not considered as likely to contain threatened species as they are existing infrastructure areas with no natural features.</p>	<p>Nil</p>



Legend

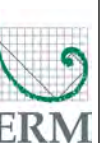
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Highway
- Road
- Track/Path
- Acacia regrowth
- Eucalypt regrowth
- Mixed eucalypt and acacia regrowth
- Eucalypt and acacia paddock trees
- Irrigated pastures and cropping
- Existing CSG and agricultural infrastructure
- Cleared pastures used for grazing

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Low Ecological Land within the Project Area

F4-2

Drawing No: 0639876_EAR_G025_R1.mxd	Ecological Assessment Report
Date: 19/03/2024	Drawing Size: A4
Drawn By: VN	Reviewed By: MD
Client: Senex Assets Pty Ltd	
Coordinate System: GDA2020 MGA Zone 55	
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.	





4.3 Aquatic Ecology and Habitat Values

The waterways present within the Project Area are all ephemeral, with most waterways drying completely during dry periods. Very few of these waterways retain pooling water during dry periods. At the time of the field surveys, most waterways present in the Project Area had already ceased surface water flows with disconnected pools noted along the watercourses. There was some subsurface flow present at sites along most creeks that contained sandy substrates. The gaps between water pools were often separated by open grasslands and poorly defined channels. Riparian vegetation was present, and density of such vegetation varied from moderate to non-existent, with most survey sites having relatively low vegetation present. The in-stream habitats present were concluded to be mostly of 'fair' condition across most sites that were surveyed (17 of 24), with the remaining seven concluded to be of 'poor' condition.

The information gathered from the field surveys and the condition of the habitats has been used to inform the broad aquatic habitat types and vegetation communities within the Project Area. These broad habitat types and vegetation communities are further detailed in Table 4-3. It is noted that these habitat types are based on the two main creek systems present within the Project Area: Wandoan Creek and Woleebee Creek.

Table 4-3: Aquatic Vegetation Communities and Broad Habitat Types within the Project Area

Habitat Type and Vegetation Community*	Photographic Example
<p>Woleebee Creek Aquatic Habitat.</p> <p>This waterbody was concluded as likely to retain subsurface (hyporheic flows) for some time after heavy rainfall.</p> <p>The wetland type of this habitat was riverine, with a stream order of 5.</p> <p>In terms of species, the habitat had a presence of Palaemonidae (freshwater Prawns) and Paratacidae (freshwater Crayfish), as well as the Eastern Long-Necked Turtle, which was captured. The overall habitat bioassessment score for this habitat was of fair condition.</p>	
<p>Wandoan Creek Aquatic Habitat.</p> <p>This waterbody had subsurface flows expressing in some areas. It was concluded as overall uncertain as to whether these were hyporheic or groundwater expressions, and the watercourse was regarded as shallow and highly ephemeral. The wetland type of this habitat was riverine, with a stream order of 4. In terms of species, the habitat had a presence of Palaemonidae (freshwater Prawns) and Paratacidae (freshwater Crayfish). The Green-stripe Frog was also recorded. The overall habitat bioassessment score for this habitat was of fair condition.</p>	

**Images and data in this table are accredited to KCB, 2024.*

Table 4-4 summarises the aquatic fauna field results from field surveys within the Project Area. For further detail refer to Appendix D.

Table 4-4: Aquatic Fauna Field Results

Fauna	Field Survey Results
Aquatic macroinvertebrates	<ul style="list-style-type: none"> ■ Low abundance of aquatic macroinvertebrates and taxa diversity across all samples in the Project Area, likely due to the largely ephemeral nature of the waterways (typical for ephemeral streams in central Queensland). ■ Relatively low PET (Plecoptera, Ephemeroptera, and Trichoptera orders) taxa diversity. ■ Relatively low Signal2 scores, indicating the aquatic macroinvertebrate assemblages were relatively depauperate. <p>Further detail presented in Section 4.6 of Appendix D.</p>
Macrocrustaceans	<p>Three families were detected:</p> <ul style="list-style-type: none"> ■ Atyidae (Glass Shrimp) – recorded at only one site; ■ Palaemonidae (Freshwater Prawn) – recorded at all sites sampled; and ■ Paratacidae (Freshwater Crayfish) – recorded at all sites sampled. <p>Further detail presented in Section 4.7 of Appendix D.</p>
Fish	<p>Eight species were collected from 14 sites sampled. Native species listed from most to least abundant include:</p> <ul style="list-style-type: none"> ■ Spangled Perch (<i>Leiopotherapon unicolor</i>) – 100% of sites; ■ Agassiz’s Glassfish (<i>Ambassis agassizii</i>) – 79% of sites; ■ Midgely’s Carp Gudgeon (<i>Hypseleotris bucephala</i>) – 79% of sites; ■ Eastern Rainbowfish (<i>Melanotaenia splendida splendida</i>) – 71% of sites; ■ Bony Bream (<i>Nematalosa erebi</i>) – 50% of sites; ■ Eel-tailed Catfish (<i>Tandanus tandanus</i>) – one specimen; and ■ Sleepy Cod (<i>Oxyeleotris lineolatus</i>) – one specimen. <p>All the native fish species recorded are relatively common and widespread across their distributions.</p> <p>Further detail presented in Section 4.8 of Appendix D.</p>
Turtles and Platypus	<ul style="list-style-type: none"> ■ A single specimen of Eastern Long-necked Turtle (<i>Chelodina longicollis</i>) was captured. This species can move long distances overland between waterholes, particularly after heavy rainfall. ■ No Platypuses (<i>Ornithorhynchus anatinus</i>) were recorded in the March 2022 surveys and there are no available historical records within 50 km of the Project Area. ■ Three sites were assessed as being average for habitat suitability for platypus, while all remaining sites were considered poor habitat suitability for platypus. ■ It is considered unlikely that platypus would occur across the Project Area. ■ Further detail presented in Section 4.9 in Appendix D.
Frogs	<p>Three species of frog were recorded in the March 2022 sampling:</p> <ul style="list-style-type: none"> ■ Green-Stripe Frog (<i>Cyclorana alboguttata</i>) – recorded at seven sites; ■ Broad-Palmed Rocket Frog (<i>Litoria latopalmata</i>) – recorded at one site; and ■ Cane Toad (<i>Rhinella marina</i>) – recorded at two sites. <p>Further detail provided in Section 4.10 in Appendix D.</p>

Information sourced from Appendix D (Freshwater Ecology, 2022).

4.4 Matters of National Environmental Significance (MNES)

The MNES within the Project Area are summarised in Table 4-5, with detailed descriptions provided in the following Sections.

Following ground-truthing of vegetation mapping during field surveys, the presence of two TECs have been confirmed within the Project Area, namely Brigalow (*Acacia harpophylla* dominant and codominant) and Poplar Box Grassy Woodland on Alluvial Plains.

Based on the outcomes of the detailed habitat assessments and targeted field surveys, five listed threatened fauna, Koala, Greater Glider (southern and central), South-eastern Glossy Black-cockatoo, Dulacca Woodland Snail and White-throated Needletail, and one flora species, Ooline, have been identified as known or likely to occur within the Project Area.

The Project Area occurs within the distribution for the Greater Glider (southern and central) (*Petauroides volans*). It is noted in the Conservation Advice, that it is likely that two separate taxa exist, to the level of subspecies in this area. However, it is noted that until such ambiguity is resolved, the listed entity will be referred to as *Petauroides volans* (DCCEEW, 2022a). For the sake of this analysis, this species will be referred to herein as the Greater Glider.

An additional 16 listed threatened species (two flora and 14 fauna) and six migratory species were determined to be potentially occurring given the overlap of distribution with the Project Area and presence of habitat for these species. For these species, potential future presence cannot be ruled out, although no records occur within the Project Area or in the locality and no observations were made during the field surveys.

The full likelihood of occurrence is attached as Appendix B.

The following Sections detail the confirmed TECs and listed threatened and/or migratory species known and likely to occur in the Project Area, and potential habitat for species with potential to occur. TECs and species habitats have been mapped and presented.

Table 4-5: MNES within the Project Area

Matter	Relevance to the Project Area
World heritage properties	There are no world heritage properties within the Project Area.
National heritage properties	There are no national heritage properties within the Project Area.
Wetlands of international importance	There are no wetlands of international importance associated with the Project Area.

Matter	Relevance to the Project Area
Threatened species and ecological communities	<p>There are six EPBC Act listed threatened species (one flora and five fauna) that are known or likely to occur within the Project Area:</p> <ul style="list-style-type: none"> ■ Dulacca Woodland Snail (<i>Adclarkia dulacca</i>) (likely to occur) – Endangered; ■ Greater Glider (central and southern) (<i>Petauroides volans</i>) (known to occur) – Endangered; ■ Koala (<i>Phascolarctos cinereus</i>) (likely to occur) – Endangered; ■ Ooline (<i>Cadellia pentastylis</i>) (known to occur) – Vulnerable; ■ South-eastern Glossy Black-cockatoo (<i>Calyptorhynchus lathami lathami</i>) (likely to occur) – Vulnerable; and ■ White-throated Needletail (<i>Hirundapus caudacutus</i>) (known to occur) – Vulnerable. <p>There are an additional 16 listed threatened species with potential to occur within the Project Area (Section 4.4.3 and 4.4.8).</p> <p>Two TECs that have been confirmed as known within the Project Area:</p> <ul style="list-style-type: none"> ■ Brigalow (<i>Acacia harpophylla</i> dominant and codominant); and ■ Poplar Box grassy woodland on alluvial plains.
Migratory species	<p>There are two EPBC Act listed migratory species that are regarded as known or likely to occur within the Project Area:</p> <ul style="list-style-type: none"> ■ White-throated Needletail (<i>Hirundapus caudacutus</i>) (known to occur); and ■ Fork-tailed Swift (<i>Apus pacificus</i>) (likely to occur). <p>There are six listed migratory species with potential to occur within the Project Area (Section 4.4.12 4.4.12).</p>
Commonwealth marine area	There are no Commonwealth marine areas within the Project Area.
The Great Barrier Reef Marine Park	The Great Barrier Reef is not associated with the Project Area
Nuclear actions	N/A to this Project.
Water resources	Considered as part of assessments by others.

Table 4-6: Summary of Habitat for Listed Threatened Species Known or Likely to Occur within the Project Area

MNES	Total Habitat in Project Area	Vegetation/Habitat Group/s
EPBC Act listed species (threatened and/or migratory)		
Dulacca Woodland Snail	<ul style="list-style-type: none"> 666.3 ha. Likely to occur from historical record in the Project Area. No observations in field surveys. 	<ul style="list-style-type: none"> Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>). Eucalypt dominated woodlands mainly with <i>Eucalyptus crebra</i> and <i>E. populnea</i>.
South-eastern Glossy Black-cockatoo	<ul style="list-style-type: none"> 1,003 ha. Likely to occur from historical record in the Project Area. No observations in field surveys. 	<ul style="list-style-type: none"> All remnant and regrowth vegetation of most broad terrestrial broad habitat types particularly those dominated by Eucalypt species with large hollow bearing trees, along with remnant and regrowth RE with potential feed trees (<i>Casuarinaceae</i> spp.). Potential nest trees occur in remnant eucalypt woodland and forest and in well-developed riparian corridors across the northern portions of the Project Area.
Greater Glider (central and southern)	<ul style="list-style-type: none"> 528 ha. Known to occur from field survey observations. 	<ul style="list-style-type: none"> All remnant vegetation of most broad terrestrial broad habitat types particularly those dominated by Eucalypt species wherever large trees with hollows occur in woodland connected with these corridors and also in the extensively wooded in the south of the Project Area.
Koala	<ul style="list-style-type: none"> 698.5 ha foraging and breeding habitat and 9,072.6 ha dispersal habitat. Likely to occur in the Project Area from sparse, historical records in the locality and potential scratches observed during field surveys, although it is noted that there is uncertainty that the scratches were definitely caused by Koala. 	<p>Foraging and breeding habitat recorded in the Project Area includes:</p> <ul style="list-style-type: none"> Eucalypt woodlands and open forests. Potential food trees occur 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</i> subsp. <i>variegata</i>). <p>Dispersal habitat has been defined as:</p> <ul style="list-style-type: none"> Cleared exotic grasslands and Brigalow woodlands.

MNES	Total Habitat in Project Area	Vegetation/Habitat Group/s
EPBC Act listed species (threatened and/or migratory)		
Ooline	<ul style="list-style-type: none"> ■ 118.7 ha habitat. ■ Known to occur from field survey observations. 	<p>Ooline habitat:</p> <ul style="list-style-type: none"> ■ Consists of relatively narrow remnant and regrowth patches in the far south of the Project Area. ■ All broad habitat types excluding those Eucalypt and Callitris woodlands. ■ Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>).
White-throated Needletail	<ul style="list-style-type: none"> ■ 0 ha mapped as a likely flyover visitor only. ■ Known to occur from field survey observations. 	<ul style="list-style-type: none"> ■ No habitat mapped, flyover visitor only.

4.4.1 Threatened Ecological Communities

The desktop review identified the potential occurrence of five TECs listed under the EPBC Act in the Project Area, including:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) – Endangered;
- Coolibah – Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions— Endangered;
- Poplar box grassy woodland on alluvial plains – Endangered;
- Semi-evergreen vine thickets (SEVT) of the Brigalow Belt (North and South) and Nandewar Bioregions— Endangered; and
- Weeping Myall woodlands – Endangered.

Following ground-truthing of vegetation mapping during field surveys, it has been confirmed the presence of two TECs within the Project Area, being Brigalow TEC and Poplar Box TEC. The remaining three TECs are not present within the Project Area.

The extent of Brigalow TEC and Poplar Box TEC is considerably smaller than the total mapped extent of the component RE. This is because smaller areas of retained REs 11.3.1, 11.9.5 and 11.9.5a (Brigalow TEC) and RE 11.3.2 (Poplar Box TEC) did not meet TEC size and/or condition criteria (patch size too small, ground stratum was dominated by exotic weeds and/or patch was not dominated by relevant tree species).

A brief description of the confirmed TECs are listed in Table 4-7, together with the constituent REs which are further described and defined in Sections 4.4.1.1 and 4.4.1.2. The following Sections provide further supporting information for each confirmed TEC.

Table 4-7: Description and Ground-truthed Extent of TEC within the Project Area

TEC Description	EPBC Act Status	RE Codes	Ground-truthed Extent (ha)	Number of Patches (Size Range [ha])	Comment
Brigalow (<i>Acacia harpophylla</i> dominant and codominant)	Endangered	11.9.5, 11.9.5a	95.8 ha	17 (0.1–44.9 ha)	An additional 14 patches and a total of 56.2 ha (RE 11.3.1, 11.9.5 and 11.9.5a) did not meet TEC condition criteria ¹ .
Poplar Box grassy woodland on alluvial plains ²	Endangered	11.3.2	32.3 ha	10 (0.03–9.6 ha)	An additional 15 patches (RE 11.3.2) did not meet TEC condition criteria ² .

¹ TEC condition criteria and thresholds found in: DoE (2013); and ² DoEE (2019).

4.4.1.1 Brigalow TEC

The Brigalow TEC was listed as Endangered under the EPBC Act on 4 April 2001 (Threatened Species Scientific Committee [TSSC], 2001a). This community occurs within Queensland and New South Wales and is characterised by *Acacia harpophylla* being either dominant in the tree layer, or co-dominant with other species – notably *Casuarina cristata*, other species of *Acacia*, or species of *Eucalyptus* (Butler, 2007). In QLD, Brigalow TEC comprises of 16 REs (DoE, 2013).

Within the Project Area, 17 patches of Brigalow TEC were detected in REs 11.9.5 and 11.9.5a, covering a total area of 95.8 ha (refer to Figure 4-3). This included 13 ha of regrowth and 82.8 ha of remnant vegetation. An example of a remnant patch of Brigalow TEC within the Project Area is shown in Photograph 4-1. An additional 14 patches of Brigalow vegetation (RE 11.3.1, 11.9.5 and 11.9.5a; totalling 56.2 ha) did not meet the criteria for recognition as a TEC as:

- *A. harpophylla* was absent or subdominant; and/or
- The was patch less than 0.5 ha in size (including areas that extended beyond the Project Area boundary); and/or
- Exotic perennial plants comprised over 50% of total vegetation cover within the patch.

4.4.1.2 Poplar Box Grassy Woodland TEC

Poplar Box Grassy Woodland on Alluvial Plains TEC was listed as Endangered under the EPBC Act on 4 July 2019 (DoEE, 2019). This community is typically a grassy woodland with a canopy dominated by *Eucalyptus populnea* 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). In QLD, Poplar Box TEC comprises of five REs (11.3.2, 11.3.17, 11.4.7, 11.4.12 and 12.3.10) (DEE, 2019).

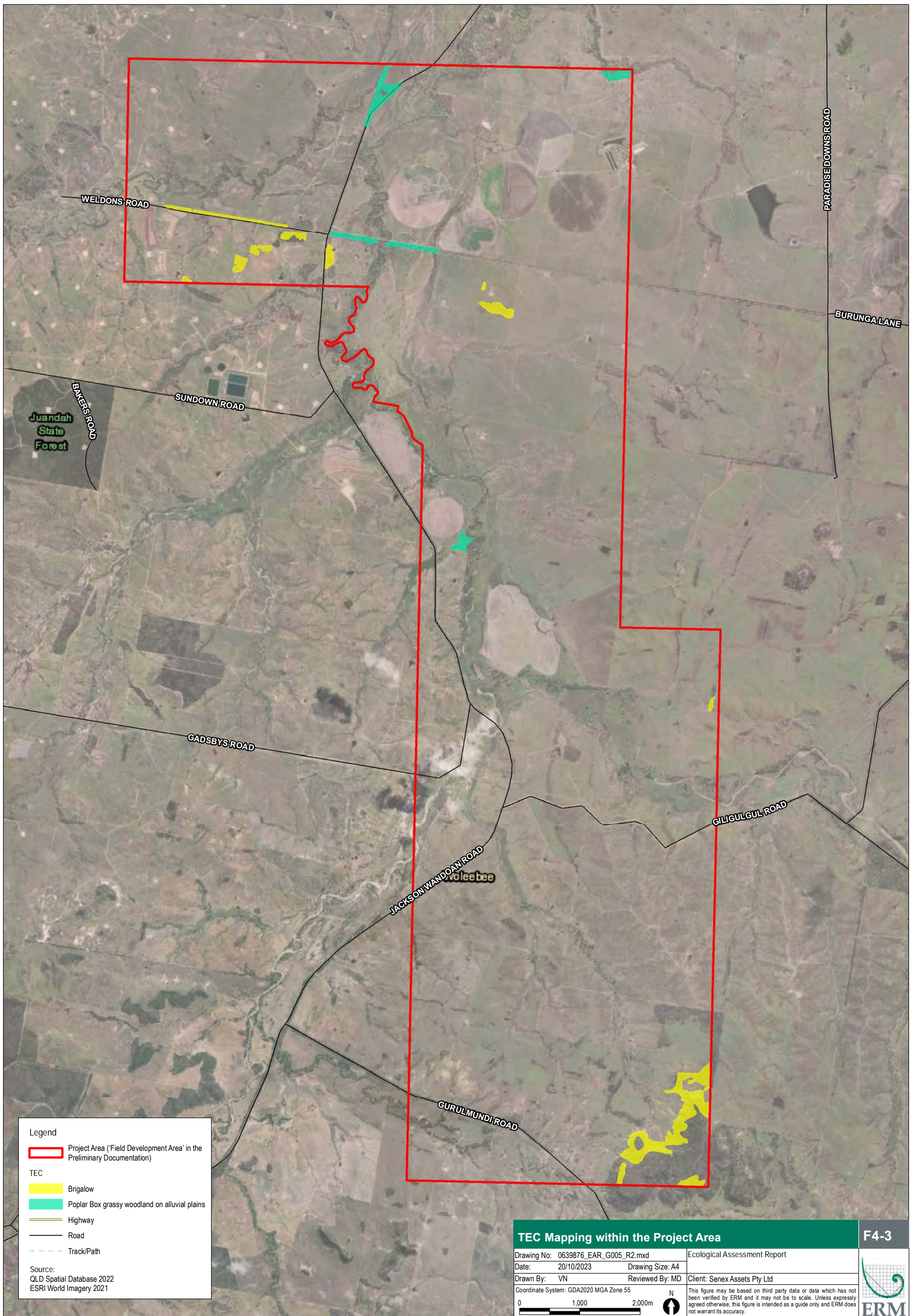
Within the Project Area, ten patches of Poplar Box TEC were detected in RE 11.3.2, covering a total area of 32.3 ha, with an example of this community shown in Photograph 4-2. Three of these patches were assessed as Category B (Good Quality) vegetation and seven patches were assessed as Category C (Moderate Quality) vegetation, all occurring on floodplains in the north, with some patches extending beyond the Project Area boundaries. An additional 15 patches of regrowth and remnant Poplar Box woodland on alluvial plains (RE 11.3.2) was assessed and did not meet the criteria for recognition as TEC (smaller than 5 ha (including any portions that extended beyond the Project Area boundary) and/or the ground stratum was dominated by exotic weeds) (Appendix C). TEC mapping is presented on Figure 4-3.



Photograph 4-1: Example Brigalow TEC within Project Area



Photograph 4-2: Example Poplar Box Woodland TEC within Project Area



Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)

TEC

- Brigalow
- Poplar Box grassy woodland on alluvial plains
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

TEC Mapping within the Project Area		F4-3
Drawing No: 0639876_EAR_G005_R2.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> <div style="margin-left: 5px;"> N ↑ </div> </div>	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.	

4.4.2 Terrestrial Listed Threatened Flora Species Likely to Occur

There were fourteen threatened flora species identified by desktop searches as having the potential to occur within 10 km of the Project Area. The field surveys recorded 124 flora species, including one EPBC Act listed threatened terrestrial flora species, Ooline (*Cadellia pentastylis*), within the Project Area. Further information on Ooline and its associated habitat within the Project Area is provided in Section 4.4.2.1 and mapped in Figure 4-4 and Figure 4-5.

Based on the likelihood of occurrence assessment using desktop and field data, no additional species were considered known or likely to occur within the Project Area. Two species were considered to have the potential to occur within the Project Area. Further information on these potentially occurring species can be found in Section 4.4.3 and mapped in Figure 4-6.

Records of threatened flora species is provided in Appendix J.

4.4.2.1 Ooline

Species Profile

Ooline (*Cadellia pentastylis*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000 and is known to occur in the Project Area from field survey observations (Appendix B). The species is a medium-sized spreading tree growing to 10 m and rarely to 25 m high. Leaves are glossy green, paler and dull underneath, and 1-7 cm long, 1.5-2 cm wide, with broad rounded tips. Leaf venation is prominent on both leaf surfaces when dry. Flowers are usually single, with white petals 5-7 mm long and occur sporadically. Fruit is a cluster of up to five brown coloured drupes, 3-5 mm in diameter, surrounded by papery, red sepals (DECC, 2005a).

Ooline is distributed from the western edge of the NSW north-west slopes, from Mt Black Jack near Gunnadah to west of Tenterfield, and extends into Queensland to Carnarvon Range and Callide Valley, south-west of Rockhampton (DEWHA, 2008a).

Ooline is listed as Vulnerable under the EPBC Act and is known to occur in the Project Area from field survey observations (Appendix B). This species grows on undulating plains, valley slopes, hillsides and scarps, often in association with Brigalow and SEVT communities (DEWHA, 2008a).

Species Threats

As per the conservation advice for the Ooline (DEWHA, 2008a), the threats include:

- Known threats;
 - Inbreeding, low seed viability, agricultural clearing, grazing, soil compaction by domestic stock, invasion of habitat by weeds, frequent fires, tunnel and sheet erosion, roadworks damage to roadside populations, and high insect attack.
- Potential threats;
 - Lack of recruitment; and
 - Logging of the tree species.

Species Occurrence in the Broader Area

A search of the ALA database identified multiple historical known records of Ooline within 10 km of the Project Area. A cluster of known Ooline records exists near Gurulmundi State Forest, with the closest being 4 km south of the Project Area, recorded between 2012 and 2020. Additionally, there is another cluster of known Ooline records located 13 km west of the Project Area, recorded between 2011 and 2017. For more information on the description of the habitat in which the record was identified, refer to Appendix H. Refer to Figure 4-5 for records within the broader area.

Habitat Assessment

Ooline grows in dry rainforest, semi-evergreen vine thickets and sclerophyll ecological communities, often locally dominant or as an emergent. This species grows on undulating plains, valley slopes, hillsides and scarps, often in association with the following ecological communities (DEWHA, 2008a):

- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions;
- Brigalow (*Acacia harpophylla* dominant and co-dominant); and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

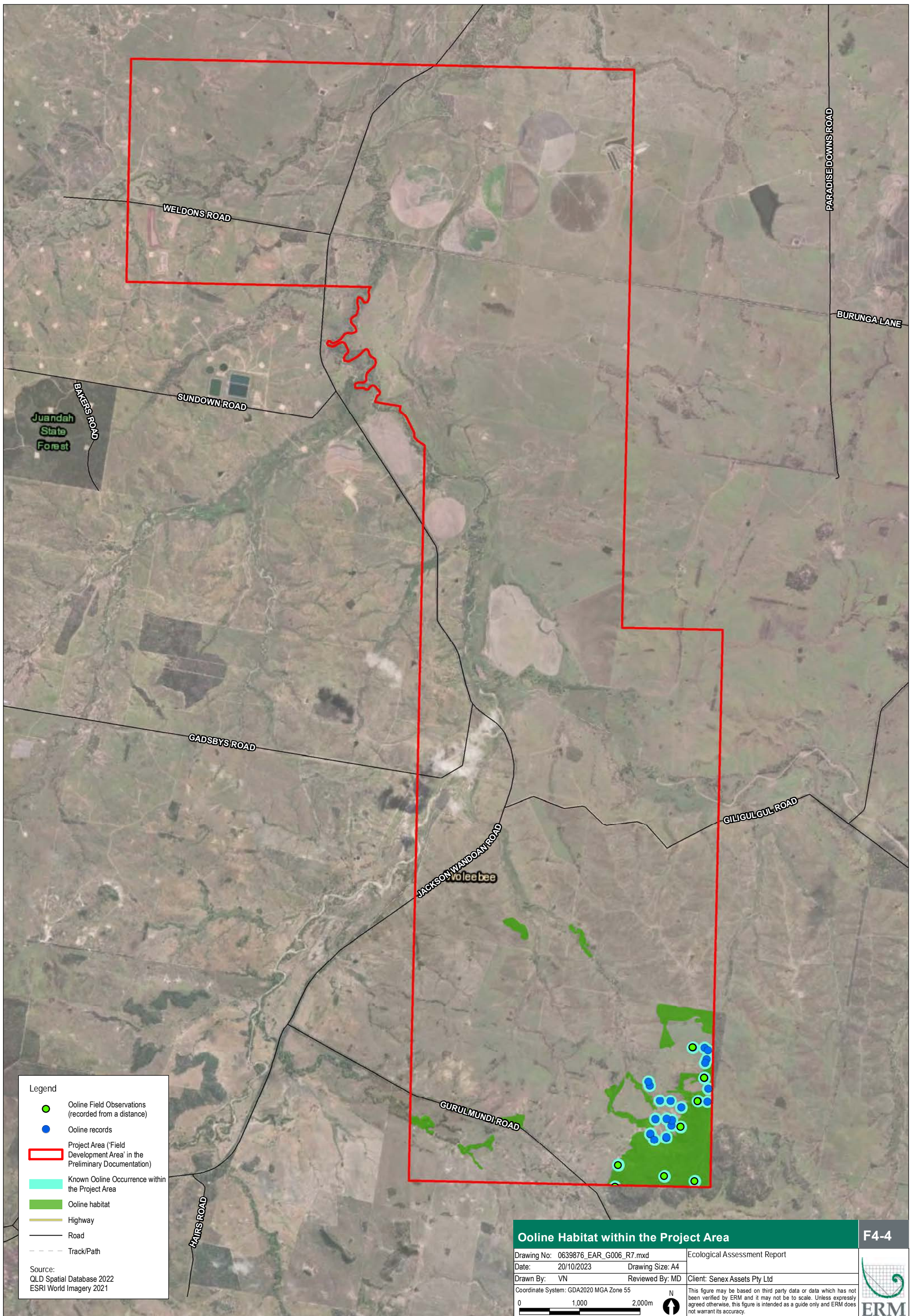
There is a total of 118.7 ha of mapped Ooline habitat within the Project Area. During the 2022 field surveys, Ooline was observed in the south-eastern part of the Project Area in Brigalow woodland (this is further described in Appendix C). In addition, the desktop searches showed four additional records within the Project Area and another six within the 10 km buffer (Appendix A).

During the 2023 field surveys, 35 individuals were recorded within the eastern portion of the Hillandale property, adjacent to existing Ooline records. The individuals identified had ranged from juveniles to mature plants from 1 to 18 m in height, occurring in mostly cleared agricultural land (Attexo, 2023).

Ooline habitat consists of relatively narrow remnant and regrowth patches in the far south of the Project Area. It is inclusive of all broad habitat types excluding those Eucalypt and Callitris woodlands and Acacia woodlands dominated by Brigalow (*Acacia harpophylla*).



Photograph 4-3: Example Stand of Ooline in Areas of Exotic Pasture

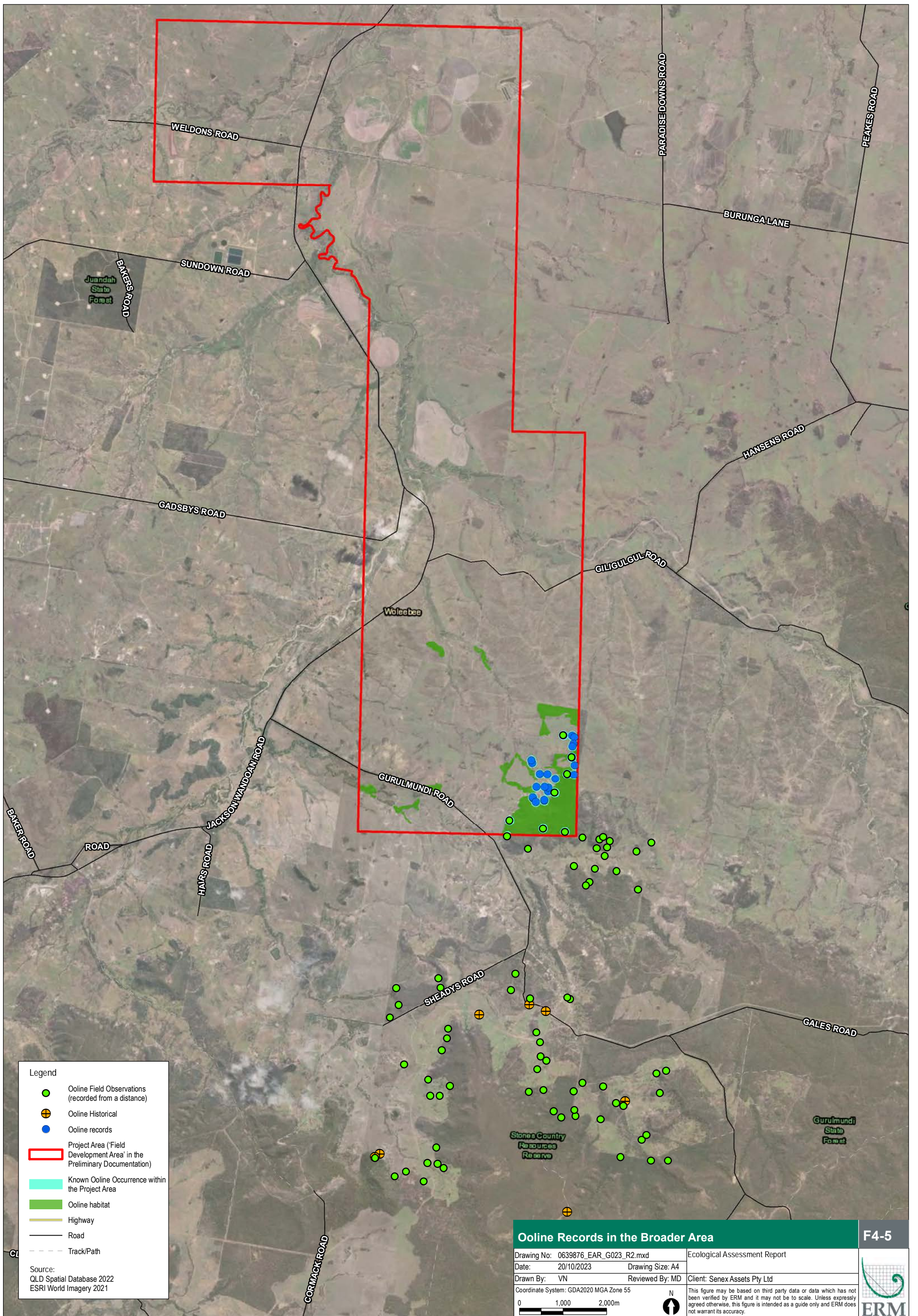


Legend

- Ooline Field Observations (recorded from a distance)
- Ooline records
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Known Ooline Occurrence within the Project Area
- Ooline habitat
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Ooline Habitat within the Project Area		F4-4
Drawing No: 0639876_EAR_G006_R7.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> <div style="margin-left: 5px;"> </div> </div>	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>	



Legend

- Ooline Field Observations (recorded from a distance)
- Ooline Historical
- Ooline records
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Known Ooline Occurrence within the Project Area
- Ooline habitat
- Highway
- Road
- Track/Path

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Ooline Records in the Broader Area		F4-5
Drawing No: 0639876_EAR_G023_R2.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> 0 1,000 2,000m </div>	<div style="display: flex; align-items: center; justify-content: center;"> N </div>	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>

4.4.3 Listed Threatened Terrestrial Flora Species with Potential to Occur

Two listed threatened terrestrial flora species, Belson's Panic (*Homopholis belsonii*) and Slender Tylophora (*Vincetoxicum forsteri*), have been assessed as having the potential to occur within the Project Area (Appendix B). In essence, because part of this species' distributions overlaps the Project Area and suitable habitat is present within the Project Area, their presence cannot be ruled out. This is despite no signs or observations of these species within the Project Area during field surveys using survey techniques aligned with the relevant survey guidelines.

Belson's Panic and Slender Tylophora are listed as Vulnerable and Endangered under the EPBC Act, respectively.

Within the Project Area, potential mapped habitat for Belson's Panic totals 366.3 ha and includes:

- Eucalypt dominated woodlands mainly of *Eucalyptus crebra*, *E. populnea* and *E. melanophloia*; and
- Acacia woodlands dominated by Brigalow (*Acacia harpophylla*).

Potential Slender Tylophora mapped habitat within the Project Area totals 122.7 ha and includes Eucalypt dominated woodlands mainly of *E. crebra*, and *E. melanophloia*. In accordance with the precautionary principle, 'potential habitat' for Belson's Panic and Slender Tylophora has been mapped.

4.4.3.1 Belson's Panic

Species Profile

Belson's Panic (*Homopholis belsonii*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The species is a perennial grass growing to 0.5 m high. Leaf blades are 2–4.5 mm wide. The common axis of the inflorescence is 8–15 cm long and the primary branches are 8–15 cm long with hairy axils. There are two or three laterally compressed 8 mm long spikelets on a typical lowermost branch (DEWHA, 2008b).

The species is known to occur within the southern Brigalow belt, Queensland and on the north-western slopes and plains of NSW. In NSW, this species occurs between Wee Waa, Goondiwindi and Glen Innes. In Queensland, it has been recorded in the Darling Downs west of Toowoomba, near Oakey, Jondaryan, Bowenville, Dalby, Acland, Sabine, Quinalow, Goombungee, Gurulmundi and Millmerran, and further west between Miles and Roma. This species occurs within the Border Rivers Maranoa– Balonne, Condamine (Queensland) and Border Rivers–Gwydir (NSW) Natural Resource Management Regions (DEWHA, 2008b).

Species Threats

As per the conservation advice for the Belson's Panic (DEWHA, 2008b), the threats include:

- Habitat clearing for mining;
- Habitat clearing for agricultural purposes;
- Development or pasture improvement;
- Overgrazing of habitat by domestic stock; and
- Introduction of invasive weeds.

Species Occurrence in the Broader Area

A search of the ALA database identified one (1) historical known record of Belson's Panic within 10 km of the Project Area, located approximately 2 km north of Project Area, recorded in 2007. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Belson's Panic occurs at elevations ranging from 200 m to 520 m above sea level. It is known to occur in dry woodland habitats on poor soils, such as those derived from basalt. It occurs on rocky hills supporting White Box (*Eucalyptus albens*) and in Wilga (*Geijera parviflora*) woodland; flat to gently undulating alluvial areas supporting Belah (*Casuarina cristata*); and soils and plant communities of Poplar Box (*Eucalyptus populnea*) woodlands.

It may also be associated with shadier areas of Brigalow (*Acacia harpophylla*), Myall (*A. melvillei*), and Weeping Myall (*A. pendula*) communities; in Mountain Coolibah (*Eucalyptus orgadophila*) communities; and on roadsides. It is generally found among fallen timber at the base of trees or shrubs, among branches and leaves of trees hanging to ground level or along the bottom of netting fences. The distribution of this species overlaps with the "Brigalow (*Acacia harpophylla* dominant and co-dominant)" EPBC Act-listed threatened ecological community (DEWHA, 2008c).

Field assessments conducted in 2022 confirmed a small portion of the Project Area to contain potential habitat, in the form of Eucalypt dominated woodlands mainly of *Eucalyptus crebra*, *E. populnea* and *E. melanophloia*; and Acacia woodlands dominated by Brigalow (*Acacia harpophylla*). Therefore, as suitable habitat is located within the Project Area, Belson's Panic is considered to have a potential to occur. The species was not recorded during the 2022 or 2023 field surveys.

4.4.3.2 Slender Tylophora

Species Profile

Slender Tylophora (*Vincetoxicum forsteri*) is currently listed as Endangered under the EPBC Act, effective 16 July 2000. The species is an herbaceous climber with clear latex that grows to about 2 m long. The stems are cylindrical, up to 3 mm in diameter with internodes up to 100 mm long. Leaves are dark green, linear, up to 100 mm long and 4 mm wide, and extra-floral nectaries are absent from the base of the leaf. Flowers are clustered in radiating groups of 3–8. Flowers are 6–22 mm in diameter, with petals olive-green externally, dark purple internally and with short hairs internally concentrated towards the tip. Fruits form follicles 95–100 mm long and 5 mm wide (DEWHA, 2008c).

Slender Tylophora has rarely been collected and is known from eight localities in the Dubbo area and Mt Crow near Barraba in NSW, and "Myall Park" near Glenmorgan in Queensland. This species is conserved within Goobang National Park, Eura State Forest, Goonoo State Forest, Pilliga West State Forest and Coolbaggie Nature Reserve (DEWHA, 2008c).

Species Threats

As per the conservation advice for the Slender Tylophora (DEWHA, 2008c), the threats include:

- Habitat disturbance from grazing and fire;
- Introduction of invasive weeds, particularly Lantana (*Lantana camara*); and
- Habitat disturbance from forestry activities.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any records of Slender Tylophora 10 km of the Project Area.

Habitat Assessment

The species grows in dry scrub, open forest and woodlands associated with *Melaleuca uncinata*, *Eucalyptus fibrosa*, *E. sideroxylon*, *E. albens*, *Callitris endlicheri*, *C. glaucophylla*, *Allocasuarina luehmannii*, *Acacia hakeoides*, *A. lineata*, *Myoporum* spp., and *Casuarina* spp. This species occurs within the Border Rivers–Gwydir, Central West, Namoi (NSW), and Border Rivers Maranoa–Balonne (Queensland) Natural Resource Management regions (DEWHA, 2008c).

Field assessments conducted in 2022 confirmed a small portion of the Project Area to contain potential habitat, in the form of Eucalypt dominated woodlands mainly of *Eucalyptus crebra*, *E. populnea* and *E. melanophloia*. Therefore, as suitable habitat is located within the Project Area, Slender Tylophora is considered to have a potential to occur. The species was not recorded during the 2022 or 2023 field surveys.

4.4.4 Listed Threatened Terrestrial Flora Species identified in the RFI but not Known, Likely or Potential to Occur

4.4.4.1 Bluegrass

Species Profile

Bluegrass (*Dichanthium setosum*) is currently listed as Endangered under the EPBC Act, effective 16 July 2000. Bluegrass is an upright perennial grass less than 1 m tall. It has mostly hairless leaves about 2–3 mm wide. The flowers are densely hairy and clustered together along a stalk in a cylinder shape and appear mostly during summer. The species can form pure swards or occur as scattered clumps (DEWHA, 2008d).

The species occurs chiefly on the northern tablelands in the Saumarez area, west of Armidale, and 18-30 km east of Guyra. It is more rarely found on the north-western slopes, central western slopes and north-western plains of NSW, extending west to Narrabri. In Queensland it has been reported from the Leichhardt, Morton, North Kennedy and Port Curtis regions. This species occurs in the Mistake Range, in Main Range National Park, and possibly in Glen Rock Regional Park, adjacent to the Main Range National Park (DEWHA, 2008d).

Species Threats

As per the conservation advice for Bluegrass (DEWHA, 2008d), the threats include:

- Heavy grazing from domestic stock;
- Loss of habitat through agricultural clearing;
- Frequent fires;
- Introduction of invasive grasses; and
- Road widening.

Species Occurrence in the Broader Area

A search of the ALA database identified one historical known record of Bluegrass within 10 km of the Project Area. This record is located approximately 2 km north of the Project Area, recorded in 2017. Additionally, a cluster of Bluegrass records are located in Wandoan, approximately 12 km north-east of the Project Area, recorded in 1930, 1971 and 2020. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Bluegrass is associated with heavy basaltic black soils and stony red-brown hard setting loam with clay subsoil and is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The extent to which this species tolerates disturbance is unknown. The species occurs within the Border Rivers–Gwydir, Central West, Namoi, Northern Rivers (NSW), South East and Fitzroy (Queensland) Natural Resources Management Regions (DEWHA, 2008d).

Field assessments conducted in 2022 confirmed no potential habitat within the Project Area that supports the species. Therefore, Bluegrass is considered unlikely to occur. The species was not recorded during the 2022 or 2023 field surveys.

4.4.4.2 *Calytrix gurulmundensis*

Species Profile

Calytrix gurulmundensis is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. *C. gurulmundensis*, is a shrub growing to 2 m tall. Leaves are linear, 4–11 mm long, 0.5–1 mm wide and aromatic when crushed. Flowers have cream petals with yellow at the base, but can also be white, pinkish-white or yellow, and are up to 11 mm long and 3 mm wide. Flowers can have 60–70 yellow stamens with a few filaments inflexed in the bud stage. Flowering occurs from July to October. The species is known from the Gurulmundi, Guluguba and Barakula area in Queensland (DEWHA, 2008e).

Species Threats

As per the conservation advice for *Calytrix gurulmundensis* (DEWHA, 2008e), the threats include:

- Vegetation clearing;
- Increased fragmentation and loss of remnant vegetation;
- Altered fire regimes;
- Quarrying, and
- Inappropriate timber harvesting.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of *Calytrix gurulmundensis* within 10 km of the Project Area. The closest known records of the species are a cluster located in Gurulmundi State Forest, approximately 11 km south-east of the Project Area, recorded between 1961 and 2021.

Habitat Assessment

This species occurs on ridge tops in open scrubland with sparse stunted *Eucalyptus* spp., *Acacia* spp., and *Casuarina*, in *Triodia*-hummock grassland with scattered shrubs, and growing on yellow lateritic sandy clay, shallow red gravelly soil and sandstone. This species has a linear range of less than 100 km. This species occurs within the Fitzroy and Border Rivers and Maranoa–Balonne (Queensland) Natural Resource Management Regions (DEWHA, 2008e).

The distribution of this species is not known to overlap with any EPBC Act-listed threatened ecological community (DEWHA, 2008e).

Field assessments conducted in 2022 confirmed no potential habitat within the Project Area that supports the species. Therefore, suitable habitat is not located within the Project Area, the *C. gurulmundensis* is considered unlikely to occur. The species was not recorded during the 2022 or 2023 field surveys.

4.4.4.3 *Curly-bark Wattle*

Species Profile

Curly-bark Wattle (*Acacia curranii*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The species is an erect or spreading multi-stemmed shrub growing to 4 m tall, with distinctive red curling (minniritchi) bark. Branches are angular, maroon-grey with silky, downy hairs. The leaf-like phyllodes are erect, linear, depressed along the midrib, 13–18 cm long, 1–1.5 mm wide and covered by silky silver hairs. Flowers are golden yellow in colour and arranged in spikes 5–7 mm long on a stalk 1.5 mm long. Pods are flat, up to 6 cm long by 3 mm wide and with coarse long hairs. Seeds are oblong, about 3 mm long, greyish-brown with a pale area and a basal seed stalk (aril). Flowering time is August and September (DEWHA, 2008f).

Curly-bark Wattle is known from three separate areas: Lake Cargelligo and Gunderbooka Range near Bourke in NSW, and Gurulmundi in Queensland. A population of about 150 trees has been recorded on Mount Gunderbooka. This species is conserved within the Gundabooka National Park and Nombininie Nature Reserve (DEWHA, 2008f).

Species Threats

As per the conservation advice for Curly-bark Wattle (DEWHA 2008f), the threats include:

- Habitat erosion;
- Grazing, browsing and horning of adult and seedling plants by feral goats (*Capra hircus*);
- Grazing by domestic stock;
- Clearing of vegetation for fire trail widening;
- Quarrying activities;
- Predation of seeds by insects, and
- Lack of suitable fire disturbances for seedling establishment.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of Curly-bark Wattle within 10 km of the Project Area. The closest known records of the species are a cluster located in Gurulmundi State Forest, approximately 11 km south-east of the Project Area, recorded between 1961 and 2008.

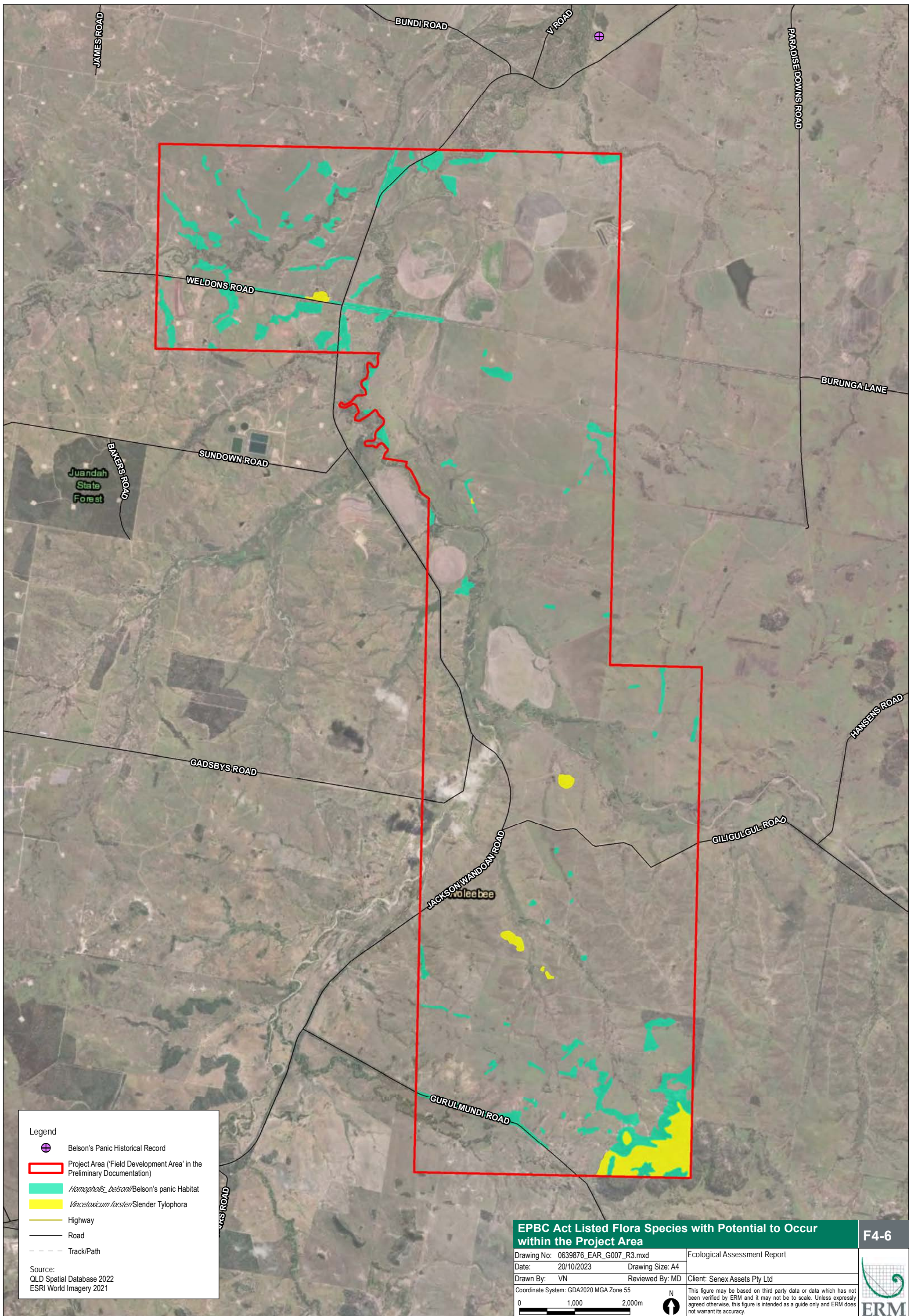
Habitat Assessment

Curly-bark Wattle grows in dry sclerophyll forests and semi-arid woodlands. This species occurs within the Lachlan, Western (NSW), and Border Rivers Maranoa–Balonne (Queensland) Natural Resource Management Regions (DEWHA, 2008f).

The distribution of this species overlaps with the following EPBC Act-listed threatened ecological communities (DEWHA, 2008f):

- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions;
- Brigalow (*Acacia harpophylla* dominant and co-dominant);
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland; and
- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions.

Field assessments conducted in 2022 confirmed no potential habitat within the Project Area that supports the species. Therefore, suitable habitat is not located within the Project Area, the Curly-bark Wattle is considered unlikely to occur. The species was not recorded during the 2022 or 2023 field surveys.



Legend

- Belson's Panic Historical Record
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Homopholis belsoni*/Belson's panic Habitat
- Vincetoxicum forsteri*/Slender Tylophora
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

EPBC Act Listed Flora Species with Potential to Occur within the Project Area		F4-6
Drawing No: 0639876_EAR_G007_R3.mxd		Ecological Assessment Report
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

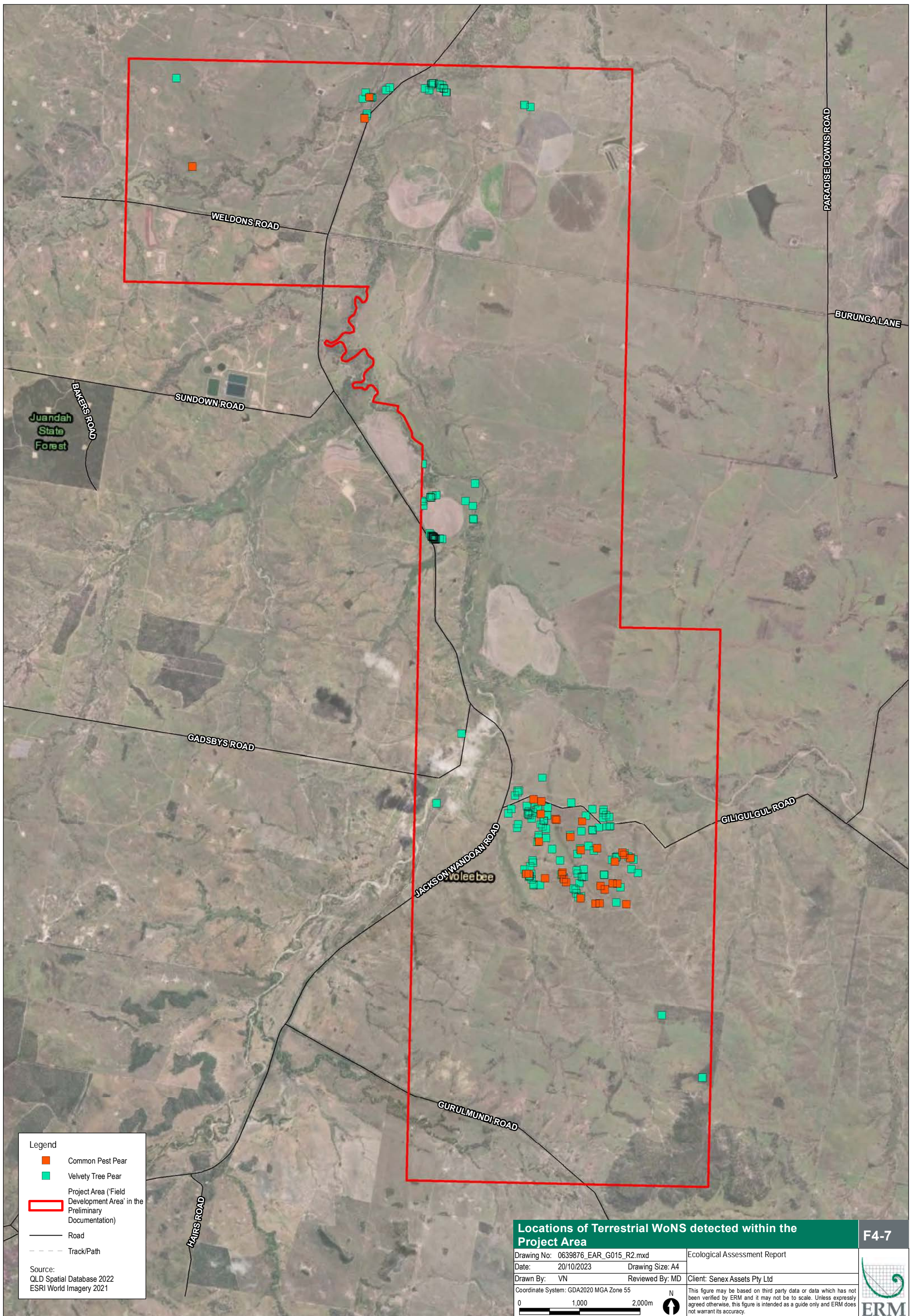
4.4.5 Weeds of National Significance

Desktop searches of the Queensland Government WildNet database (DES, 2022a) found five species of WoNS recorded within 10 km of the Project Area (the 'adjoining areas'). These species and WoNS detected during field surveys are given in Table 4-8. Locations of WoNS detected within the Project Area are shown in Figure 4-7.

Table 4-8: Terrestrial Weeds of National Significance Relevant to the Project Area

Scientific Name	Common Name	WoNS/ Biosecurity Act Status	Comments*
<i>Parthenium hysterophorus</i>	Parthenium Weed	WoNS, Cat. 3 Restricted Matter	■ Potentially occurring within the Project Area. Previously recorded within the 10 km buffer.
<i>Senecio madagascariensis</i>	Fireweed	WoNS, Cat. 3 Restricted Matter	■ Potentially occurring within the Project Area. Previously recorded within the adjoining areas (DES, 2022a).
<i>Anredera cordifolia</i>	Madeira Vine	WoNS, Cat. 3 Restricted Matter	■ Potentially occurring within the Project Area. Previously recorded within the adjoining areas (DES, 2022a).
<i>Opuntia aurantiaca</i>	Tiger Pear	WoNS, Cat. 3 Restricted Matter	■ Detected during field surveys at moderate densities in Brigalow woodland. The closest records in ALA (2022) are over 45 km away, around Yuleba North, Barakula and Taroom. No previous records in WildNet from the Project Area (DES, 2022a).
<i>Opuntia stricta</i>	Common Pest Pear	WoNS, Cat. 3 Restricted Matter	■ Previously recorded within the adjoining areas (DES, 2022a). Detected in field surveys throughout the Project Area at low densities.
<i>Opuntia tomentosa</i>	Velvety Tree Pear	WoNS, Cat. 3 Restricted Matter	■ Previously recorded within the adjoining areas (DES, 2022a). Detected in field surveys throughout the Project Area at low densities.

*Information sourced from BOOBOOK (2022) Appendix C.



Legend

- Common Pest Pear
- Velvety Tree Pear
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Road
- - - Track/Path

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Locations of Terrestrial WoNS detected within the Project Area		F4-7
Drawing No: 0639876_EAR_G015_R2.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

4.4.6 Aquatic Listed Threatened Flora Species

A total of four floating attached macrophyte species and 15 emergent macrophyte species were recorded across all sites. No listed aquatic flora species were recorded during field surveys or considered likely to occur in the Project Area. See likelihood of occurrence (Appendix B).

4.4.7 Terrestrial Listed Threatened Fauna Species Known and Likely to Occur

Five EPBC Act listed threatened species (Koala, Greater Glider, Glossy Black-cockatoo, Dulacca Woodland Snail and White-throated Needletail) are considered known or likely to occur within the Project Area (a full likelihood of occurrence is shown in Appendix B). A summary of listed threatened species that are known or likely to occur and their associated habitat within the Project Area is provided in Section 4.4.7.1 to 4.4.7.5.

Records of threatened fauna species is provided in Appendix J.

4.4.7.1 Koala

Species Profile

The Koala is currently listed as Endangered under the EPBC Act, as of the 12th of February 2022. The Koala is a medium-sized marsupial featuring a light grey to dark grey stocky body, dependent on species range, round ears, and sharp claws. The morphological appearance of Koalas is dependent on the species range, with northern species being smaller (averaging 6.5 kg) and lighter in colouration, and southern species larger (averaging 12 kg) and darker (DAWE, 2022c). Across the species range, males are typically larger than females.

The Koala is generally found in temperate to tropical forests as well as woodlands and semi-arid communities dominated by eucalyptus species (Martin and Handasyde, 1999). The species can be found in habitat broadly defined as woodlands and open forests, as long as food trees are present (DoE, 2022). The Koala has one of the broadest distributions of threatened terrestrial species under the EPBC Act with a range extending from north-eastern Queensland to the south-east corner of Southern Australia. The biological species distribution is widespread in coastal and inland areas that extends over approximately one million square kilometres (Martin & Handasyde, 1999).

Under the revised *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022c), released on 12th February 2022, habitat for the koala is described as:

Koala habitat includes both coastal and inland areas that are typically characterised by Eucalyptus forests and woodlands. Biophysical habitat attributes for the koala include places that contain the resources necessary for individual foraging, survival (including predator avoidance), growth, reproduction and movement.

Species Threats

As per the conservation advice for the Koala (DAWE, 2022c), the threats include:

- Loss of climatically suitable habitat;
- Increased intensity / frequency of heatwaves;
- Increased intensity/frequency of bushfire;
- Declining nutritional value of foliage;
- Clearing and degradation of Koala habitat;
- Encounter mortality with vehicles and dogs; and
- Koala retrovirus (KoRV) and Chlamydia (*Chlamydia pecorum*).

Species Occurrence in the Broader Area

A search of the Atlas of Living Australia (ALA) database did not identify any historical known Koala records within 10 km of the Project Area. The closest known records of the Koala are both located approximately 12 km west and north-east of the Project Area, recorded in 1984 and 1987 respectively. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Habitat critical to the survival of the Koala is defined 'as areas that the species relies on to avoid or halt decline and promote the recovery of the species.' Under the EPBC Act, the following factors are considered when identifying habitat that is critical to the survival of the species:

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

In Queensland, Koalas are widespread, however, they can occur in patchy and low-distribution populations. Across Queensland, Koalas typically inhabit moist coastal forests, subhumid woodlands and eucalypt woodlands located adjacent to a permanent water source (DAWE, 2022c). Additionally, Koalas are known to occur within urban and rural landscapes, utilising regrowth and remnant eucalypt dominated vegetation communities for foraging and breeding resources.

Targeted searches for the species were conducted in suitable habitat throughout the Project Area in 2022. Despite field surveys specifically targeting Koalas through faecal pellet searched and spotlighting, no direct sightings were recorded. However, potential evidence of Koala occurrence within the Project Area was recorded through indirect signs of scratch marks on riparian Queensland Blue Gum trees in several locations along Wandoan Creek, Woleebee Creek and a tributary of Hellhole Creek. Whilst potentially being caused by Koala, there is always some uncertainty that they were caused by Koala when relying on scratch marks as a method of species observation.

No faecal pellets were observed during targeted surveys, with active searches completed for pellets at each habitat assessment points. Additionally, a review of the historical species records within a 10 km buffer of the Project Area are absent, however, sparse records from 1980s and 1990s exists only from beyond the 10 km buffer. There is no evidence of recent, direct Koala sightings in the Project Area or surrounds (10 km buffer) within the last 25 years. It is concluded that there is a general absence of Koalas in the Project Area, and it is considered that Koala occurrence in the Project Area is very rare.

Due to the indirect method of recording observations of Koala in the form of scratch marks in the Project Area (Photograph 4-4) that could potentially be caused by Koala, it has been conservatively concluded that habitat critical to the survival of the species does occur within the Project Area, with Koala habitat classified as either **foraging and breeding habitat** or **dispersal habitat**. Habitat has been classified and mapped based on recent habitat guidance for the species (Youngentob, et al,

2022). Within the Project Area, foraging and breeding habitat has been mapped in areas of remnant and regrowth open eucalypt forests and woodland that are dominated by eucalypt food trees or contain occasional eucalyptus (e.g., *E. tereticornis*, *E. populnea*, *E. crebra*, *E. longirostrata*, *E. melanophloia*, *E. exserta* and *Corymbia citriodora* subsp.). Within the Project Area, the following areas of field verified regrowth and remnant vegetation have been classified and mapped as Koala foraging and breeding habitat:

- Callitris and Eucalypt dominated woodlands;
- Eucalypt dominated woodlands;
- Riparian and wetland Eucalypt woodlands;
- Eucalypt open forest; and
- Regrowth eucalypt woodland.

Dispersal habitat for Koalas encompasses the broader landscape of the Project Area that does not contain eucalypt woodlands or open forests. Within the Project Area, Koala dispersal habitat is comprised of generally cleared exotic grasslands and Acacia woodlands dominated by Brigalow (*Acacia harpophylla*), with some isolated or scattered trees. The Project Area comprises of 698.5 ha of koala foraging and breeding habitat, and 9,072.6 ha of dispersal habitat. This habitat mapping method and the corresponding three potential habitat types of foraging and breeding, dispersal, and non-koala habitat, as well as the hectares for each, are provided in Table 4-9.

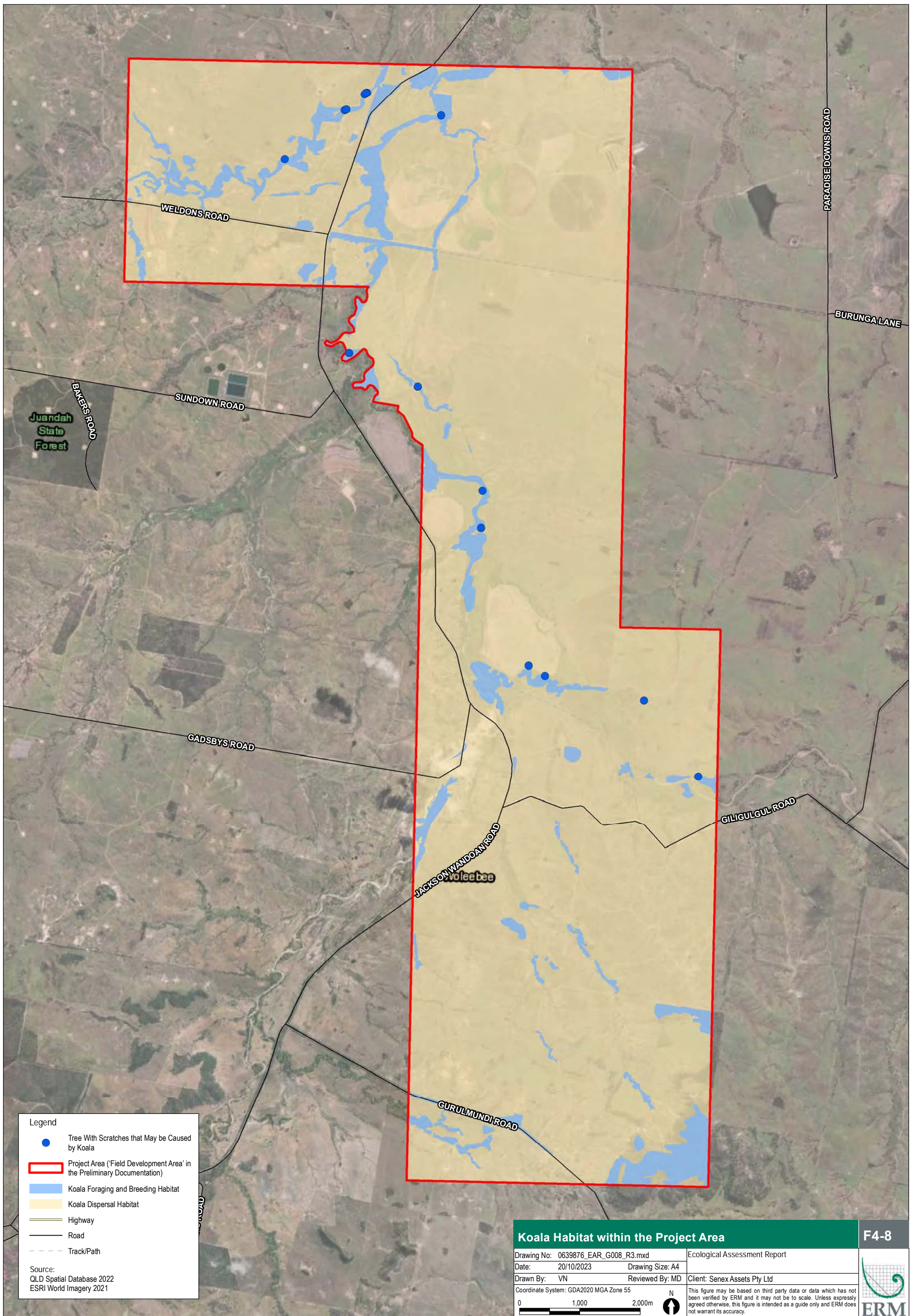


Photograph 4-4: Potential Koala Scratch Marks on a Queensland Blue Gum Tree

Table 4-9: Koala Habitat Types within the Project Area

	Potential Foraging and Breeding Habitat	Potential Dispersal Habitat	Potential Non-koala Habitat
Description	<ul style="list-style-type: none"> ■ Any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. ■ This includes remnant and regrowth vegetation. 	<ul style="list-style-type: none"> ■ Part of the broader landscape that includes grass/bare ground, rural land-uses, dwellings/towns, buildings, farm dams, sealed or unsealed roads and existing rail infrastructure. ■ Contains isolated or scattered foraging or shelter trees. ■ Contains vegetation generally not used frequently for foraging and breeding purposes by the species. 	<ul style="list-style-type: none"> ■ Not suitable habitat includes barriers defined in the DCCEE Guidelines (natural or artificial) that prevent the movement of koalas, such as mountain ranges, water bodies or treeless areas that are greater than 2 km wide.
Presence within the Project Area	<p>Regrowth and remnant vegetation of:</p> <ul style="list-style-type: none"> ■ Callitris and Eucalypt dominated woodlands; ■ Eucalypt dominated woodlands mainly of <i>E. crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>; ■ <i>Riparian and wetland</i> Eucalypt woodlands dominated by <i>E. tereticornis</i>; ■ Eucalypt open forest dominated by <i>E. populnea</i>; and ■ Open regrowth eucalypt woodland vegetation. 	<ul style="list-style-type: none"> ■ Cleared areas with occasional regrowth eucalypt woodlands along drainage lines. ■ Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>). 	<ul style="list-style-type: none"> ■ Potential non-habitat presents in the Project Area as waterways and treeless areas greater than 2 km wide.
Total in the Project Area	<ul style="list-style-type: none"> ■ 698.5 ha foraging and breeding habitat 	<ul style="list-style-type: none"> ■ 9,072.6 ha dispersal habitat 	<ul style="list-style-type: none"> ■ 0 ha non-koala habitat

Records for where evidence of potential Koala scratches have been recorded in the Project Area, as well as the Koala habitat mapping for foraging and breeding habitat, and dispersal habitat, is shown on Figure 4-8.



Legend

- Tree With Scratches that May be Caused by Koala
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Koala Foraging and Breeding Habitat
- Koala Dispersal Habitat
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Koala Habitat within the Project Area		F4-8
Drawing No: 0639876_EAR_G008_R3.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

4.4.7.2 Greater Glider (Southern and Central)

Species Profile

The Greater Glider (southern and central) (*Petauroides volans*) was upgraded from a listing of 'Vulnerable' to 'Endangered' under the EPBC Act, on the 5th of July 2022. The Greater Glider (southern and central) is eastern Australia's largest gliding possum, with a head and body length of 35-46 cm and a long furry tail measuring 45 – 60 cm (DCCEEW, 2022a). Their colouration is variable and can include dark grey, brown or cream, with a whitish or paler underside (Van Dyck et al. 2013). The Greater Glider (southern and central) occurs from Victoria, north to the Atherton Tablelands in Queensland.

The Project Area occurs within the distribution for the Greater Glider (southern and central). It is noted in the Conservation Advice, that it is likely that two separate taxa exist, to the level of subspecies in this area. However, it is noted that until such ambiguity is resolved, the listed entity will be referred to as *Petauroides volans* (DCCEEW, 2022a).

This species has been concluded as known to occur within the Project Area as the species was detected during spotlighting surveys of riparian woodland along Wandoan Creek and along Woleebee Creek, as shown on Photograph 4-5 (BOOBOOK, 2022).

Species Threats

As per the conservation advice for the Greater Glider (southern and central) (DCCEEW, 2022a), the threats include:

- Inappropriate fire regimes;
- Habitat clearing and fragmentation;
- Timber harvesting;
- Entanglement in barbed wire fencing;
- Increased temperatures and changes to rainfall patterns;
- Hyper-predation by owls;
- Competition from Sulphur-crested Cockatoos (*Cacatua galerita*); and
- Predation by feral cats (*Felis catus*) and European Red Foxes (*Vulpes vulpes*).

Species Occurrence in the Broader Area

Several individuals were identified during spotlighting surveys of riparian woodland along Wandoan Creek and along Woleebee Creek (BOOBOOK, 2022). A search of the ALA database identified one (1) historical known record of the Greater Glider (southern and central) within 10 km of the Project Area, located approximately 2 km west of the south-western corner of the Project Area, recorded in 1989. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Greater Glider (southern and central) habitat consists of tall, eucalypt forests with mature hollow-bearing trees (Eyre, 2004). Eyre et al., (2022) identifies habitat for the species to include REs with confirmed Greater Glider (southern and central) records and areas that contain habitat attributes, including live and dead hollowing bearing denning trees, feed and large trees and habitat connectivity. Habitat critical to survival for the Greater Glider (southern and central) has been defined in the species conservation advice (DCCEEW, 2022a) as:

- (a) *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;*

- (b) *Smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization;*
- (c) *Cool microclimate forest/woodland areas (e.g., protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes);*
- (d) *Areas identified as refuges under future climate changes scenarios; and*
- (e) *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.*

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

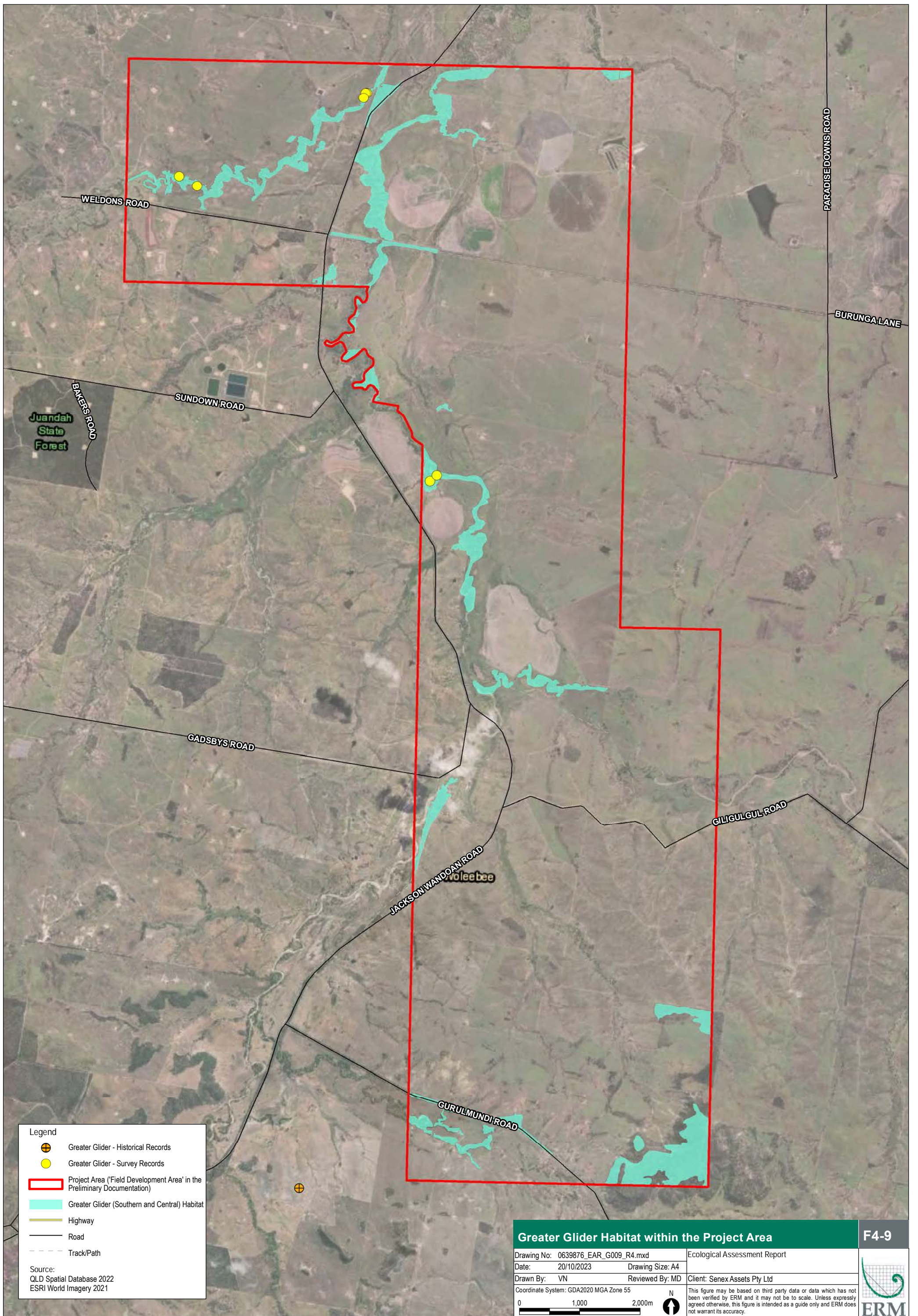
The most recent Greater Glider (southern and central) conservation advice (DCCEEW, 2022a) notes that the species home ranges approximate to 1 – 4 ha and requires 4 to 20 different dens to be considered suitable denning habitat. Additionally, the ‘Guide to Greater glider habitat in Queensland’ (Eyre et al., 2022), informs that the Greater Glider (southern and central) is estimated to require a minimum of 2 – 4 live denning trees for every 2 ha of suitable forest habitat. Greater Glider (southern and central) densities in southern Queensland have been identified as sensitive to a proportion of cleared land within a 1 km radius (Eyre 2006).

Greater Glider (southern and central) habitat within the Project Area aligns with the conservation advice description of “*large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species’ preferred food species*”. Suitable Greater Glider (southern and central) foraging habitat has been identified within the Project Area based on ground-truthing of habitats listed in Eyre et al. (2022), as well as the identification of habitat attributes for the species such as mature hollow bearing trees. Therefore, Greater Glider (southern and central) habitat within the Project Area is considered habitat critical to survival of the species.

The Project Area encompasses a total of 528 ha of Greater Glider (southern and central) foraging habitat, as show on Figure 4-9. Mapped foraging habitat for the Greater Glider (southern and central) within the Project Area consists of all remnant vegetation of the broadest terrestrial habitat types, particularly those dominated by Eucalypt species and large trees with hollows in woodlands connected to these corridors.



Photograph 4-5: Greater Glider Recorded in Riparian Vegetation Along Woleebee Creek



Legend

- Greater Glider - Historical Records
- Greater Glider - Survey Records
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Greater Glider (Southern and Central) Habitat
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Greater Glider Habitat within the Project Area		F4-9
Drawing No: 0639876_EAR_G009_R4.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

4.4.7.3 South-eastern Glossy Black-cockatoo

Species Profile

South-eastern Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*) is currently listed as Vulnerable under the EPBC Act, effective 10th August 2022. The Glossy Black-cockatoo (south-eastern) The South-eastern Glossy Black-cockatoo exhibits a dull black plumage, blackish-brown head with variable yellow patches and either bright red panels (adult males) or yellowish-red panels in the tail (females). The South-eastern Glossy Black-cockatoo are the smallest of the black-cockatoo species with a body length of approximately 48 cm and weighing approximately 420 grams (DCCEEW, 2022b).

South-eastern Glossy Black-cockatoo are widespread from Mitchell (Queensland) through eastern New South Wales and to east Gippsland (Victoria). The species distribution occurs throughout coastal areas and ranges of eastern Australia, with scattered records occurring further inland. Although the species is widespread within this range, sightings are considered uncommon. It was estimated that the extent of species occurrence is 470,000 km² with an area of occupancy for the species being 40,000 km² (Cameron et al., 2021).

South-eastern Glossy Black-cockatoo are specialised feeders, relying on the seeds of *Casuarinaceae* (She-oak) trees.

South-eastern Glossy Black-cockatoo utilise large hollows in both living and dead eucalyptus trees or stags near water and food sources for nesting (Higgins, 1999; Pavey et al., 2016). Nesting hollows are typically 20– 25 cm in diameter and located approximately 10 – 20 m from the ground. The species commonly prefers nesting hollows in close proximity to a water source where it will return to the same nesting hollow over successive seasons (Birdlife Australia, 2022).

Additionally, the species is capable of moving among isolated trees and small habitat patches within fragmented landscapes (Pavey et al., 2016, Holmes 2012). South-eastern Glossy Black-cockatoo rove widely across this landscape, with some evidence of seasonal movements following maturation of She-oak fruits (Stock & Wild 2005; Hourigan, 2012; BOOBOOK, unpubl. data).

Species Threats

As per the conservation advice for the South-eastern Glossy Black-cockatoo (DCCEEW, 2022b), the threats include:

- Inappropriate fire regimes;
- Clearing of native vegetation / timber harvesting;
- Habitat fragmentation;
- Grazing;
- Invasive weeds;
- Climate change – increased likelihood of extreme events (i.e., heatwave and drought);
- Temporal or spatial shift of resource availability as a result of climate change;
- Competition for nest hollows;
- Psittacine Beak and Feather Disease;
- Predation; and
- Bird and egg collection.

Species Occurrence in the Broader Area

A search of the ALA database identified one (1) historically known record of the South-eastern Glossy Black-cockatoo within 10 km of the Project Area, located approximately 1 km south of the south-eastern corner of the Project Area, recorded in 2009. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

The species conservation advice (DCCEEW, 2022b) defines habitat critical to the survival important habitats of the South-eastern Glossy Black-cockatoo to refer to the following attributes:

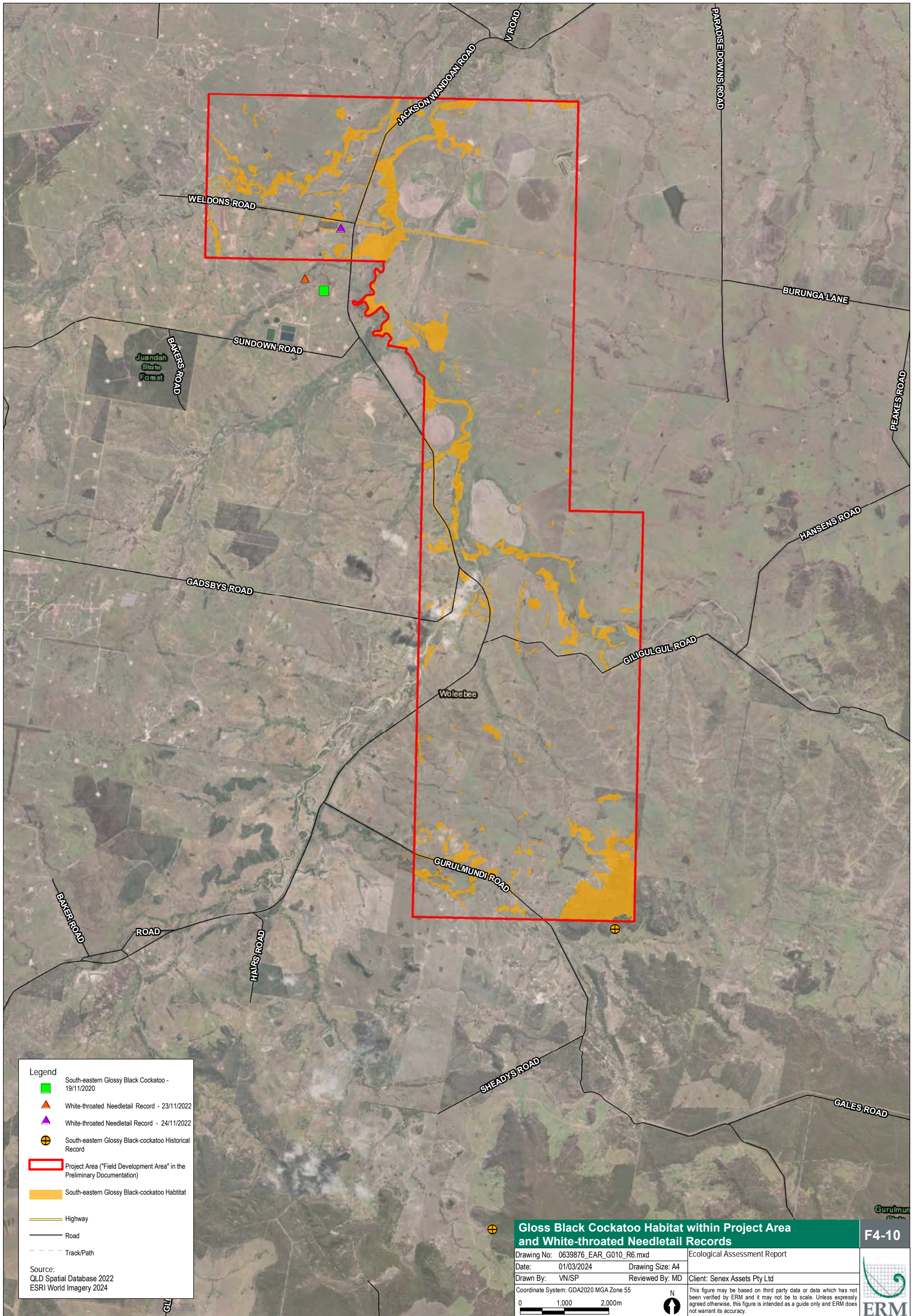
- For activities such as foraging, breeding, roosting, or dispersal;
- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- To maintain genetic diversity and long-term evolutionary development; or
- For the reintroduction of populations or recovery of the species or ecological community.
- Additionally, the species conservation advice specifies the breeding habitat critical to the survival of the South-eastern Glossy black-cockatoo to include following tree species:
 - Narrow-leaved ironbark (*Eucalyptus crebra*);
 - Blue-leaved ironbark (*E. nubila*);
 - Blakely's red gum (*E. blakelyi*); and
 - River red gums (*E. camaldulensis*).
- Potential nest hollows for the species comprise the following attributes:
 - >8 m above ground;
 - Located in branches >30 cm in diameter;
 - Branch or stem no more than 45° from vertical; and
 - Minimum entrance diameter of >15 cm.

The South-eastern Glossy Black-cockatoo feeds on any of the nine species of She-oak (*Allocasuarina spp.* and *Casuarina spp.*), however is known to prefer Black She-oak (*A. littoralis*) and Forest She-oak (*A. torulosa*) within south-east Queensland (DCCEEW, 2022b). Species preference and She-oak species availability varies depending on the region. Higgins 1999 confirmed South-eastern Glossy Black-cockatoo will feed on only one or two species of She-oak in a region. Field surveys were conducted in 2022, confirming the presence and abundance of Casuarinaceae food trees within the Project Area. Identified food trees within the Project Area included Belah (*Casuarina cristata*) throughout the Project Area, and Bull Oak (*Allocasuarina luehmannii*) in scattered woodland patches on sandy soils. No evidence of feeding (chewed cones) was observed during field surveys. However, this species has previously been recorded within the Project Area (BOOBOOK, 2021a).

South-eastern Glossy Black-cockatoo are hollow nesters, utilising both living and dead eucalyptus trees. Suitable nest hollows for the species are 15 cm in entrance diameter and approximately 1 m deep. Field surveys of the Project Area identified the presence of potential nest trees to occur in remnant eucalypt woodland and forest and in well-developed riparian corridors across the Project Area.

Using the information gathered from the species conservation advice and field assessments, habitat for the South-eastern Glossy Black-cockatoo totals 1,003 ha within the Project Area, as shown on Figure 4-10. The mapped South-eastern Glossy Black-cockatoo habitat includes all remnant and regrowth vegetation of most broad terrestrial habitat types, particularly those dominated by Eucalypt species with large hollow bearing trees, along with remnant and regrowth RE with potential feed trees (*Casuarinaceae* spp.).

Some low ecological value areas provide potential habitat for the South-eastern Glossy Black-Cockatoo. Potential foraging habitat is located within acacia regrowth, eucalypt regrowth, mixed acacia and eucalypt regrowth and eucalypt and acacia paddock trees as the species exclusively feeds on sheoak seeds (*Allocasuarina* spp. and *Casuarina* spp.). Whilst these habitat types are dominated by *Eucalyptus* spp. and *Acacia* spp. paddock trees, the presence of *Allocasuarina* spp. and *Casuarina* spp. cannot be ruled out.



Legend

- South-eastern Glossy Black Cockatoo - 19/11/2020
- ▲ White-throated Needletail Record - 23/11/2022
- ▲ White-throated Needletail Record - 24/11/2022
- ⊕ South-eastern Glossy Black-cockatoo Historical Record
- Project Area ("Field Development Area" in the Preliminary Documentation)
- South-eastern Glossy Black-cockatoo Habitat
- Highway
- Road
- Track/Path

Source:
QLD Spatial Database 2022
ESRI World Imagery 2024

Gloss Black Cockatoo Habitat within Project Area and White-throated Needletail Records		F4-10
Drawing No: 0639876_EAR_G010_R6.mxd		Ecological Assessment Report
Date: 01/03/2024	Drawing Size: A4	
Drawn By: VN/SP	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0 1,000 2,000m</div> </div>		
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

4.4.7.4 *Dulacca Woodland Snail*

Species Profile

The Dulacca Woodland Snail (*Adclarkia dulacca*) is currently listed as Endangered under the EPBC Act, effective 7 December 2016 (TSSC, 2016a). The Dulacca Woodland Snail is a medium-sized snail, with a shell diameter of 17 mm on average which is slightly flattened, pale green-brown in colouration and features a brown band above the periphery of spirals on its shell (Stanisic et al., 2010). The animal itself is orange-brown. The species is endemic to south-east Queensland, only occurring in small, isolated populations from Miles to Dulacca and south to Meandarra (Stanisic, 2011 cited in TSSC, 2016a). The mobility of this species is limited; however, it can move between areas of suitable microhabitat (TSSC, 2016a) if the prevailing conditions are suitable for it to do so.

The likelihood of occurrence has concluded this species as likely to occur within the Project Area due to the presence of suitable habitat and previous records within the Project Area (Appendix B).

Species Threats

As per the conservation advice for the Dulacca Woodland Snail (TSSC, 2016a), the threats include:

- Land clearing;
- Habitat loss at a smaller scale;
- Predation by rats (*Rattus* spp.), mice (*Mus musculus*) and feral pigs (*Sus scrofa*);
- Invasion of Buffel grass (*Cenchrus ciliaris*);
- Trampling by cattle and horses; and
- High fire intensity.

Species Occurrence in the Broader Area

A search of the ALA database identified two (2) historical known records of the Dulacca Woodland Snail within 10 km of the Project Area. These records are located approximately 4 km (south-west) and 8 km (directly south) and were both recorded in 2009. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Habitat critical to the survival of land snails includes habitat with tree cover and ground debris (TSSC, 2016a). Habitat critical to the survival of the Dulacca Woodland Snail has not specifically been defined.

The Dulacca Woodland Snail inhabits vine thicket, Brigalow (*Acacia harpophylla*) woodland/open forest, ironbark (*Eucalyptus* spp.) woodland, Lancewood (*Acacia shirleyi*) woodland and Gum-topped Box (*E. woollisiana*) woodland (TSSC, 2016a). It is largely confined to the Dulacca Downs subregion where it is found in a highly fragmented landscape, living in patches or strips of habitat retained on roadsides, shade lines and/or ridges (Stanisic et al., 2010; ALA, 2022). 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, 2016a).

The Project Area includes several small patches of suitable habitat for the Dulacca Woodland Snail (Brigalow woodlands), and the species has previously been collected from an area of REs 11.9.5a and 11.7.2 in the south of the Project Area (ALA, 2022). Using the information gathered from the species conservation advice and field assessments, habitat for the Dulacca Woodland Snail within the Project Area encompasses 666.3 ha, consisting of:

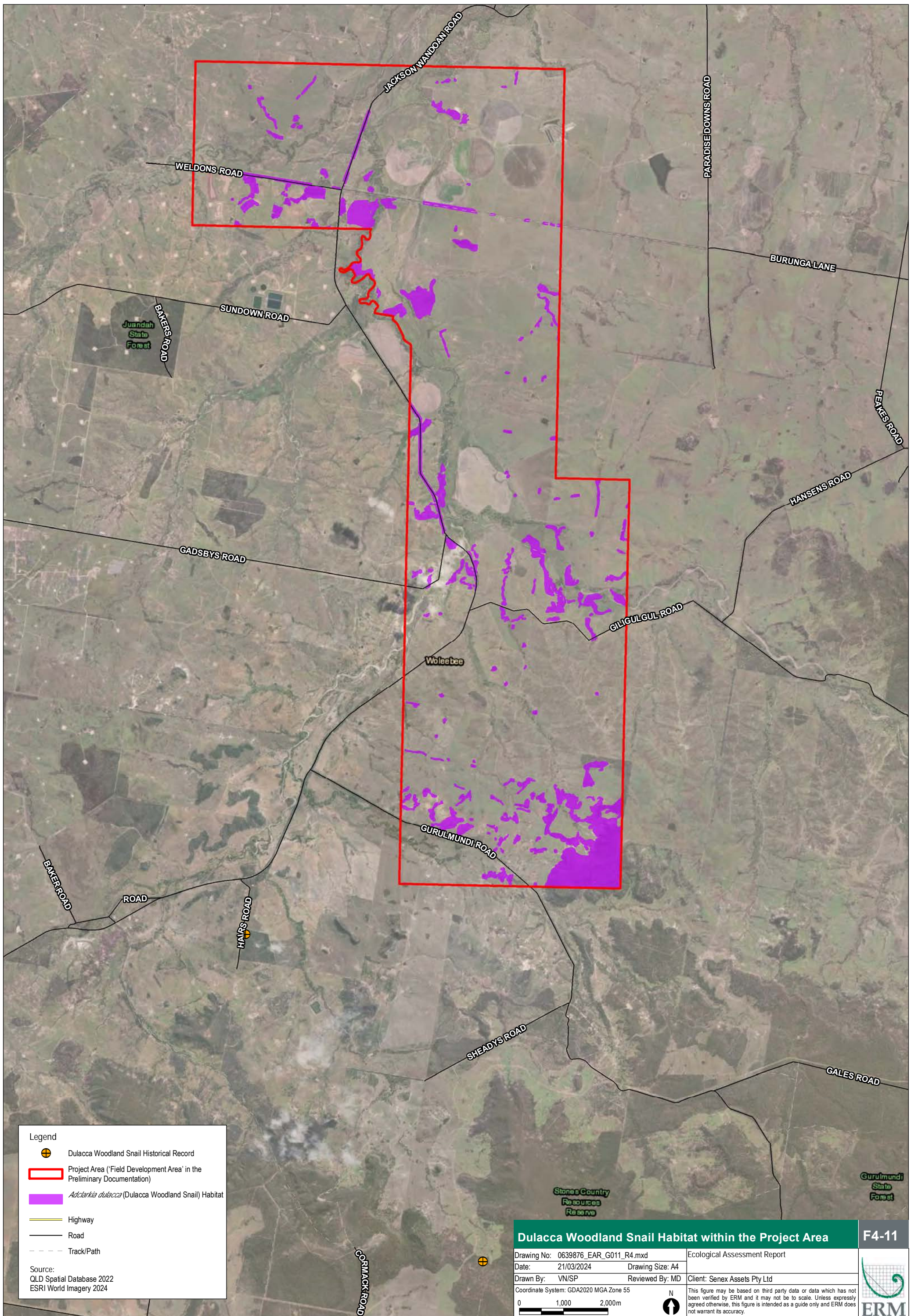
- Acacia woodlands dominated by Brigalow (*Acacia harpophylla*); and
- Eucalypt dominated woodlands mainly with *Eucalyptus crebra* and *E. populnea*.

Additionally, the species has the potential to occur in low ecological value areas consisting of:







- Acacia regrowth;
- Eucalypt regrowth;
- Mixed acacia and eucalypt regrowth; and
- Eucalypt and acacia paddock trees.

The species can inhabit areas including Brigalow regrowth, ironbark and gum-topped box regrowth and cleared habitat where abundant or suitable leaf litter, logs, woody debris, and other suitable microhabitat are present. As a conservative approach, these low ecological value habitat types have been mapped as Dulacca woodland snail habitat as the presence/absence of microhabitat (leaf litter and woody debris) is not confirmed.

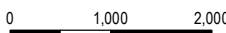


Habitat mapping for the Dulacca Woodland Snail is presented in Figure 4-11.



Legend

-  Dulacca Woodland Snail Historical Record
-  Project Area ('Field Development Area' in the Preliminary Documentation)
-  *Adiantum dulaccae* (Dulacca Woodland Snail) Habitat
-  Highway
-  Road
-  Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2024

Dulacca Woodland Snail Habitat within the Project Area		F4-11
Drawing No: 0639876_EAR_G011_R4.mxd	Ecological Assessment Report	
Date: 21/03/2024	Drawing Size: A4	
Drawn By: VN/SP	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
		
<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>		
		

4.4.7.5 White-throated Needletail

Species Profile

The White-throated Needletail is currently listed as Vulnerable under the EPBC Act, effective 4 July 2019. The White-throated Needletail (*Hirundapus caudacutus*) is a large swift measuring about 20 cm in length, with a robust, barrel-like body and a short, square tail, it has long pointed wings. The plumage is predominantly grey-brown, glossed with green. The throat and undertail are white.

The White-tailed Needletail often occur in large flocks over eastern and northern Australia, comprising approximately hundreds or thousands of birds (TSSC, 2019). The species is considered almost exclusively aerial, flying at varying heights to feed on airborne insects (i.e., beetles, cicadas, flying ants, bees and wasps, flies, termites, moths, locusts, and grasshoppers, TSSC, 2019). Within Australia, White-throated Needletail are known to roost in trees during their migration stopover (Carter 2020).

The White-throated Needletail is a seasonal visitor to Australia for the boreal winter, between the months of September to April. The species does not breed in Australia, as breeding grounds are located in the Northern Hemisphere, where egg laying occurs from late May to early June (Chantler 1999, cited in TSSC 2019). During September, the species arrives in Australia and migrates south to the Great Dividing Range in Queensland and NSW in October and November, usually arriving in the southern parts of their range (Victoria and Tasmania) in November (TSSC, 2019).

The likelihood of occurrence has concluded this species as likely to occur within the Project Area annually (September-April), following storm fronts, as a transient aerial flyover visitor only (Appendix B).

Species Threats

As per the conservation advice for the White-throated Needletail (TSSC, 2019), the threats include:

- Habitat loss and fragmentation;
- Direct mortality from wind turbines and overhead wires; and
- Poisoning.

Species Occurrence in the Broader Area

The White-throated Needletail was not observed during field investigations for the current Project, however, was observed within the Project Area during subsequent field surveys for Senex on 24 November 2022 (Cunningham, M pers. comm.), as shown on Figure 4-10. A flock of eight birds were observed flying low near Weldons Road. A search of the ALA database did not identify any historical known White-throated Needletail records within 10 km of the Project Area.

Habitat Assessment

The White-throated Needletail is predominantly aerial when on migration in Australia (September to April), occasionally stopping to roost in large patches of rainforest, woody vegetation and open Eucalypt forests consisting of dense foliage and hollows (Coventry, 1989; Higgins, 1999), generally associated with elevated areas.

Whilst occasional aerial observations have been made for this species, the Project Area is unlikely to contain important foraging habitat for the species. Additionally, no threshold area for important habitat for this species can be determined at present and has not been identified in the species conservation advice (TSSC, 2019).

White-throated Needletail are likely to only fly aerially over the Project Area and in occasional flocks during the migratory period, being September to April, following storm fronts. The Project Area does not contain rainforests or elevated open forests with dense foliage that could be used for occasional roosting by the species. While potential flights over the Project Area may occur from time to time, only

elevated areas are regarded as roosting habitat. Thus, potential habitat has not been mapped for this species, and so no subsequent impact area has been calculated.

4.4.8 Listed Threatened Terrestrial Fauna Species with Potential to Occur

A total of fourteen EPBC Act listed threatened terrestrial fauna species have been assessed as having the potential to occur within the Project Area as a result of the likelihood of occurrence presented in Appendix B. In essence, because part of these species' distributions overlaps with the Project Area, their presence cannot be ruled out. This is despite no signs or observations of these species within the Project Area during field surveys using survey techniques aligned with survey guidelines. In accordance with the precautionary principle, 'potential habitat' for the nine species has been mapped and shown in Figure 4-12 and Figure 4-13 for bird species, Figure 4-14 for mammal species and Figure 4-15 for reptiles.

Table 4-10 lists all EPBC Act listed threatened terrestrial species that have been assessed as having the potential to occur within the Project Area and describes the potential habitat that has been mapped for each species.

Table 4-10: EPBC Act Listed Threatened Terrestrial Fauna Species with Potential to Occur within the Project Area

Species Name	Common Name	EPBC Act Status	Potential Habitat Mapped within the Project Area*
Birds			
<i>Rostratula australis</i>	Australian Painted Snipe	E, Mi	<ul style="list-style-type: none"> 69.7 ha of potential habitat is present within the Project Area. Potential habitat includes small areas of ephemeral wetland habitat within the Project Area; however these may only periodically provide temporary refuges for this species. These areas correspond with riparian with riparian woodlands. This aligns with the broad habitat type of Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper	V	<ul style="list-style-type: none"> 272.1 ha of potential habitat is present within the Project Area. Potential habitat includes dry open eucalypt forests and woodlands with an open, grassy understorey and fallen timber. These areas should be subjected to a form of ongoing disturbance (i.e., historically Indigenous burning practices) to be favourable for the species.
<i>Stagonopleura guttata</i>	Diamon Firetail	V	<ul style="list-style-type: none"> 1,287.4 ha of potential habitat is present within the Project Area. Potential habitat includes grassy understoreys of open woodlands dominated by Eucalypt spp., Acacia spp., and/or Casuarina spp. Eucalyptus and Acacia woodlands and forests, occurs throughout the Project Area. Additionally, a number of low ecological value habitat types including acacia regrowth, eucalypt regrowth, mixed acacia and eucalypt regrowth and eucalypt and

Species Name	Common Name	EPBC Act Status	Potential Habitat Mapped within the Project Area*
			acacia paddock trees, only where there is high grass cover or dense shrub cover have the potential to provide foraging habitat for the species. 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.
<i>Aphelocephala leucopsis</i>	Southern Whiteface	V	<ul style="list-style-type: none"> 938.5 ha of potential habitat is present within the Project Area. Potential habitat includes a wide range of open woodlands and shrubland environments dominated by Acacia spp. and Eucalyptus spp., particularly where understorey of grasses and/or shrubs are present. Almost all woodland habitats present within the Project Area are considered suitable habitat for the Southern Whiteface.
<i>Grantiella picta</i>	Painted Honeyeater	V	<ul style="list-style-type: none"> 272.1 ha of potential habitat is present within the Project Area. Potential habitat comprises remnant and regrowth communities with abundant Acacia and Casuarina hosts of Mistletoes. Potential habitat comprises larger contiguous areas of remnant and regrowth woodland and open forest, more specifically with a multilayered shrubby understorey which the species prefers. This is made up of broad habitat type Eucalypt dominated woodlands mainly of <i>E. crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>.
<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern subspecies)	V	<ul style="list-style-type: none"> 164.3 ha of breeding and foraging habitat, and 316 ha of dispersal habitat (up to 2.1 ha of dispersal habitat to be cleared) is present within the Project Area. Potential habitat remains in the southern part of the Project Area (south of Giligulgul road) in grassy woodland with open areas for foraging and is made up of all broad habitat types excluded Acacia woodlands and cleared exotic pasture north of Giligulgul Road.
Mammals			
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	<ul style="list-style-type: none"> 259.6 ha of potential habitat is present within the Project Area. Potential habitat is made up of all broad habitat types excluding the cleared exotic pasture and small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.
<i>Dasyurus hallucatus</i>	Northern Quoll	E	<ul style="list-style-type: none"> 226.7 ha of potential habitat is present within the Project Area. Potential habitat comprises contiguous areas of remnant and regrowth woodland and forest within 5

Species Name	Common Name	EPBC Act Status	Potential Habitat Mapped within the Project Area*
			km of cliffs and rocky scarps and connected to these refuges by continuous native vegetation. This includes all broad habitat types excluding cleared exotic pasture.
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern subspecies)	V	<ul style="list-style-type: none"> ■ 145.8 ha of potential habitat is present within the Project Area. ■ Potential habitat is comprised of large contiguous areas of remnant only Eucalypt woodland and open forests, including some riparian dominated woodlands. This is because the species requires large hollow-bearing trees for dens and preferred feed tree species (selected Eucalypts).
Reptiles			
<i>Delma torquata</i>	Collared Delma	V	<ul style="list-style-type: none"> ■ 259.7 ha of potential habitat is present within the Project Area. ■ Potential habitat comprises large logs, rocky outcrops and abundant 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. This includes all broad habitat types with the above microhabitat features, excluding cleared exotic pasture.
<i>Furina dunmalli</i>	Dunmall's Snake	V	<ul style="list-style-type: none"> ■ 259.7 ha of potential habitat is present within the Project Area. ■ Potential habitat comprises large logs, rocky outcrops and abundant 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. This includes all broad habitat types with the above microhabitat features, excluding cleared exotic pasture.
<i>Hemiaspis damelii</i>	Grey Snake	E	<ul style="list-style-type: none"> ■ 431.2 ha of potential habitat is present within the Project Area. ■ Potential habitat includes Brigalow (<i>Acacia harpophylla</i>) and Belah (<i>Casuarina cristata</i>) woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies. Both woodlands were observed within the Project Area, along with suitable ephemeral wetlands. ■ Additionally, a number of low ecological value habitat types including acacia regrowth, eucalypt regrowth, mixed acacia and eucalypt regrowth and eucalypt and acacia paddock trees have the potential to provide foraging habitat for the species. These areas are slightly intersected or bordered by small gullies which

Species Name	Common Name	EPBC Act Status	Potential Habitat Mapped within the Project Area*
			may provide suitable habitat for the species where regrowth is near small gullies and floodplains.
<i>Egernia rugosa</i>	Yakka Skink	V	<ul style="list-style-type: none"> ■ 228 ha of potential habitat is present within the Project Area. ■ Potential habitat is comprised of 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. This includes all broad habitat types with the above microhabitat features, excluding cleared exotic pasture and riparian Eucalypt woodlands.
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	V	<ul style="list-style-type: none"> ■ 209.6 ha of potential habitat is present within the Project Area. ■ Potential habitat includes woodlands generally supported by clay-loam soils, including grassy White Box woodlands, open woodlands and River Red Gum–Coolibah-Bimble Box woodlands. Limited areas of potential Five-clawed Worm-skink habitat are present within the Project Area.

Status listing per EPBC: E = Endangered; V= Vulnerable; Mi =Migratory.

For the full reasoning for the potential outcomes for such species, refer to Appendix B.

*Information on potential habitat sourced from Appendix C (BOOBOOK, 2022).

4.4.8.1 Australian Painted Snipe

Species Profile

The Australian Painted Snipe (*Rostratula australis*) is currently listed as Endangered and Marine under the EPBC Act, effective 15 May 2013.

Females are generally larger and more colour abundant than males, with a chocolate-brown head, white markings around the eyes, pink-orange bill darkening at the tip and a metallic green back and wings (DSEWPaC, 2013). Males are smaller in size and exhibit a mottled grey-brown head and neck with a buff stripe through the eyes and the centre of the crown, black wings, a black band across the breast and a duller beak (DSEWPaC, 2013).

The Australian Painted Snipe is widespread and particularly common across eastern Australia, occurring in multiple Natural Resource Management (NRM) regions and Interim Biogeographic Regionalisation for Australia (IBRA) Bioregions across Australia (DSEWPaC, 2013).

Species Threats

As per the conservation advice for the Australian Painted Snipe (DSEWPaC, 2013), the threats include:

- Habitat loss and degradation as a result of drainage and water diversion for agriculture and reservoirs;
- Trampling of wetland vegetation / nests by livestock;
- Grazing by livestock;

- Climate change and reduced run-off (in the future);
- Predation and nest predation by feral cats (*Felis catus*) and European Red Fox (*Vulpes vulpes*);
- Coastal and port development; and
- Invasive weeds.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any known records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 79 km north of the Project Area, recorded near Bellington Hut State Forest. The record does not list the record date. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

The Australian Painted Snipe inhabits shallow, freshwater wetlands (occasionally brackish) and in ephemeral and permanent waterbodies (i.e., lakes, swamps, claypans, grassland / saltmarsh, dams, rice crops, sewage farms and bore drains), particularly for foraging activities. Suitable habitat for the species can be found in all states and territories in Australia.

Breeding habitat for the Australian Painted Snipe consists of shallow wetlands with bare mud and both upper parts of the understorey (i.e., shrubs and tall grasses) and canopy cover nearby. Majority of nest records have been recorded from or near small islands within freshwater wetlands, however these can also occur in/near swamps (including cane grass swamps), within flooded areas, in ground cover of water-buttens and grasses, at the base of tussocks, and under low saltbush (DSEWPaC, 2013).

Temporary foraging and dispersal habitat for the Australian Painted Snipe includes shallow, ephemeral waterbodies, including gilgai (with no gilgai observed in the Project Area).

Field assessments of the Project Area in 2022 confirmed small areas of foraging habitat present within small ephemeral wetlands on drainage lines. These habitats may provide temporary refuge for the species and support occasional transient visitors to the Project Area, particularly when water is present. Habitat mapping for the Project Area identified 69.7 ha of potential Australian Painted Snipe habitat. Therefore, as suitable foraging habitat is located within the Project Area, the Australian Painted Snipe is considered to have a potential to occur. The species was not recorded during the 2022 field surveys.

4.4.8.2 Brown Treecreeper (south-eastern)

Species Profile

Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) is currently listed as vulnerable under the EPBC Act, effective 3 March 2023. The Brown Treecreeper (south-eastern) is the largest Treecreeper in Australia. The bird species exhibits a grey-brown colouration with black streaking on the lower breast and belly, a pale face, black bars on the undertail, a dark line through the eye and a dark crown (DCCEEW, 2023a). Male and female Brown Treecreeper (south-eastern) differ slightly in appearance, as do juveniles and adults (Higgins & Peter, 2002).

The Brown Treecreeper (south-eastern) is endemic to south-eastern Australia, with a distribution spanning from the Grampians in western Victoria to the Bunya Mountains in Queensland, occurring inland to the Great Dividing Range (Shodde & Mason, 1999).

Species Threats

As per the conservation advice for the Brown treecreeper (DCCEEW, 2023a), the threats include:

- Habitat loss and fragmentation caused by clearing for agriculture;

- Habitat degradation caused by domestic livestock over-grazing;
- Conventional grazing practices;
- Unintentional effects of firewood collection;
- Increased likelihood of extreme events (i.e., wildfire, heatwave and drought);
- Inappropriate fire regimes;
- Noisy miner territorial competition;
- Nest hollow competition;
- Cat and fox predation; and
- Rabbit and overabundant kangaroo grazing pressure.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known Brown Treecreeper (south-eastern) records within 10 km of the Project Area. The nearest species record occurs 251 km south of the Project Area from 1990. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

The Brown Treecreeper (south-eastern) inhabits dry open eucalypt forests and woodlands, predominantly those dominated by stringybarks or other rough-barked eucalypt species. Favourable habitat for the species must be subjected to a form of ongoing disturbance (i.e., historically Indigenous burning practices) to prevent the ground layer from becoming too dense and uniform, leading to unfavourable habitat (DCCEEW, 2023a).

The species breeds and roosts in open dry eucalypt forest and woodlands with hollows, in either live trees, dead standing trees or tree stumps (considered essential for nesting). Brown Treecreeper (south-eastern) forage for invertebrates on-ground and in mature, live and/or dead trees (Bounds, 2019), with suitable foraging habitat for the species consisting of forests and woodlands with an open, grassy understorey, in which areas with fallen timber provide greater foraging opportunities (DCCEEW, 2023).

Habitat critical to the survival of Brown Treecreeper (south-eastern) can be defined as areas containing the following features (DCCEEW, 2023a):

- *“Relatively undisturbed grassy woodland with native understorey.*
 - *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.*
 - *The required degree of openness is mostly likely to be created by moderate levels of disturbance by fire and/or grazing.*
- *Large living and dead trees which are essential for roosting and nesting sites and for foraging;*
- *Fallen timber which provides essential foraging habitat and;*
- *Hollows in standing dead or live trees and tree stumps are also essential for nesting.”*

Any known or likely habitat should be considered as habitat critical to the survival of the subspecies (DCCEEW, 2023a).

As per the field assessments undertaken in 2022, the Project Area contains patches of suitable Callitris / Eucalyptus woodlands along the eastern boundary, slightly north and south of Jackson-Wandoan Road. Additionally, suitable habitat in the form of open Eucalypt forest was observed along the Gurulmundi Road within the southern boundary of the Project Area, and small patches exist both north and south of Weldons Road. Habitat mapping for the Project Area identified 272.1 ha of potential Brown Treecreeper habitat. Therefore, as suitable habitat is located within the Project Area,

the Brown Treecreeper (south-eastern) is considered to have a potential to occur. The species was not recorded during the 2022 field surveys.

4.4.8.3 Diamond Firetail

Species Profile

Diamond Firetail (*Stagonopleura guttata*) is listed as Vulnerable under the EPBC Act effective 31 March 2023. Adult Diamond Firetails feature a grey head and back, ashy-brown wings, white belly and a red rump. The species head features a red bill and red around the eyes. Diamond Firetail are considered a large bird species, averaging 10 – 12 cm in body length and weighing approximately 17 grams (DCCEEW, 2023b).

Distribution of the Diamond Firetail occurs from south-east Queensland to the Eyre Peninsula in South Australia, with species occurring approximately 300 km inland of this distribution (Higgins et al., 2007).

Diamond Firetails may move locally but are largely considered a sedentary species. The species typically occurs in a social group of between 5 to 40 individuals, however during breeding season (August – January) the species separates into smaller flocks. Females lay one clutch of eggs per season, where a typical clutch size is 4 – 5 eggs (Higgins et al., 2007).

Species Threats

As per the conservation advice for the Diamond Firetail (DCCEEW, 2023b), the threats include:

- Habitat loss caused by land clearing;
- Weeds, particularly exotic annual grasses altering habitat;
- Habitat degradation caused by domestic livestock grazing and overabundant native animal grazing;
- Habitat degradation caused by rabbits;
- Increase in frequency, scale or intensity of fire;
- Increased likelihood of extreme events (i.e., wildfire, heatwave, and drought);
- Noisy miner territorial competition; and
- Predation by pied currawongs.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known Diamond Firetail records within 10 km of the Project Area. The closest known record is located near Gurulmundi State Forest, approximately 14 km south-east of the Project Area, and was recorded in 2019. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

As per the species conservation advice (DCCEEW, 2023b), habitat critical to the survival of the Diamond firetail includes areas of:

- *“Eucalypt, acacia or casuarina woodlands, open forests, and other lightly timbered habitats;*
- *Low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding; and*
- *Drooping she-oak (Allocasuarina verticillata) within the Mt Lofty Ranges.”*

It is known that Diamond Firetail prefer habitats with relatively low tree density, minimal large logs and little litter cover. However, these habitats must include high grass cover for foraging, roosting and breeding (Antos et al., 2008).

Foraging habitat for the Diamond Firetail consists of grassy understoreys of open woodlands dominated by Eucalypt spp., Acacia spp., and/or Casuarina spp., where the species forages

exclusively on the ground for ripe grass, herb seeds, green leaves and insects. Diamond Firetail have also been recorded to occur in farmland and grassland with scattered trees (Higgins et al., 2007).

The species roosts in dense shrubs or smaller nests built especially for roosting.

Breeding 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.

Field assessments of the Project Area concluded that suitable habitat, being any Eucalyptus and Acacia woodlands and forests, occurs throughout the Project Area. Habitat mapping for the Project Area identified 1,287.4 ha of potential Diamond Firetail habitat. Therefore, as suitable habitat is located within the Project Area, the Diamond Firetail is considered to have a potential to occur. The species was not recorded during field surveys.

Additionally, a number of low ecological value habitat types including acacia regrowth, eucalypt regrowth, mixed acacia and eucalypt regrowth and eucalypt and acacia paddock trees have the potential to provide foraging habitat for the species. These habitat types provide a grass layer dominated by exotic grasses which the species may utilise for foraging. The current habitat mapping includes wooded areas that could be used for roosting.

4.4.8.4 Southern Squatter Pigeon

Species Profile

The Southern Squatter pigeon (*Geophaps scripta scripta*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The Southern Squatter pigeon is a medium sized ground dwelling bird approximately 30 cm in length.

Adult individuals feature a predominantly grey-brown body, with bold black and white stripes on the face and throat. The species features dark brown colouration on the upper wings, light grey-brown on the upper breast grading to blue grey on the lower breast and centre of the belly. The belly, flanks and underwings of the species are white. Additionally, the species features a black bill and dull-purple legs and feet (Higgins & Davies 1996).

Species Threats

As per the conservation advice for the Southern Squatter pigeon (TSSC, 2015a), the threats include:

- Vegetation clearing and fragmentation;
- Overgrazing of habitat by livestock and feral herbivores;
- Introduction of weeds;
- Inappropriate fire regimes;
- Thickening of understorey vegetation; predation by feral cats and foxes;
- Trampling of nests by livestock; and
- Illegal shooting.

Species Occurrence in the Broader Area

A search of the ALA database identified one (1) historical known records of the Southern Squatter Pigeon within 10 km of the Project Area. This individual was recorded within Cherwondah State Forest, approximately 6 km east of the Project Area, and was recorded in 2016. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Southern Squatter pigeon foraging only habitat is generally defined as open forests to sparse, open woodlands and scrub, and less often, savannas. Habitats are mostly remnant, regrowth or partly modified vegetation communities dominated in the overstorey by Eucalyptus, Corymbia, Acacia or

Callitris species. The species is nearly always found within 3 km of a permanent water source including rivers, creeks and waterholes (TSSC, 2015a).

In Queensland, foraging and breeding habitat for the Southern Squatter Pigeon is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills (i.e., RE Land Zone 5) and lateritic (duplex) soils on low 'jump-ups' and escarpments (i.e., RE Land Zone 7) (TSSC, 2015a).

Dispersal habitat for the species typically consists of any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies. Additionally, where scattered trees still occur and the distance of cleared land between remnant trees or patches of species' habitat does not exceed 100 m, individuals may be found foraging in, or moving across modified or degraded environments (Squatter Pigeon Workshop, 2011).

Within the northern portions of the Project Area, there is an overall lack of foraging and breeding habitat as a result of previous land clearing activities. However, suitable dry woodland habitat remains on and around the plateau in the south-eastern portion of the Project Area. Habitat mapping for the Project Area identified 164.3 ha of breeding and foraging habitat and 316 ha of dispersal habitat (up to 2.1 ha of dispersal habitat to be cleared). Additionally, the following low ecological value land types can provide dispersal habitat when within 100 m of mapped breeding and foraging habitat:

- Eucalypt regrowth;
- Acacia and Eucalypt regrowth; and
- Eucalypt and Acacia paddock trees.

Therefore, as suitable habitat is located within the Project Area, the Southern Squatter Pigeon is considered to have a potential to occur. The species was not recorded during field surveys.

4.4.8.5 Southern Whiteface

Species Profile

Southern Whiteface (*Aphelocephala leucopsis*) is listed as Vulnerable under the EPBC Act effective 31 March 2023. The Southern whiteface is a small stocky bird, averaging 11.5 cm in body length, featuring a brown dorsum, dark brown wings, white belly and a black tail with a white tip (Shodde and Mason, 1999). As per the species name, a white band runs across the species' forehead, with a darker band across the top of the head.

Distribution of the Southern Whiteface occurs south of the Australian tropics, particularly occurring from the north-east of the Western Australia wheatbelt and east to the Great Dividing Range (Shodde and Mason, 1999), with the northern-most distribution occurring from Carnarvon to the southern portion of the Northern Territory in central Australia.

Southern Whiteface are largely sedentary birds, however, are known to migrate during drought regions to the wetter regions outside of their normal distribution (Higgins and Peter, 2002). Southern Whiteface breed anytime between July and October, however the timing across the species range can be influenced by rainfall in arid regions (Higgins and Peter, 2002). Females lay a clutch size of three to four eggs on average. Young Southern Whiteface fledge within 14 and 19 days.

Species Threats

As per the conservation advice for the Southern Whiteface (DCCEEW, 2023c), the threats include:

- Habitat loss caused by clearing for agriculture;
- Habitat degradation caused by domestic livestock grazing;
- Increased frequency or length of droughts; and
- Increased likelihood of extreme events (i.e., wildfire, drought and heatwaves).

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of the Southern Whiteface within 10 km of the Project Area. The closest known record of the Southern Whiteface is located near Yuleba State Forest, approximately 57 km south-west of the Project Area, recorded in 2016. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

As per the species conservation advice (DCCEEW, 2023c), habitat critical to the survival of the Southern whiteface includes areas of:

- “Relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both;
- Habitat with low tree densities and an herbaceous understorey litter cover which provides essential foraging habitat;
- Living and dead trees with hollows and crevices which are essential for roosting and nesting.”

The Southern Whiteface resides in a wide range of open woodlands and shrubland environments dominated by *Acacia* spp. and *Eucalyptus* spp., particularly where understorey of grasses and/or shrubs are present. Along with the general habitat, breeding and roosting habitat for the species further consists of tree hollows, in either live or dead standing trees.

The Southern Whiteface forages almost exclusively on the ground, with preference for areas with low tree densities and an understorey consisting of herbs and leaf litter in open woodlands and shrublands.

Field surveys conducted across the Project Area in 2022 identified that almost all woodland habitats present within the Project Area are considered suitable habitat for the Southern Whiteface, with the exception of cleared grazed land dominated by exotic pasture grasses. Habitat mapping for the Project Area identified 938.5 ha of potential Southern Whiteface habitat. Therefore, as suitable habitat is located within the Project Area, the Southern Whiteface is considered to have a potential to occur. The species was not recorded during field surveys.

4.4.8.6 Painted Honeyeater

Species Profile

The Painted Honeyeater (*Grantiella picta*) is currently listed as Vulnerable under the EPBC Act, effective 8 July 2015. The Painted Honeyeater is a small bird, with females smaller than males. The Painted Honeyeater features black and white underparts, a deep pink bill, red eyes, black spots on the flanks and yellow edging on the flight and tail feathers (DoE, 2015a).

The Painted Honeyeater has a sparse distribution along eastern Australia, occurring from the eastern Northern Territory and north-western Queensland to south-eastern Australia. Painted Honeyeater populations, particularly breeding populations, are most abundant inland of the Great Dividing Range, especially between the Grampians (Vic) and Roma (QLD) (Higgins et al., 2001). The species is known to migrate seasonally, in response to fruiting of Mistletoe plants (DoE, 2015a).

Species Threats

As per the conservation advice for Painted Honeyeater (DoE, 2015a), the threats include:

- Deliberate destruction of mistletoe in production forests;
- Exacerbation of tree decline through pasture improvement activities;
- Competition with the aggressive noisy miner (*Manorina melanocephala*);
- Predation by invasive species (e.g., black rats);
- Collision with road vehicles; and

- Nest predation by over-abundant Pied currawongs (*Strepera graculina*), Pied and Grey butcherbirds (*Cracticus nigrogularis* and *Cracticus torquatus*), and crows and ravens.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of the Painted Honeyeater within 10 km of the Project Area. The closest known record of the Painted Honeyeater is located approximately 47 km south-west of the Project Area, recorded in 1997. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

The Painted Honeyeater inhabits Mistletoe in eucalypt forests and woodlands, riparian woodlands of Black Box and River Red Gum, box-ironbark-yellow gum woodlands, woodlands dominated by paperbarks, acacia spp., casuarina spp., Callitris spp., and occasionally farmlands and gardens (DoE, 2015a). Woodlands with a higher abundance of mature trees are of higher preference for Painted Honeyeater, as these contain a higher abundance of Mistletoes.

Breeding habitat for the Painted Honeyeater consists of Boree/Weeping Myall (*Acacia pendula*) woodlands, Brigalow (*A. harpophylla*) woodlands, box-gum woodlands and box-ironbark forests on the inland slopes of the Great Dividing Range. Additional breeding habitats include forests and woodlands with high quantities of mistletoe and where parasitism rates are high, preferably remnant vegetation. The species typically nests in mature trees that are abundant with mistletoe, where the species may use the mistletoe as a nesting substrate.

The Painted Honeyeater favours mistletoes of the genus *Amyema*, growing on forests and woodland eucalypts and acacias, for foraging and roosting habitat.

Field assessments of the Project Area in 2022 confirmed Mistletoe to be present (albeit sparingly) in Eucalypt woodlands, as well Brigalow woodlands (limited potential habitat). Habitat mapping for the Project Area identified 272.1 ha of potential Painted Honeyeater habitat. Therefore, as suitable habitat is located within the Project Area, the Painted Honeyeater is considered to have a potential to occur. The species was not recorded during the 2022 field surveys.

4.4.8.7 Corben's Long-eared Bat

Species Profile

Corben's Long-eared Bat (*Nyctophilus corbeni*) is currently listed as Vulnerable under the EPBC Act, effective 4 April 2001. Corben's Long-eared Bat is a relatively large bat species, with a head and body length of 50-75 mm, forearm length of 40-50 mm and a tail length of 35-50 mm (Reardon, 2012). Females are generally heavier than males, averaging 14-21 grams, whilst males average 11-15 grams. The species is light brown to dark grey-brown in colouration and exhibits long ears (30 mm length) that are generally folded but erect as a response to alerts, (TSSC, 2015b).

Corben's Long-eared Bat is distributed across eastern Australia, from southern-central Queensland, south to central-western New South Wales, north-western Victoria and eastern South Australia (TSSC, 2015b). Within its distribution, the species is rarely recorded with the exception of in Nandewar and Brigalow Belt South Bioregions. Majority of species records were located inland of the Great Dividing Range (Parnaby, 2009). It is thought that approximately 30% of the species total distribution is located in Queensland, however records exist for only fewer than 30 localities (TSSC, 2015b).

Species Threats

As per the conservation advice for Corben's Long-eared Bat (TSSC, 2015b), the threats include:

- Known threats:

- Habitat loss, fragmentation and degradation as a result of altered fire regimes, timber extraction and mining activities.
- Potential threats:
 - Reduction in hollow availability;
 - Exposure to agrichemicals;
 - Grazing; and
 - Predation by feral animals.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of Corben's Long-eared Bat within 10 km of the Project Area. The closest known record of the species is located in Binkey State Forest, approximately 28 km south-east of the Project Area, recorded in 2002. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Within its distribution, Corben's Long-eared Bat inhabits inland woodlands, including box, ironbark, cypress-pine woodlands (particularly in Queensland), Buloke woodlands, Brigalow woodland, Belah woodlands, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee. The species is most abundant in extensive woodlands, rather than smaller patches and in habitats with distinct tree canopy, dense and cluttered understoreys (Turbill & Ellis, 2006).

Little information is publicly available on the species breeding behaviours and habitats. However, foraging and roosting habitat likely consists of forests and woodlands dominated by *Allocasuarina luehmannii*, *Acacia harpophylla*, *Casuarina cristata*, *Eucalyptus camaldulensis*, and various other types with dead hollow-bearing trees or trees with exfoliating bark. Roosting occurs within dead trees including ironbark, cypress and bull oak, and occasionally under peeling bark. Foraging only habitats consist of remnant and regrowth vegetation and low woodlands.

Field assessments conducted in 2022 confirmed a small portion of the Project Area to contain potential foraging habitat, in the form of wooded areas and connectivity to woodlands surrounding the Project Area. Suitable habitat in the Project Area is associated with larger patches of remnant Eucalypt and Acacia woodlands. Habitat mapping for the Project Area identified 259.6 ha of potential Corben's Long-eared Bat habitat. Therefore, as suitable foraging habitat is located within the Project Area, the Corben's Long-eared Bat is considered to have a potential to occur. The species was not recorded during the 2022 field surveys.

4.4.8.8 Northern Quoll

Species Profile

The Northern Quoll (*Dasyurus hallucatus*) is currently listed as Endangered under the EPBC Act, effective 12 April 2005. The Northern Quoll exhibits reddish-brown fur with white spots on the back, cream-coloured belly, and a pointed snout (TSSC, 2005). The Northern Quoll is the smallest quoll species in Australia, weighing approximately 1.2 kg, with males typically larger than females.

Historically, the Northern Quoll was found across northern Australia, from the Pilbara region in Western Australia and continuously to Brisbane Queensland. However, due to the extent of species threats, the Northern Quoll now occurs in only five regional populations across Queensland, the Northern Territory and Western Australia (SPRAT, 2017). Within Queensland, the species occurs from Gracemere and Mount Morgan in central Queensland, north to Weipa and west to Carnarvon National Park. Although their limited distribution in Queensland, the species has recently been recorded outside of their distribution, in Maleny (south-east Queensland) (Qld DERM, 2009), Mareeba, Mount Carbine, Tolga and Cooktown (Woinarski et al. 2008).

The Northern Quoll typically feeds on invertebrates (e.g., beetles, spiders, scorpions, grasshoppers and centipedes), fruits, human refuse, vertebrates (e.g., Northern Brown Bandicoot, Common Brushtail Possum, rats, bats, bird eggs, snakes, Sugar Glider, frogs, quails and more recently, Cane Toads) (TSSC, 2005).

Species Threats

As per the Species Profile and Threats database (SPRAT, 2017), threats to the Northern Quoll include:

- Habitat loss, fragmentation and degradation;
- Lethal toxic ingestion caused by Cane Toads (*Rhinella marina*);
- Inappropriate fire regimes;
- Weed invasion;
- Predation by feral animals, including feral cats (*Felis catus*) and European Red Fox (*Vulpes vulpes*); and
- Parasitism – potential threat only.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of the Northern Quoll within 10 km of the Project Area. The closest known record of the Northern Quoll was recorded in 1892, approximately 153 km north-east of the Project Area. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Across its distribution, the Northern Quoll occupies a diverse range of habitats particularly for foraging and dispersal activities, ranging from rocky areas to eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert within close proximity to a permanent water source (SPRAT, 2017). Preferable habitats for the species typically encompass some form of rocky areas for denning with nearby access to vegetated habitats for foraging.

Breeding and denning habitat for the Northern Quoll consists of rocky areas for denning, with dens typically in rock crevices, tree hollows or termite mounds, in close proximity to vegetated habitats and a permanent water source.

Field assessments of the Project Area in 2022 identified potential suitable habitats, in the form of rocky areas, to the south-eastern corner of the Project Area in the plateau with eucalypt woodland and open forests. These habitats were considered suitable for foraging, breeding and denning purposes. Habitat mapping for the Project Area identified 226.7 ha of potential Northern Quoll habitat. Therefore, as suitable habitat is located within the Project Area, the Northern Quoll is considered to have a potential to occur. The species was not recorded during the 2022 field surveys.

4.4.8.9 Yellow-bellied Glider (South-eastern)

Species Profile

The Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*) is currently listed as Vulnerable under the EPBC Act, effective 2 March 2022.

Being the second largest arboreal marsupial (DAWE, 2022d), the Yellow-bellied Glider (south-eastern) ranges in size from 240 mm – 310 mm and exhibits a long tail ranging from 380 mm – 470 mm. On average, male individuals average 470 – 725 g in weight, whilst females average 435 – 660 g.

Yellow-bellied Gliders (south-eastern) feature a greyish-brown colouration, with a black stripe down their back and tail, and exhibit a white to yellow belly colouration, with the yellow developing with age (DAWE, 2022d). Their tail is generally black with grey edging.

The Yellow-bellied Glider (south-eastern) is endemic to eastern Australia. The species distribution spans from south-eastern Queensland to southern South-Australia, in altitudes ranging from sea level to 1400 m above sea level. Within south-east Queensland, Yellow-bellied Glider (south-eastern) occur in a patchy distribution (DAWE, 2022d). Although patchily distributed, in Queensland there are two known important populations of the species, including:

- Carnarvon Range (Inland population; Qld); and
- Blackdown Tableland (Inland population; Qld).

Species Threats

As per the conservation advice for the Yellow-bellied Glider (south-eastern) (DAWE, 2022d), the threats include:

- Habitat clearing and fragmentation;
- Extensive severe bushfires;
- Prescribed burns;
- Increased temperatures and changes to precipitation patterns;
- Timber harvesting;
- Predation by feral cats (*Felis catus*) and European red foxes (*Vulpes vulpes*);
- Habitat degradation from feral deer; and
- Entanglement in barbed wire fencing.

Species Occurrence in the Broader Area

A search of the ALA database identified three (3) historical known records of the Yellow-bellied Glider (south-eastern) within 10 km of the Project Area. These records are all located within Cherwondah State Forest, located south-east of the Project Area, and were recorded in 2009. Additional records of the Yellow-bellied Glider (south-eastern) exist in Gurulmundi State Forest, approximately 15 km south-east of the Project Area, and were all recorded in 2008. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Habitat critical to the survival of Yellow-bellied Glider (south-eastern) can be defined as areas containing the following features (DAWE, 2022d):

- “Floristically diverse eucalypt forests, dominated by winter-flowering and smooth-barked eucalypts, including mature living hollow-bearing trees and sap trees;
- Areas identified as refuges under future climate change scenarios;

- *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;*
- *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*
- *Areas in which some trees have evidence of use for sap extraction by yellow-bellied glider (south-eastern)."*

Yellow-bellied Glider (south-eastern) typically resides in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests. Within their favourable habitats, Yellow-bellied glider (south-eastern) show a preference for large patches of mature old growth forests (typically 100 years in age) as these provide suitable trees for foraging and shelter.

More specifically, breeding and denning habitat for Yellow-bellied Glider (south-eastern) consists of Eucalypt dominated woodlands and forests with hollow-bearing trees, primarily in living, smooth-barked eucalypts. Stags, being standing dead trees, are also used for denning purposes, however these only account for two percent of den trees in certain forest types.

Field surveys conducted across the Project Area in 2022 identified potential foraging and denning habitat, in the form of wooded plateaus, in the south-eastern corner of the Project Area. Although potential foraging and denning habitat is present, no sap feeding scars or individuals were observed during field surveys. Additionally, no evidence of characteristic feeding scars were detected on potential feed trees 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. Habitat mapping for the Project Area identified 145.8 ha of potential Yellow-bellied Glider (south-eastern) habitat and as such, the Yellow-bellied Glider (south-eastern) is considered to have a potential to occur.

4.4.8.10 Collared Delma

Species Profile

The Collared Delma (*Delma torquata*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The Collared Delma is the smallest legless lizard, measuring a maximum total length of 19 cm (peck & Hobson, 2007). The Collared Delma exhibits a brown to reddish-brown colouration along the main body, a pale belly, black bands across the head and nape with four cream-yellow stripes, and a grey to bluish-grey tail colouration (DEWHA, 2008g).

The Collared Delma occurs from northern New South Wales to Central Queensland, with the species main populations located in the western suburbs of Brisbane and the following localities:

- Bunya Mountains;
- Blackdown Tableland National Park;
- Bullyard Conservation Park;
- D'Aguilar Range National Park;
- Expedition National Park;
- Naumgna and Lockyer Forest Reserves; and
- Western Creek near Millmerran and the Toowoomba Range.

Species Threats

As per the conservation advice for the Collared Delma (DEWHA, 2008g), the threats include:

- Habitat loss;
- Habitat modification from urban and agricultural development;
- Removal of surface rocks (critical habitat) during developments;
- Fire; and
- Invasive weeds, particularly Dwarf Lantana (*Lantana montividentis*).

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of the Collared Delma within 10 km of the Project Area. The closest known records for the Collared Delma are located within Bellington Hut State Forest, approximately 113 km north-west of the Project Area. The species was recorded twice in this location in 2001 and 2020. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

The Collard Delma occurs in eucalypt dominated woodland and open forest habitats, particularly where suitable micro-habitats (e.g., exposed rocky outcrops) are present (DEWHA, 2008g). The species inhabits ground cover dominated by native grasses (e.g., Kangaroo Grass, Barbed Wire Grass, Wiregrass and Lomandra) (Peck & Hobson, 2007).

Field assessments of the Project Area in 2022 identified suitable habitat in the form of abundant litter, rocks and woody debris to occur in a large contiguous area of forest and woodlands associated with escarpment and plateau, particularly within the south-eastern portion of the Project Area. It was noted that the species is unlikely to inhabit the northern areas of the Project Area as woodland fragments are small, narrow and exposed to disturbance. Habitat mapping for the Project Area identified 259.7 ha of potential Collared Delma habitat. Therefore, as suitable habitat is located within the southern portion of the Project Area, the Collared Delma is considered to have a potential to occur. The species was not recorded during the 2022 field surveys.

4.4.8.11 Dunmall's Snake

Species Profile

Dunmall's Snake (*Furina dunmalli*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. Dunmall's Snake is a small to medium sized snake, measuring a total length of 60 cm (DoE, 2014a). Dunmall's Snake features a dark grey-brown body, white underbelly (Cogger, 2000), pale blotches on the upper lip scales, smooth body scales and a distinctively large head (DERM, 2007).

Dunmall's Snake occurs from northern New South Wales to Central Queensland. Within Queensland, the species range spans from the regions of Oakey, Glenmorgan and Inglewood in south-western Queensland, north to Yeppoon and the Expedition Range. Within this range, records of the species are observed at altitudes between 200 m and 500 above sea level. The species occurs throughout multiple bioregions, including the Brigalow Belt Bioregion.

Species Threats

As per the conservation advice for the Dunmall's Snake (DoE, 2014a), the threats include:

- Broadscale land clearing;
- Habitat modification for grazing, agriculture and urban development;
- Overgrazing by livestock;

- Swamp drainage; and
- Predation by feral animals.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of Dunmall's Snake within 10 km of the Project Area. The closest record of the species is located near Yuleba State Forest, approximately 41 km south-west of the Project Area, recorded in 2009. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Dunmall's Snake inhabits open forests, dominated by Brigalow (*Acacia harpophylla*), Wattles (*A. burowii*, *A. deanii*, *A. leioclyx*), native Cypress (*Callitris* spp.) and/or Bulloak (*Allocasuarina luehmannii*), and woodlands on floodplains associated with deep, cracking clays and clay loam soils (Covacevich et al., 1988, Cogger et al., 1993). The species is thought to be nocturnal, seeking fallen timber and in soil cracks for shelter.

Field assessments of the Project Area in 2022 identified suitable habitat with abundant litter, rocks and woody debris, limited to the within the south-eastern corner of the Project Area. Habitat mapping for the Project Area identified 259.7 ha of potential Dunmall's Snake habitat. Therefore, as suitable habitat is located within the Project Area, the Dunmall's Snake is considered to have a potential to occur. The species was not recorded during the 2022 field surveys.

4.4.8.12 Grey Snake

Species Profile

The Grey Snake (*Hemiaspis damelii*) is listed as Endangered under the EPBC Act, effective 5 October 2022. The Grey Snake is a small yet venomous species of snake exhibiting front-fangs, a pale-dark grey to olive-grey body, a white/cream or yellow belly with darker flecks and black skin between the scales. In Queensland, Grey snakes have an average snout vent length of 378 mm, with males larger than females (DCCEEW, 2022c).

Species distribution of the Grey Snake occurs continuously from south-eastern Queensland to southern New South Wales. Within Queensland, the species occurs in the Brigalow Belt region, on floodplains from Goondiwindi and Dalby west to Glenmorgan, on the Darling Downs and western Lockyer Valley, on the Darling Riverine Plains near Currawinya and near Rockhampton in central Queensland. Particularly, within south-east Queensland, the Grey Snake is broadly dispersed, with majority of records occurring along the Macintyre and Condamine Rivers.

Across its range, the Grey Snake has been recorded to occur in altitudes from 70 m above sea level to 540 m above sea level (DCCEEW, 2022c), however majority of records exist in regions below 300 m sea level.

Species Threats

As per the conservation advice for the Grey Snake (DCCEEW, 2022c), the threats include:

- Land clearing, pasture improvement and cultivation;
- Water extraction and diversions resulting in hydrological changes to floodplains;
- Contamination from pesticides and herbicides;
- Reduced environmental water flow;
- Poisoning by ingestion of cane toads (*Rhinella marina*);
- Predation from feral pigs (*Sus scrofa*), cats (*Felis catus*) and European red foxes (*Vulpes vulpes*);
- Coal and gas extraction; and

- High frequency of high severity fire.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of the Grey Snake within 10 km of the Project Area. The closest known record of the species is located in Barakula State Forest, approximately 52 km east of the Project Area, recorded in 2010. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

As per the species conservation advice, favourable habitat for the Grey Snake consists of Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*) woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies, including small gullies and ditches, ephemeral wetlands, and floodplains (DCCEEW, 2022c).

In Queensland, the Grey Snake favours woodlands dominated by Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*), on cracking clay soils, and in association with water bodies, including small gullies and ditches, ephemeral wetlands, and floodplains (DCCEEW, 2022c). Within these habitats, the species typically seeks shelter in floodplain environments beneath logs, rocks and soil cracks when required (DCCEEW, 2022c).

Additional habitat for the Grey Snake includes Bluegrass (*Dichanthium sericeum*) and/or Mitchell grass (*Astrebla spp.*) grassland on alluvial plains with cracking soils (DCCEEW, 2022c). In the Western Downs regions of south-east Queensland, a particular association between Grey Snakes and red sodosol soils with a strong contrast between the A horizon and sodic B horizon can be observed.

Field surveys undertaken at the Project Area in 2022 identified both Brigalow and Belah present within the northern and far south-eastern portions of the Project Area. Additionally, ephemeral wetlands and creek lines were also observed along with cracking clay soils during the field surveys. Habitat mapping for the Project Area identified 431.2 ha of potential Grey Snake habitat. Therefore, as suitable habitat is located within the Project Area, the Grey Snake is considered to have a potential to occur. Despite the presence of suitable habitat throughout the Project Area, the species was not recorded during the 2022 field surveys.

Additionally, the species has the potential to occur within a number of low ecological value habitat types including:

- Acacia regrowth;
- Eucalypt regrowth;
- Mixed acacia and eucalypt regrowth; and
- Eucalypt and acacia paddock trees.

These areas are slightly intersected or bordered by small gullies which may provide suitable habitat for the species where regrowth is near small gullies and floodplains.

4.4.8.13 Yakka Skink

Species Profile

The Yakka skink (*Egernia rugosa*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The Yakka Skink is a large, robust lizard that features a pale fawn to dark brown colouration, with a dark stripe extending from the next to the tail (DES, 2021). The species abdomen and chest are yellow-orange, and the throat is cream-yellow with dark flecks (Cogger, 2000).

The Yakka Skink is endemic to Queensland, occurring in a patchy distribution from St George to Coen and Cape York in Far North Queensland. The species occurs in the Brigalow Belt Bioregion,

specifically from Rockhampton south to St George and inland towards Chesterton Range National Park (DoE, 2014b).

Species Threats

As per the conservation advice for the Yakka Skink (DoE, 2014b), the threats include:

- Inappropriate roadside management;
- Removal of wood debris and rock microhabitat features;
- Ripping of rabbit warrens; and
- Predation by feral animals.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of the Yakka Skink within 10 km of the Project Area. The closest known record of the Yakka Skink is located near Gurulmundi State Forest, approximately 28 km south-east of the Project Area, recorded in 1998. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

Suitable habitat for the Yakka Skink is described in the 'Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles' (DSEWPC, 2011) as:

- “Open-forests to low-woodlands and scrub in QLD RE Land Zones (LZ) 3, 4, 5, 7, 8, 9, 10 and 12 (LZ 8 not considered core habitat; LZ 12 in Wet Tropics bioregion only). 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.”

The Yakka Skink predominantly inhabits open dry sclerophyll forests and/or woodlands, refuging in cavities under or around surface microhabitats (i.e., beneath rocks, in dense ground vegetation and hollow logs, and soil-bound root systems of fallen trees) (Wilson and Knowles, 1988; Cogger, 2000). Yakka Skink may also occur in cleared habitats, where shelter sites (i.e., tunnel erosion, rabbit warrens and log piles) occur (DoE, 2014b). The species rarely travels far from its shelter site, with presence typically recorded by scat piles near the entrance, as the species use communal defecation sites (Eddie 2012; Wilson 2012). The Yakka Skink further occupy vegetation types including Poplar Box (*E. populnea*), Ironbark (*E. sideroxylon*), Brigalow (*A. harpophylla*), Mulga (*A. aneura*), Bendee (*A. catenulata*), White Cypress Pine (*C. columellaris*) and Lancewood (*A. shirleyi*) woodlands and open forests (DoE, 2014b).

Field assessments of the Project Area in 2022 identified suitable habitat with large logs, rocky outcrops and abundant woody debris to occur in woodland on and around the plateau in the south-eastern corner of the Project Area. Habitat mapping for the Project Area identified 228 ha of potential Yakka Skink habitat. As the Yakka Skink primarily inhabits open dry sclerophyll forests and/or woodlands (DoE, 2014b), which the Project Area encompasses to some extent, the Yakka Skink is considered to have a potential to occur. However, the species was not recorded during the 2022 field surveys.

4.4.8.14 Five-clawed Worm-skink

Species Profile

The Five-clawed Worm-skink (*Anomalopus mackayi*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The Five-clawed Worm-skink is a medium-sized skink, averaging 27 cm in length. The species exhibits a brown to dark-brown colouration with a pale belly, three fingers and two toes, and is patterned in the northern regions of its distribution and unpatterned in the southern regions (DEWHA, 2008h). For Five-clawed Worm-skink individuals in the north, body patterns consist

of longitudinal rows of dark spots, approximately one per scale over the dorsal and lateral surfaces (Cogger et al., 1993; Cogger, 2000) and rows of dark spots on the ventral surface (Cogger, 2000).

The Five-clawed Worm-skink has a limited distribution, spanning from the western edge of the Great Dividing Range north-eastern NSW and south-eastern QLD (Sadler & Pressy, 1994).

Important populations of the Five-clawed Worm-skink exist in Queensland, anywhere where suitable habitat remains, particularly in the region between Bowenville/Oakey, Pittsworth and Jimbour (Brigalow Belt Reptiles Workshop 2010; Richardson 2006).

Species Threats

As per the conservation advice for the Five-clawed Worm-skink (DEWHA, 2008h), the threats include:

- Clearing and fragmentation of habitat for agriculture and development;
- Habitat degradation from overgrazing;
- Removal of refuge sites and litter;
- Predation by feral cats and foxes; and
- Soil and water pollution.

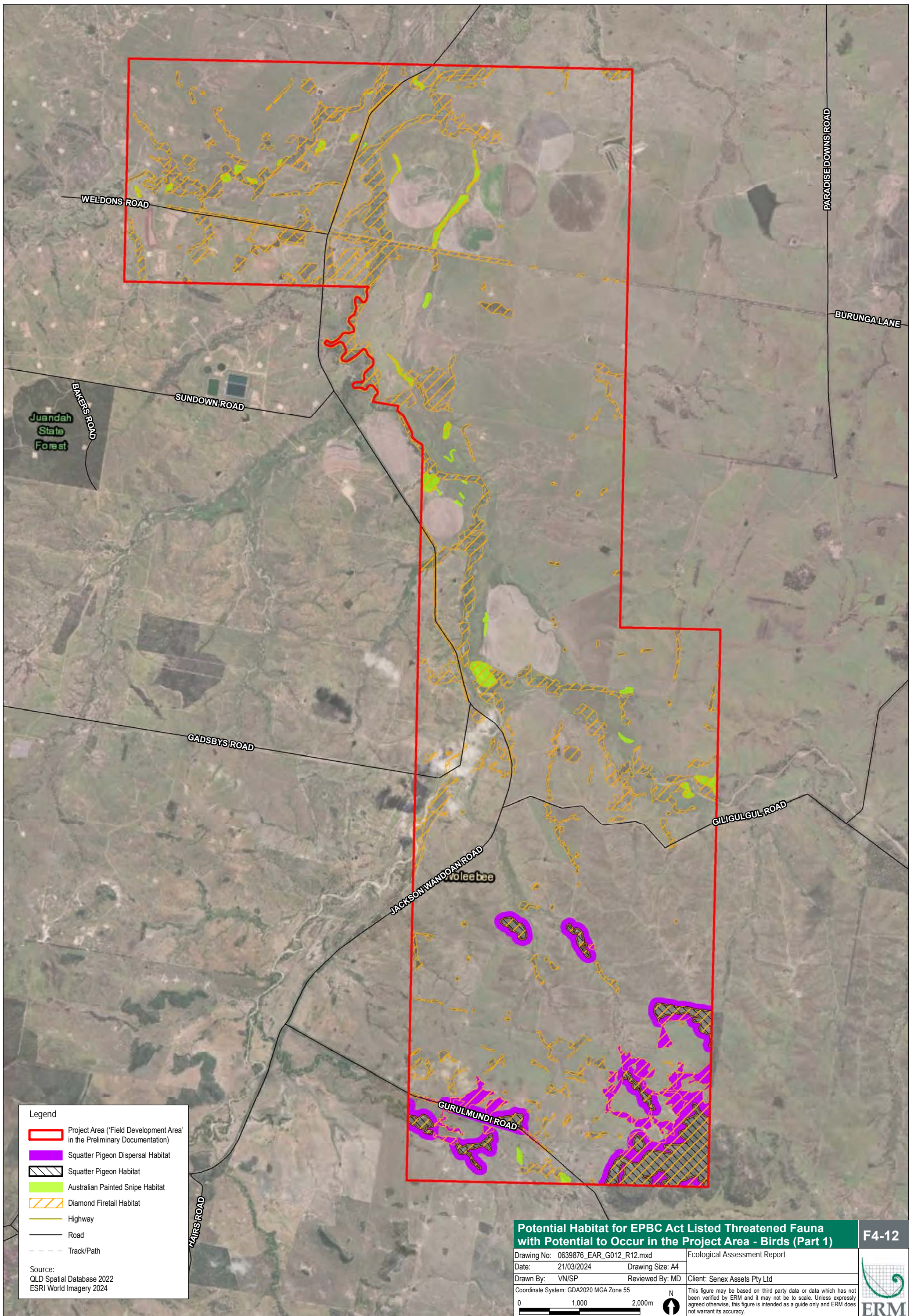
Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of the Five-clawed Worm-skink within 10 km of the Project Area. The closest known record of the species was recorded in 2002, approximately 150 km south-east of the Project Area. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

The Five-clawed Worm-skink inhabits woodlands generally supported by clay-loam soils (Shea et al., 1987), including grassy White Box woodlands, open woodlands and River Red Gum–Coolibah-Bimble Box woodlands (DEWHA, 2008f). Within these woodlands, the species resides in deep burrows and soil cracks. On the surface, the Five-clawed Worm-skink uses fallen logs and timber as sheltering sites (DEWHA, 2008h).

Field assessments of the Project Area in 2022 identified limited areas of potential Five-clawed Worm-skink habitat, with an absence of native grasslands with deep, cracking clays. In few areas of the Project Area, ephemeral wetlands and creek lines are present along with cracking clay soils (limited). Habitat mapping for the Project Area identified 209.6 ha of potential Five-clawed Worm-skink habitat. Therefore, as potentially suitable habitat is located within the Project Area, the Five-clawed Worm-skink is considered to have a potential to occur. The species was not recorded during the 2022 field surveys.

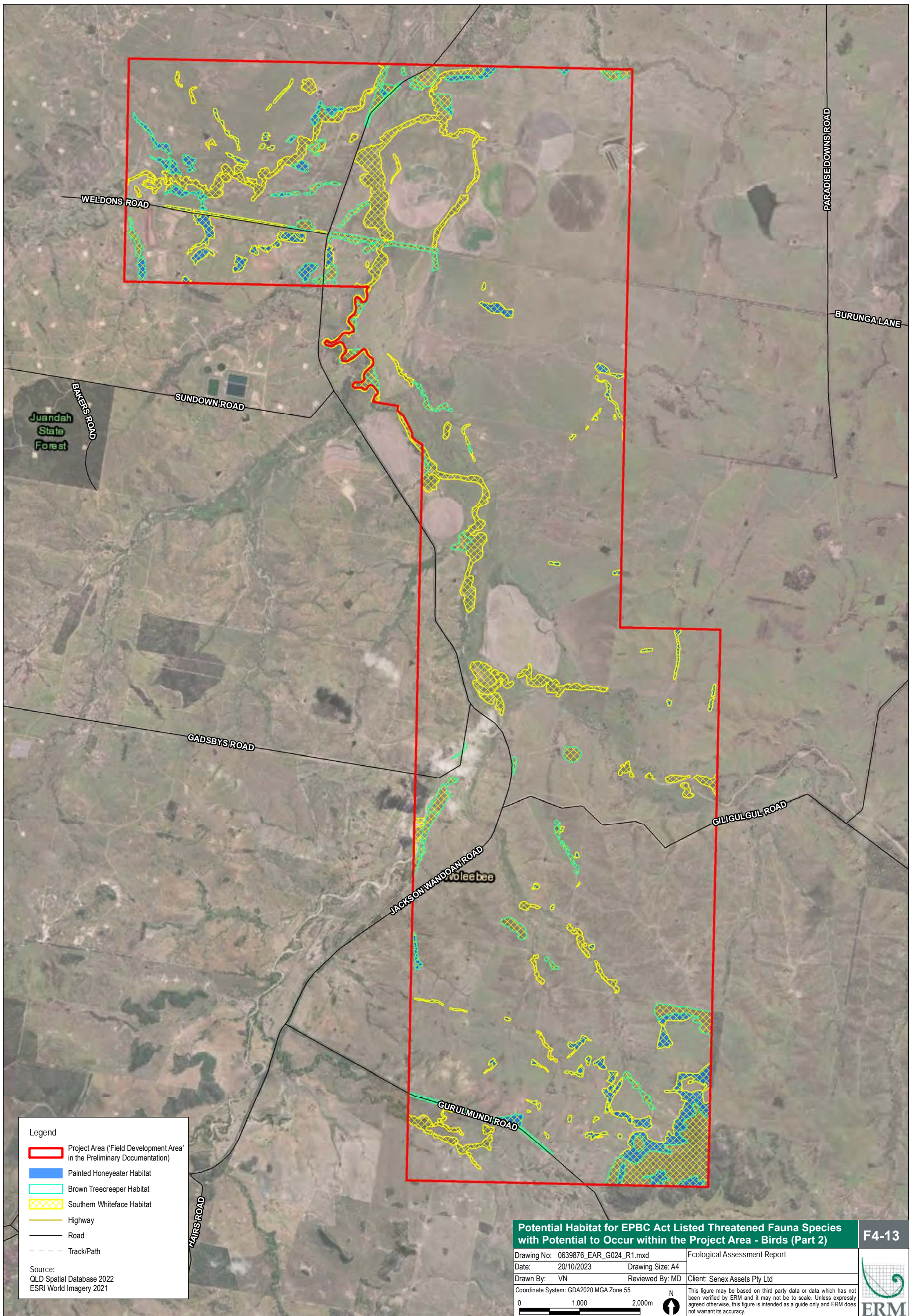


Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Squatter Pigeon Dispersal Habitat
- Squatter Pigeon Habitat
- Australian Painted Snipe Habitat
- Diamond Firetail Habitat
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2024

Potential Habitat for EPBC Act Listed Threatened Fauna with Potential to Occur in the Project Area - Birds (Part 1)		F4-12
Drawing No: 0639876_EAR_G012_R12.mxd	Ecological Assessment Report	
Date: 21/03/2024	Drawing Size: A4	
Drawn By: VN/SP	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> <div style="margin-left: 10px;"> <div style="text-align: center; font-size: 8px;">N</div> <div style="text-align: center;">↑</div> </div> </div>	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.	

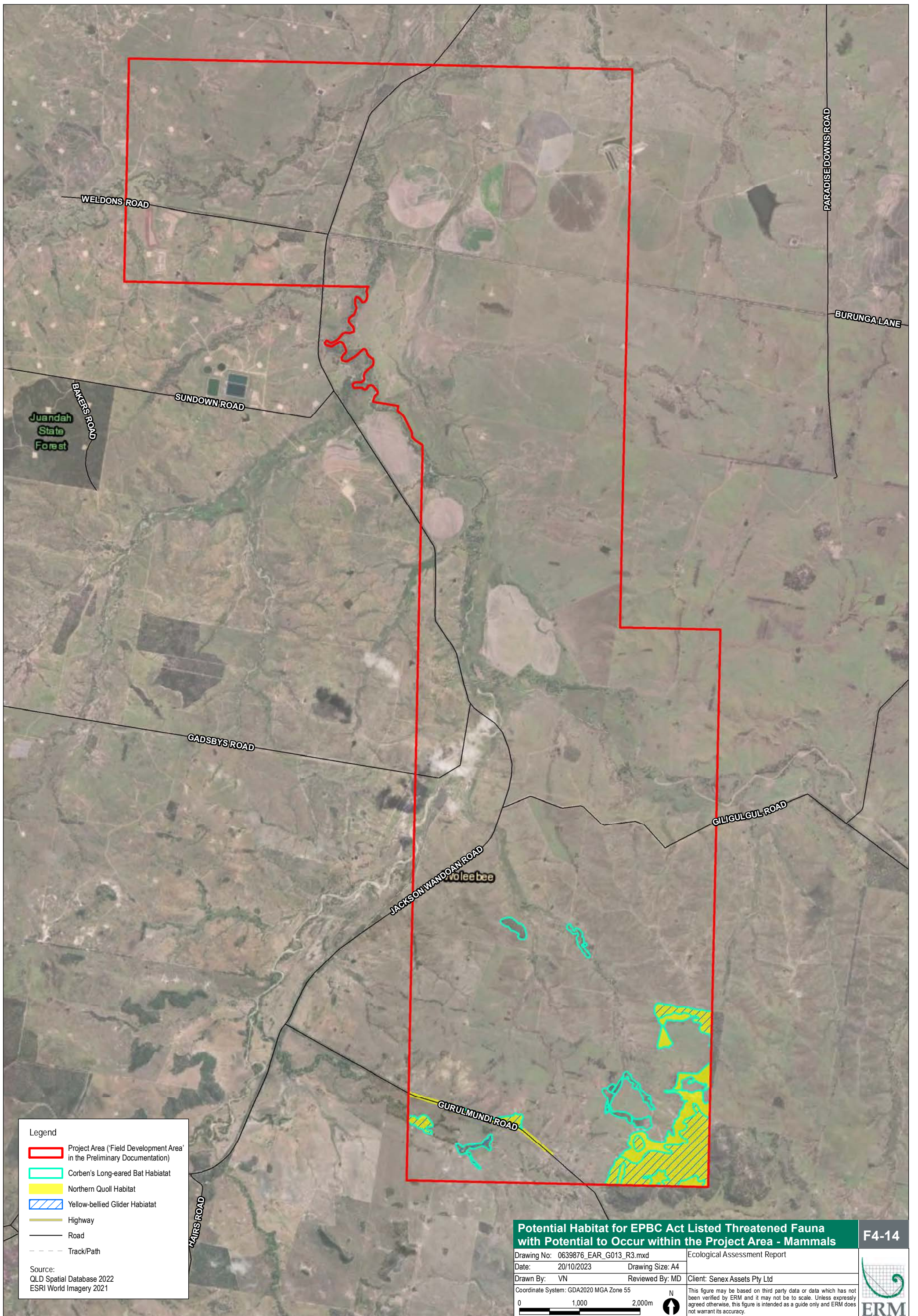


Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Painted Honeyeater Habitat
- Brown Treecreeper Habitat
- Southern Whiteface Habitat
- Highway
- Road
- Track/Path

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Potential Habitat for EPBC Act Listed Threatened Fauna Species with Potential to Occur within the Project Area - Birds (Part 2)		F4-13
Drawing No: 0639876_EAR_G024_R1.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">0</div> <div style="margin-right: 10px;">1,000</div> <div style="margin-right: 10px;">2,000m</div> <div style="text-align: center;"> <div style="border: 1px solid black; width: 10px; height: 10px; margin: 0 auto;"></div> <div style="font-size: 8px; margin: 0 auto;">N</div> </div> </div>		<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>
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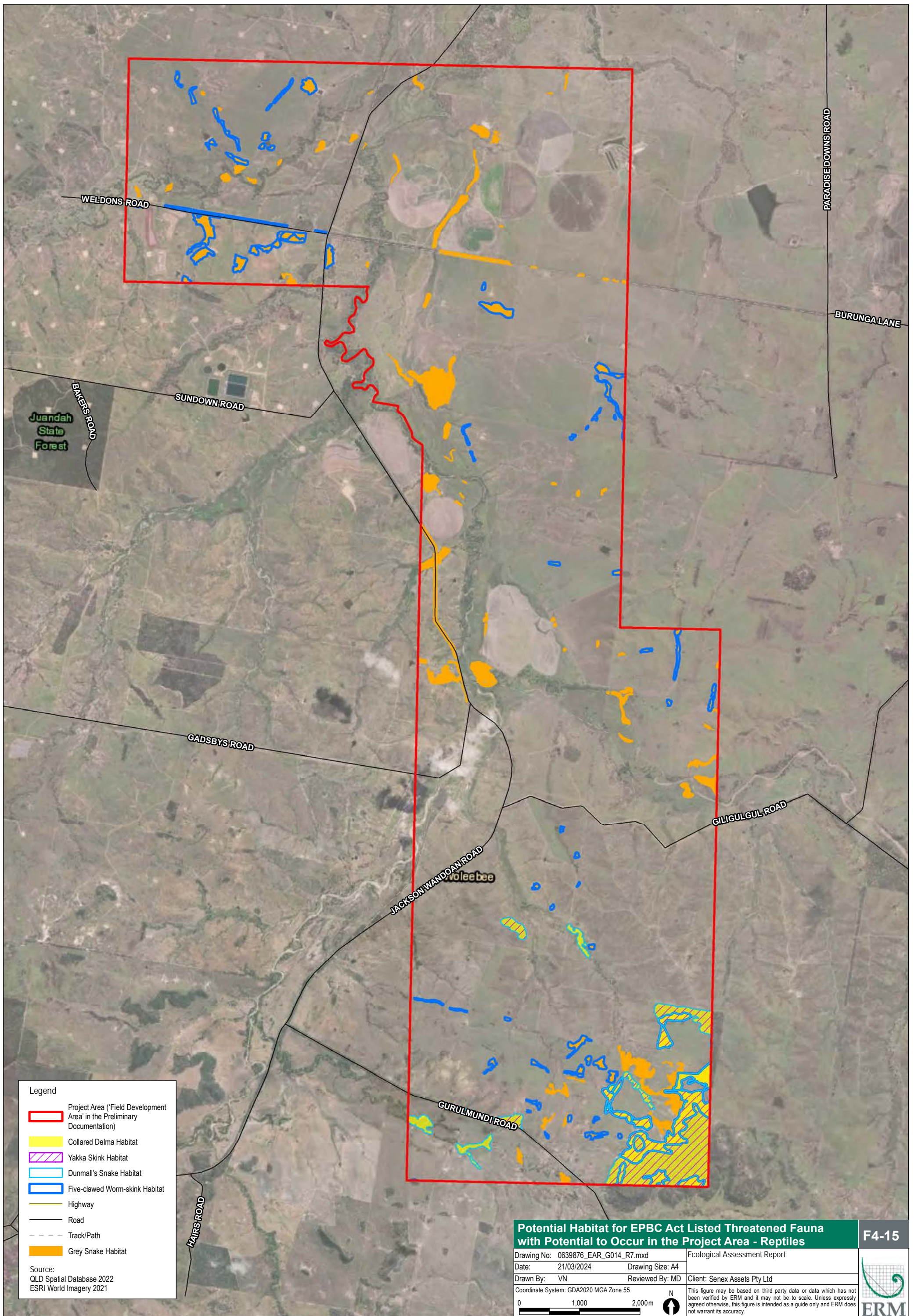


Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Corben's Long-eared Bat Habiatat
- Northern Quoll Habitat
- Yellow-bellied Glider Habiatat
- Highway
- Road
- Track/Path

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Potential Habitat for EPBC Act Listed Threatened Fauna with Potential to Occur within the Project Area - Mammals		F4-14
Drawing No: 0639876_EAR_G013_R3.mxd		Ecological Assessment Report
Date: 20/10/2023	Drawn By: VN	Reviewed By: MD
Coordinate System: GDA2020 MGA Zone 55		Client: Senex Assets Pty Ltd
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Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Collared Delma Habitat
- Yakka Skink Habitat
- Dunmall's Snake Habitat
- Five-clawed Worm-skink Habitat
- Highway
- Road
- Track/Path
- Grey Snake Habitat

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

Potential Habitat for EPBC Act Listed Threatened Fauna with Potential to Occur in the Project Area - Reptiles		F4-15
Drawing No: 0639876_EAR_G014_R7.mxd		Ecological Assessment Report
Date: 21/03/2024	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0</div> <div style="margin-right: 10px;">1,000</div> <div style="margin-right: 10px;">2,000m</div> </div>		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

4.4.9 Listed Threatened Terrestrial Fauna Species identified in the RFI but not Known, Likely or Potential to Occur

4.4.9.1 Brigalow Woodland Snail

Species Profile

The Brigalow Woodland Snail is currently listed as Endangered under the EPBC Act, effective 7 December 2016. The Brigalow Woodland Snail features a brownish-yellow shell with reddish bands on the rounded and tightly coiled whorls and is approximately 20 mm in length. The shell is slightly flattened with a low, domed spine (TSSC, 2016b).

The Brigalow Woodland Snail is endemic to south-east Queensland, with populations predominantly occurring in Dalby and Chinchilla. The species occurs in the 'Brigalow (*Acacia harpophylla* dominant and co-dominant)' ecological community, which is currently listed as Endangered under the EPBC Act (TSSC, 2013), however it may also occur in the Coolibah— Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt Bioregions' ecological community, also currently listed as Endangered under the EPBC Act (TSSC, 2011). Species distribution is severely fragmented with an area of occupancy of 76 m² (DotEE, 2016). The mobility, and therefore capacity for dispersal, of this species is very limited (TSSC, 2016b).

Species Threats

As per the conservation advice for the Brigalow Woodland Snail (TSSC, 2016b), the threats include:

- Land clearing;
- Habitat disturbance;
- Predation by rats (*Rattus* spp.), mice (*Mus musculus*) and feral pigs (*Sus scrofa*);
- Invasion of Buffel grass;
- Trampling by cattle and horses; and
- Fire.

Species Occurrence in the Broader Area

A search of the ALA database did not identify any historical known records of the Brigalow Woodland Snail within 10 km of the Project Area. The closest known record of the species was recorded in Gurulmundi State Forest, approximately 15 km south of the Project Area, recorded in 2014. However, this specimen has been misidentified, refer to Appendix I. The next nearest known record is 52.1 km south-east of the Project Area, recorded in 2011. For more information on the description of the habitat in which the record was identified, refer to Appendix H.

Habitat Assessment

The Brigalow Woodland Snail inhabits remnant and scattered brigalow and eucalypt woodland patches, road verges and riparian corridors along the Condamine River floodplain within its distribution (TSSC, 2016b). In these habitats, the snail shelters under logs and leaf litter, however, also requires canopy and on-ground timber cover for survival and breeding (Stanisic et al., 2010). These habitat features maintain adequate humidity levels within the snail's microhabitat.

Field assessments of the Project Area in 2022 identified the Project Area to be highly fragmented, with any present Eucalypt and Brigalow woodland isolated and fragmented in small patches. The Project Area is located outside of the species known distribution and separated from known occurrences by substantial unsuitable habitat barriers. Although, a limited portion of the Project Area is located within the modelled distribution where the species or species habitat may occur, there are no validated / publicly available records of the species within 50 km of the Project Area and the

mobility of this species, and therefore capacity for dispersal, is very limited. As such, the species is considered unlikely to occur within the Project Area.

4.4.10 Aquatic Listed Threatened Fauna Species

A total of 2,192 individual fish from eight species, one species of turtle and three species of frog were recorded. No listed threatened species were identified during the field surveys. Three EPBC Act listed threatened aquatic fauna species were identified in the desktop review to potentially occur in and adjacent to the Project Area, these being:

- White-throated Snapping Turtle (*Eseya albagula*) – Critically Endangered;
- Fitzroy River Turtle (*Rheodytes leukops*) – Vulnerable; and
- Murray Cod (*Maccullochella peelii*) – Vulnerable.

All three species inhabit rivers with a preference for deep, permanent channels. The Project Area lacks rivers and other permanent waterways with deep channels. Only one specimen of Eastern Long-necked Turtle (not a listed threatened species) was recorded during aquatic field surveys. This species can move long distances overland between waterholes, particularly after heavy rainfall.

After completing a likelihood of occurrence and the subsequent field surveys, all three aquatic listed threatened species were considered unlikely to occur within the Project Area (Appendix B).

4.4.11 Listed Migratory Species Likely to Occur

Two EPBC Act listed migratory species, the White-throated Needletail and Fork-tailed Swift have been considered as known and likely to occur within the Project Area respectively.

The White-throated Needletail is a largely aerial species when on migration through Australia, only occasionally stopping to roost in Eucalypt forests (Higgins, 1999). As a result, it is considered unlikely there will be a significant impact. It should be noted that this species is also listed as Vulnerable under the EPBC Act, however due to its aerial nature, it is also unlikely to be significantly impacted by Project activities. This species was further described in Section 4.4.7.5.

4.4.11.1 Fork-tailed Swift

Species Profile

The Fork-tailed Swift (*Apus pacificus*) is currently listed as Marine and Migratory under the EPBC Act. The Fork-tailed Swift is a medium to large migratory bird, measuring a total length of 18-21 cm, with a wingspan of 40-42 cm and weighing approximately 30-40 grams. The migratory bird features a blackish colouration across the body with a white band across the rump, a white patch on the chin and throat.

The Fork-tailed Swift is a non-breeding migratory species in Australia, visiting all states and territories (Higgins, 1999). Within Queensland specifically, the species has scattered records across the Gulf Country and few records in Cape York Peninsula. The Fork-tailed Swift is widespread west of the Great Dividing Range, with the species commonly sighted along the line connecting Chinchilla and Hughenden.

Species Threats

There are currently no known significant threats to the Fork-tailed Swift in Australia. Although potential threats may exist, including habitat destruction and predation by feral animals, these are considered negligible due to the species' widespread distribution (Birdlife International, 2009).

Habitat Assessment

Within Australia, the Fork-tailed Swift is almost exclusively aerial, particularly over inland plains, above foothills and coastal areas (Higgins, 1999). The species predominantly occurs over dry, open habitats, particularly riparian woodlands, tea-tree swamps, low scrub, heathland and/or saltmarsh. Foraging habitat for the Fork-tailed Swift consists of remnant, regrowth and non-remnant vegetation.

The species was not recorded during the 2022 field surveys, however as it is almost exclusively aerial, it is considered likely to fly aerially over the Project Area, particularly during the migratory months as occasional flocks in spring and summer. Although likely to occur, the Fork-tailed Swift is unlikely to rely on any terrestrial habitats within the Project Area.

4.4.12 Listed Migratory Species with Potential to Occur

Seven listed migratory species have been determined as having the potential to occur within the Project Area (likelihood of occurrence found in Appendix B). There were no signs or observations of the species within the Project Area based on targeted field investigations across the field survey events using survey techniques aligned with survey guidelines, including:

- Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (Department of Environment, Water, Heritage and the Arts [DEHWA], 2017);
- Draft referral guidelines for 14 birds listed as migratory species under the EPBC Act (DoE, 2015b); and
- Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (DoEE, 2017).

The potential occurrence conclusion for these species was therefore based off presence of suitable habitat only, and/or the presence of records in the adjoining areas. Potential habitat for these species is largely associated with waterbodies and drainage features (predominately farm dams), that may occasionally be used. Therefore, even though no records for these species occur within the Project Area, they have been conservatively concluded as potentially occurring based on adjoining area records and/or the presence of habitat requirements.

The migratory species that have the potential to occur and their habitat within the Project Area are listed in Table 4-11. These include species that just have the potential to fly aerially overhead, and species, such as the common sandpiper, Latham's Snipe and Sharp-tailed Sandpiper, that have the potential to stop over within the Project Area in very limited suitable habitat (ephemeral wetlands on drainage lines and farm dams) which are mapped in Figure 4-12.

Table 4-11: EPBC Act Listed Migratory Species with Potential to Occur within the Project Area

Species Name	Common Name	EPBC Act Status	Potential Habitat within the Project Area*
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi	<ul style="list-style-type: none"> Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.
<i>Gallinago hardwickii</i>	Latham's Snipe	Mi	<ul style="list-style-type: none"> Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.
<i>Cuculus optatus</i>	Oriental Cuckoo	Mi	<ul style="list-style-type: none"> There are limited areas of potential habitat in the form of remnant woodlands and non-remnant patches of native vegetation, within the Project Area.
<i>Rhipidura rufifrons</i>	Rufous Fantail	Mi	<ul style="list-style-type: none"> There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area.
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Mi	<ul style="list-style-type: none"> There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area.
<i>Calidris acuminata</i>	Sharp-Tailed Sandpiper	Mi	<ul style="list-style-type: none"> Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.

Status listing per EPBC: E=Endangered, V=Vulnerable and Mi =Migratory.

For the full reasoning for the likelihood of occurrence conclusions for these species, refer to Appendix B.

*Information on potential habitat sourced from Appendix C (BOOBOOK, 2022).

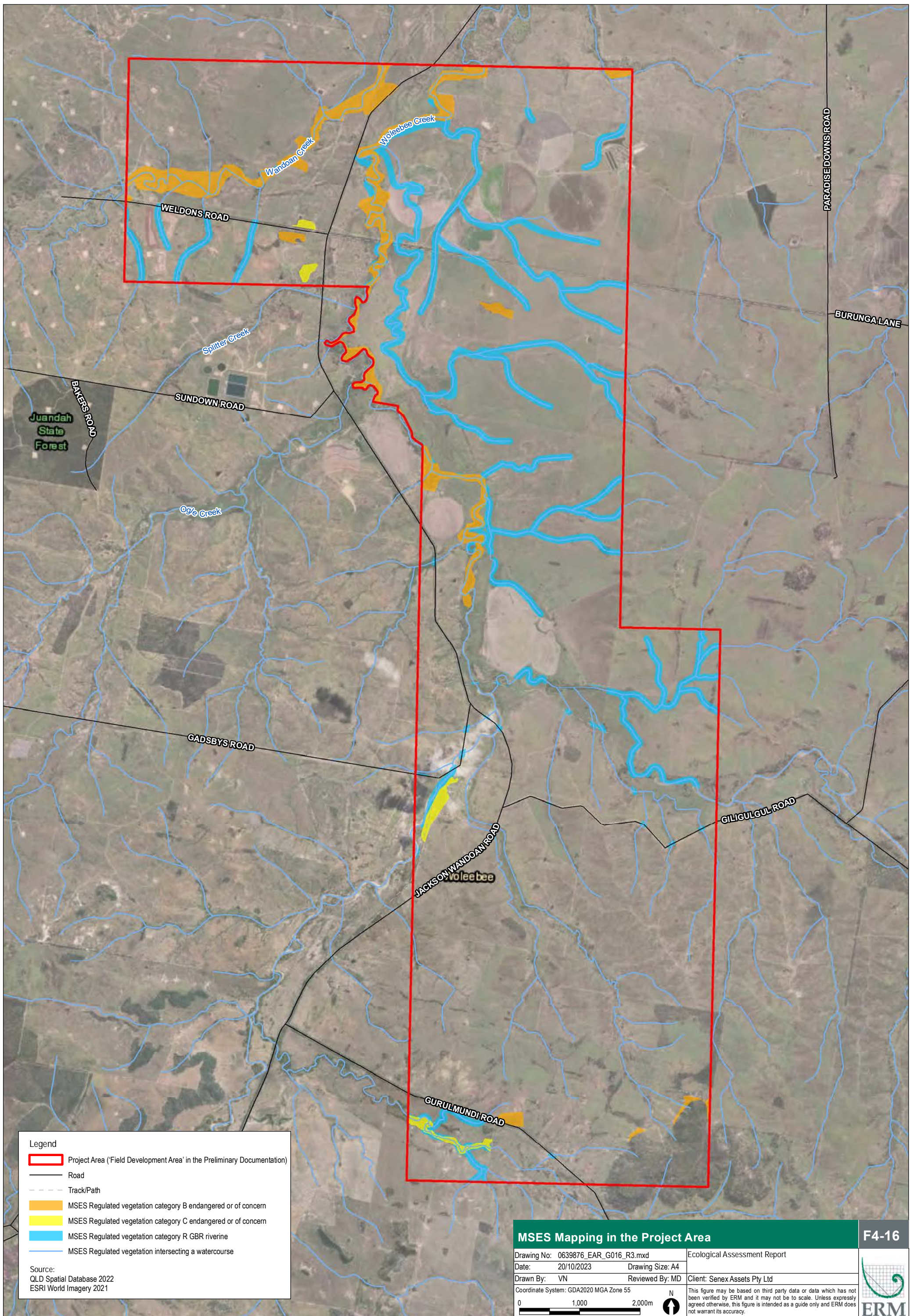
5.1 Matters of State Environmental Significance (MSES)

MSES are defined within the *Queensland Environmental Offsets Policy 2014* (QLD Offset Policy) for Significant Residual Impacts (SRI) (Department of State Development, Infrastructure and Planning, 2014) and prescribed activities assessable under the *Sustainable Planning Act 2009* (SPA). SPA has been superseded by the *Planning Act 2016*, but the QLD Offset Policy only references the SPA at this time. The MSES relevant to the Project Area considered as part of this assessment are summarised in Table 4-12. MSES requiring assessment include Regulated Vegetation and protected wildlife habitat and are further detailed in this Section. MSES in the Project Area, based on desktop mapping supported by ground-truthing of representative locations, are presented on Figure 4-16.

Table 4-12: MSES within the Project Area

Prescribed Matter	Relevance to the Proposed Action	Assessment
Regulated Vegetation	<ul style="list-style-type: none"> ■ Category B remnant vegetation – there is 334.8 ha of Endangered and Of Concern remnant vegetation present within the Project Area. ■ Category C high value regrowth – there is 38.4 ha of high value regrowth within the Project Area. ■ Category R GBR riverine regrowth – there is 595.4 ha of Great Barrier Reef riverine vegetation within the Project Area. ■ Defined distance of a watercourse – watercourses intersect with regulated vegetation within the Project Area. ■ Wetlands – no regulated vegetation is within 100m of a Vegetation Management Wetland within the Project Area. ■ Essential Habitat – there is 96.3 ha of essential habitat present within the Project Area. 	1-4 and 6 required
Connectivity Areas	Connectivity areas within the Project Area are comprised chiefly of vegetation associated with watercourses, including Woleebee Creek. The main connectivity areas within the adjoining areas (10 km buffer of Project Area) are located to the south and east and will not be affected by the proposed development.	Not required
Wetlands and Watercourses	In accordance with the Development Assessment Mapping Systems (DAMS) mapping, there are no wetlands or watercourses mapped as high ecological significance, or high ecological value, within the Project Area.	Not required
Designated Precincts in Strategic Environmental Areas	In accordance with the DAMS mapping, no Strategic Environmental areas are recorded over the Project Area. This mapping is in accordance with the <i>Regional Planning Interests Act 2014</i> which governs the framework for Strategic Environmental Areas.	Not required
Protected Wildlife Habitat	<p>Habitat for eight listed threatened species (five fauna and one flora) and one Near Threatened fauna species were considered known or likely to occur within the Project Area:</p> <ul style="list-style-type: none"> ■ Central Greater Glider listed as Vulnerable (528 ha habitat); ■ Dulacca Woodland Snail listed as Vulnerable (666.3 ha habitat); ■ South-eastern Glossy Black-cockatoo listed as Vulnerable (1,003 ha habitat); 	Required

Prescribed Matter	Relevance to the Proposed Action	Assessment
	<ul style="list-style-type: none"> ■ Koala listed as Endangered (698.5 ha preferred breeding and foraging habitat and 9,072.6 ha general dispersal habitat); ■ Pale Imperial Hairstreak listed as Vulnerable (180.2 ha habitat); ■ Ooline listed as Vulnerable (118.7 habitat); ■ Short-beaked Echidna listed as Special Least Concern (9,772 ha habitat); ■ White-throated Needletail listed as Vulnerable (no habitat mapped as aerial flyover visitor only to the Project Area). 	
Protected Areas	There are no Protected Areas within the Project Area.	Not required
Declared Fish Habitat Areas and Highly Protected Zones of State Marine Parks	In accordance with DAMS mapping, there are no declared fish habitat areas within the Project Area.	Not required
Waterways Providing for Fish Passage	In accordance with DAMs mapping, there are a number of waterways defined by the Fisheries Act, that are noted as high and major risk waterways of potential impacts from the development in the Project Area. Any works will be in accordance with the Fisheries Act and relevant waterway barrier codes as per QLD legislation.	Not required
Marine Plants	There are no marine plant communities within the Project Area.	Not required
Legally Secured Offset Areas	There are no legally secured offset areas within the Project Area.	Not required



Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Road
- Track/Path
- MSES Regulated vegetation category B endangered or of concern
- MSES Regulated vegetation category C endangered or of concern
- MSES Regulated vegetation category R GBR riverine
- MSES Regulated vegetation intersecting a watercourse

Source:
 QLD Spatial Database 2022
 ESRI World Imagery 2021

MSES Mapping in the Project Area		F4-16
Drawing No: 0639876_EAR_G016_R3.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> </div>	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">N</div> <div style="font-size: 1.2em;">↑</div> </div>	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>

5.1.1 Regional Ecosystems

The VM Act distinguishes between vegetation that is Endangered, Of Concern, or Least Concern REs. REs are Queensland vegetation communities found within a particular bioregion that have a consistent combination of geology, landform, and soil type and vegetation characteristics, as determined by the Queensland Herbarium.

There are 16 REs mapped within the Project Area that account for a total of 678.3 ha of native vegetation. Seven of these REs are classed under the VM Act as Endangered or Of Concern. The dominant vegetation communities identified in desktop searches and verified by field surveys were RE 11.3.25. *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines and RE 11.9.5. *Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks.

REs ground-truthed within the Project Area are listed in Table 4-13 and mapped polygons which are based on desktop mapping supported by ground-truthing of representative locations are presented in Figure 4-17.

Table 4-13: Ground-truthed Regional Ecosystems within the Project Area.

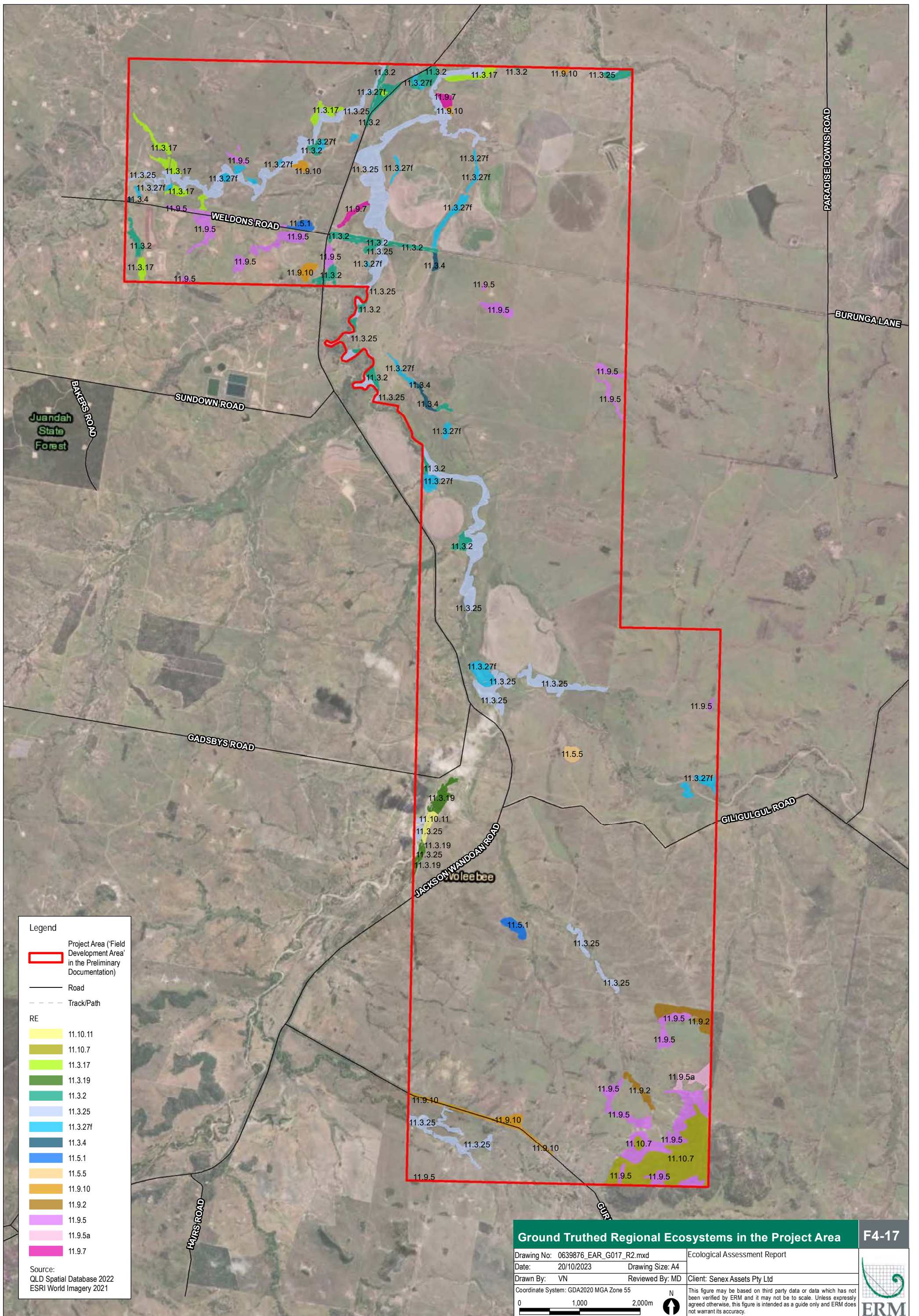
RE Code	Description	Structure Category	VM Act Class	Biodiversity Status	Area within Project Area (ha)	% of Project Area
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	Mid-dense	E	E	8.2	0.08
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Sparse	OC	OC	77.8	0.79
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains	Sparse	OC	OC	5.4	0.06
11.3.17	<i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains	Sparse	OC	E	41.1	0.42
11.3.19	<i>Callitris glaucophylla</i> , <i>Corymbia</i> spp. and/or <i>Eucalyptus melanophloia</i> woodland on Cainozoic alluvial plains	Sparse	LC	NC	14.2	0.14
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Sparse	LC	OC	322.5	3.29
11.3.27f	Freshwater wetlands: <i>Eucalyptus coolabah</i> and/or <i>E. tereticornis</i> open woodland to woodland fringing swamps	Other	LC	OC	58.2	0.59
11.3.39	<i>Eucalyptus melanophloia</i> +/- <i>E. chloroclada</i> open woodland on undulating plains and valleys with sandy soils	Sparse	LC	NC	4.6	0.05

RE Code	Description	Structure Category	VM Act Class	Biodiversity Status	Area within Project Area (ha)	% of Project Area
11.5.1	<i>Eucalyptus crebra</i> and/or <i>E. populnea</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces	Sparse	LC	NC	11.6	0.12
11.5.5	<i>Eucalyptus melanophloia</i> , <i>Callitris glaucophylla</i> woodland on Cainozoic sand plains and/or remnant surfaces. Deep red sands	Sparse	LC	NC	7.3	0.07
11.9.2	<i>Eucalyptus melanophloia</i> +/- <i>E. orgadophila</i> woodland to open woodland on fine-grained sedimentary rocks	Sparse	LC	NC	25.3	0.26
11.9.5	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	Mid-dense	E	E	190.0	1.94
11.9.5a	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks: with <i>Cadellia pentastylis</i> and <i>Brachychiton</i> spp. as emergent or dominant in some places, a dense tall shrub layer and a more open low shrub layer of Semi-evergreen vine thicket species, occurring on undulating plains and rises.	Mid-dense	E	E	11.4	0.12
11.9.7	<i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	Sparse	OC	OC	8.1	0.08
11.9.10	<i>Eucalyptus populnea</i> open forest with a secondary tree layer of <i>Acacia harpophylla</i> and sometimes <i>Casuarina cristata</i> on fine-grained sedimentary rocks	Mid-dense	OC	E	29.5	0.30
11.10.7	<i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks	Sparse	LC	NC	103.7	1.06

RE Code	Description	Structure Category	VM Act Class	Biodiversity Status	Area within Project Area (ha)	% of Project Area
11.10.11	<i>Eucalyptus populnea</i> , <i>E. melanophloia</i> +/- <i>Callitris glaucophylla</i> woodland on coarse-grained sedimentary rocks	Sparse	LC	NC	7.7	0.08

VM Act Status Listing: E = Endangered, OC = Of Concern and LC = Least Concern.

Biodiversity Status: E = Endangered, OC = Of Concern and NC = No Concern at Present.



Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Road
- Track/Path

RE

- 11.10.11
- 11.10.7
- 11.3.17
- 11.3.19
- 11.3.2
- 11.3.25
- 11.3.27f
- 11.3.4
- 11.5.1
- 11.5.5
- 11.9.10
- 11.9.2
- 11.9.5
- 11.9.5a
- 11.9.7

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Ground Truthed Regional Ecosystems in the Project Area		F4-17
Drawing No: 0639876_EAR_G017_R2.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0</div> <div style="margin-right: 10px;">1,000</div> <div style="margin-right: 10px;">2,000m</div> </div>		
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

5.1.2 Regulated Vegetation

A vegetation clearing permit will be required for any disturbance to Category B Regulated Vegetation, while Category C will be required to be avoided. However, disturbance to Of Concern and Endangered REs will likely also require an assessment against the Significant Residual Impact Guidelines (2014) with the potential to trigger offsets if impact thresholds are exceeded. Where disturbance to Least Concern REs occurs that is also regarded as habitat for listed threatened species, the *Queensland Environmental Offsets Policy – Significant Residual Impact Guideline 2014* (SRI Guideline) will apply (also applies to MSES, regulated under the VM Act and NC Act).

The Project Area contains patches of both Category B and Category C Regulated Vegetation based on the current Queensland Regulated Vegetation Map version 6.01 (4th October 2022), as shown in Figure 4-16. There is approximately 334.8 ha of Category B and 38.4 ha of Category C Regulated Vegetation within the Project Area. There is also 595.4 ha of Category R GBR riverine regrowth and 96.3 ha of Essential Habitat mapped within the Project Area. This Regulated Vegetation Map is the regulatory dataset used by the Queensland Government to map MSES, as opposed to the ground-truthed RE mapping used for ESAs and threatened species habitat mapping presented in this EAR.

5.1.3 Environmentally Sensitive Areas

There are no Category A ESA within the Project Area. Category B ESA within the Project Area are ground-truthed Endangered RE (Biodiversity Status), which consists of patches of the following REs: 11.3.17, 11.9.5, 11.9.5a and 11.9.10.

Category C ESA within the Project Area includes ground-truthed habitat for EVNT species listed under the NC Act, and ground-truthed remnant and regrowth vegetation within government mapped areas of Regulated Vegetation that is essential habitat or 'essential regrowth habitat', and Of Concern RE (Biodiversity Status), which comprises the following RE: 11.3.2, 11.3.4, 11.3.25, 11.3.27f and 11.9.7.

ESA in the north of the Project Area include the extensive riparian corridors along Wandoan Creek and Woleebee Creek (Category C). ESA in the north also comprise small fragments of Brigalow and/or Belah woodland, including areas with co-dominant Poplar Box, either fringing riparian corridors or scattered across the surrounding undulating downs (Category B). ESA in the south of the Project Area also include scattered fragments of Brigalow/Belah dominant and codominant woodland on rolling downs and around the plateau area in the southeast (Category B) along with a riparian corridor along Hellhole Creek (Category C). ESA in the south also comprises a mapped area of essential habitat (Category C), for the Short-beaked Echidna and Glossy-black Cockatoo covering part of the wooded plateau in the southeast of the Project Area, including areas of RE 11.10.7 Narrow-leaved Ironbark open forest.

Koala dispersal habitat is defined by DCCEEW pursuant to the EPBC Act; however, dispersal habitat does not meet the criteria for 'essential habitat' under the VM Act. Essential habitat is defined as Category A (declared, offset or exchange area), Category B (remnant) or Category C (regrowth) areas of regulated vegetation on the regulated vegetation management map, that have at least three (3) essential habitat factors for the protected wildlife. This must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or in which the protected wildlife, at any stage of its life cycle, is located.

Ground-truthed ESAs are mapped in Appendix C attached to this EAR.

5.1.3.1 Terrestrial habitat

The vegetation conditions of eight REs, that represented the major vegetation types in the northern part of the Project Area, were assessed using the BioCondition methodology of Eyre *et al.* (2015). All BioCondition sites (one site for seven REs and two sites for RE 11.3.25) were in remnant vegetation, resulting in a total of nine Assessment Units (AUs) being assessed (AU defined by a combination of RE and growth status (remnant or regrowth)).

All AUs received moderate (0.40 – 0.60) to high (0.60 – 0.80) BioCondition scores, reflecting:

- Significant disturbance and consequent loss of ecosystem integrity relative to intact areas of each RE; and/or
- landscape level fragmentation with small patch size, low connectivity and a low proportion of remnant and regrowth vegetation in the surrounding landscape.

Terrestrial BioCondition site characteristics and scores are summarised in Section 3.2.2 in Appendix C.

5.1.3.2 Aquatic habitat

Full descriptions of physical parameters and habitat for each site assessed in March 2022 field surveys are provided in Appendix D. The availability and quality of aquatic habitat is strongly influenced by water permanency. Twenty-three of the 32 sites held water in March 2022 while all other sites were dry. The habitat bioassessment only included twenty-four sites as the approach is not applicable to drainage features (five sites) and wetlands (three sites). Instream habitat was mostly found to be in 'fair' condition across all sites sampled (18 of the 24 sites). The remaining sites were determined to be in 'good' condition.

Further information is provided in Section 4.4 of the Aquatic Ecology Report provided in Appendix D.

5.1.4 Terrestrial Flora Species

The field surveys recorded 124 flora species, including one threatened flora species listed under the NC Act, Ooline. Ooline, which is also an EPBC Act listed threatened flora species, is addressed in Section 4.4.2.1 and habitat is mapped in Figure 4-4. This species grows on undulating plains, valley slopes, hillsides and scarps, often in association with Brigalow and SEVT communities (DEWHA, 2008a). During field surveys, Ooline was recorded in isolated stands or clumps in the south-eastern part of the Project Area in Brigalow woodlands. Stands of Ooline reached up to 35 m high in Brigalow woodland on the foot slopes and mid-slopes outside the Project Area to the south. There is 118.2 ha of Ooline habitat and 3,231.7 ha of areas of potential Ooline occurrence that has been mapped within the Project Area.

5.1.4.1 Terrestrial Flora Species with the Potential to Occur

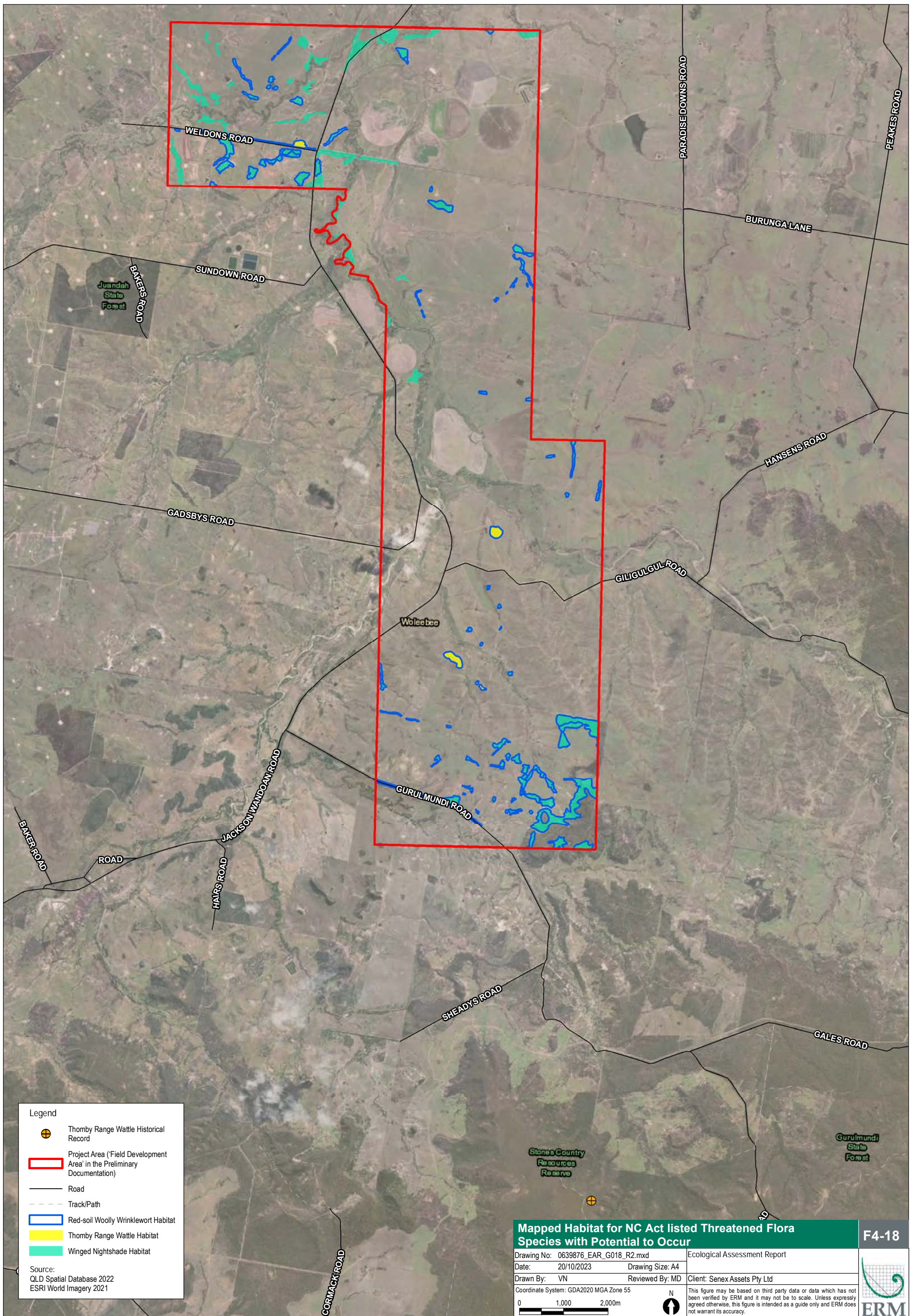
Based on the likelihood of occurrence assessment, five additional NC Act listed threatened flora species, are considered as having potential to occur within the Project Area (Appendix B). A summary of listed threatened terrestrial flora species that have the potential to occur within the Project Area, is provided in Table 4-14 and their potential habitat mapped in Figure 4-18.

Table 4-14: NC Act Listed Threatened Terrestrial Flora with Potential to Occur within the Project Area

Scientific Name	Common Name	Status	Likelihood of Occurrence	Potential Habitat within the Project Area*
		NC Act		
<i>Homopholis belsonii</i>	Belson's Panic	VU	Potential	<ul style="list-style-type: none"> ■ Potential habitat for this species includes the broad habitat types of Eucalypt dominated woodlands mainly of <i>E. crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i> and Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>). ■ 366 ha of potential habitat has been mapped within the Project Area.
<i>Rutidosia lanata</i>	Red-soil Woolly Wrinklewort	NT	Potential	<ul style="list-style-type: none"> ■ Potential habitat for this species is ecotonal transitions of the broad habitat types of Eucalypt dominated woodlands mainly of <i>E. crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i> and Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>). ■ 271.8 ha of potential habitat has been mapped within the Project Area.
<i>Vincetoxicum forsteri</i>	Slender Tylophora	EN	Potential	<ul style="list-style-type: none"> ■ Potential habitat for this species includes Eucalypt dominated woodlands mainly of <i>E. crebra</i>, and <i>E. melanophloia</i>. ■ 122.6 ha of potential habitat has been mapped within the Project Area.
<i>Acacia wardellii</i>	Thomby Range Wattle	NT	Potential	<ul style="list-style-type: none"> ■ Potential habitat is comprised of small amounts of the Eucalypt dominated woodlands mainly of <i>E. crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>. ■ 18.8 ha of potential habitat has been mapped within the Project Area.
<i>Solanum stenopterum</i>	Winged Nightshade	VU	Potential	<ul style="list-style-type: none"> ■ Potential habitat includes the broad habitat types of Eucalypt dominated woodlands mainly of <i>E. crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i> and Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>). ■ 380 ha of potential habitat has been mapped within the Project Area.

Status listing per the NC Act: EN = Endangered, VU = Vulnerable, NT = Near Threatened.

*Information on potential habitat sourced from BOOBOOK, 2022 in Appendix C.



Legend

- Thomby Range Wattle Historical Record
- Project Area ('Field Development Area' in the Preliminary Documentation)
- Road
- Track/Path
- Red-soil Woolly Winklewort Habitat
- Thomby Range Wattle Habitat
- Winged Nightshade Habitat

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Mapped Habitat for NC Act listed Threatened Flora Species with Potential to Occur		F4-18
Drawing No: 0639876_EAR_G018_R2.mxd		Ecological Assessment Report
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
0 1,000 2,000m		
		<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>

5.1.4.2 Invasive Flora Species

Five species of weeds (invasive plants) proscribed as Category 3 restricted matter under the Biosecurity Act were detected during field surveys within the Project Area:

- Velvety Tree Pear (*Opuntia tomentosa*) – common throughout the Project Area occurring at low to moderate density in remnant and regrowth woodland and in non-remnant pasture;
- Common Pest Pear (*O. stricta*) – common throughout the Project Area occurring at low to moderate density in remnant and regrowth woodland and in non-remnant pasture;
- Tiger Pear (*O. aurantiaca*) – moderately common in a single patch of Brigalow woodland;
- Harrisia Cactus (*Harrisia martinii*) – low density in two locations in the north of the Project Area; and
- Mother-of-millions (*Bryophyllum delagoensis*) – detected in two locations, each of which are in Poplar Box woodland on floodplains with numerous shallow drainage channels (BOOBOOK, 2022).

Opuntia species recorded are classified as WoNS and is described in Section 4.4.5. Other weeds of management interest detected within the Project Area include:

- Willows Cactus (*Cereus uruguayanus*) – occurring in Narrow-leaved Ironbark woodland in the central part of the Project Area;
- African Lovegrass (*Eragrostis curvula*) – occurring on sandy soils in the central and southern part of the Project Area; and
- Brazilian Nightshade (*Solanum seaforthianum*) – occurring in riparian woodland, Brigalow woodland and in SEVT in the south of the Project Area (BOOBOOK, 2022).

5.1.5 Aquatic Flora Species

Across all sites, aquatic macrophyte diversity was relatively poor with the highest diversity recorded in a billabong adjacent to Wandoan Creek. Four floating attached macrophyte species and 15 emergent macrophyte species were recorded across all sites. Floating attached macrophytes were recorded at only five sites and no submerged or floating attached macrophyte species or species listed under state legislation as threatened was considered likely to occur (Freshwater Ecology, 2022). Further information is provided in Section 4.5 of Appendix D.

5.1.6 Terrestrial Fauna Species

Four reptiles, 13 mammals, 123 birds and three butterfly non-NC Act listed species were located in the Project Area during field surveys. Seven NC Act listed species are considered as known or likely to occur within the Project Area: Dulacca Woodland Snail, Koala, Greater Glider, Glossy Black-cockatoo, Golden-tailed Gecko, Pale Imperial Hairstreak, Short-beaked Echidna and White-throated Needletail (Appendix B). A summary of listed threatened species that are known or considered likely to occur and their associated preferred and general habitat within the Project Area per the SRI Guidelines, is provided in Table 4-15.

Habitat mapping is provided for the Koala in Figure 4-8, for the Greater Glider in Figure 4-9, for the South-eastern Glossy Black-cockatoo in Figure 4-10, for the Golden-tailed Gecko in Figure 4-19, and the Pale Imperial Hairstreak in Figure 4-20. No habitat mapping was prepared for the White-throated Needletail as it is considered to only be a likely transient fly-over visitor to the Project Area. Additionally, no mapping was prepared for the Short-beaked Echidna as its habitat is likely to be present for the whole Project Area.

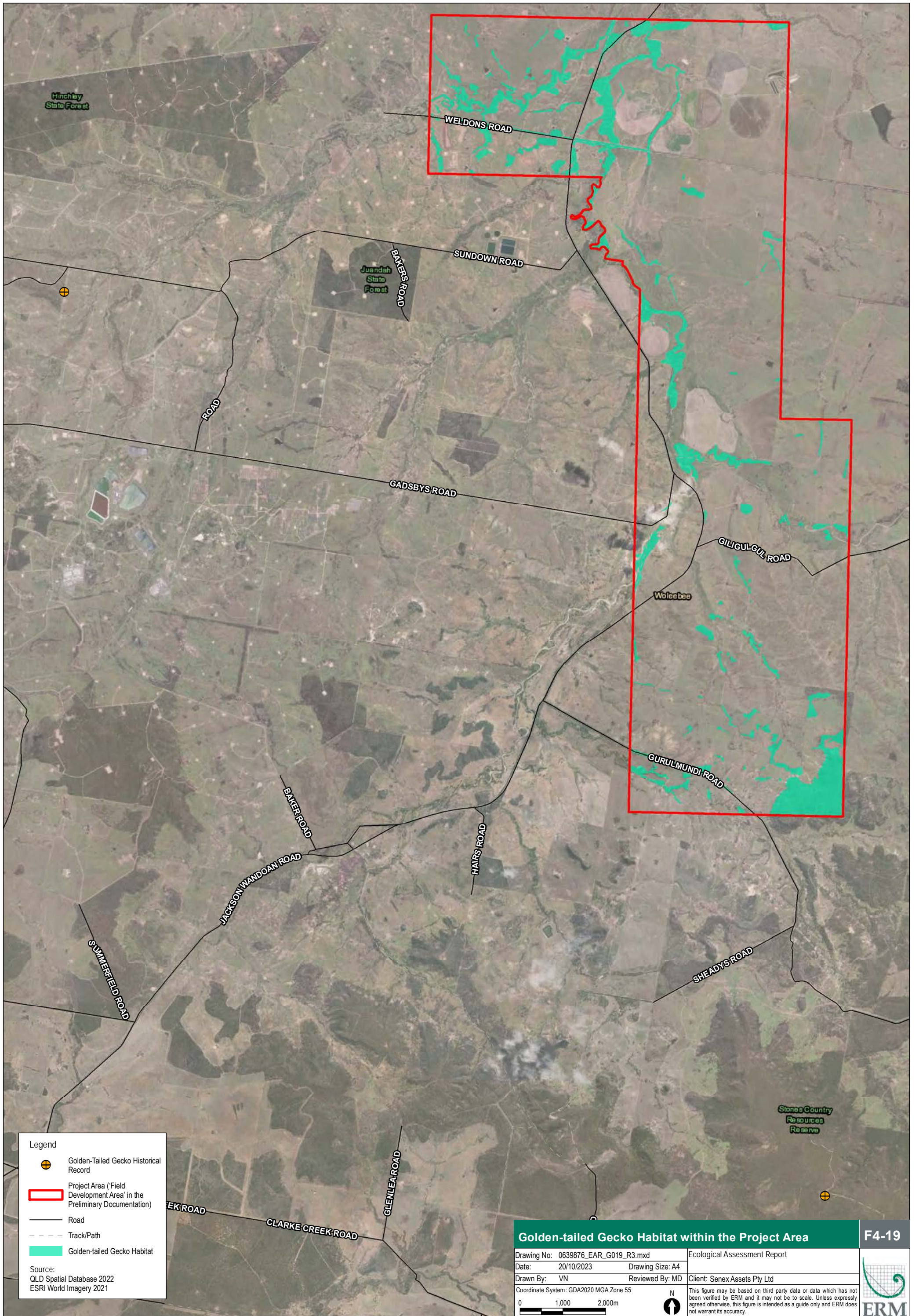
Table 4-15: NC Act Listed Threatened Fauna Species Known or Likely to Occur within the Project Area

Scientific Name	Common Name	Status	Likelihood of Occurrence	Habitat Definition, Records and Regional Importance of the Species
		NC Act		
<i>Adclarkia dulacca</i>	Dulacca Woodland Snail	EN	Likely	<ul style="list-style-type: none"> The Dulacca Woodland Snail has been recorded within the adjoined areas to the Project Area (a 10 km buffer) in Brigalow woodland areas (ALA, 2022). Suitable habitat of woodland consisting of <i>Brigalow woodlands dominated by Acacia harpophylla</i> is present within the Project Area. It has therefore been concluded as likely to occur within the Project Area. Figure 4-11 identifies the habitat for the Dulacca Woodland Snail in the Project Area. The total amount of habitat for this species within the Project Area is 666.3 ha.
<i>Calyptorhynchus lathamii lathamii</i>	South-eastern Glossy Black-cockatoo	VU	Likely	<ul style="list-style-type: none"> The South-eastern Glossy Black-cockatoo has previously been recorded within the Project Area (BOOBOOK 2021a, DES 2022a), and two recent sightings (2009) have been reported within the adjoined areas of the Project Area). This is a specialised feeder dependent on seeds of <i>Casuarinaceae</i> (She-oak) trees. Breeding pairs nest in large hollows generally high up in large eucalypt trees or stags near water and food sources (Pavey et al. 2016). The species is capable of moving among isolated trees and small habitat patches within fragmented landscapes (Pavey et al. 2016, Holmes 2012). <i>Casuarinaceae</i> food trees are abundant within the Project Area including Belah (<i>Casuarina cristata</i>), which occurs throughout the Project Area and Bull Oak (<i>Allocasuarina luehmannii</i>), which occurs in scattered woodland patches on sandy soils, however no evidence of feeding (chewed cones) was observed during field surveys. Potential nest trees also occur in remnant Eucalypt woodland and forest and in well-developed riparian corridors across the Project Area (BOOBOOK, 2022). Figure 4-10 identifies the habitat for the South-eastern Glossy Black-cockatoo in the Project Area. The total amount of preferred habitat for this species within the Project Area is 1,003 ha.

Scientific Name	Common Name	Status	Likelihood of Occurrence	Habitat Definition, Records and Regional Importance of the Species
		NC Act		
<i>Strophurus taenicauda</i>	Golden-tailed Gecko	NT	Likely	<ul style="list-style-type: none"> ■ The Golden-tailed Gecko has been recorded within the adjoining areas to the Project Area (a 10 km buffer) in woodland and regrowth areas. (ALA, 2022). Suitable habitat of woodland consisting of <i>Acacia</i> spp. are present within the Project Area. ■ Figure 4-19 identifies the potential habitat for the Golden-tailed Gecko in the Project Area. The total amount of preferred habitat for this species within the Project Area is 906.7 ha.
<i>Petauroides armillatus</i> (<i>Petauroides volans</i>)	Greater Glider	EN	Known	<ul style="list-style-type: none"> ■ The species was detected in Queensland Blue Gum 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 in the south of the Project Area. ■ Figure 4-9 identifies the habitat Greater Glider in the Project Area. The total amount habitat for this species within the Project Area is 528 ha.
<i>Phascolarctos cinereus</i>	Koala	EN	Likely	<ul style="list-style-type: none"> ■ The field investigations conducted throughout 2022 did not directly record an individual Koala, however evidence of potential Koala scratches have been recorded in the Project Area on riparian Queensland Blue Gum (<i>Eucalyptus tereticornis</i>) trees in several locations along Wandoan Creek, Woleebee Creek and a tributary of Hellhole Creek. The Koala is generally found in a range of temperate to tropical forests as well as woodlands and semi-arid communities dominated by <i>Eucalyptus</i> spp. (Martin & Handasyde, 1999). Koalas are also known to inhabit regrowth habitat. ■ Figure 4-8 identifies the preferred and general habitat for the Koala in the Project Area. The total amount of foraging and breeding habitat for this species within the Project Area is 698.5 ha, and general habitat for the species is 9,072.6 ha. It is noted that Koala habitat that is mapped as foraging and breeding is preferred habitat, and the dispersal habitat is regarded as general habitat, per the SRI Guidelines.

Scientific Name	Common Name	Status	Likelihood of Occurrence	Habitat Definition, Records and Regional Importance of the Species
		NC Act		
<i>Jalmenus eubulus</i>	Pale Imperial Hairstreak (Butterfly)	VU	Likely	<ul style="list-style-type: none"> ■ The Pale Imperial Hairstreak has been recently recorded in the nearby Gurulmundi State Forest. ■ Occurs in Poplar box and Casuarina woodland, as well as grassland in clay and loam soils. Distributed across the Darling Downs region. The species has been recorded from the Condamine floodplain around Dalby, Chinchilla and Condamine and also from two localities along Tchanning Creek (ALA 2022). ■ Figure 4-20 identifies the potential habitat for the Pale Imperial Hairstreak in the Project Area. The total amount of preferred habitat for this species within the Project Area is 180.2 ha.
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	SLC	Likely	<ul style="list-style-type: none"> ■ Recent records are present for this species in the adjoining areas. This species can be found across a wide range of habitats, including open woodland, semi-arid and arid areas as well as in agricultural areas (Aplin et al., 2016). Their foraging requirements include ant nests and termite mounds (Nicol et al., 2011). ■ The total amount of habitat for this species within the Project Area is 9,814 ha. This habitat has not been mapped as the species will inhabit the entire of the Project Area.
<i>Hirundapus caudacutus</i>	White-throated Needletail	VU	Known	<ul style="list-style-type: none"> ■ A flock of eight birds were observed flying low near Weldons Road on 24 November 2022, during field surveys after those conducted for the current project. ■ Species likely only to fly aerially over the Project Area (through September to April on its migration), which contains no rainforest vegetation. The Project Area does not contain habitat in the form of elevated Eucalypt forests or wooded ridges to act as foraging and roosting habitat for the species. ■ Habitat mapping has therefore not been undertaken for this species as it is only likely to fly aerially over the Project Area.

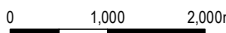


Status listing per the NC Act: EN= Endangered, VU = Vulnerable and NT = Near Threatened.

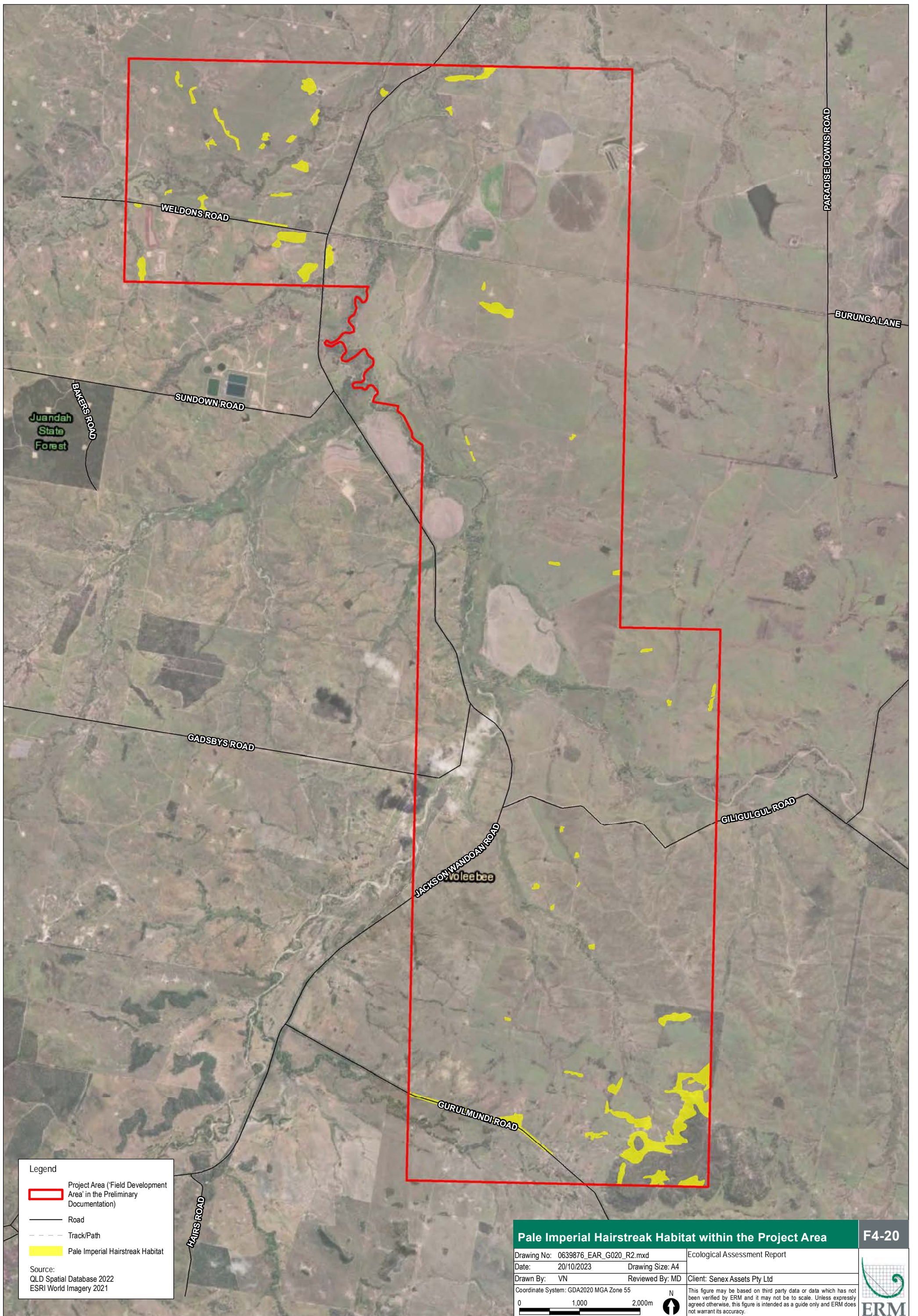


Legend

-  Golden-Tailed Gecko Historical Record
-  Project Area ('Field Development Area' in the Preliminary Documentation)
-  Road
-  Track/Path
-  Golden-tailed Gecko Habitat

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Golden-tailed Gecko Habitat within the Project Area		F4-19
Drawing No: 0639876_EAR_G019_R3.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
		
<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>		
		



Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Road
- - - Track/Path
- Pale Imperial Hairstreak Habitat

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Pale Imperial Hairstreak Habitat within the Project Area		F4-20
Drawing No: 0639876_EAR_G020_R2.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">0</div> <div style="margin-right: 10px;">1,000</div> <div style="margin-right: 10px;">2,000m</div> <div style="text-align: center;"> <div style="border: 1px solid black; width: 10px; height: 10px; display: inline-block; margin-bottom: 2px;"></div> <div style="font-size: 8px; margin-bottom: 2px;">N</div> <div style="font-size: 12px; margin-bottom: 2px;">↑</div> </div> </div>		<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>

5.1.6.1 Terrestrial Fauna Species with Potential to Occur

Based on the likelihood of occurrence, ten NC Act fauna species are considered to have the potential to occur within the Project Area (Appendix B). In essence, because part of these species' distributions overlaps with the Project Area, their presence cannot be ruled out. This is despite no signs or observations of these species within the Project Area during field surveys using survey techniques aligned with survey guidelines. In accordance with the precautionary principle, 'potential habitat' for species with habitat present was mapped.

Table 4-16 presents these ten species with potential to occur, and their general and/or preferred habitat mapped within the Project Area, in accordance with the requirements within the MSES SRI Guideline. Mapping for all species but the Common Death Adder has been presented in the MNES Section, where the Common Death Adder is mapped as part of Figure 4-21.

Table 4-16: NC Act Listed Threatened Fauna Species with Potential to Occur within the Project Area

Species Name	Common Name	NC Act Status	Potential Habitat Mapped within the Project Area*
Birds			
<i>Rostratula australis</i>	Australian Painted Snipe	EN	<ul style="list-style-type: none"> 69.7 ha of potential habitat is present within the Project Area. Potential habitat includes small areas of ephemeral wetland habitat within the Project Area; however these may only periodically provide temporary refuges for this species. These areas correspond with riparian with riparian woodlands. This aligns with the broad habitat type of Riparian and wetland Eucalypt woodlands dominated by <i>E. tereticornis</i>.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern)	VU	<ul style="list-style-type: none"> 272.1 ha of potential habitat is present within the Project Area. Potential habitat includes dry open eucalypt forests and woodlands with an open, grassy understorey and fallen timber. These areas should be subjected to a form of ongoing disturbance (i.e., historically Indigenous burning practices) to be favourable for the species.
<i>Stagonopleura guttata</i>	Diamond Firetail	VU	<ul style="list-style-type: none"> 1,287.4 ha of potential habitat is present within the Project Area. Potential habitat includes grassy understoreys of open woodlands dominated by <i>Eucalypt</i> spp., <i>Acacia</i> spp., and/or <i>Casuarina</i> spp. <i>Eucalyptus</i> and <i>Acacia</i> woodlands and forests, occurs throughout the Project Area.
<i>Aphelocephala leucopsis</i>	Southern Whiteface	VU	<ul style="list-style-type: none"> 938.5 ha of potential habitat is present within the Project Area. Potential habitat includes a wide range of open woodlands and shrubland environments dominated

Species Name	Common Name	NC Act Status	Potential Habitat Mapped within the Project Area*
			by <i>Acacia</i> spp. and <i>Eucalyptus</i> spp., particularly where understorey of grasses and/or shrubs are present. Almost all woodland habitats present within the Project Area are considered suitable habitat for the Southern Whiteface.
<i>Grantiella picta</i>	Painted Honeyeater	VU	<ul style="list-style-type: none"> 272.1 ha of potential habitat is present within the Project Area. Potential habitat comprises remnant and regrowth communities with abundant <i>Acacia</i> and <i>Casuarina</i> hosts of Mistletoes. Potential habitat comprises larger contiguous areas of remnant and regrowth woodland and open forest, more specifically with a multi-layered shrubby understorey which the species prefers. This is made up of broad habitat type Eucalypt dominated woodlands mainly of <i>E. crebra</i>, <i>E. populnea</i> and <i>E. melanophloia</i>.
<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern subspecies)	VU	<ul style="list-style-type: none"> 164.3 ha of breeding and foraging habitat and 316 ha of dispersal habitat (up to 2.1 ha of dispersal habitat to be cleared) is present within the Project Area. Potential habitat remains in the southern part of the Project Area (south of Giligulgul road) in grassy woodland with open areas for foraging and is made up of all broad habitat types excluding <i>Acacia</i> woodlands and cleared exotic pasture north of Giligulgul Road.
Mammals			
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	VU	<ul style="list-style-type: none"> 259.6 ha of potential habitat is present within the Project Area. Potential habitat is made up of all broad habitat types excluding the cleared exotic pasture and small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.
<i>Dasyurus hallucatus</i>	Northern Quoll	LC	<ul style="list-style-type: none"> 226.7 ha of potential habitat is present within the Project Area. Potential 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. This includes all broad habitat types excluding cleared exotic pasture.
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern subspecies)	VU	<ul style="list-style-type: none"> 145.9 ha of potential habitat is present within the Project Area.

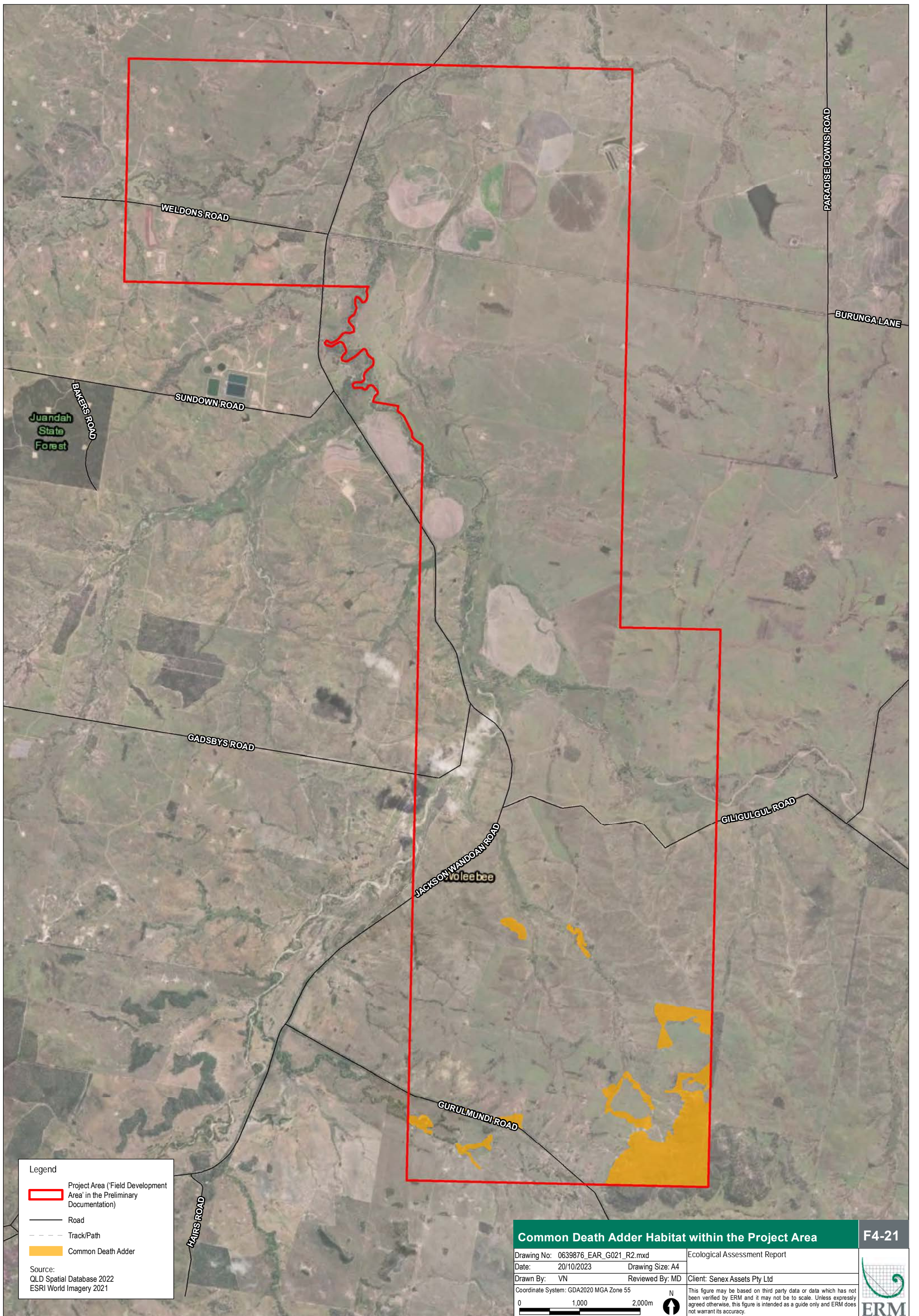
Species Name	Common Name	NC Act Status	Potential Habitat Mapped within the Project Area*
			<ul style="list-style-type: none"> Potential habitat is comprised of large contiguous areas of remnant only Eucalypt woodland and open forests, including some riparian dominated woodlands. This is because the species requires large hollow-bearing trees for dens and preferred feed tree species (selected Eucalypts).
Reptiles			
<i>Delma torquata</i>	Collared Delma	VU	<ul style="list-style-type: none"> 259.7 ha of potential habitat is present within the Project Area. Potential habitat comprises large logs, rocky outcrops and abundant 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. This includes all broad habitat types except for the cleared exotic pasture as well as small, isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.
<i>Acanthophis antarcticus</i>	Common Death Adder	VU	<ul style="list-style-type: none"> 259.7 ha of potential habitat is present within the Project Area. Potential habitat comprises large logs, rocky outcrops and abundant 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. This includes all broad habitat types except for the cleared exotic pasture as well as small, isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.
<i>Furina dunmalli</i>	Dunmall's Snake	VU	<ul style="list-style-type: none"> 259.7 ha of potential habitat is present within the Project Area. Potential habitat comprises large logs, rocky outcrops and abundant 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. This includes all broad habitat types except for the cleared exotic pasture as well as small, isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.
<i>Strophurus taenicauda</i>	Golden-tailed Gecko	NT	<ul style="list-style-type: none"> 906.7 ha of potential habitat is present within the Project Area.

Species Name	Common Name	NC Act Status	Potential Habitat Mapped within the Project Area*
			<ul style="list-style-type: none"> Potential habitat is where there is abundant decorticated trees, stags and woody debris (RE with abundant tall <i>Acacia</i> spp. and/or <i>Callitris</i>). This includes all broad habitat types except for the cleared exotic pasture as well as small, isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.
<i>Hemiaspis damelii</i>	Grey Snake	EN	<ul style="list-style-type: none"> 431.2 ha of potential habitat is present within the Project Area. Potential habitat includes Brigalow (<i>Acacia harpophylla</i>) and Belah (<i>Casuarina cristata</i>) woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies. Both woodlands were observed within the Project Area, along with suitable ephemeral wetlands.
<i>Egernia rugosa</i>	Yakka Skink	VU	<ul style="list-style-type: none"> 228 ha of potential general habitat is present within the Project Area. Potential habitat is comprised of 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. This includes all broad habitat types with the above microhabitat features, excluding cleared exotic pasture and riparian Eucalypt woodlands.
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	EN	<ul style="list-style-type: none"> 209.6 ha of potential habitat is present within the Project Area. Potential habitat includes woodlands generally supported by clay-loam soils, including grassy White Box woodlands, open woodlands and River Red Gum–Coolibah-Bimble Box woodlands. Limited areas of potential Five-clawed Worm-skink habitat are present within the Project Area.

Status listing per EPBC: EN = Endangered; VU = Vulnerable; Mi = Migratory; LC = Least Concern.

For the full reasoning for the potential outcomes for such species, refer to Appendix B.

*Information on potential habitat sourced from Appendix C (BOOBOOK, 2022)



Legend

- Project Area ('Field Development Area' in the Preliminary Documentation)
- Road
- Track/Path
- Common Death Adder

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Common Death Adder Habitat within the Project Area		F4-21
Drawing No: 0639876_EAR_G021_R2.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> </div>	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">N</div> <div style="font-size: 1.2em;">↑</div> </div>	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

5.1.6.2 Invasive Fauna Species

Evidence of pest fauna detected within the Project Area included infrequent Rabbit (*Oryctolagus cuniculus*) latrines, frequent Dingo or Dog (*Canis familiaris*) tracks, and Pig (*Sus scrofa*) scats and diggings. These species are listed as Category 3, 4, 5, 6 or Category 3, 4, 6 Restricted Matters under the Biosecurity Act.

Locations for Biosecurity Act listed pest fauna recorded within the Project Area are shown in Appendix G of Appendix C (BOOBOOK, 2022).

5.1.7 Aquatic Fauna Species

A total of two 2,192 fish from eight species, one species of turtle and three species of frog were recorded. No listed threatened species were identified during the field surveys. Two EPBC Act listed threatened aquatic fauna species were identified in the desktop review to potentially occur in and adjacent to the Project Area, these being:

- White-Throated Snapping Turtle— Critically Endangered; and
- Fitzroy River Turtle – Vulnerable.

After completing a likelihood of occurrence and the subsequent field surveys, both species were considered unlikely to occur within the Project Area (Appendix B).

5.1.7.1 Invasive Aquatic Fauna Species

One introduced species, Tilapia (*Oreochromis mossambicus*), was recorded as juveniles at a single site. Tilapia is a restricted noxious fish under the Biosecurity Act.

5.1.8 Watercourses And Wetlands

The Project Area is located within the upper Dawson River catchment in the Fitzroy River Basin. The largest watercourse that passes through the Project Area is Woleebee Creek which drains into Juandah Creek approximately 15 kilometres to the north of the Project Area, before entering the Dawson River approximately 55 kilometres north of the Project Area. Watercourses present within the Project Area are ephemeral, flowing after rainfall periods. (Freshwater Ecology, 2022). Several watercourses (stream orders 2– 5) intersect the Project Area. Named watercourses include:

- Woleebee Creek runs south – north through the Project Area on the western boundary of the PL 445 and PL 209;
- Conloi Creek feeds into Woleebee creek from the southeastern boundary of the Project Area;
- Hellhole creek runs from the south through the southwestern boundary of the Project Area south of Gurulmundi Road, feeding into Woleebee creek; and
- Wandoan Creek runs from the northwestern boundary, meandering to the northern boundary of the Project Area, west of Jackson – Wandoan Road.

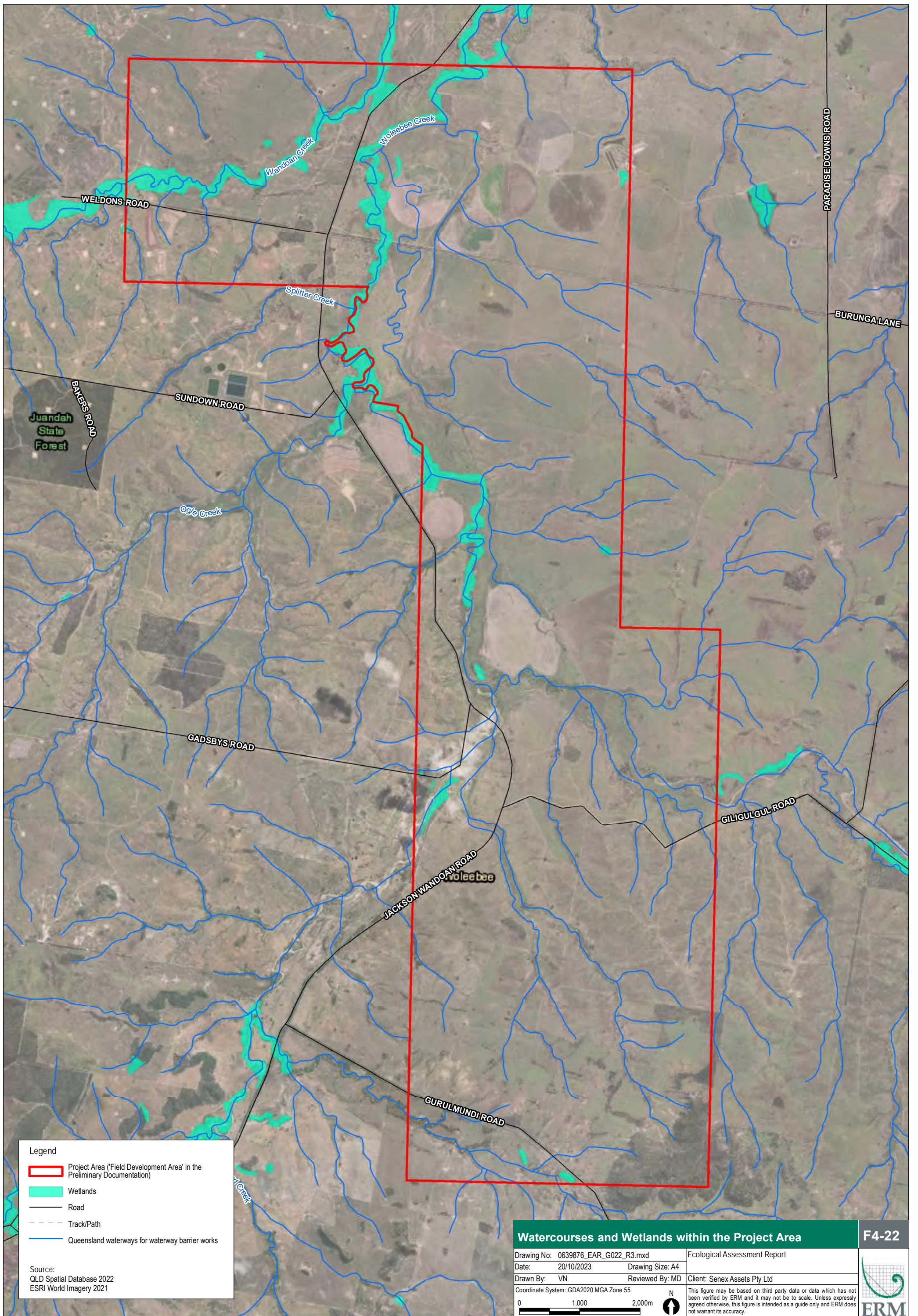
The Project Area contains watercourses mapped under the VM Act. The VM Act protects riparian vegetation associated with watercourses (Riparian Protection Zone [RPZ]), with the level of protection afforded dependent on the stream order:

- RPZ includes 10 m from the defining bank of a Stream Order 1 or 2 watercourse or drainage feature;
- RPZ includes 25 m from the defining bank of a Stream Order 3 or 4 watercourse or drainage feature; or
- RPZ includes 50 m from the defining bank of a Stream Order 5 or higher, watercourse of drainage feature.

The Project Area contains stream orders 2-5 watercourses. The Project Area contains watercourses mapped under the VM Act.

There are no Wetland Protection Areas or High Ecological Value (HEV) Wetlands mapped within the Project Area. There are no HEV Waterways that occur in the Project Area.

Figure 4-22 shows the relevant drainage features and wetlands mapped within the Project Area.



- Legend
- Project Area ('Field Development Area' in the Preliminary Documentation)
 - Wetlands
 - Road
 - Track/Path
 - Queensland waterways for waterway barrier works

Source:
QLD Spatial Database 2022
ESRI World Imagery 2021

Watercourses and Wetlands within the Project Area		F4-22
Drawing No: 0639876_EAR_G022_R3.mxd	Ecological Assessment Report	
Date: 20/10/2023	Drawing Size: A4	
Drawn By: VN	Reviewed By: MD	Client: Senex Assets Pty Ltd
Coordinate System: GDA2020 MGA Zone 55		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1,000</div> <div style="margin-right: 5px;">2,000m</div> </div>	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">N</div> <div style="font-size: 1.2em;">↑</div> </div>	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

6. POTENTIAL IMPACTS

Activities associated with the Project have the potential to cause both direct and indirect impacts to MNES and MSES, with the level of impact depending on the type and location of the activity proposed.

As previously described, the Project activities include the development of up to 151 gas wells and associated well site facilities; gas and water gathering systems for the producing wells; access tracks for operational purposes; brine and produced water storage; borrow pits; and ancillary supporting facilities.

Risks to biodiversity values associated with these activities include:

- Clearing of native vegetation and habitat for threatened and migratory species and threatened ecological communities;
- Introduction and/or spread of weed species;
- Disturbance or displacement to fauna species from foraging or roosting habitat, or breeding places;
- Degradation of threatened species habitats or threatened ecological communities as a result of dust, erosion or accidental release of hazardous materials;
- Habitat fragmentation;
- Inhibiting the ability of ecological communities or species to adapt and survive predicted climate change effects (for example through impeding migration pathways or inhibiting access to refuge areas); and
- Fauna injury during construction activities and movement of machinery/vehicles.

These potential impacts are further described in Table 6-1.

The vast majority of the Project Area is already disturbed (8,844.3 ha of the 9,772 ha area is non-remnant vegetation) and the total maximum disturbance limit will be approximately up to 530 ha and is located to avoid remnant vegetation (potential habitat for listed threatened species).

Table 6-1: Potential Impacts to MNES and MSES in the Project Area

Potential Impact	Stage of Development	Relevance to the Proposed Action
Clearing of native vegetation and habitat for threatened and migratory species and threatened ecological communities, leading to disturbance or displacement of fauna species from foraging or roosting habitat, or breeding place.	Construction	<p>Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land). The areas of potential habitat for MNES that are known to, likely or potentially occur within the Project Area are:</p> <ul style="list-style-type: none"> ■ Australian Painted Snipe – 69.7 ha; ■ Belson’s Panic – 366.3 ha; ■ Brown Treecreeper (south-eastern) – 272.1 ha; ■ Collared Delma – 259.7 ha; ■ Common Sandpiper – 29.5 ha; ■ Corben’s Long-eared Bat – 259.6 ha; ■ Diamond Firetail – 1,287.4 ha; ■ Dulacca Woodland Snail – 666.3 ha;

Potential Impact	Stage of Development	Relevance to the Proposed Action
		<ul style="list-style-type: none"> ■ Dunmall's Snake – 259.7 ha; ■ Five-clawed Worm-skink – 209.6 ha; ■ Fork-tailed Swift – aerial only (no impacts); ■ Grey Snake – 431.2 ha; ■ Greater Glider (southern and central) – 528 ha; ■ Koala – 698.5 ha foraging and breeding habitat and 9,072.6 ha of dispersal habitat (up to 530 ha of dispersal habitat to be cleared); ■ Latham's Snipe – 29.5 ha; ■ Northern Quoll – 226.7 ha; ■ Ooline – 118.7 ha habitat (no impact to 118.7 ha of habitat and surveys will be done in all areas of proposed disturbance to enable avoidance to all stands and isolated trees (if present)); ■ Oriental Cuckoo – 896.7 ha; ■ Painted Honeyeater – 272.1 ha; ■ Rufous Fantail – 604.2 ha; ■ Satin Flycatcher – 687.5 ha; ■ Sharp-tailed Sandpiper – 29.5 ha; ■ Slender Tylophora – 122.7 ha; ■ South-eastern Glossy Black-cockatoo – 1,003 ha; ■ Southern Squatter Pigeon – 164.3 ha of breeding and foraging habitat, and 316 ha of dispersal habitat (up to 2.1 ha of dispersal habitat to be cleared); ■ Southern Whiteface – 938.5 ha; ■ White-throated Needle-tail – aerial only (no impacts); ■ Yakka Skink – 228 ha; and ■ Yellow-bellied Glider (south-eastern) – 145.8 ha. <p>The areas of potential habitat for additional species which are MSES that are known to, likely or potentially occur within the Project Area are:</p> <ul style="list-style-type: none"> ■ Common Death Adder – 259.7 ha; ■ Golden-tailed Gecko – 906.7 ha; ■ Pale Imperial Hairstreak – 180.2 ha; ■ Short-beaked Echidna – 9,772 ha of habitat (up to 530 ha of habitat to be cleared); ■ Thomby Range Wattle – 18.8 ha; and ■ Winged Nightshade – 380.8 ha. <p>The maximum area to be disturbed represents a small portion of the overall Project Area (4.3%). A maximum of 5.8% of the previously cleared Koala dispersal habitat and 0.7% of the Southern Squatter Pigeon dispersal habitat will be disturbed. Areas of potential habitat for Ooline will be</p>

Potential Impact	Stage of Development	Relevance to the Proposed Action
		<p>surveyed and only disturbed after surveys for individual plants have been completed.</p> <p>The final disturbance footprint will avoid impacts to any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species (except for Koala and Southern Squatter Pigeon dispersal habitat) and further refinements will be made in accordance with the implementation of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001]. This is further discussed in Section 7.</p> <p>The Project is not expected to create a significant impact on a MNES TEC or listed threatened species as the Project will be developed on previously disturbed land, and TECs and potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat, will be avoided.</p>
<p>Degradation of threatened species habitats or threatened ecological communities as a result of dust, erosion or accidental release of hazardous materials (indirect impacts).</p>	<p>Construction, Operation and Decommissioning</p>	<p>Disturbances from construction, operation, and decommissioning, such as noise and dust, have the potential to negatively impact adjacent vegetation communities and habitats.</p> <p>Noise disturbances have the potential to influence breeding, roosting or foraging behaviour of native fauna. Studies suggest that the consistency of noise is more important than volume, with irregular and unpredictable noise being more disruptive to wildlife (Jones et al. 2015), as may be emitted during construction. For the general native fauna community, individuals may relocate to adjacent areas during times of noise disturbance. It is noted that noise associated with the Project principally relates to well drilling which on average is completed in 3 days per well.</p> <p>Dust generated by vehicle and machinery movements has the potential to smother vegetation directly adjacent to the works and inhibit plant growth and palatability for native fauna. There are measures available to limit dust generation and dispersion.</p> <p>Without suitable mitigation measures, dust deposition resulting from the Project's construction activities has the potential to lead to degradation of fauna habitat. Additionally, reduced vegetation cover can lead to restricted fauna movement between foraging and breeding habitat. Unmanaged dust can lead to the smothering of native vegetation and an increase in invasive flora within the area.</p> <p>Increased erosion within the Project Area has the potential to lead to the loss of topsoil and soil fertility, in turn reducing native plant species within the area due to reduced optimal soil conditions if not suitably controlled. Erosion can further</p>

Potential Impact	Stage of Development	Relevance to the Proposed Action
		<p>lead to an increase of invasive plants on disturbed soils or result in a decrease in ecosystem biodiversity.</p> <p>Erosion has the potential to impact aquatic ecosystems with increased sediment runoff, leading to a reduction in habitat quality for aquatic species. Additionally, soil erosion contributes to longer ecosystem recovery times following soil disturbance.</p> <p>The accidental release of hazardous materials (including chemical contaminants, metals, machinery and equipment fluids etc.) could result in air and water pollution, and soil contamination. Such aspects affect wildlife behaviours directly and indirectly. Direct impacts of hazardous materials can lead to changes in species physiology, behaviour, reproduction and/or survival. The release of chemicals into aquatic environments results in habitat degradation of wetland and river systems, and poor fish health or death.</p> <p>The disturbance footprint will be designed to limit the number of watercourse crossings, and all remnant vegetation will be avoided. The existing aquatic habitat features within the Project Area are generally heavily disturbed drainage features. Given the limited extent, water features relative to the Project Area and the typically dry nature of the area, impacts are expected to be minimal. However, there are measures detailed within the Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLAS-EN-PLN-015] to limit erosion and potential sedimentation during rainfall events that produce overland flows.</p> <p>The Project is unlikely to degrade species habitat as Senex will implement appropriate erosion and sediment controls, implement robust environmental monitoring, and implement appropriate environmental management measures. The Project will also avoid MNES TECs and potential habitat for MNES listed threatened species (except for Koala and Southern Squatter Pigeon dispersal habitat).</p>

Potential Impact	Stage of Development	Relevance to the Proposed Action
<p>Introduction and/or spread of weed species (indirect impacts).</p>	<p>Construction and Operation</p>	<p>The Project Area is predominantly cleared land for agricultural purposes. The production wells will be located in cleared land, avoiding all potential habitat for MNES threatened species (except for Koala and Southern Squatter Pigeon dispersal habitat), and with appropriate weed management measures implemented throughout the Project lifecycle, the Project is unlikely to impact the overall structure of the vegetation communities present.</p> <p>Weeds have the potential to increase the frequency and intensity of fires, by degrading the landscape and reducing tree densities. However, the risk of this impact to occur within the Project Area is negligible with the implementation of stringent weed washdown procedures, and the Project Area being predominantly cleared land for agriculture. Therefore, there will be no impact on fire frequency.</p> <p>Uncontrolled transport and operation for construction vehicles and machinery has the potential to introduce invasive weeds to the Project Area, and as such, management measures, including weed seed hygiene will be implemented to minimise these risks. Management measures will be implemented throughout the clearing, construction and operational phases of the Project to minimise the introduction of weed species within the Project Area.</p> <p>The majority of the Project Area and surrounding areas is cleared, pastoral property and introduced flora are common. Three WoNS species were recorded within the Project Area: tiger pear, common pest pear and velvety tree pear. Three additional species are considered potential to occur due to records within the buffered Project Area: parthenium weed, fireweed and madeira vine.</p> <p>Two additional species prescribed as Category 3 restricted matters under the Biosecurity Act, <i>Harrisia Cactus</i> and <i>Mother-of-millions</i>; and three other weeds of management interest, willows cactus, African Lovegrass and Brazilian Nightshade, were detected within the Project Area during field surveys.</p> <p>With the implementation of appropriate weed management and monitoring measures, as well as the avoidance of MNES TECs and potential habitat for MNES threatened species (except for Koala and Southern Squatter Pigeon dispersal habitat) the Project is unlikely to cause the introduction and/or spread of weed species within the Project Area.</p>
<p>Fauna injury during construction, operation and decommissioning</p>	<p>Construction, operation and decommissioning</p>	<p>The operation of vehicles and machinery within the Project Area has potential to lead to direct mortality or injury of resident fauna.</p>

Potential Impact	Stage of Development	Relevance to the Proposed Action
<p>activities and movement of machinery/vehicles.</p>		<p>Peak traffic period will be during the construction period with operational vehicle movements likely to be minimal. It is noted that well pad construction generally involves small crews with minimal truck movements and drill crews travel to site and stay on site whilst drilling.</p> <p>While many fauna groups are highly mobile (e.g., birds) and are likely to move when machinery and vehicles approach other less mobile groups (e.g., reptile and amphibians) are more vulnerable to this impact.</p> <p>Similarly, there will be trenches excavated during construction and as required for maintenance of underground infrastructure which may provide a trapping hazard for some fauna groups (e.g., amphibians, small reptiles, small mammals).</p> <p>During Project construction, maintenance and decommissioning, there will be an increase in vehicle and machinery traffic throughout the Project Area, although this is considered a temporary impact. The Project will implement effective vehicle management measures (i.e., reduced speed limits, limited traffic during operations etc.) to minimise the risk of fauna injury or mortality from vehicles and machinery. Additionally, the Project will adopt management measures to minimise the risk of trapped fauna within trenches (e.g., daily inspections of all open excavated trenches). A qualified fauna spotter catcher will conduct a search immediately prior to clearing of woody vegetation for the presence of fauna species.</p> <p>With the appropriate management measures implemented, it is considered unlikely the Project will have a significant impact on fauna through injury and mortality.</p>

Potential Impact	Stage of Development	Relevance to the Proposed Action
Habitat fragmentation.	Construction	<p>The Project Area is located in a largely cleared landscape with limited tracts of vegetation to facilitate ecosystem connectivity.</p> <p>Dispersal opportunities within the remainder of the Project Area are largely restricted to riparian areas, primarily in association with Wandoan and Woleebee Creeks. The cleared, non-remnant areas are considered likely to impede dispersal for most (less common) reptiles, amphibians, small ground mammals and arboreal mammals, with the exception of the koala. The ability for Koalas (and birds) to disperse across the broader landscape will remain during construction, due to phased development in smaller discrete work packs.</p> <p>Well pad size (typically 0.6 ha) and distance between pads and flexibility in their locations as well as flexibility in the alignment of gathering so that gathering right-of ways will cross watercourses perpendicularly. Also, as the majority of the Project Area is made up of previously cleared land, the disturbance footprint will be able to be designed to avoid almost all vegetated corridors with high dispersal opportunity. Consequently, the proposed action is unlikely to have a substantial impact on connectivity and fragmentation.</p>
Inhibiting the ability of ecological communities or species to adapt and survive predicted climate change effects.	Construction and Operation	<p>Climate change is a listed threatening process for many ecological communities and species as the associated increase in temperature increases the potential for bushfires to occur. Additionally, temperature changes limit available habitat through removal of optimal conditions. Potential impacts include impeding migration pathways or inhibiting access to refuge areas for listed species or restricting areas for threatened ecological community succession. The Project is not predicted to exacerbate these potential impacts of climate change as Project infrastructure has been designed to avoid all forested areas, MNES TECs and potential habitat for MNES threatened species (except for Koala and Southern Squatter Pigeon dispersal habitat), including all important fauna movement corridors along Wandoan Creek and Woleebee Creek.</p>
Loss of habitat, or degradation in vegetation quality from impacts associated with changes to groundwater hydrology.	Construction and operation	<p>Groundwater Dependent Ecosystems (GDEs) have been mapped and identified within and adjoining the Project Area. These GDEs occur within the riparian zones of Wandoan Creek and Woleebee Creek and utilise alluvial sources of groundwater. There is potential for the drilling and gas extraction activities to impact on GDEs during construction and operation phases.</p> <p>Reaches of Woleebee Creek within the PL 209 area were assessed during the Senex field verification program in June/July 2018 (KCB, 2018). The assessment was</p>

Potential Impact	Stage of Development	Relevance to the Proposed Action
		<p>conducted during the dry season and no flow was observed within the area surveyed. Pools of water were encountered in the lower reaches of Woleebee Creek which were considered to be rainfall derived surface water, based on their non-clear appearance and field water quality (547 $\mu\text{S}/\text{cm}$). The field verification identified that there is unlikely to be significant baseflow provided to this creek, however it is likely that during some periods, groundwater levels in the alluvium will rise into the sandy base of the creek. The field verification also concluded that based on the difference between the alluvial groundwater and surface water major ion chemistry signatures, and groundwater chemistry signatures from the Surat Basin units, groundwater within the alluvium is not considered to be sourced by the underlying Surat Basin unit (Westbourne Formation or Springbok Formation). Nonetheless, Senex have committed to ongoing monitoring of groundwater as there remains a level of uncertainty about connectivity between the alluvium and the Springbok Formation close to the northern boundary of the Project.</p> <p>Terrestrial GDEs mapped in the vicinity of the Project Area (DES, 2018) are also considered to source groundwater from the shallow alluvium, rather than the underlying Surat Basin units. However no significant impacts to GDEs are likely to occur as a result of the Project (KCB, 2024).</p>

7. MITIGATION AND MANAGEMENT MEASURES

Senex will implement an Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001 as is implemented for all Senex development in Queensland. The protocol guides infrastructure siting that considers biodiversity values and environmental constraints when selecting preferential locations, aligning with planning principles to avoid, minimise, mitigate and then manage potential environmental impacts.

Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land). Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm on-ground biodiversity values will be undertaken by a suitably qualified person.

Other measures to be implemented will include:

- Atlas Stage 3 Gas Project Significant Species Management Plan;
- Implementing the Senex Queensland Fauna and Stock Management Procedure [SENEX-CORP-EN-PRC-021];
- Weed and pest management measures through the implementation of the Senex Biosecurity Management Plan Queensland Operations [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023];
- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-015];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];
- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-014];
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017];
- Delineation of 'no-go' areas clearly indicated for avoidance;
- Restricting access tracks to only low-level traffic with restricted speed;
- Erosion and sediment control measures;
- Dust management; and
- Appropriate storage and handling of fuel, oil and chemicals and appropriate spill response equipment.

These mitigation measures, relevant to each of the potential impacts, are further described in Table 7-1.

Table 7-1: Management and Mitigation Measures for the Project Area

Potential Impacts	Relevant Stage	Key Management and Mitigation Measures
Clearing of native vegetation and habitat for threatened and migratory species and threatened ecological communities, leading to disturbance or displacement to fauna species from foraging or roosting habitat, or breeding place.	Construction	<ul style="list-style-type: none"> ■ The Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] will be implemented. ■ There will be no clearing of any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat. ■ Vegetation will not be cleared unless authorised under a Senex Access to Work (ATW) permit. The ATW will be

Potential Impacts	Relevant Stage	Key Management and Mitigation Measures
		<p>approved prior to any vegetation clearance or disturbance occurring.</p> <ul style="list-style-type: none"> ■ All infrastructure will be located preferentially in pre-disturbed areas of land. ■ Where the gathering infrastructure crosses Woleebee Creek within PL 1037, the pipeline will be constructed using horizontal directional drilling method to avoid the requirement to clear vegetation and habitats in these areas. ■ Targeted surveys will be undertaken for threatened flora species Belson's Panic, Ooline, and Slender Tylophora, so that disturbance will be avoided, if they are found to occur, or in the case of Belson's Panic (a grass known to recolonise in cleared or highly disturbed areas (Menkins, 1998)) avoided, relocated or reinstated. ■ Habitat assessment will be undertaken for threatened fauna where infrastructure is proposed, and habitat is potentially present. ■ Maximum RoW width will not exceed 18 m for gathering (and 24 m for trunklines). ■ To prevent unnecessary land and vegetation disturbance, vehicles and equipment will be retained within the approved work zone. ■ 'No-go' areas will be GPS located and clearly marked e.g., with signage, bunting, flagging tape. ■ Reinstatement of areas which are not required for ongoing operational purposes. ■ A qualified fauna spotter catcher will conduct a search immediately prior to clearing of woody vegetation for the presence of fauna species. Where fauna is detected, the spotter catcher will assess and implement the most appropriate method to avoid or minimise impacts on that fauna as a result of clearing.
<p>Degradation of threatened species habitats or threatened ecological communities as a result of dust, erosion or accidental release of hazardous materials (indirect impacts)</p>	<p>Construction and Operation</p>	<ul style="list-style-type: none"> ■ The Senex Queensland Fauna Stock Management Procedure will be implemented. ■ Staff and contractors will be made aware through general site induction and training of the potential to generate dust emissions and mitigation and management measures that should be implemented. ■ Vehicles, plant and machinery will comply with site-specific speed limits to minimise dust generation. ■ Dust suppression may be used where deemed to be appropriate. ■ Erosion and sediment control to be managed in accordance with the Queensland Erosion and Sediment Control Plan and Contractor's erosion and sediment control procedures. ■ Appropriate erosion and sediment control measures are to be installed at watercourse crossing points to adequately

Potential Impacts	Relevant Stage	Key Management and Mitigation Measures
		<p>stabilise soils to prevent erosion and as per the Queensland Erosion and Sediment Control Procedure [SENEX-QLDS-EN-PRC-003].</p> <ul style="list-style-type: none"> ■ RoW construction period in waterways will be undertaken in accordance with the timeframes of applicable waterway barrier works permits. ■ Construction activities must not interfere or block natural drainage e.g., disturbing channel contours.
Habitat fragmentation	Construction	<ul style="list-style-type: none"> ■ Infrastructure will be located preferentially avoiding, then minimize isolating, fragmenting, edge effects or dissecting tracts of native vegetation. ■ Pipeline infrastructure will maximize co-location. ■ Maximum RoW width will not exceed 18 m for gathering (and 24 m for trunklines). ■ Gathering lines are all below ground. ■ No felled vegetation windrows to be more than 50 m. ■ RoW rehabilitated to 6m wide access track post construction and all rehabilitated at end of project (unless landholder requests it to be retained for ongoing use purposes).
Inhibiting the ability of ecological communities or species to adapt and survive predicted climate change effects (for example through impeding migration pathways or inhibiting access to refuge areas)	Construction and Operation	<ul style="list-style-type: none"> ■ All infrastructure will be located preferentially in pre-disturbed areas of land or low ecological value land. ■ The Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] will be implemented to avoid habitat fragmentation. ■ Where the gathering infrastructure crosses Woleebee Creek within PL 1037, the pipeline will be constructed using horizontal directional drilling method to avoid impeding this extant wildlife corridor. ■ Maximum RoW width will not exceed 18 m for gathering (and 24 m for trunklines) ■ Reinstatement of areas which are not required for ongoing operational purposes.
Fauna injury during construction activities and movement of machinery/vehicles	Construction and Operation	<ul style="list-style-type: none"> ■ The Senex Queensland Fauna Stock Management Procedure will be implemented. ■ Excavations and trenches must be inspected for trapped fauna on a daily basis during construction. ■ Measures to prevent fauna entrapment and facilitate escape must be implemented within open trenches. ■ A qualified fauna spotter catcher will conduct a search immediately prior to clearing of vegetation for the presence of fauna species. Where fauna is detected, the spotter catcher will assess and implement the most appropriate method to avoid or minimise impacts on that fauna as a result of clearing.

Potential Impacts	Relevant Stage	Key Management and Mitigation Measures
Introduction and/or spread of weed species	Construction and Operation	<ul style="list-style-type: none"> ■ The Senex Queensland Weed Hygiene Procedure will be implemented. ■ Implementation of the Senex Biosecurity Management Plan Queensland Operations [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] which includes requirements for weed washdowns, certification and record keeping for all Project vehicles and machinery. ■ Project development will be planned to minimise vehicle, plant and equipment movements between properties that would otherwise require weed washdowns and certification prior to those movements. ■ Access to a landholder’s property will not occur unless authorised under a Senex Authority to Work permit. Site specific weed management requirements will be defined prior to access to any property or work site. ■ Weed management and control methods will depend upon the location, weed species identified, the degree of the infestation, relevant landholder agreement or conduct and compensation agreements provisions, and local, state and national regulatory requirements. ■ Imported material able to transport weed seed will be assessed to ensure they are free of contamination, disease and invasive weeds. Landowner approval may also be required for imported soils and gravel.

8. IMPACT ASSESSMENTS

8.1 MNES Impact Assessment

The significance of impacts to MNES are determined against the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (SIG 1.1) (DoE, 2013), assuming the controls and mitigation measures in Section 6 are implemented. Eight MNES were identified as part of this Ecological Assessment to have a potential for a significant impact due to known or likely presence within the Project Area. These eight MNES, including two TEC, one listed threatened flora species and five listed threatened fauna species have been assessed against SIG 1.1 criteria. A summary of the results of the significant impact assessments are provided below in Table 8-1, with the full assessment against SIG 1.1 criteria included in Appendix F.

Impact assessments have been completed for species and species habitat concluded as known, likely and potential to occur within the Project Area.

8.1.1 Threatened Ecological Communities

Disturbance within areas mapped as being Potential Habitat for TEC within Figure 4-3 will be avoided except where detailed site ecology surveys provide finer scale habitat mapping which confirms that no TEC is present in the location proposed to be disturbed.

The detailed site ecology surveys and habitat mapping refinement will be undertaken in accordance with the Senex Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001].

8.1.2 MNES Flora Species

Disturbance within areas mapped as being habitat for Ooline in Figure 4-4 will be avoided. Additional targeted flora surveys for Ooline, Belson's Panic, and Slender Tylophora, will be conducted within and immediate surrounding (e.g., 30 m buffer) the disturbance footprint as part of the preclearance surveys. Senex has committed to avoiding all individual Ooline plants and any individual Slender Tylophora plants (should any be found to occur within proposed disturbance footprints), as well as avoiding, relocating or reinstating any individual Belson's Panic plants (a grass that is known to recolonise in cleared or highly disturbed areas (Menkins, 1998) should any be found to occur within proposed disturbance footprints). Additionally, as stated, the Project will preferentially be located within previously cleared areas.

8.1.3 MNES Fauna Species

Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land).

Disturbance within these areas of identified habitat for MNES areas may occur and not be accounted within the maximum disturbance limits where detailed site ecology surveys (undertaken in accordance with the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001]) provide finer scale habitat mapping which confirms that there is in fact no habitat actually present within the proposed disturbance location.

Although the placement of wells and gathering provides good flexibility to help avoid habitat areas, it is recognised that in a small number of circumstances the Project's linear infrastructure may not be able to totally avoid traversing mapped potential habitat areas due to other constraints (such as cultural heritage sites or artifacts, geological features, landholder/livestock/agricultural requirements and existing or planned landholder, utility or community infrastructure).

Senex recognises that some disturbance of threatened fauna species habitat may be required to accommodate such potential circumstances. As such, with the exclusion of locations where site

ecology surveys verify that habitat is in fact not present, Senex commits to the following maximum disturbance limits:

- Up to 530 ha of Koala dispersal habitat as shown in Figure 4-8; and
- Up to 2.1 ha of Southern Squatter Pigeon dispersal habitat as shown in Figure 4-12.

It is noted that impacts within Koala dispersal habitat will be minimised using the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] but will, at times, require the unavoidable disturbance of open areas and removal of individual juvenile and non-juvenile trees and seedlings which are located within a predominantly cleared landscape. It is noted that impacts to dispersal habitat will be largely temporary in terms of RoW will be constructed and then rehabilitated. Application of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] means that individual 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 8-1: MNES Significant Impact Assessment Summary

MNES	Project Area (ha)	Maximum Disturbance Limit (ha)	Comments	Impact Significance
Brigalow TEC	95.8 ha	0 ha	The Brigalow TEC was confirmed to occur within the Project Area (BOOBOOK, 2022). As a result of the Project design and inclusion of avoidance measures, there will be no clearing or disturbance of any areas mapped as this TEC in Figure 4-3, and therefore no significant impact will occur.	Not significant
Poplar Box TEC	32.3 ha	0 ha	The Poplar Box TEC was confirmed to occur within the Project Area (BOOBOOK, 2022). As a result of the Project design and inclusion of avoidance measures, there will be no clearing or disturbance of any areas mapped as this TEC in Figure 4-3, and therefore no significant impact will occur.	Not significant
Australian Painted Snipe	69.7 ha	0 ha	The disturbance footprint will result in no clearing of potential Australian Painted Snipe habitat within the Project Area (as mapped within Figure 4-12).	Not significant
Belson's Panic	366.3 ha	0 ha	A total of 366.3 ha of Belson's Panic potential habitat is scattered throughout the Project Area (Figure 4-6), of which, all will be avoided by the Project. Senex has committed to preferentially avoiding any areas confirmed with Belson's Panic individuals or areas confirmed as habitat for the threatened species, as well as relocating or reinstating any individual Belson's Panic (grass) plants (should any be found to occur within proposed disturbance footprints).	Not significant
Brown Treecreeper (south-eastern)	272.1 ha	0 ha	The disturbance footprint will result in no clearing of potential Brown Treecreeper habitat within the Project Area (as mapped within Figure 4-13).	Not significant
Collared Delma	259.7 ha	0 ha	The disturbance footprint will result in no clearing of potential Collared Delma habitat within the Project Area (as mapped within Figure 4-15).	Not significant

MNES	Project Area (ha)	Maximum Disturbance Limit (ha)	Comments	Impact Significance
Corben's Long-eared Bat	259.6 ha	0 ha	The disturbance footprint will result in no clearing of potential Corben's Long-eared Bat habitat within the Project Area (as mapped within Figure 4-14).	Not significant
Diamond Firetail	1,287.4 ha	0 ha	The disturbance footprint will result in no clearing of potential Diamond Firetail habitat within the Project Area (as mapped within Figure 4-12).	Not significant
Dulacca Woodland Snail	666.3 ha	0 ha	The disturbance footprint will result in no clearing of potential Dulacca Woodland Snail habitat within the Project Area (as mapped within Figure 4-12). The Dulacca Woodland Snail is considered likely to occur within the Project Area (BOOBOOK, 2022). As a result of Atlas CSG Project design and inclusion of avoidance measures, there will be no direct impact to potential Dulacca Woodland Snail habitat (as mapped within Figure 4-11). Micro siting will occur at any disturbance location and any identified population avoided and indirect impacts minimised and therefore no significant impact will occur.	Not significant
Dunmall's Snake	259.7 ha	0 ha	The disturbance footprint will result in no clearing of potential Dunmall's Snake habitat within the Project Area (as mapped within Figure 4-15).	Not significant
Five-clawed Worm-skink	209.6 ha	0 ha	The disturbance footprint will result in no clearing of potential Five-clawed Worm-skink habitat within the Project Area (as mapped within Figure 4-15).	Not significant
Greater Glider (southern and central)	528 ha	0 ha	The Project will result in will result in no clearing of the mapped extent of Greater Glider habitat as illustrated in Figure 4-9.	Not significant
Grey Snake	431.2 ha	0 ha	The disturbance footprint will result in no clearing of potential Grey Snake habitat within the Project Area (as mapped within Figure 4-15).	Not significant

MNES	Project Area (ha)	Maximum Disturbance Limit (ha)	Comments	Impact Significance
Koala	Foraging and breeding habitat 698.5 ha Dispersal habitat 9,072.6 ha	Up to 530 ha for dispersal habitat	<p>The Koala is considered as known to occur within the Project Area, given the presence of signs of the Koala during field surveys. Due to the indirect observations of the Koala in the form of scratch marks in the Project Area, it has been conservatively concluded that habitat critical to the survival of the species does occur within the Project Area. Habitat has been classified and mapped based on recent habitat guidance for the species (Youngentob, K.N, et al, 2022). In this case the vegetated areas of the Project Area containing Koala food trees (e.g., <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>) were mapped as Koala foraging and breeding habitat.</p> <p>The disturbance footprint will result in no clearing of potential Koala breeding and foraging habitat within the Project Area (as mapped within Figure 4-8).</p> <p>There will be a removal of up to 530 ha of dispersal habitat for the Koala (5.8% of the total dispersal habitat available in the Project Area. This impact is not likely to result in a significant impact to the species since they will predominantly be temporary and short-term disturbances that will not impede the koala in its ability to traverse and move across the landscape.</p>	Not significant
Northern Quoll	226.7 ha	0 ha	The disturbance footprint will result in no clearing of potential Northern Quoll habitat within the Project Area (as mapped within Figure 4-14).	Not significant
Ooline	118.7 ha of habitat	0 ha of habitat Stands and isolated patches of Ooline in areas of potential occurrence, if present, will be avoided.	<p>The Project Area provides 118.7 ha of habitat for Ooline which is associated with relatively narrow remnant and regrowth patches in the far south of the Project Area. During field surveys, Ooline was observed in the adjoining areas (10 km buffer) and in addition, the desktop searches showed four additional records within the Project Area and another six within the 10 km buffer adjoining areas. Ooline habitat areas are shown on Figure 4-4.</p> <p>The Project will not result in any impact to Ooline habitat. Additionally, as stated, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas as part of the application of the Project's mitigation measures to ensure that if any individual plants are present, they can be avoided.</p>	Not significant

MNES	Project Area (ha)	Maximum Disturbance Limit (ha)	Comments	Impact Significance
Painted Honeyeater	272.1 ha	0 ha	The disturbance footprint will result in no clearing of potential Painted Honeyeater habitat within the Project Area (as mapped within Figure 4-13).	Not significant
Slender Tylophora	122.7 ha	0 ha	A total of 122.7 ha of Slender Tylophora is scattered throughout the Project Area (Figure 4-6), of which, all will be avoided by the Project. Senex has committed to avoiding any individual Slender Tylophora plants (should any be found to occur within proposed disturbance footprints).	Not significant
South-eastern Glossy Black-cockatoo	1,003 ha	0 ha	The disturbance footprint will result in no clearing of potential Glossy Black-cockatoo habitat within the Project Area (as mapped within Figure 4-12).	Not significant
Southern Squatter Pigeon	164.3 ha breeding and foraging habitat 316 ha of dispersal habitat	up to 2.1 ha of dispersal habitat	The disturbance footprint will result in no clearing of Southern Squatter Pigeon breeding and foraging habitat within the Project Area (as mapped within Figure 4-12). There will be a removal of up to 2.1 ha of dispersal habitat for the Koala. This impact is not likely to result in a significant impact to the species since clearing will occur in previously cleared land. Additionally, clearing will be temporary and short-term disturbances that will not impede the Southern Squatter Pigeon in its ability to traverse and move across the landscape.	Not significant
Southern Whiteface	938.5 ha	0 ha	The disturbance footprint will result in no clearing of potential Southern Whiteface habitat within the Project Area (as mapped within Figure 4-13).	Not significant
White-throated Needletail	0 ha	0 ha	The White-throated Needletail has been identified as known to occur within the Project Area. The White-throated Needletail was not observed during field investigations for the current Project, however, was observed within the Project Area during subsequent field surveys for Senex on 24 November 2022 (Cunningham, M pers. comm.). A flock of eight birds were observed flying low near Weldons Road.	Not significant

MNES	Project Area (ha)	Maximum Disturbance Limit (ha)	Comments	Impact Significance
			This species was conservatively concluded to be an important population in the Project Area and the surrounding landscape due to the following reasons. Firstly, there is an absence of detailed population data for the Project Area it was recorded within the Project Area in 2022. However, as the White-throated Needletail is a largely aerial species, and the lack of habitat in the Project Area, a significant impact to this species is considered unlikely.	
Yakka Skink	228 ha	0 ha	The disturbance footprint will result in no clearing of potential Yakka Skink habitat within the Project Area (as mapped within Figure 4-15).	Not significant
Yellow-bellied Glider (south-eastern)	145.8 ha	0 ha	The disturbance footprint will result in no clearing of potential Yellow-bellied Glider (south-eastern) habitat within the Project Area (as mapped within Figure 4-14).	Not significant

8.1.4 Cumulative Impacts

The Atlas Stage 3 Gas Project (the Project) will be serviced by the ARC Pipeline proposed by ARC Pipeline Pty Ltd. Potential impacts of the ARC Pipeline, as detailed in the ARC Pipeline EPBC Act MNES Ecological Assessment Report (e2m, 2024), are the subject of a separate referral under the EPBC Act.

To address cumulative impacts of the Atlas Stage 3 Gas Project (the Project) and the ARC pipeline projects on MNES, consideration has been given to the combined impact of both projects on known and likely-to occur MNES identified in this report. An assessment of cumulative impacts on these MNES, based on information contained in the ARC Pipeline EPBC Act MNES Ecological Assessment Report, is provided below.

As indicated in the ARC Pipeline EPBC Act MNES Ecological Assessment Report (e2m, 2024), the ARC Pipeline has the potential to result in direct and indirect impacts to MNES known and likely to occur. As per the ARC Pipeline EPBC Act MNES Ecological Assessment Report (e2m, 2024) a suite of planning and management actions will be implemented to avoid, minimise and mitigate potential impacts from the ARC Pipeline on those matters.

Assessment against the SIG 1.1 Criteria was conducted which determined that the ARC Pipeline is unlikely to result in a significant residual impact on MNES.

As part of this Atlas Stage 3 Gas Project (the Project), Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land). With the implementation of the proposed controls and mitigation measures, the Atlas Stage 3 Gas Project (the Project) is unlikely to result in any significant indirect impacts to any MNES. Given the above and noting that the ARC Pipeline is unlikely to result in a significant impact on MNES (having regard to the scale, context and intensity of direct impacts on MNES), it is unlikely that Atlas Stage 3 Gas Project (the Project) and the ARC Pipeline will result in a significant impact on MNES prescribed under the EPBC Act.

8.2 MSES Impact Assessment

MSES within the Project Area have been considered for Significant Residual Impact (SRI) in accordance with the SRI Guideline (DEHP, 2014), with the outcomes summarised in Table 8-2. Appendix G highlights if the proposed development will potentially affect threatened wildlife habitat MSES, within the Project Area to cause an SRI. Outcomes within Table 8-2 assume that controls and mitigation measures in Section 7 are implemented.

Table 8-2: MSES Significant Residual Impact Assessment Summary

Prescribed Matter	SRI Impact Test	Will the Action Cause an SRI
Regulated Vegetation		
Category B- Endangered or Of Concern REs	<p>Table 2.1 of the SRI Guideline states that for clearing for linear infrastructure, clearing in a regional ecosystem that is Endangered or Of Concern will result in an SRI if it is:</p> <ul style="list-style-type: none"> ■ Greater than 25m wide in a grassland (structural category) regional ecosystem; or ■ Greater than 20m wide in a sparse (structural category) regional ecosystem; or 	No

Prescribed Matter	SRI Impact Test	Will the Action Cause an SRI
	<ul style="list-style-type: none"> ■ Greater than 10m wide in a dense to mid-dense (structural category) regional ecosystem. <p>Regulated Vegetation that is Category B is present as 10 patches totalling 317.2 ha (<3.3%) of the Project Area, all of which will be avoided. Thus, no SRI will result.</p>	
Category C – High value regrowth	Regulated Vegetation that is Category C is present as 4 patches totalling 22.6 ha (<0.3%) of the Project Area, all of which will be avoided. No SRI will result.	No
Category R – Great Barrier Reef riverine	Regulated Vegetation that is Category R totals 595.4 ha (<6.2%) of the Project Area, all of which will be avoided. No SRI will result.	No
Essential Habitat	Regulated Vegetation that is Essential Habitat totals 96.3 ha (<1%) of the Project Area, of which all will be avoided. No SRI will result.	No
REs within a defined distance of a watercourse	<p>Table 2.1 of the SRI Guideline states that for a prescribed activity to have an SRI on an RE that is within the defined distance of a watercourse, criteria 1 and 3 must be exceeded. Criteria 1 states that for clearing for linear infrastructure, clearing in a regional ecosystem that is within the defined distance of a watercourse will result in an SRI if it is:</p> <ul style="list-style-type: none"> ■ Greater than 25 m wide in a grassland (structural category) regional ecosystem; or ■ Greater than 20 m wide in a sparse (structural category) regional ecosystem; or ■ Greater than 10 m wide in a dense to mid-dense (structural category) regional ecosystem. <p>All Category B REs will be cleared. Therefore, there will be no SRI to Regulated Vegetation intersecting a watercourse within the Project Area.</p>	No
REs within a defined distance of a wetland	<p>Table 2.1 of the SRI Guideline states that for a prescribed activity to have an SRI on an RE that is within the defined distance of a wetland, criteria 1 and 2 must be exceeded. Criteria 1 states that for clearing for linear infrastructure, clearing in a regional ecosystem that is within the defined distance of a wetland will result in an SRI if it is:</p> <ul style="list-style-type: none"> ■ greater than 25 m wide in a grassland (structural category) regional ecosystem; or ■ greater than 20 m wide in a sparse (structural category) regional ecosystem; or ■ greater than 10 m wide in a dense to mid-dense (structural category) regional ecosystem. <p>Criteria 2 states that an SRI results from clearing within a regional ecosystem that is within 50 m of a mapped wetland. There are no mapped wetlands within the Project Area. Criteria 1 and 2 cannot be exceeded. Therefore, no REs occur within 100 m of a wetland and so no SRI will result.</p>	No

Prescribed Matter	SRI Impact Test	Will the Action Cause an SRI
Protected Wildlife Habitat		
<p>Protected wildlife habitat (EN, VU) – fauna</p>	<p>Section 5.1 of the SRI Guideline states that an action is likely to have a significant impact on Endangered and Vulnerable wildlife if the impact to habitat is likely to:</p> <ul style="list-style-type: none"> ■ Lead to a long-term decrease in the size of a local population; or ■ Reduce the extent of occurrence of the species; or ■ Fragment an existing population; or ■ Result in genetically distinct populations forming as a result of habitat isolation; or ■ Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat; or ■ Introduce disease that may cause the population to decline, or ■ Interfere with the recovery of the species; or ■ Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species <p>Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species, except for Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land), as mapped in Figure 4-8 and Figure 4-12 respectively.</p> <p>No impact to Ooline habitat as mapped in Figure 4-4, and all proposed disturbance areas will be surveyed for individual Ooline plants so that, if present, they can be avoided.</p> <p>Up to 530 ha impact to Short-beaked Echidna habitat (not mapped as includes the entire Project Area) (5.4% of Short-beaked Echidna habitat).</p> <p>No impact to White-throated Needletail as likely only aerial throughout Project Area.</p> <p>Impacts to the size of the population, extent of occurrence, connectivity, contribution to threats, interference with recovery and disruption to ecologically significant locations are considered when assessed against the relevant guidelines. Given the small scale of impacts, as well as the existing disturbance within the Project Area, it is unlikely that there will be an SRI to any of these species.</p>	<p>No SRI triggered</p>

9. CONCLUSION

This EAR was developed to determine the ecological values within the Project Area, and then to assess the potential impacts to these values. BOOBOOK Ecological Consulting undertook terrestrial field ecological surveys via targeted vehicle based and foot traverses of the Project Area, over the periods of 14 – 18 March 2022, 22 – 25 March 2022; 30 April – 5 May 2022, and 9 – 13 June 2022. Additionally, Attexo conducted terrestrial threatened flora surveys foot traverses of the Project Area, over the periods of 31 January – 3 February 2023. Aquatic field ecological surveys were undertaken by Freshwater Ecology over an eight-day period (14 – 21 March 2022). The results from both the terrestrial and aquatic surveys have been incorporated into this EAR. The terrestrial field investigations involved using survey techniques aligned with survey guidelines including vegetation assessments, BioCondition assessment, targeted flora and fauna surveys and habitat assessment. The aquatic field surveys involved aquatic habitat assessments, water quality, macroinvertebrate samples and flora and fauna surveys. The EAR also involved a desktop assessment using several publicly available databases, mapping, and aerial imagery.

Baseline botanical surveys were undertaken to describe dominant flora and vegetation community structure within the Project Area. Ground-truthing of the RE vegetation communities within the Project Area was undertaken using the quaternary level of data collection as described by Neldner *et al.* (2022). The DoR mapping was generally consistent with ground-truthing performed during field investigations.

Management practices have been recommended to avoid and as required, manage the potential indirect impacts to terrestrial and aquatic ecology associated with the proposed activities in the Project Area. It is expected that by implementing the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001], adherence to the conditions stipulated in the relevant Environmental Authorities, as well as the management practices identified in this EAR, the extent of Koala and Southern Squatter Pigeon dispersal habitat removed and indirect impacts to flora and fauna (including MNES and MSES species) will be minimal. Senex have committed to directly avoiding all MNES fauna habitats and TECs within the Project Area, except for Koala and Southern Squatter Pigeon dispersal habitat (all of which is previously cleared land).

Indirect disturbances to terrestrial and aquatic ecosystems relating to weeds and pests, displacement and degradation of habitat, as well as potential for mortality of fauna, will be able to be effectively managed by implementing the environmental management practices outlined.

For MNES protected under the EPBC Act, two listed TECs, six listed threatened species (5 fauna and one flora) and two listed migratory species were identified as known or likely to occur in the Project Area, due to direct field observations within the Project Area or recent historical records. The TECs were Brigalow (*Acacia harpophylla* dominant and co-dominant) and Poplar Box Grassy Woodland on Alluvial Plains. The listed threatened species were the Dulacca Woodland Snail, Koala, Glossy Black-cockatoo, Greater Glider, Koala, Ooline and White-throated Needle-tail. The listed migratory species were the White-throated Needle-tail and Fork-tailed Swift. Additionally, sixteen MNES species were considered to have the potential to occur within the Project Area, including Australian Painted Snipe, Belson's Panic, Brown Tree-creeper (south-eastern), Collared Delma, Corben's Long-eared Bat, Diamond Firetail, Dunmall's Snake, Five-clawed Worm-skink, Grey Snake, Northern Quoll, Painted Honeyeater, Slender Tylophora, Southern Squatter Pigeon, Southern Whiteface, Yakka Skink and Yellow-bellied Glider (south-eastern).

For MSES protected under the NC Act, the Project Area was found to contain Regulated Vegetation as well as NC Act listed threatened species protected wildlife habitat as follows:

- Regulated Vegetation that is Category B (Endangered and Of Concern RE);
- Regulated Vegetation that is Category C – high value regrowth;
- Regulated Vegetation that is Category R – Great Barrier Reef riverine vegetation;
- Regulated Vegetation that is Essential Habitat;
- Regulated Vegetation that is within the defined disturbance of a watercourse; and

- Protected wildlife habitat for listed flora and fauna species which included (in addition to those six listed threatened MNES fauna and flora who were also listed under the NC Act) were:
 - Pale Imperial Hairstreak (*Jalmenus eubulus*); and
 - Short-beaked Echidna (*Tachyglossus aculeatus*).

Potential impacts were identified as part of the Project to include the following:

- Clearing of native vegetation and habitat for threatened and migratory species and threatened ecological communities;
- Introduction and/or spread of weed species;
- Disturbance or displacement to fauna species from foraging or roosting habitat, or breeding places;
- Degradation of threatened species habitats or threatened ecological communities as a result of dust, erosion or accidental release of hazardous materials;
- Habitat fragmentation;
- Inhibiting the ability of ecological communities or species to adapt and survive predicted climate change effects (for example through impeding migration pathways or inhibiting access to refuge areas); and
- Fauna injury during construction activities and movement of machinery/vehicles.

Senex has committed to not clearing any areas confirmed as MNES TECs or areas confirmed as potential habitat for MNES threatened species with the exception of Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land). Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm on-ground biodiversity values will be undertaken by a suitably qualified person, with particular focus on MNES with a known, likely or potential occurrence. Ooline may propagate in cleared areas and all proposed disturbance footprints will undergo pre-clearance surveys to ensure that any stands or isolated trees of Ooline area will be avoided. All mapped habitat for Ooline (as shown in Figure 4-4) will be avoided. There will also be up to 530 ha of disturbance within Koala dispersal habitat and 2.1 ha of disturbance within Southern Squatter Pigeon dispersal habitat.

Further mitigation measures that will, or have already been implemented as a part of the Project to mitigate any direct or indirect impacts will include:

- Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001];
- Atlas Stage 3 Gas Project Significant Species Management Plan;
- Implementing the Senex Queensland Fauna and Stock Management Procedure [SENEX-CORP-EN-PRC-021];
- Weed and pest management measures through the implementation of the Senex Biosecurity Management Plan Queensland Operations [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023];
- Environmental Management Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-015];
- Rehabilitation Plan Atlas Stage 3 Gas Project [SENEX-ATLS-EN-PLN-018];
- ATP 2059 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-013];
- PL 445 and PL 209 Coal Seam Gas Water Management Plan [SENEX-ATLS-EN-PLN-014];
- Atlas Stage 3 Water Monitoring and Management Plan [SENEX-ATLS-EN-PLN-017];
- Delineation of 'no-go' areas clearly indicated for avoidance;
- Restricting access tracks to only low-level traffic with restricted speed;

- Erosion and sediment control measures;
- Dust management; and
- Appropriate storage and handling of fuel, oil and chemicals and appropriate spill response equipment.

The significant impact assessments undertaken against the relevant guidelines (SIG 1.1 and SRI Guidelines), assessed the potential impacts as well as the implemented mitigation and management measures, to determine whether or not the Project would result in any significant residual impacts to likely or known MSES and MNES.

MNES Significant Impact Assessment Outcomes:

The following details the significant impact assessment outcomes for MNES against the SIG 1.1. The outcomes for TECs in the Project Area are as follows:

- Brigalow (*Acacia harpophylla* dominant and co-dominant) is present as 17 patches totalling 95.8 ha (<1%) of the Project Area (as shown in Figure 4-3), all of which will be avoided by the Project; and
- Poplar Box Grassy Woodland on Alluvial Plains is present as 10 patches totalling 32.3 ha (<0.4%) of the Project Area (as shown Figure 4-3), all of which will be avoided by the Project.

The following details the significant impact assessment outcomes for listed threatened and/or migratory MNES that are known or likely to occur:

- Dulacca Woodland Snail totalling 666.3 ha of habitat within the Project Area (as shown Figure 4-11), will be avoided through careful design of the Project such that any direct disturbance to habitat for the species will not occur;
- Glossy Black-cockatoo (south-eastern subspecies) totalling 1,003 ha of habitat within the Project Area (as shown Figure 4-10), will be avoided through careful design of the Project such that any direct disturbance to habitat for the species will not occur;
- Greater Glider totalling 528 ha of habitat within the Project Area (as shown in Figure 4-9) will be avoided through careful design of the Project such that any direct disturbance to habitat for the species will not occur;
- Koala totalling 698.5 ha of foraging and breeding habitat within the Project Area (as shown on Figure 4-8), will be avoided through careful design of the Project such that any direct disturbance to foraging and breeding habitat for the species will not occur. A total of 9,072.6 ha of Koala dispersal habitat occurs within the Project Area and impact upon this habitat will be minimised through careful design of the Project such that any direct disturbance to habitat for the species will not exceed 530 ha; and
- Habitat for Ooline is made up of 118.7 ha of habitat consisting of relatively narrow remnant and regrowth patches in the far south of the Project Area (which will all be avoided by the Project) (habitat mapped on Figure 4-4). Additionally, as stated, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas as part of the application of the Project's mitigation measures to ensure that if any individual plants are present, they can be avoided.

It is noted that the White-throated Needletail (*Hirundapus caudacutus*) is known to occur within the Project Area, however it is likely only to be an aerial flyover visitor due to the lack of suitable roosting areas in the Project Area. Therefore, no habitat will be directly or indirectly impacted for this species. Further, the White-throated Needletail along with the Fork-tailed Swift were identified as listed migratory species known and likely to occur respectively. As with the White-throated Needletail, the Fork-tailed Swift was concluded to be an aerial flyover visitor only and so both migratory species were concluded to not be at risk of being significantly impacted by the Project.

With the implementation of the proposed controls and mitigation measures, the Project is unlikely to result in any significant indirect impacts to any MNES.

MSES Significant Impact Assessment Outcomes:

Based on the assessment conducted in this EAR, there was concluded to be no Significant Residual Impact (SRI) to these MSES, based on an assessment against the SRI Guidelines, for the following reasons;

- Regulated Vegetation that is Category B – Regulated Vegetation that is Category B is present as 10 patches totalling 334.8 ha (<3.5%) of the Project Area, all of which will be avoided. The proposed development avoids clearing in remnant vegetation and so in accordance with criteria in the SRI Guideline, no SRI will result;
- Regulated Vegetation that is Category C – Regulated Vegetation that is Category C is present as 4 patches (potentially of RE 11.9.5) totalling 38.4 ha (<0.4%) of the Project Area, all of which will be avoided. No SRI will result;
- Regulated Vegetation that is Category R – Regulated Vegetation that is Category R totals 595.4 ha (<6.2%) of the Project Area, all of which will be avoided. No SRI will result;
- Regulated Vegetation that is Essential Habitat – Regulated Vegetation that is Essential Habitat totals 96.3 ha (<1%) of the Project Area, all of which will be avoided. No SRI will result;
- Regulated Vegetation that is within the defined disturbance of a watercourse— all Category B REs (11.3.25, 11.3.19 and 11.3.2) within the defined distance of a watercourse are avoided. Thus, no SRI will result;
- Protected wildlife habitat for listed fauna – for species known or likely to occur, there will be no SRI because there will be no clearing of habitat (with the exception of Koala and Southern Squatter Pigeon dispersal habitat (being, 530 ha and 2.1 ha respectively, of previously cleared land), and habitat for the NC Act special least concern Short-beaked Echidna). Direct habitat disturbance for known and likely threatened and NC Act special least concern fauna species from the Project will be limited to:
 - Dulacca Woodland Snail (666.3 ha habitat – 0 ha of total habitat will be disturbed);
 - Greater Glider (southern and central) (528 ha habitat – 0 ha of total habitat will be disturbed);
 - Koala (698.5 ha preferred breeding and foraging habitat and 9,072.6 ha general dispersal habitat – up to 530 ha or 5.8% of total general dispersal habitat will be disturbed);
 - Pale Imperial Hairstreak (180.2 ha habitat – 0 ha of total habitat will be disturbed);
 - Short-beaked Echidna (9,772 ha habitat – up to 530 ha or 5.4% of total habitat will be disturbed);
 - South-eastern Glossy Black-cockatoo (1,003 ha habitat – 0 ha of total habitat will be disturbed);
 - White-throated Needletail (no habitat mapped as aerial flyover visitor only to the Project Area).

Protected wildlife habitat for listed flora – for the only threatened flora species known or likely to occur in the Project Area, Ooline, there will be no SRI because there will be no direct disturbance within the 118.7 ha of mapped habitat (as shown in Figure 4-4). Additionally, surveys will be undertaken in all other proposed disturbance areas in accordance with the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001], so that all individual Ooline plants present (if any), are avoided.

With the implementation of the proposed controls and mitigation measures, the Project is unlikely to result in any significant indirect impacts to any MSES.

Environmentally Sensitive Areas

There are no Category A ESA within the Project Area. Category B ESA within the Project Area are ground-truthed endangered RE (Biodiversity Status), which consists of patches of the following RE: 11.3.17, 11.9.5, 11.9.5a and 11.9.10. Category C ESA within the Project Area include ground-truthed habitat for EVNT species listed under the NC Act (Stevens, 2023) and ground-truthed remnant and regrowth vegetation within government mapped areas of 'essential habitat' or 'essential regrowth habitat', and Of Concern RE (Biodiversity Status), which comprises the following REs: 11.3.2, 11.3.4, 11.3.25, 11.3.27f and 11.9.7. It is noted that the Project has committed to avoiding clearing within all ESAs.

Biosecurity Issues

Eight introduced flora and three fauna species signs were recorded during field surveys. The three fauna species are listed as Restricted Invasive animals under the *Biosecurity Act 2014* including Dingo/Wild Dog (*Canis familiaris*), Rabbit (*Oryctolagus cuniculus*) and Pig (*Sus scrofa*). Five flora, Common Pest Pear (*Opuntia stricta*), Tiger Pear (*Opuntia aurantiaca*), Harrisia Cactus (*Harrisia martini*), Mother-Of-Millions (*Kalanchoe delagoensis*) and Velvety Tree Pear (*Opuntia tomentosa*) are listed as Restricted Matter under the under the *Biosecurity Act 2014*.

Opuntia species recorded are classified also classified as Weeds of National Significance. As mentioned above, appropriate biosecurity measures will be implemented to ensure that any biosecurity risks are minimised and will not impact MSES and MNES.

Concluding Remark

As most of the Project Area is cleared, the Project will be able to avoid direct impacts to habitat for MNES and MSES species and naturally vegetated habitat areas with the exception of previously cleared areas that still potentially function as Koala and Southern Squatter Pigeon dispersal habitat / habitat for the NC Act special least concern Short-beaked Echidna. The Project's mitigation measures, including Senex's Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [SENEX-ATLAS-EN-PLN-001] will be used to guide infrastructure siting, minimise direct and indirect disturbances and ensure the Project's total direct disturbance footprint avoids MNES and MSES habitats that are not already cleared.

As detailed in the MNES and MSES impact assessments provided in Appendix F and Appendix G respectively, the Project has been assessed against the relevant Commonwealth and State guidelines and it has been determined that, with the implementation of the proposed controls and mitigation measures, the Project is unlikely to result in any significant direct or indirect impacts to any MNES or MSES.

A separate assessment of cumulative impacts for the Project and the ARC Pipeline (the subject of a separate referral under the EPBC Act) determined that these projects would not result in a significant cumulative impact on MNES.

10. REFERENCES

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APPENDIX A DESKTOP RESULTS (PMST AND WO SEARCHES)



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 11-Dec-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	39
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	25
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

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

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1200 - 1300km upstream from Ramsar site	In buffer area only
Narran lake nature reserve	400 - 500km upstream from Ramsar site	In buffer area only
Riverland	1100 - 1200km upstream from Ramsar site	In buffer area only
The coorong, and lakes alexandrina and albert wetland	1400 - 1500km upstream from Ramsar site	In buffer area only

Listed Threatened Ecological Communities [[Resource Information](#)]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area	In feature area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area	In buffer area only
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [[Resource Information](#)]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
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Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Erythrorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area	In feature area
FISH			
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area	In feature area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
PLANT			
Acacia curranii Curly-bark Wattle [3908]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area	In feature area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calytrix gurulmundensis [24241]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Homopholis belsonii Belson's Panic [2406]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In feature area
Xerothamnella herbacea [4146]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Anomalopus mackayi Five-clawed Worm-skink, Long-legged Worm-skink [25934]	Vulnerable	Species or species habitat may occur within area	In feature area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area	In feature area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat may occur within area	In feature area
Furina dunmali Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat may occur within area	In feature area

SNAIL

Adclarkia cameroni Brigalow Woodland Snail [83886]	Endangered	Species or species habitat likely to occur within area	In feature area
Adclarkia dulacca Dulacca Woodland Snail [83885]	Endangered	Species or species habitat known to occur within area	In feature area

Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area

Migratory Terrestrial Species

Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area

Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

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

EPBC Act Referrals					[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
Atlas Stage 3 Gas Project	2022/09410		Assessment	In feature area	
Atlas to Reedy Creek Pipeline	2023/09585		Assessment	In feature area	
Coal Seam Gas Field Development for Natural Gas Liquefaction Park.	2008/4059		Post-Approval	In buffer area only	

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Curtis Island				
Development of Existing Coal Seam Gas Fields	2008/4398		Post-Approval	In feature area
Controlled action				
Construct and operate 447km high pressure gas transmission pipeline	2009/4976	Controlled Action	Post-Approval	In feature area
Construction and operation of Nathan Dam and associated water delivery infrastructure	2008/4313	Controlled Action	Post-Approval	In buffer area only
Development of new natural gas acreage in Surat Basin	2013/7047	Controlled Action	Post-Approval	In buffer area only
Expansion of Coal Seam Gas Fields	2009/4974	Controlled Action	Post-Approval	In feature area
Expansion Of Coal Seam Gas Operations	2010/5344	Controlled Action	Post-Approval	In buffer area only
Future Gas Supply Area Project	2012/6357	Controlled Action	Completed	In buffer area only
North Surat Coal Project- Collingwood	2012/6236	Controlled Action	Completed	In buffer area only
North Surat Coal Project- Taroom	2012/6237	Controlled Action	Completed	In buffer area only
Queensland Curtis LNG Project - Pipeline Network	2008/4399	Controlled Action	Post-Approval	In feature area
Reedy Creek to Glebe Weir Pipeline Project	2011/6181	Controlled Action	Post-Approval	In feature area
Santos GLNG Gas Field Development Project, QLD	2012/6615	Controlled Action	Post-Approval	In feature area
Surat North CSG Project, Qld	2018/8276	Controlled Action	Post-Approval	In buffer area only
Wandoan Coal Mine and Infrastructure Project	2008/4284	Controlled Action	Post-Approval	In feature area
Wandoan Coal Project - Coal Seam Methane Water Supply South	2008/4287	Controlled Action	Post-Approval	In feature area
Wandoan Coal Project Coal Seam Methane Water Supply West	2008/4283	Controlled Action	Completed	In buffer area only
Not controlled action				
Delga Solar Farm, 1039 Gadsbys Road, Woleebee, Qld	2019/8411	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
High Voltage Transmission line Development	2007/3230	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Project Atlas CSG Project, between Wollumbilla and Wandoan, Qld	2018/8329	Not Controlled Action	Completed	In feature area
Surat Basin Railway	2008/3944	Not Controlled Action	Completed	In buffer area only

Referral decision

Development of an underground longwall coal mine	2011/6129	Referral Decision	Completed	In feature area
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Bioregional Assessments

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

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point

Species: All

Type: All

Queensland status: All

Records: All

Date: All

Latitude: -26.2765

Longitude: 149.8568

Distance: 20

Email: tim@freshwaterecology.com.au

Date submitted: Monday 15 Aug 2022 15:46:40

Date extracted: Monday 15 Aug 2022 15:50:01

The number of records retrieved = 844

Disclaimer

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

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Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.

The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (<https://www.qld.gov.au/environment/plants-animals/species-information/wildnet>) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufo	<i>Rhinella marina</i>	cane toad	Y			20
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		8
animals	amphibians	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog		C		3
animals	amphibians	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog		C		4
animals	amphibians	Hylidae	<i>Cyclorana sp.</i>			C		1
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		22
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		2
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		11
animals	amphibians	Hylidae	<i>Litoria peronii</i>	emerald spotted treefrog		C		9
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		5
animals	amphibians	Limnodynastidae	<i>Limnodynastes fletcheri</i>	barking frog		C		2
animals	amphibians	Limnodynastidae	<i>Limnodynastes salmini</i>	salmon striped frog		C		9
animals	amphibians	Limnodynastidae	<i>Limnodynastes sp.</i>			C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		21
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		4
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		14
animals	amphibians	Myobatrachidae	<i>Uperoleia rugosa</i>	chubby gungan		C		4
animals	birds	Acanthizidae	<i>Acanthiza apicalis</i>	inland thornbill		C		10
animals	birds	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill		C		8
animals	birds	Acanthizidae	<i>Acanthiza lineata</i>	striated thornbill		C		2
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		12
animals	birds	Acanthizidae	<i>Acanthiza pusilla</i>	brown thornbill		C		3
animals	birds	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill		C		7
animals	birds	Acanthizidae	<i>Acanthiza uropygialis</i>	chestnut-rumped thornbill		C		2
animals	birds	Acanthizidae	<i>Gerygone fusca</i>	western gerygone		C		3
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		20
animals	birds	Acanthizidae	<i>Pyrrholaemus sagittatus</i>	speckled warbler		C		3
animals	birds	Acanthizidae	<i>Sericornis frontalis</i>	white-browed scrubwren		C		1
animals	birds	Acanthizidae	<i>Smicronis brevirostris</i>	weebill		C		49
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		1
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		19
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		1
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		1/1
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		2
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		2
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		1
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		4
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owlet-nightjar		C		14
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		8
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		11
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		5
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		6
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		2
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		1
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		2
animals	birds	Anatidae	<i>Malacorhynchus membranaceus</i>	pink-eared duck		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		9
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		4
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	2
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		4
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		2
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		5
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		4
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		2
animals	birds	Artamidae	<i>Artamus cyanopterus</i>	dusky woodswallow		C		2
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		11
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		3
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		3
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		40
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		65
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		46
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		40
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		47/1
animals	birds	Cacatuidae	<i>Calyptorhynchus funereus</i>	yellow-tailed black-cockatoo		C		1
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)		V	V	3
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		52
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		21
animals	birds	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike		C		3
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		23
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		2
animals	birds	Campephagidae	<i>Edolisoma tenuirostre</i>	common cicadabird		C		2
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		1
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		1
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		4
animals	birds	Charadriidae	<i>Elsemyornis melanops</i>	black-fronted dotterel		C		4
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		3
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		C		4
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		5
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			1
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		16
animals	birds	Columbidae	<i>Geopelia placida</i>	peaceful dove		C		8
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	1
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		23
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		7
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		6
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		6
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		33
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		23
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		64
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		8
animals	birds	Cuculidae	<i>Chalcites basalus</i>	Horsfield's bronze-cuckoo		C		1

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animals	birds	Cuculidae	<i>Chalcites osculans</i>	black-eared cuckoo		C		1
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		2
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		1
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		5
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		16
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		5
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		6
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		11
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		1
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		36
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		1
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		2
animals	birds	Hirundinidae	<i>Cheramoeca leucosterna</i>	white-backed swallow		C		1
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		4
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		5
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		1
animals	birds	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren		C		13
animals	birds	Maluridae	<i>Malurus lamberti sensu lato</i>	variegated fairy-wren		C		3
animals	birds	Maluridae	<i>Malurus leucopterus</i>	white-winged fairy-wren		C		1
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		11
animals	birds	Megaluridae	<i>Cincloramphus timoriensis</i>	tawny grassbird		C		1
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey		C		7
animals	birds	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		C		9
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		12
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		14
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		11
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		7
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		90
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		8
animals	birds	Meliphagidae	<i>Melithreptus brevirostris</i>	brown-headed honeyeater		C		4
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		1
animals	birds	Meliphagidae	<i>Nesoptilotis leucotis</i>	white-eared honeyeater		C		18
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		18
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		27
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		36
animals	birds	Meliphagidae	<i>Ptilotula penicillata</i>	white-plumed honeyeater		C		1
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		10
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		36
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		5
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		8
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		2
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		28
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		2
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		11
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		2
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		6

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animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		14
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		2
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		26
animals	birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote		C		9
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		56
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			3
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		10
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		5
animals	birds	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin		C		1
animals	birds	Petroicidae	<i>Petroica rosea</i>	rose robin		C		1
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		3
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		1
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		4
animals	birds	Phasianidae	<i>Synoicus ypsilophorus</i>	brown quail		C		1
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		5
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		6
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		21
animals	birds	Psittacidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		12
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		16
animals	birds	Psittacidae	<i>Melopsittacus undulatus</i>	budgerigar		C		3
animals	birds	Psittacidae	<i>Northiella haematogaster</i>	blue bonnet		C		2
animals	birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		1
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		42
animals	birds	Psittacidae	<i>Psephotus haematonotus</i>	red-rumped parrot		C		10
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		22
animals	birds	Psittacidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		22
animals	birds	Psophodidae	<i>Psophodes olivaceus</i>	eastern whipbird		C		1
animals	birds	Ptilonorhynchidae	<i>Chlamydera maculata</i>	spotted bowerbird		C		8
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		3
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		5
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		26
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		29
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		4
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		1
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		3
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		1
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		5
animals	birds	Turnicidae	<i>Turnix pyrrhothorax</i>	red-chested button-quail		C		1
animals	birds	Turnicidae	<i>Turnix sp.</i>			C		2
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		2
animals	birds	Tytonidae	<i>Tyto javanica</i>	eastern barn owl		C		5
animals	insects	Aeshnidae	<i>Anax papuensis</i>	Australian Emperor				4
animals	insects	Coenagrionidae	<i>Ischnura aurora</i>	aurora bluetail				1
animals	insects	Corduliidae	<i>Hemicordulia tau</i>	tau emerald				1
animals	insects	Hesperiidae	<i>Ocybadistes walkeri sothis</i>	green grass-dart				1

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animals	insects	Libellulidae	<i>Crocothemis nigrifrons</i>	black-headed skimmer				1
animals	insects	Libellulidae	<i>Diplacodes bipunctata</i>	wandering percher				3
animals	insects	Libellulidae	<i>Diplacodes haematodes</i>	scarlet percher				1
animals	insects	Libellulidae	<i>Orthetrum caledonicum</i>	blue skimmer				6
animals	insects	Libellulidae	<i>Pantala flavescens</i>	wandering glider				1
animals	insects	Libellulidae	<i>Rhyothemis graphiptera</i>	graphic flutterer				1
animals	insects	Libellulidae	<i>Tramea loewii</i>	common glider				1
animals	insects	Lindeniiidae	<i>Ictinogomphus australis</i>	Australian tiger				1
animals	insects	Lycaenidae	<i>Nacaduba berenice berenice</i>	large purple line-blue				1
animals	insects	Lycaenidae	<i>Psychonotis caelius taygetus</i>	small green-banded blue				1
animals	insects	Lycaenidae	<i>Zizina otis labradus</i>	common grass-blue (Australian subspecies)				2
animals	insects	Nymphalidae	<i>Acraea andromacha andromacha</i>	glasswing				2
animals	insects	Nymphalidae	<i>Charaxes sempronius sempronius</i>	tailed emperor				2
animals	insects	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer				5
animals	insects	Nymphalidae	<i>Danaus plexippus</i>	monarch	Y			1
animals	insects	Nymphalidae	<i>Euploea corinna</i>	common crow				8
animals	insects	Nymphalidae	<i>Hypocysta pseudirius</i>	grey ringlet				1
animals	insects	Nymphalidae	<i>Hypolimnas bolina nerina</i>	varied eggfly				3
animals	insects	Nymphalidae	<i>Junonia orithya albicincta</i>	blue argus				1
animals	insects	Nymphalidae	<i>Junonia villida villida</i>	meadow argus				5
animals	insects	Nymphalidae	<i>Melanitis leda bankia</i>	evening brown				1
animals	insects	Nymphalidae	<i>Tirumala hamata hamata</i>	blue tiger				4
animals	insects	Papilionidae	<i>Cressida cressida cressida</i>	clearwing swallowtail				1
animals	insects	Papilionidae	<i>Papilio aegaeus</i>					5
animals	insects	Papilionidae	<i>Papilio aegaeus aegaeus</i>	orchard swallowtail (Australian subspecies)				3
animals	insects	Papilionidae	<i>Papilio anactus</i>	dainty swallowtail				2
animals	insects	Papilionidae	<i>Papilio demoleus sthenelus</i>	chequered swallowtail				4
animals	insects	Pieridae	<i>Belenois java teutonia</i>	caper white				5
animals	insects	Pieridae	<i>Catopsilia gorgophone gorgophone</i>	yellow migrant				1
animals	insects	Pieridae	<i>Catopsilia pomona</i>	lemon migrant				2
animals	insects	Pieridae	<i>Catopsilia pyranthe crokera</i>	white migrant				2
animals	insects	Pieridae	<i>Cepora perimale</i>					1
animals	insects	Pieridae	<i>Delias argenthona argenthona</i>	scarlet jezebel				1
animals	insects	Pieridae	<i>Delias nysa nysa</i>	yellow-spotted jezebel (Australian subspecies)				1
animals	insects	Pieridae	<i>Elodina parthia</i>	striated pearl-white				1
animals	insects	Pieridae	<i>Eurema hecabe</i>	large grass-yellow				2
animals	insects	Pieridae	<i>Eurema smilax</i>	small grass-yellow				3
animals	malacostracans	Parastacidae	<i>Cherax destructor</i>	common yabbie				1
animals	mammals	Acrobatidae	<i>Acrobates pygmaeus</i>	feathertail glider			C	1
animals	mammals	Bovidae	<i>Bos taurus</i>	European cattle	Y			1
animals	mammals	Bovidae	<i>Capra hircus</i>	goat	Y			1
animals	mammals	Canidae	<i>Canis familiaris</i>	dog	Y			2
animals	mammals	Canidae	<i>Canis familiaris (dingo)</i>	dingo				1

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animals	mammals	Canidae	<i>Canis sp.</i>		Y			2
animals	mammals	Canidae	<i>Vulpes vulpes</i>	red fox	Y			1
animals	mammals	Dasyuridae	<i>Sminthopsis murina</i>	common dunnart		C		1
animals	mammals	Emballonuridae	<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat		C		9
animals	mammals	Equidae	<i>Equus caballus</i>	horse	Y			1
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			4
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			4
animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			6
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		30
animals	mammals	Macropodidae	<i>Notamacropus dorsalis</i>	black-striped wallaby		C		3
animals	mammals	Macropodidae	<i>Notamacropus parryi</i>	whiptail wallaby		C		2
animals	mammals	Macropodidae	<i>Notamacropus rufogriseus</i>	red-necked wallaby		C		16
animals	mammals	Macropodidae	<i>Osphranter robustus</i>	common wallaroo		C		7
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		9
animals	mammals	Molossidae	<i>Austronomus australis</i>	white-striped freetail bat		C		4
animals	mammals	Molossidae	<i>Mormopterus lumsdenae</i>	northern free-tailed bat		C		2
animals	mammals	Molossidae	<i>Mormopterus petersi</i>	inland free-tailed bat		C		8
animals	mammals	Molossidae	<i>Mormopterus ridei</i>	eastern free-tailed bat		C		1
animals	mammals	Molossidae	<i>Mormopterus sp.</i>			C		3
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			13
animals	mammals	Muridae	<i>Pseudomys patrius</i>	eastern pebble-mound mouse		C		1
animals	mammals	Petauridae	<i>Petaurus australis australis</i>	yellow-bellied glider (southern subspecies)		V	V	12
animals	mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider		C		3
animals	mammals	Petauridae	<i>Petaurus notatus</i>	Kreff's glider		C		3
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		32
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		E	E	3
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		7
animals	mammals	Pseudocheiridae	<i>Petauroides armillatus</i>	central greater glider		E	E	2
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		1
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			8
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		7
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat		C		10
animals	mammals	Vespertilionidae	<i>Chalinolobus picatus</i>	little pied bat		C		3
animals	mammals	Vespertilionidae	<i>Nyctophilus geoffroyi</i>	lesser long-eared bat		C		1
animals	mammals	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat		C		6
animals	mammals	Vespertilionidae	<i>Nyctophilus sp.</i>			C		2
animals	mammals	Vespertilionidae	<i>Scotorepens greyii</i>	little broad-nosed bat		C		12
animals	mammals	Vespertilionidae	<i>Scotorepens sp.</i>			C		1
animals	mammals	Vespertilionidae	<i>Scotorepens sp. (Parnaby)</i>	central-eastern broad-nosed bat		C		1
animals	mammals	Vespertilionidae	<i>Vespadelus baverstocki</i>	inland forest bat		C		1
animals	mammals	Vespertilionidae	<i>Vespadelus troughtoni</i>	eastern cave bat		C		8
animals	mammals	Vespertilionidae	<i>Vespadelus vulturinus</i>	little forest bat		C		5
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris species 1</i>	Midgley's carp gudgeon				1
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				1

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animals	ray-finned fishes	Plotosidae	<i>Tandanus tandanus</i>	freshwater catfish				1
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				1
animals	reptiles	Agamidae	<i>Amphibolurus muricatus</i>	jacky lizard		C		2
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		1
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		6
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python		C		3
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python		C		3
animals	reptiles	Carphodactylidae	<i>Underwoodisaurus milii</i>	thick-tailed gecko		C		3
animals	reptiles	Chelidae	<i>Chelodina longicollis</i>	eastern snake-necked turtle		C		2
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake		C		3
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		2/1
animals	reptiles	Diplodactylidae	<i>Diplodactylus vittatus</i>	wood gecko		C		1
animals	reptiles	Diplodactylidae	<i>Lucasium steindachneri</i>	Steindachner's gecko		C		4
animals	reptiles	Diplodactylidae	<i>Nebulifera robusta</i>	robust velvet gecko		C		4
animals	reptiles	Diplodactylidae	<i>Strophurus taenicauda</i>	golden-tailed gecko			NT	13
animals	reptiles	Elapidae	<i>Brachyurophis australis</i>	coral snake		C		2/1
animals	reptiles	Elapidae	<i>Cryptophis boschmai</i>	Carpentaria whip snake		C		4
animals	reptiles	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake		C		4
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake		C		5
animals	reptiles	Elapidae	<i>Furina diadema</i>	red-naped snake		C		1/1
animals	reptiles	Elapidae	<i>Hoplocephalus bitorquatus</i>	pale-headed snake		C		2/2
animals	reptiles	Elapidae	<i>Pseudechis australis</i>	king brown snake		C		1
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		3
animals	reptiles	Elapidae	<i>Suta suta</i>	myall snake		C		1
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		95/1
animals	reptiles	Gekkonidae	<i>Gehyra sp.</i>			C		1
animals	reptiles	Gekkonidae	<i>Gehyra versicolor</i>			C		9
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		47/2
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		1
animals	reptiles	Pygopodidae	<i>Paradelma orientalis</i>	brigalow scaly-foot		C		9
animals	reptiles	Scincidae	<i>Anomalopus leuckartii</i>	two-clawed worm-skink		C		1/1
animals	reptiles	Scincidae	<i>Carlia munda</i>	shaded-litter rainbow-skink		C		3
animals	reptiles	Scincidae	<i>Carlia pectoralis</i>	open-litter rainbow skink		C		6/1
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		17
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		2
animals	reptiles	Scincidae	<i>Carlia sp.</i>			C		3
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		4
animals	reptiles	Scincidae	<i>Cryptoblepharus australis</i>	inland snake-eyed skink		C		2
animals	reptiles	Scincidae	<i>Cryptoblepharus metallicus</i>	metallic snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus plagiocephalus sensu lato</i>			C		4
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		41
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		6
animals	reptiles	Scincidae	<i>Eremiascincus fasciolatus</i>	narrow-banded sand swimmer		C		1
animals	reptiles	Scincidae	<i>Lerista fragilis</i>	eastern mulch slider		C		27/1
animals	reptiles	Scincidae	<i>Lerista punctatovittata</i>	eastern robust slider		C		6

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Scincidae	<i>Lerista sp.</i>			C		2
animals	reptiles	Scincidae	<i>Lerista timida</i>	timid slider		C		3
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		23/2
animals	reptiles	Scincidae	<i>Menetia greyii</i>	common dwarf skink		C		3
animals	reptiles	Scincidae	<i>Morethia boulengeri</i>	south-eastern morethia skink		C		2
animals	reptiles	Scincidae	<i>Pygmaeascincus timlowi</i>	dwarf litter-skink		C		3
animals	reptiles	Scincidae	<i>Tiliqua scincoides</i>	eastern blue-tongued lizard		C		1
animals	reptiles	Typhlopidae	<i>Anilius proximus</i>	proximus blind snake		C		2/2
animals	reptiles	Varanidae	<i>Varanus gouldii</i>	sand monitor		C		6
animals	reptiles	Varanidae	<i>Varanus panoptes</i>	yellow-spotted monitor		C		2
animals	reptiles	Varanidae	<i>Varanus tristis</i>	black-tailed monitor		C		7
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		9
animals	snails	Camaenidae	<i>Adclarkia cameroni</i>			V	E	1
animals	snails	Camaenidae	<i>Lynfergusonia mundubbera</i>					1
animals	uncertain	Indeterminate	<i>Indeterminate</i>	Unknown or Code Pending				50
fungi	lecanoromycetes	Caliciaceae	<i>Dirinaria batavica</i>			C		1/1
fungi	lecanoromycetes	Caliciaceae	<i>Pyxine berteriana</i>			C		2/2
fungi	lecanoromycetes	Caliciaceae	<i>Pyxine petricola</i>			C		1/1
fungi	lecanoromycetes	Caliciaceae	<i>Pyxine rugulosa</i>			C		1/1
fungi	lecanoromycetes	Caliciaceae	<i>Pyxine subcinerea</i>			C		2/2
fungi	lecanoromycetes	Collemataceae	<i>Collema rugosum</i>			C		1/1
fungi	lecanoromycetes	Lecanoraceae	<i>Lecanora helva</i>			C		2/2
fungi	lecanoromycetes	Lecanoraceae	<i>Lecanora novaehollandiae</i>			C		2/2
fungi	lecanoromycetes	Ochrolechiaceae	<i>Ochrolechia africana</i>			C		1/1
fungi	lecanoromycetes	Ochrolechiaceae	<i>Ochrolechia hawaiiensis</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Parmotrema subsumptum</i>			C		2/2
fungi	lecanoromycetes	Parmeliaceae	<i>Punctelia subflava</i>			C		1/1
fungi	lecanoromycetes	Pertusariaceae	<i>Pertusaria pertusella</i>			C		1/1
fungi	lecanoromycetes	Pertusariaceae	<i>Pertusaria planaica</i>			C		1/1
fungi	lecanoromycetes	Pertusariaceae	<i>Pertusaria ternata</i>			C		1/1
fungi	lecanoromycetes	Physciaceae	<i>Physcia nubila</i>			C		2/2
fungi	lecanoromycetes	Physciaceae	<i>Physcia undulata</i>			C		1/1
fungi	lecanoromycetes	Stereocaulaceae	<i>Lepraria</i>					1/1
fungi	lecanoromycetes	Teloschistaceae	<i>Caloplaca flavorubescens</i>			C		2/2
fungi	lecanoromycetes	Teloschistaceae	<i>Caloplaca fraserensis</i>			C		1/1
plants	land plants	Acanthaceae	<i>Brunoniella australis</i>	blue trumpet		C		2
plants	land plants	Acanthaceae	<i>Dipteracanthus australasicus subsp. corynothecus</i>			C		1/1
plants	land plants	Acanthaceae	<i>Hypoestes floribunda var. floribunda</i>			C		1/1
plants	land plants	Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower		C		1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens</i>			C		1/1
plants	land plants	Alismataceae	<i>Echinodorus cordifolius</i>		Y			1/1
plants	land plants	Amaranthaceae	<i>Achyranthes aspera</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera denticulata var. denticulata</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		2
plants	land plants	Amaranthaceae	<i>Alternanthera pungens</i>	khaki weed	Y			2/1
plants	land plants	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry		C		1

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plants	land plants	Amaranthaceae	<i>Gomphrena celosioides</i>	gomphrena weed	Y			1
plants	land plants	Amaranthaceae	<i>Nyssanthes erecta</i>			C		3/2
plants	land plants	Amaranthaceae	<i>Ptilotus semilanatus</i>			C		2/1
plants	land plants	Anacardiaceae	<i>Schinus terebinthifolius</i>		Y			1/1
plants	land plants	Apocynaceae	<i>Alstonia constricta</i>	bitterbark		C		8
plants	land plants	Apocynaceae	<i>Carissa ovata</i>	currantbush		C		6
plants	land plants	Apocynaceae	<i>Gomphocarpus</i>			C		1
plants	land plants	Apocynaceae	<i>Gomphocarpus physocarpus</i>	balloon cottonbush	Y			1
plants	land plants	Apocynaceae	<i>Leichhardtia micradenia</i>			C		3
plants	land plants	Apocynaceae	<i>Leichhardtia viridiflora subsp. viridiflora</i>			C		1
plants	land plants	Apocynaceae	<i>Parsonsia eucalyptophylla</i>	gargaloo		C		3/1
plants	land plants	Apocynaceae	<i>Parsonsia rotata</i>	veinless silkpod		C		4/2
plants	land plants	Araliaceae	<i>Astrotricha longifolia</i>	star hair bush		C		1
plants	land plants	Araliaceae	<i>Hydrocotyle acutiloba</i>			C		3/3
plants	land plants	Asteraceae	<i>Apowollastonia spilanthisoides</i>			C		1/1
plants	land plants	Asteraceae	<i>Bidens biternata</i>		Y			1/1
plants	land plants	Asteraceae	<i>Brachyscome dalbyensis</i>			C		1/1
plants	land plants	Asteraceae	<i>Brachyscome microcarpa subsp. darlingensis</i>			C		2/2
plants	land plants	Asteraceae	<i>Brachyscome multifida</i>			C		1/1
plants	land plants	Asteraceae	<i>Calyptocarpus vialis</i>	creeping cinderella weed	Y			1
plants	land plants	Asteraceae	<i>Camptacra barbata</i>			C		1/1
plants	land plants	Asteraceae	<i>Cassinia laevis</i>			C		1
plants	land plants	Asteraceae	<i>Centaurea solstitialis</i>	St. Barnaby's thistle	Y			1/1
plants	land plants	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons		C		2
plants	land plants	Asteraceae	<i>Cirsium vulgare</i>	spear thistle	Y			2
plants	land plants	Asteraceae	<i>Cyanthillium cinereum</i>			C		1
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			1/1
plants	land plants	Asteraceae	<i>Flaveria trinervia</i>		Y			1/1
plants	land plants	Asteraceae	<i>Olearia</i>					1
plants	land plants	Asteraceae	<i>Olearia canescens</i>			C		1
plants	land plants	Asteraceae	<i>Olearia canescens subsp. discolor</i>			C		1/1
plants	land plants	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			1/1
plants	land plants	Asteraceae	<i>Pluchea dentex</i>	bowl daisy		C		1/1
plants	land plants	Asteraceae	<i>Podolepis longipedata</i>	tall copper-wire daisy		C		1/1
plants	land plants	Asteraceae	<i>Pterocaulon sphacelatum</i>	applebush		C		1
plants	land plants	Asteraceae	<i>Pycnosorus globosus</i>			C		1
plants	land plants	Asteraceae	<i>Rutidosia murchisonii</i>			C		3/3
plants	land plants	Asteraceae	<i>Senecio brigalowensis</i>			C		1/1
plants	land plants	Asteraceae	<i>Senecio madagascariensis</i>	fireweed	Y			1
plants	land plants	Asteraceae	<i>Sigesbeckia orientalis</i>	Indian weed		C		1
plants	land plants	Asteraceae	<i>Sonchus oleraceus</i>	common sowthistle	Y			1
plants	land plants	Asteraceae	<i>Vittadinia sulcata</i>	native daisy		C		3/1
plants	land plants	Asteraceae	<i>Xanthium occidentale</i>		Y			1
plants	land plants	Asteraceae	<i>Xanthium spinosum</i>	Bathurst burr	Y			1
plants	land plants	Asteraceae	<i>Zinnia peruviana</i>	wild zinnia	Y			1/1
plants	land plants	Basellaceae	<i>Anredera cordifolia</i>	Madeira vine	Y			1

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plants	land plants	Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine		C		5
plants	land plants	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		1
plants	land plants	Brassicaceae	<i>Lepidium bonariense</i>	Argentine peppergrass	Y			1
plants	land plants	Brassicaceae	<i>Rorippa laciniata</i>			C		1/1
plants	land plants	Brassicaceae	<i>Sisymbrium</i>					1
plants	land plants	Brassicaceae	<i>Sisymbrium thellungii</i>	African turnip-weed	Y			1/1
plants	land plants	Byttneriaceae	<i>Commersonia pedleyi</i>			C		7/7
plants	land plants	Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear	Y			19
plants	land plants	Campanulaceae	<i>Wahlenbergia capillaris</i>			SL		1
plants	land plants	Campanulaceae	<i>Wahlenbergia gracilis</i>	sprawling bluebell		SL		1
plants	land plants	Campanulaceae	<i>Wahlenbergia graniticola</i>	granite bluebell		SL		1/1
plants	land plants	Capparaceae	<i>Capparis anomala</i>			C		6
plants	land plants	Capparaceae	<i>Capparis arborea</i>	brush caper berry		C		6
plants	land plants	Capparaceae	<i>Capparis canescens</i>			C		4
plants	land plants	Capparaceae	<i>Capparis lasiantha</i>	nipan		C		8
plants	land plants	Capparaceae	<i>Capparis loranthifolia</i> var. <i>loranthifolia</i>			C		1
plants	land plants	Capparaceae	<i>Capparis mitchellii</i>			C		1/1
plants	land plants	Casuarinaceae	<i>Allocasuarina inophloia</i>			C		25/1
plants	land plants	Casuarinaceae	<i>Allocasuarina luehmannii</i>	bull oak		C		6
plants	land plants	Casuarinaceae	<i>Casuarina cristata</i>	belah		C		7
plants	land plants	Casuarinaceae	<i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i>			C		1
plants	land plants	Celastraceae	<i>Denhamia cunninghamii</i>			C		5/1
plants	land plants	Celastraceae	<i>Denhamia disperma</i>			C		2
plants	land plants	Celastraceae	<i>Denhamia silvestris</i>			C		3
plants	land plants	Celastraceae	<i>Elaeodendron australe</i>			C		2
plants	land plants	Celastraceae	<i>Elaeodendron australe</i> var. <i>integrifolium</i>			C		1
plants	land plants	Celastraceae	<i>Siphonodon australis</i>	ivorywood		C		1
plants	land plants	Chenopodiaceae	<i>Atriplex muelleri</i>	lagoon saltbush		C		2/1
plants	land plants	Chenopodiaceae	<i>Atriplex semibaccata</i>	creeping saltbush		C		1/1
plants	land plants	Chenopodiaceae	<i>Chenopodium desertorum</i>			C		1
plants	land plants	Chenopodiaceae	<i>Dysphania carinata</i>			C		1
plants	land plants	Chenopodiaceae	<i>Einadia hastata</i>			C		2
plants	land plants	Chenopodiaceae	<i>Einadia nutans</i> subsp. <i>nutans</i>			C		1
plants	land plants	Chenopodiaceae	<i>Enchylaena tomentosa</i>			C		3
plants	land plants	Chenopodiaceae	<i>Maireana microphylla</i>			C		5
plants	land plants	Chenopodiaceae	<i>Salsola australis</i>			C		2
plants	land plants	Chenopodiaceae	<i>Sclerolaena bicornis</i> var. <i>horrida</i>			C		1
plants	land plants	Chenopodiaceae	<i>Sclerolaena birchii</i>	galvanised burr		C		2
plants	land plants	Chenopodiaceae	<i>Sclerolaena lanicuspis</i>			C		1
plants	land plants	Chenopodiaceae	<i>Sclerolaena muricata</i> var. <i>muricata</i>			C		1/1
plants	land plants	Commelinaceae	<i>Commelina diffusa</i>	wandering jew		C		1
plants	land plants	Commelinaceae	<i>Commelina ensifolia</i>	scurvy grass		C		1
plants	land plants	Convolvulaceae	<i>Convolvulus arvensis</i>		Y			2/1
plants	land plants	Convolvulaceae	<i>Convolvulus graminetinus</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			C		1
plants	land plants	Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			C		1

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plants	land plants	Crassulaceae	<i>Bryophyllum delagoense</i>		Y			6
plants	land plants	Crassulaceae	<i>Bryophyllum x houghtonii</i>		Y			3
plants	land plants	Cucurbitaceae	<i>Citrullus amarus</i>		Y			1/1
plants	land plants	Cupressaceae	<i>Callitris endlicheri</i>	black cypress pine			C	9
plants	land plants	Cupressaceae	<i>Callitris glaucophylla</i>	white cypress pine			C	8
plants	land plants	Cyperaceae	<i>Abildgaardia ovata</i>				C	1/1
plants	land plants	Cyperaceae	<i>Bulbostylis barbata</i>				C	2
plants	land plants	Cyperaceae	<i>Bulbostylis pyriformis</i>				C	1/1
plants	land plants	Cyperaceae	<i>Carex appressa</i>				C	1
plants	land plants	Cyperaceae	<i>Carex inversa</i>	knob sedge			C	1/1
plants	land plants	Cyperaceae	<i>Cyperus</i>					1
plants	land plants	Cyperaceae	<i>Cyperus betchei subsp. betchei</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus bowmanni</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus flaccidus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus fulvus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus gracilis</i>				C	2/1
plants	land plants	Cyperaceae	<i>Cyperus leptocarpus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus squarrosus</i>	bearded flatsedge			C	1/1
plants	land plants	Cyperaceae	<i>Eleocharis cylindrostachys</i>				C	3/3
plants	land plants	Cyperaceae	<i>Eleocharis pallens</i>	pale spikerush			C	1
plants	land plants	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush			C	1
plants	land plants	Cyperaceae	<i>Gahnia aspera</i>				C	12/1
plants	land plants	Cyperaceae	<i>Schoenus kennyi</i>				C	4
plants	land plants	Cyperaceae	<i>Scleria mackaviensis</i>				C	4/1
plants	land plants	Cyperaceae	<i>Scleria sphacelata</i>				C	6/1
plants	land plants	Dicranaceae	<i>Sclerodontium clavinerve</i>				C	1/1
plants	land plants	Dilleniaceae	<i>Hibbertia cistoidea</i>				C	3/3
plants	land plants	Dilleniaceae	<i>Hibbertia stricta var. stricta</i>				C	1
plants	land plants	Droseraceae	<i>Drosera hookeri</i>				SL	2/2
plants	land plants	Droseraceae	<i>Drosera lunata</i>				SL	1/1
plants	land plants	Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony			C	2
plants	land plants	Elatinaceae	<i>Elatine gratiolooides</i>	waterwort			C	1/1
plants	land plants	Ericaceae	<i>Agortia pleiosperma</i>				C	3/3
plants	land plants	Ericaceae	<i>Lissanthe pluriloculata</i>				C	6/5
plants	land plants	Ericaceae	<i>Melichrus adpressus</i>				C	1/1
plants	land plants	Ericaceae	<i>Melichrus sp. (Isla Gorge P.Sharpe+ 601)</i>				C	4/2
plants	land plants	Ericaceae	<i>Melichrus urceolatus</i>	honey gorse			C	6/4
plants	land plants	Ericaceae	<i>Styphelia blakei</i>				C	2/2
plants	land plants	Ericaceae	<i>Styphelia mitchellii</i>				C	5/3
plants	land plants	Ericaceae	<i>Styphelia mutica</i>				C	1
plants	land plants	Euphorbiaceae	<i>Acalypha capillipes</i>	small-leaved acalypha			C	3
plants	land plants	Euphorbiaceae	<i>Acalypha eremorum</i>	soft acalypha			C	2/1
plants	land plants	Euphorbiaceae	<i>Bertya oleifolia</i>				C	1/1
plants	land plants	Euphorbiaceae	<i>Croton insularis</i>	Queensland cascarilla			C	10
plants	land plants	Euphorbiaceae	<i>Croton phebalioides</i>	narrow-leaved croton			C	2
plants	land plants	Euphorbiaceae	<i>Euphorbia dallachyana</i>				C	1/1

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plants	land plants	Euphorbiaceae	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Brunonia australis</i>	blue pincushion		SL		1/1
plants	land plants	Goodeniaceae	<i>Dampiera adpressa</i>			C		6/4
plants	land plants	Goodeniaceae	<i>Dampiera discolor</i>			C		5/1
plants	land plants	Goodeniaceae	<i>Goodenia bellidifolia</i> subsp. <i>argentea</i>			C		1
plants	land plants	Goodeniaceae	<i>Goodenia caroliniana</i>			C		2/2
plants	land plants	Goodeniaceae	<i>Goodenia glabra</i>			C		3
plants	land plants	Goodeniaceae	<i>Scaevola spinescens</i>	prickly fan flower		C		1/1
plants	land plants	Haloragaceae	<i>Gonocarpus urceolatus</i>			C		2/2
plants	land plants	Haloragaceae	<i>Myriophyllum verrucosum</i>	water milfoil		C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i>			C		2/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i> var. <i>protensa</i>			C		1
plants	land plants	Hemerocallidaceae	<i>Dianella longifolia</i>			C		2
plants	land plants	Hemerocallidaceae	<i>Dianella longifolia</i> var. <i>longifolia</i>			C		2
plants	land plants	Hemerocallidaceae	<i>Dianella rara</i>			C		6/1
plants	land plants	Hemerocallidaceae	<i>Dianella revoluta</i> var. <i>revoluta</i>			C		5
plants	land plants	Hypoxidaceae	<i>Hypoxis pratensis</i> var. <i>tuberculata</i>			C		1/1
plants	land plants	Isoetaceae	<i>Isoetes muelleri</i>	quillwort		C		1/1
plants	land plants	Johnsoniaceae	<i>Tricoryne anceps</i> subsp. <i>anceps</i>			C		3
plants	land plants	Johnsoniaceae	<i>Tricoryne elatior</i>	yellow autumn lily		C		1
plants	land plants	Juncaceae	<i>Juncus aridicola</i>	tussock rush		C		3
plants	land plants	Juncaceae	<i>Juncus</i> sp. (Nindigully R.Roe AQ139509)			C		1
plants	land plants	Lamiaceae	<i>Coleus australis</i>			C		2
plants	land plants	Lamiaceae	<i>Prostanthera cryptandroides</i> subsp. <i>euphrasioides</i>			C		2/2
plants	land plants	Lamiaceae	<i>Prostanthera ringens</i>			C		1
plants	land plants	Lamiaceae	<i>Teucrium junceum</i>			C		3/1
plants	land plants	Lamiaceae	<i>Westringia cheelii</i>			C		6/6
plants	land plants	Laxmanniaceae	<i>Eustrephus latifolius</i>	wombat berry		C		5
plants	land plants	Laxmanniaceae	<i>Laxmannia gracilis</i>	slender wire lily		C		2/2
plants	land plants	Laxmanniaceae	<i>Lomandra confertifolia</i> subsp. <i>pallida</i>			C		4/1
plants	land plants	Laxmanniaceae	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>			C		10
plants	land plants	Laxmanniaceae	<i>Lomandra longifolia</i>			C		5
plants	land plants	Laxmanniaceae	<i>Lomandra multiflora</i> subsp. <i>multiflora</i>			C		7
plants	land plants	Leguminosae	<i>Acacia</i>					5
plants	land plants	Leguminosae	<i>Acacia blakei</i> subsp. <i>blakei</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia burbridgeae</i>			C		2/2
plants	land plants	Leguminosae	<i>Acacia burrowii</i>			C		3
plants	land plants	Leguminosae	<i>Acacia buxifolia</i> subsp. <i>pubiflora</i>			C		3/3
plants	land plants	Leguminosae	<i>Acacia caroleae</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia complanata</i>	flatstem wattle		C		1/1
plants	land plants	Leguminosae	<i>Acacia conferta</i>			C		2/1
plants	land plants	Leguminosae	<i>Acacia crassa</i>			C		1
plants	land plants	Leguminosae	<i>Acacia crassa</i> subsp. <i>crassa</i>			C		4/1
plants	land plants	Leguminosae	<i>Acacia crassa</i> subsp. <i>longicoma</i>			C		23/2
plants	land plants	Leguminosae	<i>Acacia curranii</i>	curly-bark wattle		V	V	9/9
plants	land plants	Leguminosae	<i>Acacia deanei</i>			C		1/1

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plants	land plants	Leguminosae	<i>Acacia decora</i>	pretty wattle		C		2
plants	land plants	Leguminosae	<i>Acacia excelsa</i>			C		1
plants	land plants	Leguminosae	<i>Acacia excelsa subsp. excelsa</i>			C		2
plants	land plants	Leguminosae	<i>Acacia hakeoides</i>	hakea wattle		C		2
plants	land plants	Leguminosae	<i>Acacia harpophylla</i>	brigalow		C		6
plants	land plants	Leguminosae	<i>Acacia julifera subsp. julifera</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia juncifolia</i>			C		3/2
plants	land plants	Leguminosae	<i>Acacia leiocalyx subsp. leiocalyx</i>			C		3/1
plants	land plants	Leguminosae	<i>Acacia longispicata</i>			C		4/2
plants	land plants	Leguminosae	<i>Acacia neriifolia</i>	pechey wattle		C		2/2
plants	land plants	Leguminosae	<i>Acacia oswaldii</i>	miljee		C		2/1
plants	land plants	Leguminosae	<i>Acacia penninervis var. penninervis</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia podalyriifolia</i>	Queensland silver wattle		C		1
plants	land plants	Leguminosae	<i>Acacia salicina</i>	doolan		C		2
plants	land plants	Leguminosae	<i>Acacia shirleyi</i>	lancewood		C		85
plants	land plants	Leguminosae	<i>Acacia sparsiflora</i>			C		12
plants	land plants	Leguminosae	<i>Acacia triptera</i>			C		10/4
plants	land plants	Leguminosae	<i>Acacia wardellii</i>			NT		2/2
plants	land plants	Leguminosae	<i>Chorizema parviflorum</i>	eastern flame pea		C		1
plants	land plants	Leguminosae	<i>Daviesia genistifolia</i>	broom bitter pea		C		1/1
plants	land plants	Leguminosae	<i>Desmodium brachypodium</i>	large ticktrefoil		C		1/1
plants	land plants	Leguminosae	<i>Desmodium varians</i>	slender tick trefoil		C		2
plants	land plants	Leguminosae	<i>Glycine clandestina</i>			C		1
plants	land plants	Leguminosae	<i>Glycine clandestina var. sericea</i>			C		1
plants	land plants	Leguminosae	<i>Glycine tabacina</i>	glycine pea		C		1
plants	land plants	Leguminosae	<i>Glycine tomentella</i>	woolly glycine		C		1
plants	land plants	Leguminosae	<i>Hovea tholiformis</i>			C		1/1
plants	land plants	Leguminosae	<i>Indigofera linnaei</i>	Birdsville indigo		C		1/1
plants	land plants	Leguminosae	<i>Jacksonia rhadinoclona</i>	Miles dogwood		C		5/5
plants	land plants	Leguminosae	<i>Jacksonia scoparia</i>			C		1/1
plants	land plants	Leguminosae	<i>Labichea digitata</i>			C		3/1
plants	land plants	Leguminosae	<i>Lotus australis</i>	Australian trefoil		C		1
plants	land plants	Leguminosae	<i>Lysiphyllum carronii</i>	ebony tree		C		1
plants	land plants	Leguminosae	<i>Macroptilium</i>					1
plants	land plants	Leguminosae	<i>Melilotus indicus</i>	hexham scent		Y		1/1
plants	land plants	Leguminosae	<i>Neptunia gracilis forma gracilis</i>			C		3/2
plants	land plants	Leguminosae	<i>Rhynchosia minima var. australis</i>			C		2/2
plants	land plants	Leguminosae	<i>Senna acclinis</i>			C		1/1
plants	land plants	Leguminosae	<i>Senna artemisioides</i>			C		1
plants	land plants	Leguminosae	<i>Senna artemisioides subsp. coriacea</i>			C		1
plants	land plants	Leguminosae	<i>Senna barclayana</i>			C		6
plants	land plants	Leguminosae	<i>Sesbania cannabina var. cannabina</i>			C		1/1
plants	land plants	Leguminosae	<i>Swainsona galegifolia</i>	smooth Darling pea		C		1
plants	land plants	Leguminosae	<i>Vachellia bidwillii</i>			C		1
plants	land plants	Leguminosae	<i>Vachellia farnesiana</i>			Y		12
plants	land plants	Linderniaceae	<i>Lindernia hyssopoides</i>			C		1/1

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plants	land plants	Loranthaceae	<i>Amyema</i>					1
plants	land plants	Loranthaceae	<i>Amyema biniflora</i>			C		1/1
plants	land plants	Loranthaceae	<i>Amyema quandang</i> var. <i>bancroftii</i>	broad-leaved grey mistletoe		C		1
plants	land plants	Loranthaceae	<i>Amyema quandang</i> var. <i>quandang</i>			C		1/1
plants	land plants	Loranthaceae	<i>Lysiana subfalcata</i>			C		1/1
plants	land plants	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry		C		2/2
plants	land plants	Lythraceae	<i>Rotala mexicana</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon oxycarpum</i>			C		4
plants	land plants	Malvaceae	<i>Abutilon oxycarpum</i> var. <i>incanum</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon oxycarpum</i> var. <i>oxycarpum</i>			C		3
plants	land plants	Malvaceae	<i>Hibiscus brachysiphonius</i>			C		1
plants	land plants	Malvaceae	<i>Hibiscus sturtii</i>			C		1
plants	land plants	Malvaceae	<i>Hibiscus sturtii</i> var. <i>sturtii</i>			C		4
plants	land plants	Malvaceae	<i>Malvastrum americanum</i> var. <i>americanum</i>		Y			1/1
plants	land plants	Malvaceae	<i>Sida cordifolia</i>		Y			4/1
plants	land plants	Malvaceae	<i>Sida hackettiana</i>			C		2
plants	land plants	Malvaceae	<i>Sida trichopoda</i>			C		3
plants	land plants	Marsileaceae	<i>Marsilea</i>					1
plants	land plants	Meliaceae	<i>Owenia acidula</i>	emu apple		C		8
plants	land plants	Meliaceae	<i>Owenia venosa</i>	crow's apple		C		1
plants	land plants	Menispermaceae	<i>Tinospora smilacina</i>	snakevine		C		1
plants	land plants	Meteoriaceae	<i>Papillaria crocea</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus virens</i> var. <i>virens</i>			C		7
plants	land plants	Moraceae	<i>Trophis scandens</i>			C		1
plants	land plants	Moraceae	<i>Trophis scandens</i> subsp. <i>scandens</i>			C		1
plants	land plants	Myrtaceae	<i>Angophora floribunda</i>	rough-barked apple		C		2
plants	land plants	Myrtaceae	<i>Angophora leiocarpa</i>	rusty gum		C		4
plants	land plants	Myrtaceae	<i>Calytrix guruhmundensis</i>			V	V	22/21
plants	land plants	Myrtaceae	<i>Calytrix tetragona</i>	fringe myrtle		C		7/5
plants	land plants	Myrtaceae	<i>Corymbia bloxsomei</i>			C		1
plants	land plants	Myrtaceae	<i>Corymbia citriodora</i>	spotted gum		C		1
plants	land plants	Myrtaceae	<i>Corymbia citriodora</i> subsp. <i>variegata</i>			C		184
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		2
plants	land plants	Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C		1
plants	land plants	Myrtaceae	<i>Corymbia trachyphloia</i>			C		2
plants	land plants	Myrtaceae	<i>Corymbia trachyphloia</i> subsp. <i>trachyphloia</i>			C		21/1
plants	land plants	Myrtaceae	<i>Eucalyptus apothalassica</i>			C		6/4
plants	land plants	Myrtaceae	<i>Eucalyptus camaldulensis</i> subsp. <i>acuta</i>			C		1
plants	land plants	Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine red gum		C		1
plants	land plants	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark		C		77/3
plants	land plants	Myrtaceae	<i>Eucalyptus curtisii</i>	Plunkett mallee		NT		3/3
plants	land plants	Myrtaceae	<i>Eucalyptus elegans</i>			C		1
plants	land plants	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint		C		25/8
plants	land plants	Myrtaceae	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i>			C		5
plants	land plants	Myrtaceae	<i>Eucalyptus fibrosa</i> subsp. <i>nubilis</i>			C		36
plants	land plants	Myrtaceae	<i>Eucalyptus longirostrata</i>			C		6

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plants	land plants	Myrtaceae	<i>Eucalyptus melanophloia</i>			C		2
plants	land plants	Myrtaceae	<i>Eucalyptus melliodora</i>	yellow box		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus microcarpa</i>	inland grey box		C		2
plants	land plants	Myrtaceae	<i>Eucalyptus orgadophila</i>	mountain coolibah		C		3/2
plants	land plants	Myrtaceae	<i>Eucalyptus panda</i>			C		4/4
plants	land plants	Myrtaceae	<i>Eucalyptus populnea</i>	poplar box		C		4/2
plants	land plants	Myrtaceae	<i>Eucalyptus tenuipes</i>	narrow-leaved white mahogany		C		34/6
plants	land plants	Myrtaceae	<i>Eucalyptus tereticornis</i>			C		1
plants	land plants	Myrtaceae	<i>Eucalyptus tereticornis</i> subsp. <i>tereticornis</i>			C		3/1
plants	land plants	Myrtaceae	<i>Eucalyptus thozetiana</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus woollsiana</i>			C		1
plants	land plants	Myrtaceae	<i>Harmogia densifolia</i>			C		3/3
plants	land plants	Myrtaceae	<i>Homalocalyx polyandrus</i>			C		11/10
plants	land plants	Myrtaceae	<i>Homoranthus melanostictus</i>			C		1/1
plants	land plants	Myrtaceae	<i>Kardomia jucunda</i>			C		2/2
plants	land plants	Myrtaceae	<i>Kunzea opposita</i>			C		3
plants	land plants	Myrtaceae	<i>Kunzea opposita</i> var. <i>opposita</i>			C		3/3
plants	land plants	Myrtaceae	<i>Leptospermum polygalifolium</i>	tantoon		C		2
plants	land plants	Myrtaceae	<i>Lysicarpus angustifolius</i>	budgeroo		C		6
plants	land plants	Myrtaceae	<i>Melaleuca nodosa</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca thymifolia</i>	thyme honeymyrtle		C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca uncinata</i>			C		4/1
plants	land plants	Myrtaceae	<i>Micromyrtus carinata</i>	Gurulmundi heath-myrtle		E		31/28
plants	land plants	Myrtaceae	<i>Micromyrtus sessilis</i>			C		5/3
plants	land plants	Nyctaginaceae	<i>Boerhavia dominii</i>			C		1
plants	land plants	Oleaceae	<i>Jasminum didymum</i>			C		1
plants	land plants	Oleaceae	<i>Jasminum didymum</i> subsp. <i>lineare</i>			C		2
plants	land plants	Oleaceae	<i>Jasminum simplicifolium</i> subsp. <i>australiense</i>			C		3
plants	land plants	Oleaceae	<i>Notelaea microcarpa</i>			C		9/1
plants	land plants	Orchidaceae	<i>Cyanicula caerulea</i>			SL		1/1
plants	land plants	Orchidaceae	<i>Cymbidium canaliculatum</i>			SL		4
plants	land plants	Orchidaceae	<i>Dipodium hamiltonianum</i>	yellow hyacinth orchid		SL		1/1
plants	land plants	Orchidaceae	<i>Diuris tricolor</i>			SL		2/2
plants	land plants	Oxalidaceae	<i>Oxalis corniculata</i>			Y		2
plants	land plants	Papaveraceae	<i>Argemone mexicana</i>	prickly poppy		Y		1
plants	land plants	Pentapetaceae	<i>Melhania oblongifolia</i>			C		1
plants	land plants	Phyllanthaceae	<i>Breynia oblongifolia</i>			C		1
plants	land plants	Phyllanthaceae	<i>Phyllanthus occidentalis</i>			C		1
plants	land plants	Picrodendraceae	<i>Petalostigma pachyphyllum</i>			C		1
plants	land plants	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree		C		10/1
plants	land plants	Pittosporaceae	<i>Auranticarpa rhombifolia</i>			C		2
plants	land plants	Pittosporaceae	<i>Bursaria spinosa</i> subsp. <i>spinosa</i>			C		6
plants	land plants	Pittosporaceae	<i>Pittosporum angustifolium</i>			C		4/3
plants	land plants	Pittosporaceae	<i>Pittosporum lancifolium</i>			C		3
plants	land plants	Pittosporaceae	<i>Pittosporum spinescens</i>			C		4
plants	land plants	Plantaginaceae	<i>Gratiola pedunculata</i>			C		1/1

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plants	land plants	Poaceae	<i>Ancistrachne uncinulata</i>	hooky grass		C		8/2
plants	land plants	Poaceae	<i>Aristida blakei</i>			C		1
plants	land plants	Poaceae	<i>Aristida calycina</i>			C		1
plants	land plants	Poaceae	<i>Aristida calycina</i> var. <i>calycina</i>			C		1/1
plants	land plants	Poaceae	<i>Aristida caput-medusae</i>			C		10
plants	land plants	Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>			C		1
plants	land plants	Poaceae	<i>Aristida jerichoensis</i>			C		1
plants	land plants	Poaceae	<i>Aristida jerichoensis</i> var. <i>jerichoensis</i>			C		2/2
plants	land plants	Poaceae	<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>			C		3
plants	land plants	Poaceae	<i>Aristida leichhardtiana</i>			C		4
plants	land plants	Poaceae	<i>Aristida personata</i>			C		6/1
plants	land plants	Poaceae	<i>Aristida queenslandica</i> var. <i>dissimilis</i>			C		1
plants	land plants	Poaceae	<i>Aristida queenslandica</i> var. <i>queenslandica</i>			C		1
plants	land plants	Poaceae	<i>Aristida ramosa</i>	purple wiregrass		C		2
plants	land plants	Poaceae	<i>Aristida vagans</i>			C		2
plants	land plants	Poaceae	<i>Arundinella nepalensis</i>	reedgrass		C		3
plants	land plants	Poaceae	<i>Austrostipa ramosissima</i>	bamboo grass		C		5/1
plants	land plants	Poaceae	<i>Bothriochloa pertusa</i>		Y			1
plants	land plants	Poaceae	<i>Brachyachne convergens</i>	common native couch		C		1/1
plants	land plants	Poaceae	<i>Cenchrus ciliaris</i>		Y			3
plants	land plants	Poaceae	<i>Cenchrus spinifex</i>		Y			1/1
plants	land plants	Poaceae	<i>Chloris divaricata</i>			C		1
plants	land plants	Poaceae	<i>Chloris gayana</i>	rhodes grass	Y			1
plants	land plants	Poaceae	<i>Chloris ventricosa</i>	tall chloris		C		3
plants	land plants	Poaceae	<i>Chloris virgata</i>	feathertop rhodes grass	Y			1
plants	land plants	Poaceae	<i>Cymbopogon bombycinus</i>	silky oilgrass		C		1
plants	land plants	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass		C		5
plants	land plants	Poaceae	<i>Cynodon dactylon</i>		Y			1
plants	land plants	Poaceae	<i>Dactyloctenium radulans</i>	button grass		C		1
plants	land plants	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>			C		3/1
plants	land plants	Poaceae	<i>Digitaria breviglumis</i>			C		1
plants	land plants	Poaceae	<i>Digitaria didactyla</i>	Queensland blue couch	Y			1
plants	land plants	Poaceae	<i>Digitaria divaricatissima</i>	spreading umbrella grass		C		1/1
plants	land plants	Poaceae	<i>Digitaria parviflora</i>			C		2
plants	land plants	Poaceae	<i>Dimorphochloa rigida</i>			C		2/2
plants	land plants	Poaceae	<i>Dinebra decipiens</i> var. <i>asthenes</i>			C		1/1
plants	land plants	Poaceae	<i>Dinebra decipiens</i> var. <i>peacockii</i>			C		2/1
plants	land plants	Poaceae	<i>Enneapogon</i>					1
plants	land plants	Poaceae	<i>Enneapogon lindleyanus</i>			C		5/1
plants	land plants	Poaceae	<i>Enneapogon nigricans</i>	niggerheads		C		1
plants	land plants	Poaceae	<i>Enteropogon acicularis</i>	curly windmill grass		C		1
plants	land plants	Poaceae	<i>Enteropogon unispiceus</i>			C		2/2
plants	land plants	Poaceae	<i>Entolasia stricta</i>	wiry panic		C		5
plants	land plants	Poaceae	<i>Eragrostis</i>					3/1
plants	land plants	Poaceae	<i>Eragrostis curvula</i>		Y			2/1
plants	land plants	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass		C		3

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plants	land plants	Poaceae	<i>Eragrostis megalosperma</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis sororia</i>			C		4
plants	land plants	Poaceae	<i>Eragrostis speciosa</i>			C		1/1
plants	land plants	Poaceae	<i>Eriachne mucronata forma (Alpha C.E.Hubbard 7882)</i>			C		3/2
plants	land plants	Poaceae	<i>Eriachne pallescens</i>			C		1
plants	land plants	Poaceae	<i>Eriochloa pseudoacrotricha</i>			C		1/1
plants	land plants	Poaceae	<i>Eulalia aurea</i>	silky browntop		C		1/1
plants	land plants	Poaceae	<i>Heteropogon contortus</i>	black speargrass		C		2
plants	land plants	Poaceae	<i>Homopholis belsonii</i>	Belson's panic		E	V	1/1
plants	land plants	Poaceae	<i>Imperata cylindrica</i>	blady grass		C		1
plants	land plants	Poaceae	<i>Iseilema macratherum</i>			C		3
plants	land plants	Poaceae	<i>Leptochloa digitata</i>			C		1
plants	land plants	Poaceae	<i>Megathyrsus maximus</i>		Y			1
plants	land plants	Poaceae	<i>Megathyrsus maximus var. pubiglumis</i>		Y			1
plants	land plants	Poaceae	<i>Melinis repens</i>	red natal grass	Y			3
plants	land plants	Poaceae	<i>Panicum buncei</i>			C		2/2
plants	land plants	Poaceae	<i>Panicum decompositum</i>			C		2
plants	land plants	Poaceae	<i>Panicum effusum</i>			C		4
plants	land plants	Poaceae	<i>Paspalidium caespitosum</i>	brigalow grass		C		2/1
plants	land plants	Poaceae	<i>Perotis rara</i>	comet grass		C		1/1
plants	land plants	Poaceae	<i>Rytidosperma indutum</i>			C		1
plants	land plants	Poaceae	<i>Sarga leiocladum</i>			C		2
plants	land plants	Poaceae	<i>Setaria paspalidioides</i>			C		1/1
plants	land plants	Poaceae	<i>Setaria surgens</i>			C		3/2
plants	land plants	Poaceae	<i>Sorghum arundinaceum</i>	Rhodesian Sudan grass	Y			1
plants	land plants	Poaceae	<i>Sporobolus caroli</i>	fairy grass		C		3/1
plants	land plants	Poaceae	<i>Sporobolus coromandelianus</i>		Y			1/1
plants	land plants	Poaceae	<i>Sporobolus elongatus</i>			C		3
plants	land plants	Poaceae	<i>Thellungia advena</i>	coolibah grass		C		2
plants	land plants	Poaceae	<i>Themeda intermedia</i>		Y			1
plants	land plants	Poaceae	<i>Themeda quadrivalvis</i>	grader grass	Y			1
plants	land plants	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		3
plants	land plants	Poaceae	<i>Triodia scariosa</i>			C		5/3
plants	land plants	Poaceae	<i>Urochloa mosambicensis</i>	sabi grass	Y			1
plants	land plants	Portulacaceae	<i>Calandrinia pickeringii</i>			C		1/1
plants	land plants	Portulacaceae	<i>Portulaca oleracea</i>	pigweed	Y			2
plants	land plants	Proteaceae	<i>Grevillea floribunda subsp. floribunda</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea longistyla</i>			C		2/2
plants	land plants	Proteaceae	<i>Grevillea striata</i>	beefwood		C		2
plants	land plants	Proteaceae	<i>Hakea lorea subsp. lorea</i>			C		3
plants	land plants	Proteaceae	<i>Hakea purpurea</i>			C		3/3
plants	land plants	Proteaceae	<i>Persoonia sericea</i>	silky geebung		C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes distans</i>	bristly cloak fern		C		4/1
plants	land plants	Pteridaceae	<i>Cheilanthes sieberi subsp. sieberi</i>			C		3
plants	land plants	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		9
plants	land plants	Rhamnaceae	<i>Cryptandra</i>			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Rubiaceae	<i>Cyclophyllum coprosmoides</i>			C		1
plants	land plants	Rubiaceae	<i>Cyclophyllum coprosmoides</i> var. <i>coprosmoides</i>			C		1
plants	land plants	Rubiaceae	<i>Pomax umbellata</i>			C		1
plants	land plants	Rubiaceae	<i>Psydrax odorata</i>			C		5
plants	land plants	Rubiaceae	<i>Psydrax odorata</i> forma <i>buxifolia</i>			C		2
plants	land plants	Rubiaceae	<i>Psydrax odorata</i> forma <i>subnitida</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psydrax oleifolia</i>			C		4
plants	land plants	Rubiaceae	<i>Richardia brasiliensis</i>	white eye	Y			1
plants	land plants	Rubiaceae	<i>Scleromitron galioides</i>			C		1/1
plants	land plants	Rutaceae	<i>Acronychia pauciflora</i>	soft acronychia		C		1
plants	land plants	Rutaceae	<i>Boronia glabra</i>			C		5/3
plants	land plants	Rutaceae	<i>Citrus glauca</i>			C		4
plants	land plants	Rutaceae	<i>Cyanothamnus bipinnatus</i>			C		1
plants	land plants	Rutaceae	<i>Cyanothamnus occidentalis</i>			C		5/5
plants	land plants	Rutaceae	<i>Flindersia australis</i>	crow's ash		C		3
plants	land plants	Rutaceae	<i>Geijera parviflora</i>	wilga		C		11
plants	land plants	Rutaceae	<i>Geijera salicifolia</i>	brush wilga		C		2
plants	land plants	Rutaceae	<i>Phebalium squamulosum</i> subsp. <i>gracile</i>			C		5/3
plants	land plants	Rutaceae	<i>Zieria aspalathoides</i> subsp. <i>aspalathoides</i>			C		1/1
plants	land plants	Santalaceae	<i>Anthobolus leptomerioides</i>			C		2/2
plants	land plants	Santalaceae	<i>Exocarpos cupressiformis</i>	native cherry		C		1
plants	land plants	Santalaceae	<i>Exocarpos latifolius</i>			C		1/1
plants	land plants	Santalaceae	<i>Santalum lanceolatum</i>			SL		4
plants	land plants	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		3/1
plants	land plants	Sapindaceae	<i>Alectryon diversifolius</i>	scrub boonaree		C		8/1
plants	land plants	Sapindaceae	<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>			C		1
plants	land plants	Sapindaceae	<i>Atalaya hemiglauca</i>			C		4
plants	land plants	Sapindaceae	<i>Dodonaea</i>					4/4
plants	land plants	Sapindaceae	<i>Dodonaea filifolia</i>			C		2/2
plants	land plants	Sapindaceae	<i>Dodonaea triangularis</i>			C		6/1
plants	land plants	Sapindaceae	<i>Dodonaea viscosa</i>			C		2
plants	land plants	Sapotaceae	<i>Planchonella cotinifolia</i>			C		4
plants	land plants	Scrophulariaceae	<i>Eremophila debilis</i>	winter apple		C		1
plants	land plants	Scrophulariaceae	<i>Eremophila deserti</i>			C		4/2
plants	land plants	Scrophulariaceae	<i>Eremophila longifolia</i>	berrigan		C		1
plants	land plants	Scrophulariaceae	<i>Eremophila mitchellii</i>			C		4/1
plants	land plants	Solanaceae	<i>Nicotiana forsteri</i>			C		1/1
plants	land plants	Solanaceae	<i>Nicotiana megalosiphon</i>			C		1/1
plants	land plants	Solanaceae	<i>Physalis lanceifolia</i>		Y			1/1
plants	land plants	Solanaceae	<i>Solanum</i>					2
plants	land plants	Solanaceae	<i>Solanum aviculare</i>	kangaroo apple		C		1
plants	land plants	Solanaceae	<i>Solanum coracinum</i>			C		3/3
plants	land plants	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		3/2
plants	land plants	Solanaceae	<i>Solanum jucundum</i>			C		3/3
plants	land plants	Solanaceae	<i>Solanum mitchellianum</i>			C		4/2
plants	land plants	Solanaceae	<i>Solanum nemophilum</i>			C		12/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Solanaceae	<i>Solanum parvifolium</i>			C		2
plants	land plants	Solanaceae	<i>Solanum parvifolium</i> subsp. <i>parvifolium</i>			C		1/1
plants	land plants	Solanaceae	<i>Solanum semiarmatum</i>	prickly nightshade		C		5
plants	land plants	Solanaceae	<i>Solanum stenopterum</i>			V		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C		4/1
plants	land plants	Sterculiaceae	<i>Brachychiton australis</i>	broad-leaved bottle tree		SL		2
plants	land plants	Sterculiaceae	<i>Brachychiton populneus</i>			C		2
plants	land plants	Sterculiaceae	<i>Brachychiton populneus</i> subsp. <i>populneus</i>			SL		2
plants	land plants	Sterculiaceae	<i>Brachychiton populneus</i> subsp. <i>trilobus</i>			SL		3
plants	land plants	Sterculiaceae	<i>Brachychiton rupestris</i>			SL		14
plants	land plants	Stylidiaceae	<i>Stylidium debile</i>	frail trigger plant		SL		1/1
plants	land plants	Surianaceae	<i>Cadellia pentastylis</i>	ooline		V	V	37/10
plants	land plants	Thymelaeaceae	<i>Pimelea</i>					1/1
plants	land plants	Verbenaceae	<i>Glandularia aristigera</i>		Y			5
plants	land plants	Verbenaceae	<i>Phyla nodiflora</i>	carpetweed		C		1
plants	land plants	Verbenaceae	<i>Verbena halei</i>		Y			1/1
plants	land plants	Viscaceae	<i>Viscum articulatum</i>	flat mistletoe		C		1/1
plants	land plants	Vitaceae	<i>Causonis clematidea</i>			C		1
plants	land plants	Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>			SL		14
plants	land plants	Zygophyllaceae	<i>Roepera glauca</i>			C		1/1

CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*.

The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.

The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).

This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

APPENDIX B LIKELIHOOD OF OCCURRENCE

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
Listed Threatened Species							
Flora							
<i>Acacia curranii</i>	Curly-bark Wattle	V	V	No	Yes – Locality	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. <i>Suitable habitat (heath associated with rock pavements) is patchily distributed to the south of the Project Area, but not within the Project Area.</i>	Unlikely to occur. <ul style="list-style-type: none"> Project Area is within the distribution for the species. 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 2022a). No records exist within the Project Area however, ten records exist within the 10 km buffer in suitable habitat heath associated with rock pavements on the southern boundary of Gurulmundi State Forest in 1982.
<i>Acacia wardellii</i>	Thomby Range Wattle	NT	-	No	Yes – Locality.	A slender shrub or small tree endemic to south southern inland Queensland from north of Mundubbera to south of Surat (ALA, 2022). Occurs in woodland to tall open forest with <i>Corymbia trachyphloia</i> , <i>C. intermedia</i> , <i>Eucalyptus major</i> , <i>E. cloeziana</i> , <i>E. decorticans</i> and <i>E. crebra</i> on gravelly soils from shallow weathered sandstone. <i>Potential habitat of dry Eucalypt woodlands occurs within the Project Area.</i>	Potential to occur. <ul style="list-style-type: none"> Project Area is within the distribution for the species. Limited areas of potential habitat of dry Eucalypt woodlands occurs within the Project Area. No records within the Project Area but a specimen has been collected in the Locality from Gurulmundi State Forest in 2018 (ALA, 2022). It was also recorded during field surveys within 4 km of the Project Area (Boobook, 2022).
<i>Arythroxon hispidus</i>	Hairy Joint Grass	V	V	No	No	Growing in or on the edges of rainforest and in wet Eucalypt forest, often near creeks or swamps (TSSC, 2008). It has been recorded from many locations in north-eastern NSW and southeast Queensland. Outlying and disjunct populations of this species associated with springs and spring-fed wetlands occur in the Carnarvon Range and Taroom area (DES 2022h). <i>There is a lack of suitable rainforest, wet Eucalypt forest or spring-fed wetland habitats within the Project Area.</i>	Unlikely to occur. <ul style="list-style-type: none"> The Project Area is within the known distribution of the species. Lack of suitable rainforest and wet Eucalypt forest habitat, as well as spring-fed wetlands in the Project Area No recent records exist for this species within the Project Area/ Locality and no observations were made during field surveys. The closest record of the species was recorded 80 km north-east of the Project Area, in cleared, non-native vegetation near Dawson River in 1995.
<i>Cadellia pentastylis</i>	Ooline	V	V	No	Yes – Project Area and Locality.	Ooline grows in 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. <i>This species is present in the southern part of the Project Area (South of Giligulgul Road). It was observed as retained isolated trees and clumps or extensively in remnant Brigalow woodlands.</i>	<ul style="list-style-type: none"> Known to occur. This species is present in the far south-eastern corner of the Project Area (South of Giligulgul Road). It was observed as retained isolated trees and clumps or in remnant Brigalow woodlands. Thirty-five (35) specimen records occur within the Project Area and another six (6) records occurred within the 10 km desktop search area between 1995 and 2020 (DES 2022a). 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

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
							properties, however these forests or reserves are not present within the Project Area. Based on field surveys in 2022 and 2023, 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.
<i>Calytrix gurulmundensis</i>	Gurulmundi Fringe-myrtle	V	V	No	Yes – Locality.	This species is recorded as having an area of occurrence in open shrubland with sparse stunted <i>Eucalypt</i> , <i>Casuarina</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. <i>Suitable habitat (heath associated with rock pavements) is patchily distributed to the south of the Project Area, but not within the Project Area.</i>	Unlikely to occur. <ul style="list-style-type: none"> Project Area is within the distribution for the species. 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 are abundant in Gurulmundi State Forest to the south, including 26 specimen records within 10 km of the Project Area between 1961 and 2021 (DES 2022a). The species is abundant on the plateau area to the south of the Project Area including parts of Gurulmundi State Forest, Stones Country Resources Reserve and adjacent properties.
<i>Dichanthium setosum</i>	Bluegrass	-	V	No	No	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. 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>). <i>Associated species not present within the Project Area and the substrates present were not preferred by the species (prefers basalt derived soils).</i>	Unlikely to occur. <ul style="list-style-type: none"> The Project Area is within the known distribution of the species. Associated species are not present within the Project Area and the substrates present were not preferred by the species (prefers basalt derived soils). No recent records exist for this species within the Project Area, however the species has been recorded within the 10 km buffer, in cleared non-native vegetation in 1971 and 2017.
<i>Eucalyptus curtisii</i>	Plunkett Mallee	NT	-	No	No	This species occurs within the dry sclerophyll woodlands on sandy podosols with blocked drainage, often on clay loams and stony clays with loose stones on the surface. <i>There is no potential habitat present in the form of stony impeded drainage soils within the Project Area.</i>	Unlikely to occur. <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is no potential habitat present in the form of stony impeded drainage soils within the Project Area. No records within the Project Area, however the species has been recorded within the 10 km buffer, in cleared non-native vegetation in 1966.
<i>Homopholis belsonii</i>	Belson's Panic	E	V	No	Yes – Locality.	It occurs on rocky hills supporting White Box (<i>Eucalyptus albens</i>) and in Wilga (<i>Geijera parviflora</i>) woodland; flat to gently 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. <i>There is potential habitat of Poplar Box and Brigalow woodlands, or open forests present within the Project Area.</i>	Potential to occur. <ul style="list-style-type: none"> Project Area is within the distribution for the species. There are limited areas of potential habitat for this species in the form of isolated patches of Brigalow and Poplar Box open forests and woodlands within the Project Area. There are no records for this species within the Project Area. One specimen has been recorded 2 km to the north at the junction of Woleebie and Wandoan Creeks in 2007 (ALA, 2022; DES, 2022).

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Lepidium monoplocoides</i>	Winged Pepper-cress	-	E	No	No	<p>This 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>Areas of known populations of this species are in the Murray-Darling basin on floodplains and other periodically 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).</p> <p><i>There is a lack of potential habitat in preferred Eucalyptus camaldulensis riparian areas within the Project Area.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> The Project Area is outside of the known distribution for the species. There is a lack of potential habitat in preferred <i>Eucalyptus camaldulensis</i> riparian areas within the Project Area. <p>No recent records exist for this species within the Project Area/Locality and no observations were made during field surveys.</p>
<i>Micromyrtus carinata</i>	Gurulmundi Heath-myrtle	E	-	No	No	<p>A pendulous shrub that occurs on the tops of laterised ridges, on shallow to deep, yellow or red sands. This species is often found growing within heath or open woodland. In such habitats it is found to be associated with species including <i>Triodia</i> sp., <i>Hopolyandrus</i>, <i>Corymbia trachyphloia</i>, <i>Acacia triptera</i> and <i>Eucalyptus exserta</i> (DES, 2022h).</p> <p><i>Suitable habitat (heath associated with rock pavements) is not present within the Project Area.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> The Project Area is within the known distribution of the species. Suitable habitat (heath associated with rock pavements) is not present within the Project Area. <p>No records within the Project Area, however the species has been recorded 11 times within the 10 km buffer, between 1960 and 2014.</p>
<i>Solanum stenopterum</i>	Winged Nightshade	E	-	No	No	<p>Occurs in Poplar Box and <i>Casuarina</i> woodlands, as well as grassland in clay and loam soils. Distributed across the Darling Downs region. The species has been recorded from the Condamine floodplain around Dalby, Chinchilla and Condamine and also from two localities along Tchanning Creek (ALA, 2022).</p> <p><i>There is a suitable habitat associated with Poplar Box and Casuarina woodland within the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. <p>There is limited areas of suitable habitat associated with Poplar Box and <i>Casuarina</i> woodland within the Project Area.</p>
<i>Thesium australe</i>	Austral Toadflax	V	V	No	No	<p>A semi-parasitic species that attaches to the roots of a range of grass species, particularly Kangaroo Grass (<i>Themeda triandra</i>). Distribution includes parts of Queensland, New South Wales, the ACT and Victoria. In Queensland, the species is known in Kumbia, Glen Rock Regional Park, Carnarvon National Park, Crows Nest, Clifton, Warwick, Greenmount, Cambooya, Dalby, the Bunya Mountains, Blackbutt and Imbil. 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).</p> <p><i>Suitable habitat is not present within the Project Area.</i></p>	<p>Unlikely to be present.</p> <ul style="list-style-type: none"> The Project Area is within the distribution for the species. Suitable habitat (heath, Kangaroo Grass grassland) is not present within the Project Area. <p>No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 84 km from the Project Area in cleared, non-native vegetation in 1846.</p>
<i>Vincetoxicum forsteri</i>	Slender Tylophora	E	E	No	No	<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 State Forest, Pilliga West State Forest and Coolbaggie Nature Reserve. <i>Vincetoxicum forsteri</i> inhabits dry scrub, open forest and woodlands associated with <i>Melaleuca uncinata</i>, <i>Eucalyptus fibrosa</i>,</p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. <p>Limited areas of 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</p>

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<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 <i>Casuarina spp.</i> (DECC, 2005a; Forster et al., 2004). <i>Potential habitat of dry Eucalypt woodlands occurs within the far south-eastern corner of the Project Area.</i>	and wetland eucalypt communities considered unsuitable for this species. No records within the Project Area or Locality. The closest record is approximately 99 km south-west of the Project Area in Eucalyptus woodlands with a tussock grassy understorey in 1960.
<i>Xerothamnella herbacea</i>	Null	E	E	No	No	<i>Xerothamnella herbacea</i> is known from two sites northeast 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. <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 (Queensland Herbarium, 2008). <i>There is suitable habitat of Brigalow woodlands present within the Project Area.</i>	Unlikely to occur. <ul style="list-style-type: none"> The Project Area is within the known distribution of the species. There is suitable habitat of Brigalow woodlands present within the Project Area. No recent records exist for this species within the Project Area/Locality and no observations were made during field surveys. The closest record is approximately 90 km south-east of the Project Area in cleared non-native vegetation, recorded in 1984.
Birds							
<i>Aphelocephala leucopsis</i>	Southern Whiteface	V	V	No	No	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 dominated by acacia and eucalypt species. Breeding habitat: This species nests and roosts in tree hollows, in either live or dead standing trees within habitats dominated by Eucalypt and Acacia species. Foraging habitat: This species forages almost exclusively on the ground, with preference for areas with low tree densities and an understorey consisting of herbs and leaf litter in habitats dominated by Eucalypt or Acacia species. <i>Species will utilise almost all habitats present within the Project Area, excluding any cleared grazed.</i>	Potential to occur. <ul style="list-style-type: none"> Project Area is within the distribution for this species. No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 58 km from the Project Area, recorded at campground at Rocky Creek in Yuleba. Species has the potential to utilise almost all habitats present within the Project Area, excluding any cleared grazed land. Potential habitats in the Project Area include all areas of eucalypt open forests/woodlands and acacia woodlands. Whilst potential foraging habitat occurs in all broad habitat types, breeding habitat is more likely to occur in areas of eucalypt open woodland/open forest with tree hollows. These areas of more abundant hollows are present in areas of riparian eucalypt open forest in the Project Area, and the larger patches of eucalypt woodland in the south-east corner.
<i>Lathamus discolor</i>	Swift Parrot	E	CE, Ma	No	No	Majority of the Swift Parrot population winters in Victoria and New South Wales, inhabiting flowering woodlands and forests, including inland box-ironbark and grassy woodlands, coastal swamp mahogany (<i>E. robusta</i>) and spotted gum (<i>Corymbia maculata</i>) when in flower. Species distribution in mainland Australia fluctuates based on the availability of preferential food resources. Breeding habitat: This species does not breed in mainland Australia; breeding habitat is restricted to Tasmania. Foraging habitat: This species forages in the largest trees available, on <i>psyllid</i> lerps, seeds and fruits, with non-breeding birds preferring to feed in inland box-ironbark and grassy woodlands, coastal swamp mahogany (<i>E. robusta</i>) and spotted gum (<i>Corymbia maculata</i>) when in flower.	Unlikely to occur. <ul style="list-style-type: none"> Project Area is not located within the distribution for this species. No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 62 km south from the Project Area, recorded in cleared, non-native vegetation. The Project Area does not contain preferential foraging resources for the Swift Parrot.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Calidris ferruginea</i>	Curlew Sandpiper	CE	CE, Ma and Mi	No	No	<p>This species is occasionally recorded inland, though less often than in coastal regions of Australia, within 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>Breeding habitat: This species does not breed in Australia.</p> <p>Foraging habitat: potential foraging habitat exists in the Project Area in the form of dams.</p> <p>Roosting habitat: this species roost in open situations with damp substrate, especially on bare shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh.</p> <p><i>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.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> Project Area is within the broad distribution of the species, however it is predominantly associated with the coastal fringe around Australia, with occasional vagrants recorded in inland area associated with wetland areas, including farm dams and modified habitats. 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. No records for the species occur within the Project Area/Locality and no observations were made during field surveys. The closest record was recorded 9 km south of the Project Area, in eucalypt woodlands in with a tussock grass understorey in 2014.
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black-cockatoo	V	V	No	Yes – within Locality	<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.</p> <p>Foraging habitat: The glossy black cockatoo feed almost exclusively on the seeds of sheoaks (<i>Allocasuarina</i> spp. and <i>Casuarina</i> spp.), usually relying on one or two species within a region (Higgins 1999).</p> <p>Breeding habitat: They are hollow nesters, utilising large hollows in both living and dead Eucalypt trees (Higgins, 1999).</p> <p><i>Potential foraging and breeding habitat exists in the Project Area, in the form of Eucalypt woodland and mixed Eucalypt/Belah (She-oak) woodland. Additionally, some scattered patches exists within the central portion of the Project Area.</i></p>	<p>Likely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. Potential foraging and breeding habitat exists in the southern and northern portions of the Project Area, in the form of Eucalypt woodland and Belah (She-oak) woodland. Additionally, some scattered patches exists within the central portion of the Project Area. Potential breeding habitat is restricted to habitat types in the Project Area that contain suitable hollow-bearing trees. Potential nest trees occur in remnant eucalypt woodland and forest and in well-developed riparian corridors across the Project Area. Two records within the adjoining area are present from 2009 and were recorded in Eucalypt open forest in with grassy understorey and Brigalow (<i>Acacia harpophylla</i>) forest and woodlands. No observations were made during field surveys.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern)	V	V	No	No	<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>Breeding and roosting habitat: This species nests and roosts in hollows, in either live trees, dead standing trees or tree stumps.</p> <p>Foraging habitat: An open understorey is preferable to enable individuals to forage on or near the ground while maintaining vigilance for predators. Areas with fallen timber provide greater foraging opportunities.</p> <p><i>Patches of suitable Callitris/ Eucalypt woodlands of exist along the Eastern boundary of the Project Area, just North and South of Jackson-Wandoan Road. Additionally Open Eucalyptus forest occurs along the Gurulmundi Road in the south-</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is marginally within the distribution for this species. Suitable habitat is present within the Project Area. No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 194 km from the Project Area in Bluegrass and Tall Bunch Grass tussock grasslands. Small patches of suitable dry Eucalyptus woodland/ forest habitat occurs across the Project Area Whilst potential foraging habitat occurs in all broad habitat types, breeding habitat is more likely to occur in areas of eucalypt open woodland/open forest with tree hollows. These areas of more abundant hollows are

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Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<i>eastern corner of the Project Area. Small patches of open Eucalyptus forest exist both north and south of Weldons Road.</i>	present in areas of riparian eucalypt open forest in the Project Area, and the larger patches of eucalypt woodland in the south-east corner.
<i>Erythrorichis radiatus</i>	Red Goshawk	E	E	No	No	<p>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 avoids very dense and very open habitats. This species has a large home range.</p> <p>Breeding and roosting habitat: This species rarely breeds in areas with fragmented vegetation. Breeding habitat is restricted to trees that are taller than 20 m and within 1km of a watercourse or wetland.</p> <p>Foraging habitat: Habitat has to be open enough for fast hunting and manoeuvring in flight, but with enough cover for ambushing of prey.</p> <p><i>Dense wooded areas for roosting and breeding habitat are lacking in the Project Area.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> Project Area in the Brigalow Belt Bioregion is now considered to be outside of the distribution for the species. There are no validated recent records from this region (since 1997) and the Brigalow Belt Bioregion is now considered to be outside the species distribution (MacColl et al. 2021). Dense wooded areas for roosting and breeding habitat are lacking in the Project Area. No records for the species exist within the immediate Project Area/ Locality and no observations were made during field surveys. The closest record of this species was recorded 62.6 km south-east of the Project Area in cleared, native vegetation.
<i>Falco hypoleucos</i>	Grey Falcon	V	V	No	No	<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>Breeding habitat: Nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (<i>Eucalyptus camaldulensis</i>) and Coolibah (<i>E. coolabah</i>)</p> <p>Foraging habitat: timbered lowland plains, acacia shrubland crossed by tree-line watercourses, as well as treeless areas, tussock grasslands and open woodlands.</p> <p>Roosting habitat: this species is likely to roost in both its breeding and foraging habitat. This species has also been observed roosting on the ground.</p> <p><i>The Grey Falcon requires Acacia shrubland habitat as well as lowland plains associated with water, which is lacking within the Project Area.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> Project Area is within the species distribution. The Grey Falcon requires Acacia shrubland habitat as well as lowland plains associated with water, which is lacking within the Project Area. No records for the species occur within the Project Area/adjoining area and no observations were made during field surveys. The closest record of this species was recorded 63.8 km south-east of the Project Area in eucalyptus woodlands with a shrubby understorey.
<i>Geophaps scripta scripta</i>	Southern Squatter Pigeon	V	V	No	Yes (within the 10 km Locality 2016, but within a large area of suitable habitat)	<p>Southern Squatter pigeon habitat is generally defined as open-forests to sparse, open-woodlands and scrub that are mostly dominated by Eucalyptus, Corymbia or Callitris species. Additionally, they also favour remnant regrowth or partly modified vegetation communities that are within 3 km of water bodies.</p> <p>Breeding habitat: Breeding habitat occurs on stony rises on sandy, gravelly soils, within 1 km of a suitable, permanent waterbody (including farm dams and watercourses).</p> <p>Foraging habitat: Natural foraging habitat for the species is 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>Dispersal habitat: Dispersal habitat is any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies. Additionally, where scattered trees still occur and the distance of cleared land between remnant</p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is a lack of foraging and breeding habitat to the north of Project Area due to it being largely cleared with dense pastoral grasses, however areas of suitable habitat are present in the south-eastern corner of the Project Area in the form of dry woodlands. The landscape in the north of the Project Area is unsuitable for this species being largely cleared and with dense encroachment by pastoral grasses in most remaining woodland patches. Suitable dry woodland habitat remains on and around the plateau in the southeastern part of the Project Area. No records within the Project Area and the closest record is from 2016 in cleared non-native vegetation near Cherwondah State Forest (ALA, 2022),

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						trees or patches of species' habitat does not exceed 100 m, individuals may be found foraging in, or moving across modified or degraded environments (Squatter Pigeon Workshop, 2011). <i>There is a lack of foraging and breeding habitat to the north of Project Area due to it being largely cleared with dense pastoral grasses, however areas of suitable habitat are present in the south-eastern corner of the Project Area in the form of dry woodlands.</i>	which is a large area of suitable habitat around 10 km east of the Project Area.
<i>Grantiella picta</i>	Painted Honeyeater	V	V	No	No	The Painted Honeyeater lives in dry, open forests and woodlands. The species usually occurs in areas with flowering and fruiting mistletoe and flowering Eucalypts. This species prefers Acacia dominated woodlands, as well Paperbarks, Casuarinas, Callitris and Box-Ironbark-Yellow Gum woodlands with a large number of mature trees as these host more Mistletoe. Breeding habitat: breeding habitat is typically mature trees in remnant vegetation with high quantities of mistletoe. Foraging and roosting habitat: Associated with woodlands and forests with Mistletoe. <i>Mistletoe is present sparingly in Eucalypt woodlands across the Project Area that could be utilised as habitat for this species.</i>	Potential to occur. <ul style="list-style-type: none"> Project Area is within the distribution for the species. Areas with a high abundance of mistletoe species in either eucalypt or acacia woodlands provide foraging habitat for this species. 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. No records within the Project Area or Locality. The closest record of this species was recorded 47 km south-east of the Project Area, in eucalypt open forest with tussock grass understorey in 1997.
<i>Hirundapus caudacutus</i>	White-throated Needletail	V	V and Mi	No	No	According to Higgins (1999), this species occurs over most types of habitat, but are recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland (as cited in DSEWPC, 2019b). Whilst rare, they have been recorded on wooded ends of ridges, roosting after dark high in the eucalypt tree canopies (Tarburton, 1993). Breeding habitat: this species does not breed in Australia. Roosting habitat: the species is noted to roost in tall mature forests and woodlands amongst dense foliage and in hollows often associated with ridgelines. Foraging habitat: the species almost always will fly aerially at 'cloud level' and forage over farmland, heathland and mudflats. <i>Species likely to only fly aerially over the Project Area, which contains no rainforest vegetation. The Project Area does not contain habitat in the form of elevated eucalypt forests or wooded ridges to act as foraging and roosting habitat for the species.</i>	Known to occur. <ul style="list-style-type: none"> Project Area is within the distribution for the species. Species likely only to fly aerially over the Project Area (through September to April on its migration), which contains no rainforest vegetation. The Project Area does not contain habitat in the form of elevated Eucalypt forests or wooded ridges to act as foraging and roosting habitat for the species. A flock of eight birds were observed flying low near Weldon's Road on 24 November 2022, during field surveys after those conducted for the current project.
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	No	No	The Australian painted snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. Marchant & Higgins (1993) stated that 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 (as cited in DoE, 2019d). Breeding habitat: requirements specific for this species include shallow wetlands with bare mud and dense low vegetation cover and/or and tree or shrub cover	Potential to occur. <ul style="list-style-type: none"> Project Area is within the distribution for the species. 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. No records within the Project Area or Locality. The closest record of this species was recorded 166 km south-west of the Project Area, in eucalypt open forest with tussock grass understorey.

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Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands.</p> <p>Foraging habitat: 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 bore drains.</p> <p><i>Small areas of foraging habitat present within small ephemeral wetlands on drainage lines. These may provide temporary refuge and foraging habitat for the species and support occasional transient visitors to the Project Area.</i></p>	
<i>Stagonopleura guttata</i>	Diamond Firetail	V	V	No	No (However, within Locality; two records within 25 km in 2019 and 2021 and several within Barakula State Forest, 40 km to the east)	<p>Found in grassy eucalypt, acacia or casuarina woodlands, including Box-Gum Woodlands and Snow Gum <i>Eucalyptus pauciflora</i> Woodlands. 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>Breeding habitat: Nests are globular structures built either in the shrubby understorey, or higher up associated in woodland areas, especially 'under hawk' or raven's nests.</p> <p>Roosting habitat: Birds roost in dense shrubs of woodlands or in smaller nests built especially for roosting.</p> <p>Foraging habitat: 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> <p><i>Suitable habitat includes any Eucalyptus or Acacia woodlands/ forests throughout the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> ● Project Area is within the distribution for this species. ■ Suitable habitat is present within the Project Area. ■ No records exist for this species within the Project Area or within the 10 km Locality and no observations were made in the field. The closest record of the species was recorded 14 km south-west of the Project Area in eucalypt woodlands with shrubby understorey, in 2019. ■ Suitable habitat includes any Eucalyptus woodlands/ forests throughout the Project Area. Species also occurs in Acacia dominant areas.
Fish							
<i>Maccullochella peelii</i>	Murray Cod	-	V	No	No	<p>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.</p> <p>Breeding habitat: 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.</p> <p><i>Suitable habitat is not present in the Project Area due to the ephemeral nature of the creeks at the site, and an absence of deep channels (greater than 2.4m), with slow flowing water.</i></p>	<ul style="list-style-type: none"> ■ Unlikely to be present. ■ Project Area is just outside the distribution for this species. ■ Suitable habitat is not present in the Project Area due to the ephemeral nature of the creeks at the site. ■ No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record is approximately 62 km from the Project Area in the Condamine River in 2015.
Mammals							
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	No	No	<p>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 (DECC, 2007). 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 (DERM, 2011c). Some populations of the Large-eared</p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> ■ The Project Area occurs within the distribution for this species. ■ The southern part of the Project Area includes forested escarpment areas along the Great Dividing Range. However, there are no records within the Western Downs Regional Council area. The closest records are from over

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>Pied Bat would rely in part on the TEC of Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant).</p> <p>Foraging and roosting habitat: 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.</p> <p>Breeding habitat: the species is known to breed in two known locations, which are not in the vicinity of the Project Area.</p> <p><i>Potential habitat of Brigalow present but a lack of sandstone cliffs, and woodland valley areas for roosting.</i></p>	<p>100 km northwest of the Project Area, in the Expedition Ranges (ALA 2022).</p> <ul style="list-style-type: none"> Limited areas of potential habitat of Brigalow is present but a lack of sandstone cliffs, and woodland valley areas for roosting. No records occur within the Project Area/ Locality and no observations were made during field surveys. Closest records are from over 100km to the northwest of the Project Area, recorded in eucalyptus open forests with a grassy understorey in 2003.
<i>Dasyurus hallucatus</i>	Northern Quoll	-	E	No	No	<p>The northern quoll occurs in a range of habitats, including open dry sclerophyll forest and woodland, riparian woodland, low dry vine thicket, the margins of notophyll vineforest, sugarcane farms and in urban areas. They are most abundant in hilly or rocky areas close to permanent water.</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>Breeding habitat: generally requires 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. Dens are made in rock crevices, tree holes or occasionally termite mounds.</p> <p>Foraging and dispersal habitat: this species is more likely to be present in Queensland where there are high relief areas that have shallower soils, greater cover of boulders, less fire impact and closer to permanent water.</p> <p><i>Potential suitable rocky areas for breeding, denning and foraging habitat are limited to the far south-eastern corner of the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Potential suitable rocky areas for breeding, denning and foraging habitat are limited to the far south-eastern corner of the Project Area in the plateau with eucalypt woodland/open forest habitat types. No records within the Project Area or adjoining area. The closest record is approximately 142 km north-east of the Project Area in eucalyptus woodlands with a tussock grass understorey, recorded in 1966.
<i>Macroderma gigas</i>	Ghost Bat	E	V	No	No	<p>In Queensland the species occurs in 4-5 disjunct populations, north from Rockhampton (TSSC, 2016c). 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, 2016c)</p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> The Project Area is outside the known distribution of this species, with the closest record over 223 km north-west of the Project Area, recorded in cleared non-native vegetation in 1997 (ALA 2022)
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V	No	No	<p>This microbat species has a scattered distribution mostly within the Murray-Darling Basin, but with some records outside of this area. It is more common in box, ironbark and cypress pine woodland on the western slopes and plains. Its stronghold seems to be the Pilliga scrub. It roosts in tree hollows, crevices and under loose bark.</p> <p>Foraging habitat: Foraging tends to be located around patches of trees in the landscape.</p> <p>Breeding habitat: Little information is available on the breeding behaviour for the species.</p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. 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. Suitable habitat in the Project Area is associated with larger patches of remnant eucalypt and acacia woodlands.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>Roosting habitat: Roosting behaviour is located within dead trees including ironbark's, cypress and bullock.</p> <p><i>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.</i></p>	<ul style="list-style-type: none"> No records within the Project Area or Locality. The closest record is approximately 40 km south-east of the Project Area in cleared non-native vegetation in 2013.
<i>Petauroides volans</i>	Greater Glider (central and southern)	E	E	No	Yes (confirmed in Project Area during field surveys)	<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 taller, montane older forests which have an abundance of hollows.</p> <p>There is no information available that differentiates foraging, breeding and denning habitat for the species however, for denning and nesting it prefers tall mature forests with large tree hollows.</p> <p><i>Potential foraging and denning habitat of tall, mature Eucalypt forests is present within the Project Area, specifically along the riparian areas.</i></p>	<p>Known to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. 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 open eucalypt woodland area in the southeast of the Project Area in 2022.
<i>Petaurus australis australis</i>	Yellow-bellied Glider (south-eastern)	V	V	No	No	<p>This species is found in Eucalypt dominated woodlands and forests, including both wet and dry sclerophyll forests (Kavanagh et al. 1995; Rees et al. 2007).</p> <p>Breeding habitat: Hollow-bearing trees used by the yellow-bellied glider (south-eastern) are primarily 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>Foraging and roosting habitat: The species shows a preference for larger patches of mature growth forests that contain suitable trees that they require for foraging and roosting.</p> <p><i>There is potential foraging and roosting habitat present in the form of wooded plateaus in the far south-eastern corner of the Project Area however no feed trees were detected in the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is potential foraging and roosting habitat present in the form of wooded plateaus in the far south-eastern corner of the Project Area however no feed trees were detected in the Project Area. 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. Denning habitat of tall, mature eucalypt forests present within the Project Area, specifically along the riparian areas. No records within the Project Area or Locality. The closest record is approximately 11 km east of the Project Area in eucalyptus open forests with a grassy understorey in 2009.
<i>Phascolarctos cinereus</i>	Koala	-	E	No	No	<p>Koalas naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by Eucalyptus species as explained by Martin & Handasyde 1999 (as cited in, DoE, 2019h).</p> <p>Breeding and foraging habitat: 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>Dispersal behaviour: the species is known to traverse a matrix of landscape features from remnant and regrowth vegetation to paddock trees and grasslands.</p> <p><i>Foraging and breeding habitat of Eucalypt forests, and preferred food trees including E. tereticornis, E. populnea, E. crebra, E. longirostrata, E. melanophloia,</i></p>	<p>Likely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There are only sparse records in the locality suggesting a very low density population, with no evidence of recent (last 25 years) Koala sightings in the Project Area or within 10km of the locality. A targeted field survey was undertaken in the Project Area, which included spotlighting, searches for scats and scratch marks, with no Koalas observed or scats detected during the 20 days of field surveys. Evidence of Koala from the 2022 field surveys was in the form of potential scratch marks only, and there is uncertainty that the scratches were from Koalas.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<i>E. exserta</i> and <i>Corymbia citriodora subsp. variegata</i>), as well as dispersal opportunities, are present within the Project Area.	<ul style="list-style-type: none"> There is potential foraging and breeding habitat for Koala present in the form of Eucalypt dominated woodlands and open forests in the Project Area, particularly along riparian areas.
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	SLC	-	No	Yes – records within the 10 km buffer.	<p>This species can be found across a wide range of habitats, including open woodland, semi-arid and arid areas as well as in agricultural areas (Aplin et al., 2016). Their foraging requirements include ant nests and termite mounds (Nicol et al., 2011).</p> <p><i>The species is likely to occur in low densities utilising all broad habitat types as general habitat.</i></p>	<p>Likely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. The species is a generalist and occurs across a variety of habitats throughout the Project Area, which includes open woodland, semi-arid and arid areas. Recent records present within the Study Area from 2014, and there are various recent records within the 10 km buffer for this species.
Reptiles							
<i>Acanthophis antarcticus</i>	Common Death Adder	V	-	No	No	<p>This species lives in woodlands, open forests and heathlands; requires abundant shelter/ambush predation cover e.g., low shrubs, rocks, logs and dense leaf litter (Wilson, 2022).</p> <p><i>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.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. 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. No records within the Project Area or adjoining areas. The closest record was recorded approximately 34.7 km south-west of the Project Area in cleared, non-native vegetation.
<i>Anomalopus mackayi</i>	Five-clawed worm-skink	E	V	No	No	<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; Rive– Red Gum - Coolibah-Bimble/Poplar Box and Weeping Myall grassy woodlands; White Box grassy woodland; Myall woodland, and Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant).</p> <p><i>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.</i></p>	<p>Potential to be present.</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. Areas of potential habitat are limited on the site, with an absence of native grasslands with deep, cracking clays. Potential habitat includes area of Brigalow woodlands, with coarse woody debris and deep leaf litter cover. Ephemeral wetlands and creek lines are also present along with cracking clay soils in some areas. No records exist for this species within the Project Area or Locality and no observations were made in the field. The closest record was recorded approximately 150 km southeast of the Project Area in cleared non-native vegetation in 2023.
<i>Delma torquata</i>	Collared Delma	V	V	No	No	<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>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Suitable habitat with abundant litter, rocks and woody debris occurs in remnant areas of forest and woodland associated with the escarpment and plateau in the far south-eastern corner of the Project Area. The species is unlikely to occur in the northern or central parts of the Project

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<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><i>Suitable habitat with abundant litter, rocks and woody debris occurs in remnant areas of forest and woodland associated with the escarpment and plateau in the far south-eastern corner of the Project Area. The species is unlikely to occur in the northern or central parts of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitat features for this species.</i></p>	<p>Area, where woodland fragments are small, narrow and disturbed, with few suitable habitat features for this species.</p> <ul style="list-style-type: none"> No records within the Project Area or Locality. The closest record was recorded 111 km north-west of the Project Area in eucalyptus woodlands with a tussock grass understorey in 2020.
<i>Egernia rugosa</i>	Yakka Skink	V	V	No	Yes – Locality	<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 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><i>Dry sclerophyll forests and vegetation within the Brigalow belt south bioregion is present within the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Suitable habitat with abundant litter, rocks and woody debris occurs in large remnant areas of forest and woodland associated with the escarpment and plateau in the far south-eastern corner of the Project Area. The species is unlikely to occur in the northern or central parts of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitat features for this species. No records within the Project Area and Locality. The closest record was recorded 29 km south-east of the Project Area in other shrublands in 1998.
<i>Eseya albagula</i>	White-throated Snapping Turtle	CE	CE	No	No	<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><i>There is a lack of well-flowing rivers with permanently flowing water with large woody debris present within the Project Area.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is a lack of well-flowing rivers with permanently flowing water with large woody debris present within the Project Area. No records within the Project Area or Locality. The closest record was recorded 60 km north-east of the Project Area in adjacent to Dawson Creek in 1998.
<i>Furina dunmalli</i>	Dunmall's Snake	V	V	No	No	<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. burowii</i>, <i>A. deanii</i>, <i>A. leioclyx</i>), native Cypress (<i>Callitris</i> spp.) or Bull-oak (<i>Allocasuarina luehmannii</i>).</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><i>There is some limited suitable habitat with abundant litter, rocks and woody debris present in the far south-eastern corner of the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is some limited suitable habitat with abundant litter, rocks and woody debris present in the far south-eastern corner of the Project Area. No records within the Project Area or Locality. The closest record was recorded 38 km south-west of the Project Area in Brigalow (<i>Acacia harpophylla</i>) forests and woodlands in 2009.
<i>Hemiaspis damelii</i>	Grey Snake	E	E	No	No	<p>This species inhabits Brigalow <i>Acacia harpophylla</i> and Belah <i>Casuarina cristata</i> woodlands on dark brown to black cracking clay soils but are also found in Queensland Bluegrass <i>Dichanthium sericeum</i> and/or Mitchell Grass <i>Astrelba</i> spp. grasslands on alluvial plains with cracking clay soils, and red sodsol soils on the western downs of Queensland. Closely associated with waterbodies, particularly</p>	<p>Potential to be present.</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. Brigalow and Belah are present in the north and far South-eastern parts of the Project Area, and ephemeral wetlands and creek lines are also present, with cracking clay soils in some areas.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>ephemeral wetlands and floodplains. Shelters in and under soils cracks, rocks, logs, flood debris and abandoned burrows.</p> <p>Breeding habitat: There is no information about breeding habitat for this species.</p> <p>Foraging habitat: 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><i>Brigalow and Belah are present within the north and far south-eastern parts of the Project Area. Ephemeral wetlands and creek lines are also present along with cracking clay soils in some areas.</i></p>	<ul style="list-style-type: none"> No records exist for this species within the Project Area, or the Locality and no observations were made in the field. The closest record was recorded 51 km east of the Project Area in eucalyptus open woodlands with shrubby understorey in Barakula State Forest in 2010.
<i>Rheodytes leukops</i>	Fitzroy River Turtle	V	V	No	No	<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><i>There is a lack of rivers with large deep pools and rocky or sandy substrates present within the Project Area.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is a lack of rivers with large deep pools and rocky or sandy substrates present within the Project Area. No records within the Project Area or Locality. The closest record was recorded 174 km north of the Project Area in cleared non-native vegetation in 2009.
<i>Strophurus taenicauda</i>	Golden-tailed Gecko	NT	-	No	Yes – within Locality	<p>This gecko is endemic to inland southern and central Queensland, where it is found to use habitat of dry woodland and open forest habitats in the Brigalow Belt. This species lives in tree hollows and splits, and under loose bark on live and dead trees (Wilson, 2022). The species also occurs in non-remnant vegetation with abundant Acacia species near to remnant and regrowth habitat patches (BOOBOOK, unpubl. data).</p> <p><i>There is suitable remnant and regrowth Acacia dominated woodlands with peeling bark within the Project Area, including along streamlines.</i></p>	<p>Likely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is suitable remnant and regrowth Acacia dominated woodlands with peeling bark within the Project Area, including along streamlines. No records within the Project Area but the species has been recorded in the adjoining areas in woodland and regrowth vegetation in 2014 (ALA, 2022).
Invertebrates							
<i>Adclarkia cameroni</i>	Brigalow Woodland Snail	V	E	No	No	<p>Found in remnant Eucalypt and Brigalow woodland associated with the Condamine River floodplain, centred on the area between Dalby and Miles/Condamine (TSSC 2016a).</p> <p>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 2016a). 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.</p> <p><i>Limited areas of potential habitat of fragmented isolated patches of Brigalow and Eucalypt woodlands are present in areas across the Project Area.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> The Project Area is outside the known distribution and separated from known occurrences by substantial barriers of unsuitable habitat. Limited areas of potential habitat of fragmented isolated patches of Brigalow and Eucalypt woodlands are present in areas across the Project Area and given the fragmented nature of these habitats they are unlikely to be utilised or colonised by the species given it's very limited mobility. No records within the Project Area. The closest known record of the species was recorded in Gurulmundi State Forest, approximately 15 km south of the Project Area, recorded in 2014. However, this record was incorrectly identified (refer to Appendix I). The next nearest known record is 52.11 km south-east of the Project Area, recorded in 2011 (ALA, 2023). A statement from Craig Eddie (Principal Ecologist) is provided in Appendix I.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
<i>Adclarkia dulacca</i>	Dulacca Woodland Snail	E	E	No	Yes – Locality.	<p>This species occurs in a small number of isolated populations in the areas between Miles and Dulacca, and south to Meandarra (TSSC 2016b). This species inhabits a variety of remnant and scattered habitats, such as 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 2016b). 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 2016b). 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> <p><i>Potential habitat of very fragmented, isolated patches of Brigalow woodlands is present in areas across the Project Area.</i></p>	<ul style="list-style-type: none"> Likely to occur. Project Area is within the distribution for the species. The Project Area includes several small patches of suitable habitat (Brigalow woodland). Elsewhere the species persists in similarly fragmented landscapes. This species was not located in surveys of the Project Area. The species has previously been collected from an area of RE 11.9.5a and 11.7.2 south of the Project Area, in the adjoining area (ALA, 2022). <p>A statement from Craig Eddie (Principal Ecologist) is provided in Appendix I.</p>
<i>Jalmenus eubulus</i>	Pale Imperial Hairstreak (Butterfly)	V	-	No	Yes – within Locality	<p>Endemic to the Brigalow Belt bioregion, associated with mature Brigalow open forests and woodlands.</p> <p>(Eastwood <i>et al.</i> 2008; Valentine and Johnson 2012).</p> <p>The species is usually located in mature Brigalow dominated open forests and woodlands, able to disperse across moderately fragmented landscapes, outside of Brigalow habitats.</p> <p><i>There is suitable habitat associated with Brigalow woodland within the Project Area.</i></p>	<p>Likely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is suitable habitat associated with Brigalow woodland within the Project Area. There are no records for this species within the Project Area. One specimen recorded near Gurulmundi State Forest in the Locality in 2008 (ALA, 2022; DES, 2022).
Migratory Species							
Marine Species							
<i>Apus pacificus</i>	Fork-tailed Swift	-	Mi, Ma	No	No	<p>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> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging habitat: exclusively aerial and found across a range of habitats.</p> <p><i>Potential foraging habitat over dry open habitats present, where it would fly aerially over.</i></p>	<p>Likely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Potential foraging habitat over dry open habitats present, where it would be only likely to fly aerially over. No records within the Project Area or Locality. The closest record was recorded 12.5 km west of the Project Area in eucalypt open forest in Cherwondah State Forest in 2002.
Terrestrial Species							
<i>Cuculus optatus</i>	Oriental Cuckoo	-	Mi	No	No	<p>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 species may occur in association with remnant and regrowth RE types 11.3.2, 11.3.25, 11.9.4, 11.9.5, 11.9.5a, 11.9.10, 11.3.19, 11.5.1 within the Project Area.</p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species but occurs predominantly in coastal areas.

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<p>The species winters in many different countries, including the coastal parts of northern and eastern Australia (BirdLife International, 2015).</p> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging and roosting habitat: 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> <p><i>There is limited areas of potential suitable remnant woodlands and non-remnant patches of native vegetation habitat, within the Project Area.</i></p>	<ul style="list-style-type: none"> Wetland habitat within the Project Area is limited to small ephemeral vegetated swamps and billabongs associated with meandering drainage lines which are unlikely to attract this species. No records for the species exist within the Project Area/ Locality and no observations were made during field surveys. The closest record was recorded 84 km south-east of the Project Area in cleared, non-native vegetation in Chinchilla.
<i>Motacilla flava</i>	Yellow Wagtail	-	Mi, Ma	No	No	<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>Breeding habitat: Does not breed in Australia.</p> <p>Foraging and roosting habitat: Has a strong association with water, particularly rock substrates along watercourses, but also lakes and marshes.</p> <p><i>Potential foraging habitat of waterbodies (predominately farm dams) present within the Project Area.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. Potential foraging habitat of waterbodies (predominately farm dams) present within the Project Area. No records for the species exist within the Project Area/ Locality and no observations were made during field surveys. There are also no records for this species from southern inland Queensland and so it is unlikely to occur within the limited habitat present in the Project Area. The closest record was recorded 275 km north of the Project Area in cleared, non-native vegetation near Duaringa, in 1905.
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	Mi, Ma	No	No	<p>Satin Flycatchers inhabit heavily vegetated gullies in Eucalypt-dominated forests and taller woodlands, and on migration, occur in drier woodlands and open forests.</p> <p>Roosting habitat: there is no information on the roosting behaviour for the species.</p> <p>Foraging habitat: the species is known to forage in the canopy and subcanopy of trees.</p> <p>Breeding habitat: breeding occurs in south-east Australia, but no other information is provided on the specifics of such locations.</p> <p><i>There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area. No records within the Project Area or Locality. The closest record was recorded 28 km north of the Project Area in eucalypt woodlands with shrubby understorey, in 1997.
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	Mi, Ma	No	Yes (within Locality, 2020)	<p>In east and south-east Australia, the rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as tallow-wood (<i>Eucalyptus microcorys</i>) and mountain grey gum (<i>E. cypellocarpa</i>). 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.</p> <p>Breeding habitat: breeding occurs in south-east Australia, but no other information is provided on the specifics of such locations.</p> <p>Foraging and roosting habitat: There is no information concerning feeding or roosting sites during species migration.</p> <p><i>There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. There is some limited potential habitat present in the form of remnant and non-remnant woodlands within the Project Area. No records within the Project Area, but there is a record from the Locality, from November 2020 in non-remnant riparian woodland near Sundown Rd, 8 km north of the Project Area (BOOBOOK unpublished data).

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
Wetland Species							
<i>Actitis hypoleucos</i>	Common Sandpiper	-	Mi, Ma	No	No	<p>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> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging habitat: this species forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands. It has been observed foraging in billabongs, lakes and dams.</p> <p>Roosting habitat: 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 'n mu' or 'loaf' on rocks.</p> <p><i>Small areas of foraging habitat are present within small ephemeral wetlands, which may provide temporary refuge for the species, within the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Small areas of foraging habitat are present within small ephemeral wetlands on drainage lines, which may provide temporary refuge for the species and support occasional transient visitors to the Project Area. No records within the Project Area or Locality. The closest record was recorded 84 km south-east of the Project Area in cleared land adjacent to Baking Board Creek in Chinchilla.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	Mi, Ma	No	No	<p>Prefers habitat on muddy edges of freshwater wetlands or brackish wetlands. Can be found at dams inland. Will often occupy coastal mudflats when ephemeral terrestrial wetlands have dried out.</p> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging habitat: foraging habitat is at the edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. Also among inundated vegetation of saltmarsh, grass or sedges. They forage in sewage ponds, and often 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>Roosting habitat: Roosting occurs at 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 or on rocks in water.</p> <p><i>Small areas of foraging habitat present within small ephemeral wetlands, which may provide temporary refuge for the species, within the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Small areas of foraging habitat present within small ephemeral wetlands on drainage lines, which may provide temporary refuge for the species and support occasional transient visitors to the Project Area. No records within the Project Area or Locality. The closest record was recorded 61 km south-east of the Project Area in cleared land 1 km east of Leichardt Highway and 2 km west of Condamine River.
<i>Calidris melanotos</i>	Pectoral Sandpiper	-	Mi, Ma	No	No	<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>Breeding habitat: Does not breed in Australia.</p> <p>Foraging habitat: forages in shallow water or soft mud at the edge of wetlands,</p> <p>Roosting habitat: 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>Unlikely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species but occurs predominantly in coastal areas. Wetland habitat within the Project Area is limited to small ephemeral vegetated swamps and billabongs associated with meandering drainage lines which are unlikely to attract this species. No records for the species exist within the Project Area/ Locality and no observations were made during field surveys. The closest record was

Identification		Status		Records		Assessment	
Scientific Name	Common Name	NC Act	Comm. EPBC Act	Recent WildNet Records within 10 km	Recent ALA Records within 10 km	Habitat Summary	Likelihood of Occurrence
						<i>Wetland habitat within the Project Area is limited to small ephemeral vegetated swamps and billabongs associated with meandering drainage lines which are unlikely to attract this species.</i>	recorded 108 km south-west of the Project Area in cleared, non-native vegetation near Roma, in 1996.
<i>Charadrius leschenaultii</i>	Great Sand Plover	V	V, Mi, Ma	No	No	<p>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 (TSSC, 2016b).</p> <p><i>There is no suitable foraging habitat of coastal wetlands present within the Project Area.</i></p>	<p>Unlikely to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for this species. There is no suitable foraging habitat of coastal wetlands present within the Project Area. No records for the species exist within the Project Area/Locality and no observations were made during field surveys. The closest record was recorded 237 km south-east of the Project Area in cleared, native vegetation near Toowoomba in 2019.
<i>Gallinago hardwickii</i>	Latham's Snipe	-	Mi, Ma	No	No	<p>They usually occur in 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. This species has been said to occur very rarely 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.</p> <p>Breeding habitat: Does not breed in Australia.</p> <p>Foraging habitat: characterized by areas of mud (either exposed or beneath a very shallow covering of water) and some form of cover (e.g., low, dense vegetation)</p> <p>Roosting habitat: on the ground near (or sometimes 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, in drainage ditches or plough marks, among boulders, or in shallow water if cover is unavailable.</p> <p><i>Small areas of foraging habitat are present within small ephemeral wetlands, which may provide temporary refuge for the species, within the Project Area.</i></p>	<p>Potential to occur.</p> <ul style="list-style-type: none"> Project Area is within the distribution for the species. Small areas of foraging habitat are present within small ephemeral wetlands on drainage lines, which may provide temporary refuge for the species and support occasional transient visitors to the Project Area. No records within the Project Area or Locality. The closest record was recorded 34 km south-east of the Project Area in eucalypt open forest with grassy understorey.

Note: CE = Critically Endangered; E = Endangered; V = Vulnerable; Mi = Migratory; Ma = Marine; NT = Near Threatened

**APPENDIX C BOOBOOK ECOLOGICAL CONSULTING TERRESTRIAL
ECOLOGY REPORT**



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Broadscale Ecological Assessment Report

Senex Atlas 3 Gasfield Project – Survey of Terrestrial Ecological Values.

Compiled by BOOBOOK for ERM

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List of Abbreviations

ALA	Atlas of Living Australia (database)
AU	Assessment Units (vegetation)
Biosecurity Act	<i>Biosecurity Act 2014</i> (Qld)
CE/CR	Critically Endangered
DAFF	Department of Agriculture, Forestry and Fisheries (Qld)
DAWE	Department of Agriculture, Water and the Environment (Australia) – now the Department of Climate Change, Energy, the Environment and Water
DEE	Department of the Environment and Energy (Australia) – now the Department of Climate Change, Energy, the Environment and Water
DES	Department of Environment and Science. Queensland (Qld)
DNRM	Department of Natural Resources and Mines. Queensland (Qld)
DoR	Department of Resources (Qld).
E	Endangered
EP Act	<i>Environment Protection Act 1994</i> (Qld)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Australia)
ESA	Environmentally Sensitive Area/s
GDE	Groundwater Dependent Ecosystem/s
GIS	Geographic Information System
GPS	Global Positioning System
LC/C	Least Concern
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NCAP	No Concern at Present
NC Act	<i>Nature Conservation Act 1992</i> (Qld)
NT	Near Threatened
OC/O	Of Concern
PMST	Protected Matters Search Tool
Qld	Queensland
Rd	Road
RE	Regional Ecosystem/s
REDD	Regional Ecosystem Description Database
SF	State Forest
SLC	Special Least Concern
SPRAT	Species Profile and Threats Database
TEC	Threatened Ecological Community/ies
V	Vulnerable
VMA	<i>Vegetation Management Act 1999</i> (Qld)
Water Act	<i>Water Act 2000</i> (Qld)
WDRC	Western Downs Regional Council
WoNS	Weeds of National Significance

Executive Summary

This report summarises an assessment conducted for ERM, of terrestrial ecological values across the Senex Atlas 3 project area, located southwest of Wandoan, southern inland Queensland. The project area includes the entirety or parts of ATP 2059 (roughly 18.5 km²), PL 445 (6.2 km²), PL 1037 (2.8 km²) and PL 209 (70.3 km²) tenements, covering a total area of approximately 97.7 km². This survey area is referred to here as the Project Area. The Project Area includes parts of the Taroom Downs and Southern Downs biogeographic subregions within the Brigalow Belt Bioregion. The northern part of the Project Area comprises meandering watercourses on broad floodplains surrounded by gently rolling downs on fine sedimentary rocks. Landscapes to the south are increasingly hilly, including steep slopes with outcropping sandstone around hill crests. Landscapes in the northern part of the Project Area are largely converted to non-remnant pasture land but include a network of narrow, winding, riparian woodland corridors along watercourses, with connectivity north to other tributaries of the Dawson River. Landscapes in the southern part of the Project area are dominated by non-remnant pastures on rolling downs but include a wooded plateau in the extreme southeast, which is contiguous with a large area of remnant woodland outside the Project Area, extending to the Great Dividing Range in the Gurulmundi area and beyond. Small, isolated fragments of remnant and regrowth vegetation are scattered on floodplains and rolling downs throughout the Project Area. However, an area around Gilgul Road contains little native vegetation and forms a filter or barrier to movement of wildlife between north and south.

A field assessment included identification and mapping of regional ecosystems (RE) and Threatened Ecological Communities (TEC), searches for notable flora and fauna, including threatened species and pest species, and verification of Environmentally Sensitive Areas (ESA) across the Project Area. Vegetation structure assessments and faunal habitat assessments were made at 57 locations representing the diversity of landforms and vegetation across the Project Area. BioCondition assessments were made at nine (9) of these locations representing the major vegetation types present in the northern part of the Project Area.

Threatened Ecological Communities present within the Project Area included Brigalow (*Acacia harpophylla* dominant and codominant) and Poplar Box grassy woodland on alluvial plains. Fifteen (15) regional ecosystems were present within the Project Area including four (4) Endangered RE and five (5) Of Concern RE.

Likelihood-of-Occurrence assessments, based on field survey results, desktop assessment and expert knowledge, were made for threatened flora and fauna, and for migratory and marine species listed under the Commonwealth of Australia *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Similar Likelihood of Occurrence assessments were made for threatened flora and fauna listed under the Queensland *Nature Conservation Act 1992* (NC Act). Six (6) threatened flora species were assessed as potentially occurring within the Project Area, including three (3) EPBC Act and NC Act listed species and three (3) further species listed under the NC Act. One EPBC Act and NC Act listed threatened plant species, *Ooline (Cadellia pentastylis)*, was detected during field surveys, occurring in the extreme south-eastern part of the Project Area. Seventeen (17) threatened fauna species were assessed as potentially occurring in the Project Area, including fourteen (14) EPBC and NC Act listed species, and an additional three (3) NC Act listed species. Two EPBC Act and NC Act threatened fauna species – Central Greater Glider (*Petauroides armillatus*) and Koala (*Phascolarctos cinereus*) – were detected within the Project Area during field surveys. Twelve (12) marine and migratory species listed under the EPBC were assessed as potentially present within the Project Area. All of these are bird species and they include threatened species as well as common and widespread species, some of which occur in the Project Area as annual visitors and others which may occasionally be present as vagrants. Predictive habitat mapping was conducted for all threatened flora and fauna species assessed as potentially occurring within the Project Area. The results of field surveys and subsequent assessments emphasize the importance of riparian corridors in the north and the extensively wooded area in the south to biodiversity in the Project Area.

Conclusions drawn in this report are based on available information at the time of writing. Any additional information may alter such conclusions and the author reserves the right to do so if such information becomes available. This report has been made as at the date of the report and is not to be used after six (6) months and not if there are any material changes meanwhile. In either event it should be referred back for review. To the extent permitted by law BOOBOOK does not accept liability for any loss or damage which any person may suffer arising from any negligence or breach of contract on its part. This report was prepared for the benefit of the party to whom it is directed only and for the purpose identified within. BOOBOOK does not accept responsibility to any other person for the contents of the report.

1 Introduction

1.1 Site Description

This report provides results from a broadscale assessment of terrestrial ecological values undertaken for ERM across the Senex Energy Atlas 3 Gasfield Project (the Project). The survey area (hereafter termed 'the Project Area') covers approximately 97.7 km² (9 771.08 ha) comprising the entirety of the 'Tetris' petroleum exploration area (ATP 2059, 18.5 km²), the entirety of petroleum tenement PL 445 (6.2 km²) and parts of PL 1037 (2.8 km²) and PL209 (70.3 km²). The Project Area includes parts of 25 cadastral land parcels comprising private and leasehold lands along with road reserves and easements. The Project Area extends from 10 to 24 km southwest and south-southwest of Wandoan and is accessed via Jackson-Wandoan Road, Gurulmundi Road, Giligulgul Road and local roads. The Project Area is entirely within the boundary of Western Downs Regional Council (WDRC), southern inland Queensland (Appendix A)

Biogeographically, the Project Area is entirely within the Brigalow Belt Bioregion and straddles a diffuse boundary between Subregion 25 (Taroom Downs) in the north and Subregion 26 (Southern Downs) in the south (as per Sattler and Williams 1999). ATP2059 and PL445 are entirely within Taroom Downs. Much of PL209, south to the Woleebee Creek and Conloi Creek floodplains, is also within Taroom Downs, with the remaining southern portion in Southern Downs. Landscapes in the Taroom Downs portion are dominated by meandering watercourses traversing broad alluvial plains (Landzone 3) flanked by rolling rises on fine-grained sediments (Landzone 9) with a few scattered patches of colluvial sand deposits (Landzone 5). Elevation in this area varies from 250 m above sea level on Woleebee Creek at the northern limit of the Project Area, up to 350 m on peaks to the southeast, with the bulk of the Taroom Downs portion on flats and gentle slopes below 300 m above sea level. Landscapes in the Southern Downs portion include similar landforms (Landzones 3, 5 and 9) but with alluvial sediments restricted to gullies along of streamlines and increasing topographic relief to the south, rising to a rocky scarp and plateau in the extreme southeast (Landzone 10). Elevation in the Southern Downs portion of the Project Area rises from around 265 m on Woleebee Creek to 420 m on the plateau in the extreme southeast. The Project Area is entirely drained by streams that flow north to the Dawson River, within the Fitzroy Basin.

Geologically the Project Area forms part of the Surat Basin, with substrates following a conformal north to south series of late-Jurassic to early-Cretaceous sedimentary strata, overlain by Quaternary alluvial deposits (Qa-Qld) on floodplains and by fine-grained Tertiary mudrock (Ts-Qld) in the extreme southwest. A minor southwest trending fault is associated with the course of Woleebee Creek south of the junction with Conloi Creek. The Taroom Downs portion lies on fine-grained sediments of the Springbok Sandstone (Jis) and Westbourne Formation (Jiw). The Biogeographic transition between Taroom Downs and Southern Downs subregions is associated with a broad band of medium to coarse-grained Gubberamunda Sandstone (JKig) with fine to medium-grained bedrock of the Orallo formation (Kyo) forming the rolling hills further south. Surface rock is generally absent from the northern part of the Project Area, excepting small patches of gravel that is not derived from the underlying substrate. By contrast, surface rocks and bedrock outcropping around hillcrests and slopes are increasingly common south of Giligulgul Road. Soils across the northern half of the Project Area vary from grey or brown sandy loams along streamlines, dark brown clay on floodplains and brown clay-loams on the surrounding undulating downs. Patches of duplex soils with a deep surface layer of pale-brown sand occur on Gubberamunda Sandstone in the central part of the Project Area.

The northern part of the Project Area is extensively cleared of native vegetation and converted to non-remnant pasture dominated by native and introduced grasses, notably Buffel Grass (*Cenchrus ciliaris*) and Sabi Grass (*Urochloa mossambicus*). This includes the entire Taroom Downs portion and the northern half of the portion in Southern Downs subregion. Riparian woodland dominated by Queensland Blue Gum (*Eucalyptus tereticornis*) with some fringing areas of Poplar Box (*Eucalyptus populneus*), Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*), follows the winding course of major watercourses through this landscape. These narrow woodland corridors are disturbed by thinning, regrowth, grazing, tracks, weeds, gaps and edge effects causing death of some peripheral trees. However, these corridors have high faunal habitat values, in particular for arboreal mammals and birds, due to features such as an abundance of large trees with hollows occurring on alluvial soils near water sources and ephemeral wetlands in floodplain depressions or cut-off oxbows from changes in stream path. The corridors along Wandoan Creek and Woleebee Creek form part of an extensive dendritic network of riparian woodland with connectivity north to the Dawson River at Taroom but isolated from other large woodland patches to the east, south and west. In the rolling downs beyond the watercourses, remaining fragments of woodland are small, scattered, isolated and disturbed.

The southern part of the Project Area, within Southern Downs subregion, includes similar but less continuous riparian woodland corridors along Hellhole Creek, Woleebee Creek and its tributaries. This area also includes many small,

disturbed fragments of Brigalow and Belah woodland on the rolling downs. A more substantially wooded area occurs around the plateau in the extreme southeast with Brigalow and Belah forest, Mountain Coolibah (*E. orgadophila*) woodland and open forest of Narrow-leaved Ironbark (*Eucalyptus crebra*). Stands of Ooline (*Cadellia pentastylis*) up to 35 m high occur in Brigalow woodland on the footslopes and midslopes in this area. This forest and woodland includes fringing areas of regrowth and in some areas is disturbed by fire, light grazing, weeds, tracks and fencelines. Nonetheless, this area shows high ecological integrity and overall low levels of disturbance. This area is tenuously connected with much larger area of forest beyond the Project Area, to the south and east, and in particular it is on the periphery of the very extensive forested area around Barakula SF. This combined area is of State significance for tract size, connectivity and special biodiversity values.

Significant ongoing threats to biodiversity within the Project Area include further loss of remnant and regrowth vegetation in an area that is already extensively cleared; potential loss of connectivity among areas of remnant and regrowth vegetation, especially though disruption of riverine corridors by tracks, powerlines and other linear infrastructure; loss of ecological integrity of vegetation patches through edge effects around fragments and along narrow corridors, death of larger trees without corresponding recruitment, disturbance of understorey vegetation, and invasion by weeds and pastoral grasses.

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. An approval to develop pipeline and gasfield infrastructure and to extract coal seam gas within this area (PL 209) was granted to APLNG incorporated as a component of the much broader Walloons gas fields (DSEWPaC 2009a). Major pipelines and high-voltage powerlines pass through the Site to supply adjacent industrial and agricultural infrastructure.

An overview map of important features of the Project Area is presented in Appendix A. Representative images of landscapes and vegetation within the Project Area are shown in Figure 1a-h.



Figure 1a-b: Representative images of landscapes and vegetation within the Project Area: View east across non-remnant pasture on an extensive floodplain to riparian vegetation along Woleebee Creek (left) and view west in non-remnant pasture on rolling hills near Giligulgul Road (right). Landscapes in the northern part of the Project Area are largely cleared and comprise non-remnant pasture dominated by introduced grasses such as Buffel Grass (*Cenchrus ciliaris*) on floodplains and gently undulating downs with corridors of riparian vegetation along water courses and scattered small fragments of remnant and regrowth woodland elsewhere.



Figure 1c-d: Queensland Blue Gum (*Eucalyptus tereticornis*) riparian woodland (RE 11.3.25) at BioCondition survey site 873-B04 near the proposed horizontal directionally drilled pipeline crossing point on Woleebee Creek (left), and Poplar Box (*Eucalyptus populnea*) grassy woodland on alluvial plains (RE 11.3.2, Poplar Box TEC) at BioCondition survey site 873-B03 (right).



Figure 1e-f: View east from non-remnant area to scarp and plateau in the southeastern part of the Project Area, with an isolated Kurrajong tree (*Brachychiton populneus*) in the foreground, Brigalow (*Acacia harpophylla*) and Ooline (*Cadellia pentastylis*) dominant (RE 11.9.5, Brigalow TEC) on the slopes behind and Narrow-leaved Ironbark (*Eucalyptus crebra*) open forest (RE 11.10.7) on the summit (left), and open forest of Ooline and Brigalow with Narrow-leaved Bottle Tree (*Brachychiton rupestris*) and Broad-leaved Bottle Tree (*B. australis*) emergent and semi-evergreen vine thicket understorey species (RE 11.9.5a, Brigalow TEC) at site 873-S96 (right).



Figure 1g-h: Ooline, Brigalow and Mountain Coolibah woodland (RE 11.9.5, Brigalow TEC) on the slopes of the plateau in the southeast at site 873-S97, which is part of an extensive patch along this scarp with varying abundance of Brigalow (left), and view south in low Brigalow woodland (RE 11.9.5, not TEC) with the plateau area in the background. This vegetation meets the criteria for mapping as remnant but is not TEC, due to evidence of past clearing with introduced Buffel Grass forming over 50% of the total vegetation cover.

1.2 Purpose & Scope

The purpose of this report is to provide a baseline description of terrestrial ecological values and potential constraints within the Project Area. Results presented here are based on an initial desktop assessment combined with field surveys to confirm vegetation communities, notable flora and fauna species and habitat values present within the Project Area.

BOOBOOK was requested to undertake the following assessments for Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) within the Project Area:

- ✦ Assess ground-truthed ecological values, specifically:
 - Identify Threatened Ecological Communities (TEC) listed under the *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act);
 - Verify mapped Regional Ecosystems (RE) and identify their *Vegetation Management Act 1999* (VMA) and biodiversity status;
 - Identify areas of regrowth vegetation equivalent to endangered RE;
 - Conduct BioCondition assessments at up to 10 sites in the within the Project Area; and,
 - Verify mapped Environmentally Significant Areas (ESA) and identify any other potential ESA;
- ✦ Identify MNES or MSES flora and fauna species potentially present in the Project Area, including:
 - Threatened species listed under the EPBC Act and/or the *Nature Conservation Act 1992* (NC Act);
 - Migratory and Marine species listed under the EPBC Act; and,
 - Pest species, focussing on Weeds of National Significance (WoNS) and on species listed under the *Biosecurity Act 2014* (Biosecurity Act);
- ✦ Assess Queensland Government mapped areas of Essential Habitat for NC Act listed threatened flora and fauna species; and,
- ✦ Provide predictive mapping of habitat for EPBC Act and NC Act listed threatened flora and fauna species potentially present within the Project Area.

1.3 Survey Team

Field ecological surveys within the Project Area were conducted by BOOBOOK staff with assistance in land access from Senex staff. Field surveys were conducted by Michael Cunningham (Senior Ecologist), Courtney Andrew (Graduate Ecologist) and Rosamund Aisthorpe (Botanist) in the periods 14 – 18th March 2022, 22 – 25th March 2022; 30 April – 5th May 2022), and 9 – 13th June 2022. All aspects of the project including field survey and reporting were conducted under the supervision of Craig Eddie (Principal Ecologist).

2 Methodology

2.1 Desktop & Literature Review

A was performed prior to the field survey which included interrogation of the following datasets:

- ✦ EPBC Act Protected Matters Search Tool (PMST) (DAWE 2022a);
- ✦ WildNet Queensland fauna and flora records (DES 2022a);
- ✦ Atlas of Living Australia fauna and flora records (ALA 2022);
- ✦ Protected Plants Flora Survey Trigger Map (DES 2022b);
- ✦ Referable Wetlands mapping (DES 2022c);
- ✦ Environmentally Sensitive Area mapping (DES 2022d);
- ✦ Matters of State Environmental Significance (DES 2022e);
- ✦ State terrestrial biodiversity and aquatic conservation values (DES 2022f);
- ✦ Regulated vegetation mapping (DoR 2022);

- ✂ Remnant vegetation RE: Regional Ecosystems – biodiversity status (DES 2022g);
- ✂ Mature Regrowth mapping (DES 2020b);
- ✂ Essential Habitat mapping (DES 2019);
- ✂ Ordered stream mapping (DNRM 2010);
- ✂ Groundwater dependent ecosystem mapping (DES 2018);
- ✂ Previous ecological surveys in the Senex Atlas gasfield (BOOBOOK 2014, 2020, 2021a, 2021b, 2022; ERM 2018), and,
- ✂ A prior EPBC referral (DSEWPac 2009) and Environmental Impact Statement (APLNG 2010a, b) for gasfield and pipeline development within PL 209.

Desktop searches were conducted for the entire Project Area and separately, for each property within the Project Area. Searches were made using online spatial layers, and/or searches using lot/plan details as a reference or centre point coordinates within each property, with a 10 km buffer. The entire Project Area and 10 km buffer around this are referred to below as the 'Desktop Search Area'. Additional searches of species records (ALA 2022; DES 2022a) were made of well surveyed areas nearby (Gurulmundi SF, Cherwondah SF) of Western Downs Regional Council area and, separately, of records within Southern and Central Queensland of each threatened species considered as possibly occurring within the Project Area. These datasets provided a baseline for subsequent field assessment.

2.2 Field Survey

Field ecological surveys were conducted via targeted vehicle based and foot traverses of the Project Area. Location and other data for all notable features encountered were recorded using a Zebra tablet device, hand-held GPS receivers and written notes.

2.2.1 Ground-truthed vegetation survey

Baseline botanical surveys were undertaken to describe dominant flora and vegetation community structure within the Project Area. Ground-truthing of the Regional Ecosystem (RE) designation (DES 2022g) within the Project Area was undertaken using the quaternary level of data collection as described by Neldner *et al.* (2022).

Vegetation community assessments were undertaken within 50 m x 20 m plots (0.1 ha) within representative locations in all identified RE and regrowth vegetation types within the Project Area. Faunal habitat values were also assessed within these plots (see below). The locations of vegetation and habitat survey sites are shown in Appendix A.

Vegetation community polygons were verified in accordance with Queensland RE description and biodiversity status as per the latest updates of the Regional Ecosystem Description Database (REDD) (DES 2021) and TEC criteria (DAWE 2022b; TSSC 2013, 2019).

RE polygons were assigned to remnant or non-remnant status as defined by the *Vegetation Management Act 1999*, with reference to Version 3.2 of the Queensland Government BioCondition Benchmark Database (Queensland Herbarium 2021). Remnant vegetation had obtained a canopy cover more than 50% of the benchmark canopy layer and a height more than 70% of the benchmark height of minimally disturbed vegetation of a given RE (referred to below as the 50/70 rule). The minimum size of areas mapped as TEC follows the specified criteria for each listed vegetation community (TSSC 2013, 2019), which for Brigalow vegetation comprises areas larger than 0.5 ha. No minimum size has been specified for SEVT (McDonald 2010) therefore all patches of this vegetation type larger than 0.5 ha were mapped as TEC. Minimum size thresholds for native vegetation that is not a TEC follow the Queensland Herbarium guidelines and practice, which map vegetation at a scale of 1:100 000, with a minimum area of 5 ha (see p. 26 in Neldner *et al.* 2022). An exception to this rule was made for RE 11.3.27 (Freshwater wetlands), where a minimum size of 0.5 ha was applied to mapping. RE 11.3.27 includes a range of palustrine wetland communities that are typically small in area but contribute disproportionately to biodiversity, faunal breeding sites and habitat for threatened species. Where long, narrow linear corridors of vegetation were present, these features were mapped down to a minimum width of 25 m (equivalent to the 1:25 000 scale in Neldner *et al.* 2022). Note that these minimum thresholds for mapping refer to overall vegetation patch size, which may include two or more polygons of different vegetation types. Small or narrow polygons were also be mapped for patches of vegetation that meet these size criteria but extend beyond the survey boundaries, with only a small portion included within the Project Area. Some patches were excluded from vegetation mapping based on these minimum size criteria but were mapped as potential habitat areas where these included identified habitat features for threatened species. Ground-truthed areas of advanced regrowth vegetation (i.e. native vegetation older than 15 years that does not meet the 50/70 rule cited above) were assigned to the floristically equivalent RE for assessment of potential ESA status.

2.2.2 BioCondition Assessment

BioCondition assessments were used to evaluate ecological functionality of vegetation within the Project Area. These assessments applied the methodologies described by Eyre *et al.* (2015). This involved the establishment of a 100 m x 50 m plot for measurements relating to canopy layer structure and diversity, a 100 m transect to measure canopy cover, a 50 m x 10 m subplot for measuring plant richness in shrub and ground layers, a 50 m x 20 m subplot for measuring coarse woody debris, and five 1 x 1 m quadrats to estimate ecological components of ground cover within the assessment area. These values were used as indicators of ecosystem function relative to minimally disturbed benchmark sites (Queensland Herbarium 2021) within the same vegetation type (AU). As requested by the client, up to 10 BioCondition assessments were made to gauge ecological condition of the major vegetation types in the northern part of the Project Area only. These BioCondition assessments complement the quaternary vegetation assessments, which were made within remnant and regrowth of each vegetation type present within the Project Area.

The following information was recorded at each BioCondition site:

- ✎ Date;
- ✎ Observers;
- ✎ Description of location (bioregion, general description, co-ordinates for plot origin and centre, plot bearing and alignment);
- ✎ General habitat description and RE type;
- ✎ Median height for canopy, emergent and sub-canopy strata;
- ✎ Slope position/slope degree and slope aspect;
- ✎ Tree species richness (within 100 m x 50 m plot);
- ✎ Native plant species richness (within 50 m x 10 m plot);
- ✎ Non-native plant cover (within 50 m x 10 m plot);
- ✎ Total length of coarse woody debris (length >10 cm diameter and >0.5 m long within 50 m x 20 m plot);
- ✎ Number and average diameter at breast height (DBH) of large eucalypt and non-eucalypt trees (within 100 m x 50 m plot);
- ✎ Recruitment of canopy species (within the 100 m x 50 m plot);
- ✎ Tree and shrub canopy cover (within 100 m transect);
- ✎ Ground cover within 1 m x 1 m plots (native perennial grass and organic litter cover in the ground layer);
- ✎ Disturbances (severity, last event and observation type).

Large tree DBH thresholds for each RE were used where published benchmarks were available, otherwise the default ≥ 30 cm DBH for eucalypts and ≥ 20 cm DBH for non-eucalypts was applied.

Site photographs were taken using a digital camera in accordance with Eyre *et al.* (2015) (i.e. one photograph at plot origin and north, east, south and west photographs at the plot centre). Photograph numbers were recorded. Locations of BioCondition sites were determined using a handheld Global Positioning System (GPS) (Garmin GPSmap 78S) and BioCondition assessment data was captured by mobile GIS devices (Zebra tablet device). For this assessment it was not necessary to mark the origin and centre point of BioCondition plots with steel fence posts, as suggested in Eyre *et al.* (2015), due to current and proposed land use (grazing, forestry and coal seam gas development).

Scores for BioCondition sites were calculated in accordance with Eyre *et al.* (2015) which compares the values obtained at each survey site with values in the benchmark document for that particular RE (Queensland Herbarium 2021). Subscores are awarded to each site are totalled and divided by the maximum possible score for that RE. This provides a numeric index along a continuum of biodiversity condition, where scores close to 0 indicate sites that are ecologically 'dysfunctional' and scores closer to 1 indicate increasing functional integrity.

2.2.3 Flora Species Survey

A search was made for EPBC Act and NC Act listed threatened flora and selected Special Least Concern flora within the Project Area. Where found, the species, location and number of individuals were recorded. However, these broadscale surveys were not exhaustive. Many areas of vegetation beyond identified points of interest were not visited but were mapped from viewpoints and imagery, and assigned an appropriate level of confidence. Flora species names follow Brown (2021).

Significant weed species, WoNS and Biosecurity Act Restricted Matters, were recorded as representative examples to indicate the presence and abundance of the species within a given part of the Project Area.

2.2.4 Fauna Species Survey

Incidental and targeted searches were conducted to detect the presence of threatened vertebrate fauna. Incidental searches consisted of opportunistic active searches in suitable habitat while traversing the Project Area. Targeted faunal survey techniques included recordings of bat calls using Anabat recorders, and spotlighting for arboreal mammals. Bat calls were recorded overnight in two locations within the northern part of the Project Area. Spotlighting surveys were made in two sites, in riparian woodland along Wandoan Creek and in similar vegetation along Woleebee Creek, both within the northern part of the Project Area. Each spotlighting survey commenced one hour after sunset and consisted of a two-hour, approximately two-kilometre meandering transect through habitat suitable for arboreal mammals covering all vegetation strata along the route.

2.2.5 Fauna Habitat Assessment

Data were collected for fauna habitat features to inform likelihood of occurrence and significant impact assessments for threatened fauna. These data were collected within the same 50 m x 20 m plot used for vegetation assessments, including proposed infrastructure areas within non-remnant vegetation. Features were assessed semi-quantitatively and included the presence and abundance of:

- ✦ hollow-bearing live trees, stags and logs;
- ✦ logs by size class;
- ✦ leaf and woody litter, stone/rock and grassy ground cover;
- ✦ rock outcrops, gilgais, termite mounds and burrows; and,
- ✦ mistletoe and other potential food plants.

Active or potential fauna breeding places were also recorded where found. Such places included:

- ✦ Decorticating trees and logs; and,
- ✦ Hollow-bearing logs, live trees and stags.

The results of habitat assessments, combined with published information and ecologist knowledge of fauna distribution and habitat use, were used to predict habitat suitability for EPBC Act and NC Act listed threatened fauna species. These results were used to develop GIS-based maps of potential habitat for threatened species within the Project Area.

2.2.6 Environmentally Sensitive Areas (ESA)

Government mapped ESA include protected estates defined by cadastral boundaries, such as State Forests and Resource Reserves, as well as ecological features, such as endangered and of concern vegetation communities and mapped essential habitat for threatened species, comprising remnant vegetation within a 1 km radius of validated species records. Ecological ESA identified in desktop assessment (DES 2022d) were ground-truthed in the field to verify the existence and extent of these features. Ground-truthing of vegetation also identified additional areas of ESA.

2.3 Survey Conditions and Limitations

The weather during the survey period was mild and wet with 425.8 mm rainfall measured in January – May at the nearby Woleebee Nevasa weather station compared with long term (1912-2021) median value of 204.2 mm at this weather station (BOM 2022). Multiple survey mobilisations were required over a three-month period due to

disruptions by rain. Weather conditions during the survey were initially warm and humid, becoming mild to cool and humid with light frosts in later survey periods. Much of the soil remained moist with some areas waterlogged throughout this time. Abundant plant growth occurred during the period of initial surveys, with withering and haying off in the later period. There was limited flowering of plants during the survey, with many spring flowering shrubs and forbs in this area. Conditions during the survey period were generally good for detection and identification of threatened plant species. However, this broad scale survey was based on visits to identified points of interest chosen based on desktop and field assessments. It was not possible to visit and search all areas within the available survey time.

Similarly, faunal surveys were limited to incidental searches within areas of suitable habitat and targeted techniques for rapid detection of key species within the Project Area. In general, these targeted surveys conformed to generic guidelines for fauna survey techniques (Eyre *et al.* 2018) but search effort was insufficient to determine the presence or absence of most threatened species within the Project Area. For example, spotlighting surveys conformed to Australian Government guidelines (DSEWPaC 2011a) for detection of arboreal mammals within suitable habitat. However, these surveys were insufficient for estimating abundance and mapping occurrence of species such as Greater Glider, Yellow-bellied Glider and Koala across the Project Area. Several species of Long Eared Bats, *Nyctophilus* spp., may potentially occur within the Project Area and it is not possible to reliably distinguish these species on calls (DSEWPaC 2010a), therefore trapping is required to detect the South-eastern Long-eared Bat, *N. corbeni*. Only incidental searches were made for threatened birds and these do not meet the Australian government guidelines for search effort (e.g. 10 hours over 5 days of targeted stationary observations for Australian Painted Snipe, *Rostratula australis*; DSEWPaC 2010b). Timed surveys (20 min) were made for threatened reptiles at selected habitat assessment points as per DSEWPaC (2011b) guidelines. However, search effort was insufficient to cover the extent of suitable habitat within the project area (e.g. recommendation for 20 min search per hectare for detection of Yakka Skink, *Egernia rugosa*; Ferguson and Mathieson 2014).

Planned additional faunal surveys, including targeted searches for the threatened Dulacca Woodland Snail, *Adclarkia dulacca*, along with further spotlighting, active searches for reptiles and trapping of bats, was stymied by abundant rainfall that constrained access to much of the Project Area during the survey period. Consequently, predictive mapping of threatened flora and fauna occurrence are conservative estimates of occurrence that assume species presence within areas of potentially suitable habitat.

3 Results & Discussion

3.1 Matters of National Environmental Significance

3.1.1 Threatened Ecological Communities

PMST search results (DAWE 2022a) indicated the potential presence of five TECs within the Project Area these being:

- ✦ Brigalow (*Acacia harpophylla* dominant and co-dominant);
- ✦ Coolibah – Black Box woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions;
- ✦ Poplar Box grassy woodland on alluvial plains;
- ✦ Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions; and,
- ✦ Weeping Myall woodlands.

Two TEC were detected within the Project Area, these being: Brigalow (*Acacia harpophylla* dominant and co-dominant) ('Brigalow TEC'); Poplar Box grassy woodland on alluvial plains ('Poplar Box TEC').

Seventeen (17) patches of Brigalow TEC were detected with the mapped area varying from 0.14 ha through to a maximum size of 44.93 ha. This includes six patches of regrowth (13.00 ha) and 11 patches of remnant (82.75 ha). These areas of Brigalow TEC (RE 11.9.5 and 11.9.5a) occur on rolling downs throughout the Project Area with larger patches around the plateau in the south. An additional 14 patches of Brigalow vegetation (RE 11.9.5; total 56.21 ha) did not meet the criteria for recognition as TEC – either with *Acacia harpophylla* absent or subdominant or with exotic perennial plants comprising over 50% of total vegetation cover within the patch. Additional patches of Brigalow dominated vegetation (equivalent to RE 11.3.1 and 11.9.5) were less than 0.5 ha in size and were excluded from recognition as TEC but were mapped as habitat areas for Brigalow dependent threatened species.

Ten patches of Poplar Box TEC were detected within the Project Area. All Poplar Box TEC comprised remnant vegetation of RE 11.3.2, including three patches assessed as Category B (Good Quality) and seven patches assessed as Category C (Moderate Quality). Areas of Poplar Box TEC within the Project Area vary in size from 0.03 to 9.58 ha, all

occurring on floodplains in the north, with some patches extending beyond the Project Area boundaries. An additional fourteen polygons of regrowth and remnant Poplar Box woodland on alluvial plains (RE 11.3.2) were assessed and did not meet the criteria for recognition as TEC. The ground stratum of these areas was generally dominated by exotic weeds and all but one of these polygons were smaller than 5 ha, being part of patches with other vegetation types.

Mapped areas of TEC within the Project Area are shown in Appendix B. The extent of TEC in the Project Area is summarised in Table 1. Representative images of TEC within the Project Area are shown in Figure 1d-g.

Table 1: Description and ground-truthed extent of TEC within the Project Area.

TEC Description	RE Codes	Extent of TEC (ha)
Brigalow (<i>Acacia harpophylla</i> dominant and codominant)	11.9.5, 11.9.5a	95.75
Poplar Box grassy woodland on alluvial plains	11.3.2	32.29

3.1.2 Threatened Flora

PMST search results (DAWE 2022a) indicated the possible occurrence of nine (9) EPBC Act listed threatened flora species within the Project Area. WildNet (DES 2022a) and ALA (2022) database searches returned records for four (4) of these species within the Desktop Search Area, these being Curly-bark Wattle (*Acacia curranii*), Ooline (*Cadellia pentastylis*), Gurulmundi Fringe-myrtle (*Calytrix gurulmundensis*) and Belson’s Panic (*Homopholis belsonii*).

One species of EPBC Act listed threatened flora, Ooline, was detected within the Project Area during field surveys. Ooline occurred from the footslopes to the crest of the scarp in the extreme southeast of the Project Area, occurring at all developmental stages, from juveniles and small trees through to trees over 30 m high. Ooline was recorded as isolated trees or clusters of trees in non-remnant vegetation, and at varying abundance, from scattered trees through to a dominant species in patches of RE 11.9.5 and 11.9.5a. Representative images of EPBC Act listed threatened flora species detected within the Project Area are shown in Figure 2a-b.

Details of the desktop search and field survey results are provided below in Table 2 with the likelihood of occurrence assessment of EPBC Act listed threatened flora that occur or could potentially occur in the Project Area. Desktop records of threatened flora species and locations where threatened flora species were detected during field surveys are mapped in Appendix C.

Table 2: Likelihood of occurrence assessment for EPBC Act-listed threatened flora in the Project Area.

Key to Status: E = Endangered; V = Vulnerable; NT = Near Threatened; LC = Least Concern.

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Acanthaceae	<i>Xerothamnella herbacea</i> Herbaceous Xerothamnella	E	E	A small annual forb occurring in well shaded areas around shallow, braided drainage lines and gilgais in Brigalow woodland. Distributed in widely scattered sites across the southern Brigalow Belt of Queensland from Yelarbon, on the NSW border, north to Kokotungo in Central Queensland (ALA 2022).	Unlikely to be present. Small areas of suitable habitat are present however 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).
Apocynaceae	<i>Vincetoxicum forsteri</i> (syn. <i>Tylophora linearis</i>) Slender Tylophora	E	E	A twining vine, which is widely distributed in dry woodland along the western slopes of the Great Dividing Range, mainly in NSW, from around West Wyalong north to Yetman. There are very few records of this species from Queensland, with one specimen collected near Glenmorgan in 1960 (ALA 2022) and a recent collection near Miles (BOOBOOK unpubl. data).	Potentially present. Suitable habitat (dry eucalypt woodland) exists as several small fragments through the Project Area and a larger area in the southeast corner. A recent collection is known from approximately 36 km southeast of the Project Area (BOOBOOK unpubl. Data).

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Brassicaceae	<i>Lepidium monoplocoides</i> Winged Peppergrass	V	LC	A small annual forb found in the Murray-Darling basin on floodplains and other periodically 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).	Unlikely to be present. Habitat in the Project Area is dissimilar to that at known localities and the Project Area is far outside the known range of this species.
Mimosaceae	<i>Acacia curranii</i> Curly-bark Wattle	V	V	A shrub or small tree occurring in widely disjunct areas of dry woodland on rocky ranges, from around Lake Cargelligo in southwestern NSW north to Gurulmundi in inland southern Queensland (ALA 2022). At Gurulmundi 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 2022h).	Unlikely to be present. There is no suitable habitat (heath associated with rock pavements on land zone 7) within the Project Area. The nearest confirmed population being approximately 15 km south-southeast of the Project Area near the southern boundary of Gurulmundi SF (DES 2022a).
Myrtaceae	<i>Calytrix gurulmundensis</i> Gurulmundi Fringe-myrtle	V	V	A narrow endemic to areas around Gurulmundi State Forest and western parts of Barakula State Forest, in southern inland Queensland. This species occurs in heathy scrub and shrubby woodland communities, growing on skeletal soils overlying indurated rock pavements on plateau summits.	Unlikely to be present. There is no suitable habitat (heath associated with skeletal soils and rock pavements on land zone 7) within the Project Area. This habitat and the species are abundant in Gurulmundi SF to the south, including twenty-six (26) specimen records within 10 km of the Project Area (DES 2022a).
Poaceae	<i>Arthraxon hispidus</i> Hairy-joint Grass	V	V	A grass species growing in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps (TSSC 2008). It has been recorded from many locations in north-eastern NSW and southeast Queensland. Outlying and disjunct populations of this species associated with springs and spring-fed wetlands occur in the Carnarvon Range and Taroom area (DES 2022h).	Unlikely to be present. Suitable habitat (spring-fed wetlands) is absent from the Project Area. The closest known records are 81 km north of the Project Area around artesian springs near Taroom.
Poaceae	<i>Dichanthium setosum</i> A bluegrass	V	LC	Distributed across basalt tablelands and ranges of eastern inland NSW and Queensland (ALA 2022). In Queensland, it is recorded in disjunct patches from Toowoomba in the south to the Burdekin River dam in the north. It grows on basaltic black clays and hard-setting red-brown loams (DAWE 2022b) in woodland or open grassy woodland dominated by Brigalow and/or eucalypt species (DES 2022h). It can tolerate moderate disturbance and, in some areas, occurs in cleared woodland, grassy roadside remnants and highly disturbed pasture (DES 2022h).	Unlikely to be present. Substrates in the Project Area are dissimilar to those at known localities (basalt derived soils) and there are no records within 100 km of the Project Area.
Poaceae	<i>Homopholis belsonii</i> Belson's Panic	V	V	Distributed in the southern Brigalow Belt of northern NSW and southern Queensland (ALA 2022, DES 2022h). Within Queensland it principally occurs in Poplar Box, Brigalow and Belah dominated communities where it occurs in shaded situations on alluvial soils, often along drainage lines (DES 2022h). The species does not persist in intensively grazed landscapes.	Potentially present. The Project Area includes suitable habitat areas of Poplar Box and Brigalow/Belah woodland on alluvium. One specimen record occurs approximately 2 km to the north near the junction of Woleebee and Wandoan Creeks (ALA 2022, DES 2022a).

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Surianaceae	<i>Cadellia pentastylis</i> Ooline	V	V	Distributed in the southern Brigalow Belt of Queensland and northern NSW (DAWE 2022b). It occurs patchily from around Gunnedah north to Blackall and Daringa (ALA 2022). It grows on undulating plains, valley slopes, hillsides and scarps, often in association with Brigalow and SEVT communities (Santos 2012; DAWE 2022b; DES 2022h).	Confirmed present. This species is abundant in Brigalow woodland around the plateau in the southeastern part of the Project Area. It was observed as isolated trees and clumps or as a common tree in Brigalow woodland in Gurulmundi SF, Stones Country RR and adjacent properties. Four (4) specimen records occur within the Project Area and another six (6) records occurred within the 10 km desktop search area (DES 2022a).



Figure 2a-b: EPBC Act listed threatened flora species detected in the Project Area included Ooline, occurring in the south of the Project Area as isolated paddock trees (left) through to an abundant large tree dominating areas of Brigalow woodland along the southeastern scarp and adjacent footslopes. This species has distinctive ovate leaves (right) and was readily detected at a distance at the time of survey (Autumn) due to a red flush of new growth in the tree canopy.

3.1.3 Weeds of National Significance

Desktop searches of the Queensland Government WildNet database (DES 2022a) found five species of WoNS recorded within the Desktop Search Area, these being *Parthenium hysterophorus*, *Senecio madagascariensis*, *Anredera cordifolia*, *Opuntia stricta* and *O. tomentosa*. An additional WoNS species, *O. aurantiaca*, was detected during field surveys of PL 209 outside the Project Area. Two WoNS species were detected during field surveys within the Project Area, these being *Opuntia stricta* and *O. tomentosa*. Table 3 presents a likelihood of occurrence assessment of WoNS detected within the Desktop Search Area. Locations of WoNS detected within the Project Area are shown in Appendix D. Representative images of these WoNS are shown in Figure 3a-b.

Table 3. WoNS detected or potentially occurring within the Project Area.

Family	Scientific Name	Common Name	WoNS/ Biosecurity Act Status	Comments
Asteraceae	<i>Parthenium hysterophorus</i>	Parthenium Weed	WoNS, Cat. 3 Restricted Matter	Potentially occurring within the Project Area. Previously recorded from the Desktop Search Area (DES 2022a).
Asteraceae	<i>Senecio madagascariensis</i>	Fireweed	WoNS, Cat. 3 Restricted Matter	Potentially occurring within the Project Area. Previously recorded from the Desktop Search Area (DES 2022a).

Family	Scientific Name	Common Name	WoNS/ Biosecurity Act Status	Comments
Basellaceae	<i>Anredera cordifolia</i>	Madeira Vine	WoNS, Cat. 3 Restricted Matter	Potentially occurring within the Project Area. Previously recorded from the Desktop Search Area (DES 2022a).
Cactaceae	<i>Opuntia aurantiaca</i>	Tiger Pear	WoNS, Cat. 3 Restricted Matter	Potentially occurring within the Project Area. Detected nearby during field surveys. Occurring at moderate densities in Brigalow woodland around survey site 873-S74. The closest records in ALA (2022) are over 45 km away, around Yuleba North, Barakula and Taroom. No previous records in WildNet from the Desktop Search Area (DES 2022a).
Cactaceae	<i>Opuntia stricta</i>	Common Pest Pear	WoNS, Cat. 3 Restricted Matter	Confirmed present within the Project Area. Previously recorded from the Project Area (DES 2022a). Detected in field surveys throughout the Project Area at low densities.
Cactaceae	<i>Opuntia tomentosa</i>	Velvety Tree Pear	WoNS, Cat. 3 Restricted Matter	Confirmed present within the Project Area. Previously recorded from the Project Area (DES 2022a). Detected in field surveys throughout the Project Area at low densities.



Figure 3a-b: Weeds of National Significance (WoNS) detected in the Project Area included Velvety Tree Pear (*Opuntia tomentosa*) (left) and Common Pest Pear (*O. stricta*) (right). Both species are also Class 3 Restricted Matter under the Biosecurity Act. These pest species were present at low densities throughout the Project Area.

3.1.4 Threatened Fauna

Desktop searches (ALA 2022; DAWE 2022a; DES 2022a) combined with previous ecological surveys in the vicinity (BOOBOOK 2020, 2021a, 2021b, 2022; ERM 2018), and local knowledge, suggested twenty-two EPBC Act listed threatened terrestrial fauna species that might occur within the Project Area. PMST searches (DAWE 2022a) also identified three EPBC Act listed threatened aquatic fauna species that might occur within the Project Area – Murray Cod (*Machullochella peilii*), Southern Snapping Turtle (*Elseya albagula*) and Fitzroy River Turtle (*Rheodytes leukops*). These aquatic species are outside the scope of the present terrestrial ecological assessment and are addressed in a corresponding assessment of aquatic ecology. Desktop searches (ALA 2022; DES 2022a) revealed records of seventeen EPBC listed threatened terrestrial fauna species recorded from the WDRC Area of which six species were previously recorded within the Desktop Search Area.

EPBC Act listed threatened fauna species detected during field surveys included several Greater Glider (*Petauroides armillatus*) observed during spotlighting surveys of riparian woodland along Wandoan Creek and along Woleebee Creek, and indirect evidence of Koala (*Phascolarctos cinereus*), detected from scratches on riparian Queensland Blue Gum trees in several locations along Wandoan Creek, Woleebee Creek and a tributary of Hellhole Creek. Representative images showing evidence of threatened species detected within the Project Area are shown in Figure 4a-b.

Locations of historical records of threatened fauna, and sites where threatened species were detected during field surveys are shown in Appendix E. A likelihood of occurrence assessment for EPBC Act listed threatened fauna is presented in Table 4.

Table 4: Likelihood of occurrence assessment for EPBC Act listed threatened fauna within the Project Area.

Key to Status: CE/CR = Critically Endangered; E = Endangered; V = Vulnerable; NT = Near Threatened; LC = Least Concern.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Calyptorhynchus lathamii</i> Glossy Black-Cockatoo	V	V	Distributed through coastal areas and ranges of eastern Australia with scattered records further inland. This is a specialised feeder dependent on seeds of Casuarinaceae (She-oak) trees. Breeding pairs nest in large hollows generally high up in large eucalypt trees or stags near water and food sources (Pavey <i>et al.</i> 2016). The species is capable of moving among isolated trees and small habitat patches within fragmented landscapes (Pavey <i>et al.</i> 2016, Holmes 2012). The species roves widely across this landscape, with some evidence of seasonal movements following maturation of She-oak fruits (Stock and Wild 2005; Hourigan 2012; BOOBOOK, unpubl. data).	Likely to be present. Casuarinaceae food trees are abundant within the Project Area. These include Belah (<i>Casuarina cristata</i>), which occurs throughout the Project Area, Bull Oak (<i>Allocasuarina luehmannii</i>) in scattered woodland patches on sandy soils. Potential nest trees occur in remnant eucalypt woodland and forest and in well-developed riparian corridors across the Project Area. No evidence of feeding (chewed cones) was observed during field surveys. However, this species has previously been recorded within the Project Area (BOOBOOK 2021a, DES 2022a).
Birds	<i>Calidris ferruginea</i> Curlew Sandpiper	CE	CR	A non-breeding migratory wader species usually encountered on coastal saline and freshwater tidal and palustrine wetlands (Clemens <i>et al.</i> 2021; DAWE 2022b). The Australian population has declined by > 50-80% over the past 17 years (Clemens <i>et al.</i> 2021). This is a predominantly coastal, gregarious bird that feeds in shallow inundated areas and on recently exposed mudflats or sandy shores (Clemens <i>et al.</i> 2021). Passage migrants are very occasionally recorded on inland wetlands (ALA 2022; Birdlife Australia 2022). Nearest records of the species to the Project Area are from Lake Broadwater, a large palustrine wetland near Dalby (ALA 2022).	Unlikely to be present. Wetland habitat within the Project Area comprises small ephemeral vegetated swamps and billabongs associated with meandering drainage lines. The species not been recorded in the vicinity of the Project Area.
Birds	<i>Charadrius leschenaultii</i> Greater Sand Plover	V	V	This is a gregarious, migratory species that is overwhelmingly coastal in occurrence when in Australia (ALA 2022). Records from inland sites are extremely rare and probably reflect vagrant birds blown off course by storms (TSSC 2016b).	Unlikely to be present. This is a coastal species with no significant occurrences inland. There is no suitable habitat for this species within the Brigalow Belt South Bioregion.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Erythrotriorchis radiatus</i> Red Goshawk	V	E	A highly mobile species with a large home range. Breeding habitat is in intact tall open forest and woodland around major drainage lines, especially near permanent water bodies where there is high avian prey diversity, but the species could potentially forage much further away from these areas (Marchant and Higgins 1993). Telemetry studies indicate that the species forms a single wide-ranging population, with individuals covering distances over 1000 km from breeding areas in the tropical north to non-breeding areas further south (MacColl <i>et al.</i> 2021). The species is sensitive to landscape level clearing and may now be extinct in NSW and Southern Queensland (DERM 2012, Seaton 2014). 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).	Unlikely to be present. The Project Area is within the historical range of this species (ALA 2022). Woodland in the southeastern corner is connected to an extensive, wooded area of potentially suitable habitat around Gurulmundi and Barakula. However, there are no validated recent records from this region (since 1997) and the Brigalow Belt Bioregion is now considered to be outside the species distribution (MacColl <i>et al.</i> 2021).
Birds	<i>Falco hypoleucos</i> Grey Falcon	V	V	A rarely seen species, occurring at low densities throughout much of the arid and semi-arid interior of Australia (TSSC 2020). This is a pursuit predator that hunts birds and other small prey in open woodland plains. The species nests in large trees along stream lines (TSSC 2020). The species is very occasionally recorded in more mesic areas such as the Brigalow Belt (ALA 2022).	Unlikely to be present. 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.
Birds	<i>Geophaps scripta scripta</i> Squatter Pigeon (southern subspecies)	V	V	This subspecies occurs throughout the Brigalow Belt from Texas to Townsville and from Rockhampton west to Longreach (ALA 2022). This is a ground-feeding, ground-nesting inhabitant of grassy woodlands with open areas for foraging, usually within 3 km of a water source (Higgins and Davies 1996). The species feeds on seeds of legumes, forbs and some grasses (Higgins and Davies 1996; Ward <i>et al.</i> 2021). Ongoing declines, particularly in the south of the range, have been attributed to intensive grazing, land clearing, predation by foxes and cats, and encroachment of foraging habitat by introduced pastoral grasses, especially Buffel Grass (<i>Cenchrus ciliaris</i>) (Ward <i>et al.</i> 2021).	Potentially present. The Project Area is within the broad range of this species (ALA 2022). The landscape in the north of the Project Area is unsuitable for this species being largely cleared and with dense encroachment by pastoral grasses in most remaining woodland patches. Suitable dry woodland habitat remains on and around the plateau in the southeastern part of the Project Area. There are very few records from the area between Jackson, Miles and Wandoan, however survey effort is also low (Birdlife Australia 2022). The closest recent record is a 2016 sighting from near Cherwondah SF (ALA 2022), which is a large area of potentially suitable habitat around 6 km east of the Project Area.
Birds	<i>Grantiella picta</i> Painted Honeyeater	V	V	The breeding range extends along the eastern Murray-Darling basin from Chinchilla in Queensland to the Grampians range in western Victoria (Watson <i>et al.</i> 2021). Dispersed records from further northwest in Queensland represent seasonal migration and nomadic movements across the winter range (Watson <i>et al.</i> 2021; ALA 2022). This species lives and breeds in woodland with high densities of <i>Amyema</i> mistletoe food plants (Higgins <i>et al.</i> 2001, Watson 2012). Recent analyses suggest that the species population is larger than previously thought with no significant decline in the past decade (Watson <i>et al.</i> 2021).	Potentially present. The Project Area is within the broader range of this species (ALA 2022), however there are no publicly available records of this species from the region between Miles, Jackson and Wandoan (ALA 2022; Birdlife Australia 2022). Mistletoes (<i>Amyema</i> spp.) were present but uncommon across the Project Area.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Hirundapus caudacutus</i> White-throated Needletail	V	V	An aerial insectivore present in eastern and south-eastern Australia as a spring/summer non-breeding migrant (Tarburton 2021). Occurring over most habitat types, including disturbed areas, but with a preference for foraging over wooded areas (Tarburton and Garnett 2021). Individuals regularly roost in tall trees or trees on ridgelines, arriving and leaving roosts in the dark (Tarburton 2021). Migrating birds fly at high altitude and at night (Tarburton 2021). Ongoing declines largely due to loss of breeding sites (large trees with hollows) in northeast Asia (Tarburton and Garnett 2021).	Likely to be present. Likely to occur annually (September-April), following storm fronts throughout the Project Area.
Birds	<i>Rostratula australis</i> Australian Painted Snipe	E	E	A secretive nomadic wader that forages and breeds in variably inundated wetlands with features such as complex shorelines, areas of shallow water, dense low vegetation and exposed wet mud (DEE 2019; Rogers <i>et al.</i> 2021). Feeds on seeds and invertebrates (Rogers <i>et al.</i> 2021). Partially migratory, with birds in south-eastern Australia moving in autumn-winter to coastal areas of central and northern Queensland, where it occurs year-round (Rogers <i>et al.</i> 2021). The species is unpredictable in occurrence and difficult to detect. Total numbers are estimated at below 2500 individuals (DEE 2019).	Potentially present. The Project Area is within the species known range, however there are no publicly accessible records in the area between Miles, Roma, Injune and Taroom (ALA 2022). Previous records from WDRC include the Condamine River floodplain and Lake Broadwater near Dalby. Small areas of ephemeral wetland habitat occur within the Project Area and these may periodically provide temporary refuges for this species.
Mammals	<i>Chalinobus dwyeri</i> Large-eared Pied Bat	V	V	This species occurs in coastal and inland ranges of New South Wales through to central Queensland (ALA 2022). In Queensland the species has a disjunct distribution, occurring in the Scenic Rim area of Southeast Queensland, in the Carnarvon and Expedition Ranges, and in the Shoalwater Bay area of central Queensland. to the scenic rim area of southeast Queensland (ALA 2022). Known occurrences of this species are within or near forested landscapes with high relief (DAWE 2022b). The species roosts and breeds in deep fissures in large rocky outcrops and cliffs.	Unlikely to be present. The southern part of the Project Area includes forested escarpment areas along the Great Dividing Range. However, there are no records within the WDRC area. The closest records are from over 100 km northwest of the Project Area, in the Expedition Ranges (ALA 2022).
Mammals	<i>Dasyurus hallucatus</i> Northern Quoll	E	LC	This species is recorded from subcoastal ranges north from around Toowoomba through to Cape York, extending inland through the Fitzroy Basin (ALA 2022). However, the species has declined markedly and is now confined to rugged and remote areas throughout its distribution (Burnett 2012). 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).	Potentially present. The Project Area is within the broader historical range of this species (ALA 2022), however there are no records within the WDRC area. Potentially suitable rocky habitat occurs around the wooded plateau in the southeastern corner of the Project Area.
Mammals	<i>Macroderma gigas</i> Ghost Bat	V	E	This species is a large carnivorous bat. In Queensland the species occurs in 4-5 disjunct populations, north from Rockhampton (TSSC 2016c). 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 2016c). The species is likely to be sensitive to vegetation clearing (Bullen 2021).	Unlikely to be present. The Project Area is outside the known distribution of this species, with the closest record over 200 km further north (ALA 2022).

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Mammals	<i>Nyctophilus corbeni</i> Eastern Long-eared Bat	V	V	The Project Area is within the species' known range, which includes the Murray-Darling basin and Dawson River catchment (Churchill 2008). Inhabits shrubby woodland, particularly Box / Ironbark / Cypress Pine vegetation with a dense cluttered understory (TSSC 2015). Roosts solitarily, in tree hollows and crevices and under loose bark (Reardon 2012; TSSC 2015).	Potentially present. The species is unlikely to occur in the highly fragmented landscapes in the north of the Project Area. Suitable habitat occurs in wooded areas in the far south. The species has been recorded from Binkey SF, 22 km east, in woodland that is contiguous with that in the southeast of the Project Area.
Mammals	<i>Petauroides armillatus</i> Central Greater Glider	V	E	The taxonomy of Greater Gliders is in flux with at least two species now recognised (McGregor <i>et al.</i> 2020; TSSC 2022). Geographical boundaries between southern and central populations are unclear (TSSC 2022). The form occurring in this region is referred to <i>Petauroides armillatus</i> (Central Greater Glider) in Queensland, and this population is listed under the EPBC Act as <i>Petauroides volans</i> (Greater Glider (Southern and Central)). This form occurs in south and central eastern Queensland, extending inland along the Carnarvon Range (ALA 2022). The species occurs in eucalypt woodlands and open forest with large trees containing large hollows (TSSC 2022). This exclusively arboreal species is sensitive to fragmentation and is restricted to large habitat patches and highly connected corridors of riparian woodland with abundant hollow bearing trees.	Confirmed present. 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 wooded southeast of the Project Area.
Mammals	<i>Petaurus australis australis</i> Yellow-bellied Glider (south-eastern)	V	V	Occurs in eucalypt forests from South Australia through to central Queensland, extending inland to the Expedition and Carnarvon Ranges (Eyre and Goldingay 2005; ALA 2022). This is a vocal, group living, territorial species, which feeds on tree exudates, pollen, nectar and invertebrates. The species occurs at low density, relative to other arboreal mammals, and requires large areas of contiguous forest habitat (Eyre and Goldingay 2005). This species is dependent on sap from selected smooth-barked eucalypts, in particular the Grey Gums (<i>Eucalyptus longirostata</i> , <i>E. major</i>) (Eyre and Goldingay 2005). Feed trees may be identified by characteristic incisions in the bark (Eyre and Goldingay 2005).	Potentially present. 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.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Mammals	<i>Phascolarctos cinereus</i> Koala	E	E	Requires eucalypt woodland and forest habitat with suitable food trees (mainly <i>Eucalyptus</i> spp.) (DAWE 2022c). Favoured habitat is <i>E. tereticornis</i> riparian woodland along streamline (Smith <i>et al.</i> 2013). Koalas outside riparian habitat in inland Queensland require access to water sources, generally within 1 km, including farm dams, especially during dry periods (Davies <i>et al.</i> 2013). The species is sensitive to habitat fragmentation (McAlpine <i>et al.</i> 2015; DAWE 2022c). Koalas are capable of traversing gaps between habitat patches and may feed in scattered paddock trees, but dispersing individuals in open habitats are at greater risk of predation and vehicle collision (Youngentob <i>et al.</i> 2021; DAWE 2022c). The species generally occurs at lower density in fragmented landscapes and depends on larger areas of primary habitat as source populations and as refuges in drought (Smith <i>et al.</i> 2013; McAlpine <i>et al.</i> 2015).	Likely to be present. This area is within the species distribution, with several previous records within 10 km of the Project Area (ALA 2022). Indirect evidence of occurrence within the Project Area (characteristic scratches) was detected from multiple locations during field surveys. This suggests a sparse population occurring across this area. Suitable habitat includes woodland corridors along major streams in the north along with the wooded area in the southeast corner of the Project Area. Potential food trees occurring in the Project Area including <i>E. tereticornis</i> , <i>E. populnea</i> , <i>E. crebra</i> , <i>E. melanophloia</i> and <i>E. orgadophila</i> .
Reptiles	<i>Delma torquata</i> Collared Delma	V	V	The species range extends from around Ipswich in South-east Queensland through the Southern Brigalow Belt, although occupancy appears extremely localised and patchy (DSEWPac 2011b, ALA 2022). Lives under surface rock or large woody debris in eucalypt woodlands and open forests (Peck 2012, Wilson 2022). The species is rarely encountered, difficult to detect and search effort in this region is low.	Potentially present. The closest publicly accessible records are over 100 km distant, around Roma and the Bunya Mountains (ALA 2022). However, the Project Area is within the broad range of the species (ALA 2022). The species is difficult to detect, it has been observed elsewhere in the region (BOOBOOK, unpubl. data) and survey effort is low. 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. Suitable woodland habitat with abundant litter, rocks and woody debris occurs on and around the plateau in the southeastern corner of the Project Area.
Reptiles	<i>Egernia rugosa</i> Yakka Skink	V	V	Ranges throughout the Brigalow Belt extending east to subcoastal areas of Central Queensland and north to the Einasleigh Uplands and lower Cape York Peninsula (ALA 2022). The species lives in woodland and open forests, extending into adjacent grassland with regrowth trees. Requires suitable loamy soils with infrequent flooding for burrows or shelters in sinkholes, abandoned rabbit warrens, large hollow logs, or piles of woody debris (Wilson 2022, Eddie 2012). The species is rarely encountered, difficult to detect and search effort in this region is low.	Potentially present. The Project Area is within the broad range of the species, with low resolution records from the Gurulmundi and Yuleba North areas (ALA 2022). The species is unlikely to occur in the northern part of the Project Area, where woodland fragments are small, isolated, narrow and disturbed, with few suitable habitat features for this species. Suitable habitat with large logs, rocky outcrops and abundant woody debris occurs in woodland on and around the plateau in the southeastern corner of the Project Area.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Reptiles	<i>Furina dunmalli</i> Dunmall's Snake	V	V	This snake occurs in scattered patches throughout the Southern Brigalow Belt and adjacent parts of South-east Queensland (ALA 2022, DSEWPac 2011b). Occupies woodlands and open forests, and may be reliant on the presence of abundant fallen woody debris (Hobson 2012). Feeds on lizards including skinks and possibly geckos (Shine 1981) and presumably requires abundant prey. Usually occurs on heavy soils (Wilson 2022), often with soil cracks and/or gilgais. The species is rarely encountered, difficult to detect and search effort in this region is low.	Potentially present. The Project Area is within the broad range of this species, with the closest publicly accessible records about 35 km distant, around Jackson North and Miles (ALA 2022). 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. Suitable habitat with abundant litter, rocks and woody debris occurs in southern part of the Project Area.
Molluscs	<i>Adclarkia cameroni</i> Brigalow Woodland Snail	E	V	This snail is found in eucalypt and brigalow woodland associated with the Condamine River floodplain, centred on the area between Dalby and Miles/Condamine (Stanisic <i>et al.</i> 2010; DAWE 2022b, ALA 2022).	Unlikely to be present 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. A non-specimen backed record in WildNet and ALA (ALA 2022; DES 2022a) from Gurulmundi SF near Glenaubyn is incorrectly attributed to this species (Craig Eddie, unpubl. data).
Molluscs	<i>Adclarkia dulacca</i> Dulacca Woodland Snail	E	E	This snail inhabits vine thicket, Brigalow (<i>Acacia harpophylla</i>) woodland/open forest, ironbark (<i>Eucalyptus</i> spp.) woodland, Lancewood (<i>Acacia shirleyi</i>) woodland and Gum-topped Box (<i>E. woollsiana</i>) woodland (TSSC 2016a). It is confined to the Dulacca Downs subregion and adjacent areas of the Southern Downs subregion, occurring in highly fragmented landscapes, living in small woodland patches, strips of habitat retained on roadsides, shade lines and/or on ridges (Stanisic <i>et al.</i> 2010; ALA 2022).	Likely to be present The Project Area includes several small patches of suitable habitat (Brigalow woodland). Elsewhere the species persists in similarly fragmented landscapes. The species has previously been collected from an area of RE 11.9.5a and 11.7.2 within the Desktop Search Area (ALA 2022).

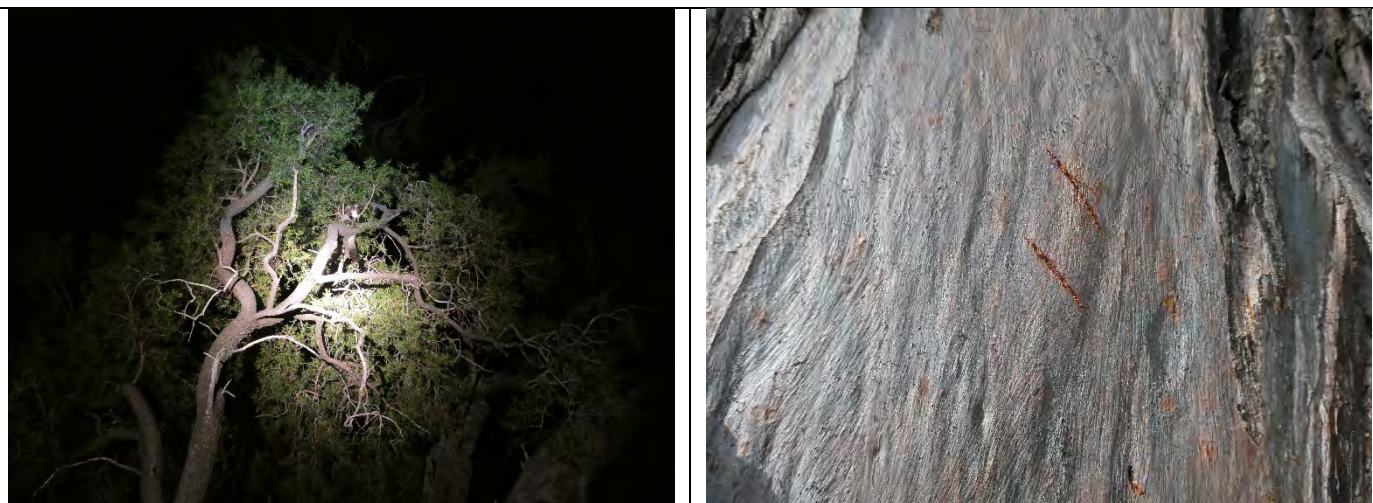


Figure 4a-b: Threatened Fauna detected in the Project Area included Central Greater Glider (*Petauroides armillatus*), seen here in riparian vegetation along Woleebee Creek (left), and characteristic scratches from Koala (*Phascolarctos cinereus*) (right).

3.1.5 Migratory & Marine Fauna

PMST search results indicated the possible occurrence of 12 migratory and 17 marine species listed under the EPBC Act. Table 5 provides a likelihood of occurrence assessment for these species. All species, excepting the threatened species discussed in section 3.1.4, are common and wide-ranging bird species. Five of these species are annual summer breeding or non-breeding migrants to the Project Area, with an additional four species likely regular visitors. The remaining species assessed as potentially occurring within the Project Area may be occasional transient visitors. One EPBC listed migratory or marine fauna species was detected during field surveys, this being Rainbow Bee-eater (*Merops ornatus*), an annual summer visitor likely breeding within the Project Area, which was observed in Poplar Box woodland near Woleebee Creek.

Table 5: Likelihood of occurrence assessment for EPBC Act listed migratory and marine fauna within the Project Area.

Key to EPBC Status: Mi = Migratory; Ma = Marine; CE = Critically Endangered; E = Endangered; V = Vulnerable

Family	Scientific Name	Common Name	EPBC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Actitis hypoleucos</i>	Common Sandpiper	Mi, Ma	Spring-summer migrant to Australia usually found in coastal environments (muddy, sandy or rocky stream banks, mangrove margins) but may occur on any inland freshwater or saline wetland during passage, including artificial habitats (Pizzey and Knight 2010). Less commonly reported from the inland (ALA 2022).	Potentially present. Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.
Birds	<i>Anseranus semipalmata</i>	Magpie Goose	Ma	A gregarious, nomadic species that ranges widely across northern and eastern Australia (Menkhorst <i>et al.</i> 2019). Grazes on grassy margins around wetlands. Congregates during the dry winter season in permanent coastal wetlands in the north (Menkhorst <i>et al.</i> 2019).	Unlikely to be present. The species is occasionally recorded from larger wetlands in this region. However, there is insufficient suitable habitat to attract this species to the Project Area.
Birds	<i>Apus pacificus</i>	Fork-tailed Swift	Mi, Ma	Aerial spring/summer migrant and insectivore, present over most habitat types including disturbed areas (DAWE 2022b).	Likely to be present. May potentially occur overhead throughout the Project Area.
Birds	<i>Ardea ibis</i>	Cattle Egret	Ma	Widely distributed in northern and eastern Australia, also SW Australia. Inhabits a wide range of dryland and wetland habitats and notably associates with livestock (Pizzey and Knight 2010). Nests colonially in flooded or swamp forests.	Potentially present. Limited foraging habitat is present within the Project Area in small ephemeral wetlands and non-remnant grassland, but this species also forages in pasture with cattle. The species may occasionally occur as a casual visitor within the Project Area.
Birds	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mi, Ma	A widespread spring-summer migrant to Australia, utilizing both inland and coastal wetlands such as tidal mudflats, saltmarshes and saline and freshwater inland swamps (Pizzey and Knight 2010). There are numerous records from inland southern Queensland (ALA 2022).	Potentially present. Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.

Family	Scientific Name	Common Name	EPBC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Calidris ferruginea</i>	Curlew Sandpiper	Mi, Ma, CE	A migratory species usually encountered on coastal and near-coastal saline and freshwater tidal and palustrine wetlands (DAWE 2022b). Passage migrants are occasionally present on inland wetlands but the species is sparsely recorded across inland Queensland (ALA 2022).	Unlikely to be present. In southern Queensland the species occurs predominantly in coastal areas. There is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), which is unlikely to attract this species.
Birds	<i>Calidris melanotos</i>	Pectoral Sandpiper	Mi, Ma	Spring-summer migrant preferring freshwater wetlands, both inland and sub-coastally (Pizzey and Knight 2010). Much less common than the related Sharp-tailed Sandpiper in Australia, there are few records in inland southern Queensland (ALA 2022).	Unlikely to be present. In southern Queensland the species occurs predominantly in coastal areas. There is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), which is unlikely to attract this species.
Birds	<i>Chrysococcyx osculans</i>	Black-eared Cuckoo	Ma	The Project Area is within the range of the species (ALA 2022). Breeding migrant to inland Australia, inhabiting dry woodlands and shrublands (Pizzey and Knight 2010).	Likely to be present. Limited areas of suitable habitat are present within remnant woodland and non-remnant patches of native vegetation. The species is commonly recorded from the region.
Birds	<i>Charadrius leschenaultii</i>	Greater Sand Plover	Mi, Ma, V	This species is overwhelmingly coastal in occurrence when in Australia (ALA 2022). Records from inland sites are extremely rare and probably reflect vagrant birds blown off course by storms (TSSC 2016b).	Unlikely to be present. This species occurs in coastal wetlands and migrates along coastlines. There is no suitable habitat in this area.
Birds	<i>Cuculus optatus</i>	Oriental Cuckoo	Mi	Migrant to coastal and near-inland northern and eastern Australia, inhabiting denser forest types but may occur in other habitats on passage (Pizzey and Knight 2010).	Potentially present. Limited areas of suitable habitat are present within remnant woodland and non-remnant patches of native vegetation.
Birds	<i>Gallinago hardwickii</i>	Latham's Snipe	Mi, Ma	Spring-summer migrant, preferring wet pastures, boggy margins of vegetated wetlands and similar habitat at a range of elevations (Pizzey and Knight 2010). It occurs throughout eastern Australia including southern inland Queensland (ALA 2022).	Potentially present. Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.
Birds	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Ma	Occurs around the entire Australian coast but also penetrates far inland on larger rivers (Pizzey and Knight 2010). Feeds on a variety of vertebrates and will take carrion. There are numerous records of the species in the Dawson catchment (ALA 2019).	Unlikely to be present. May overfly the Project Area but there is no suitable lacustrine or riverine habitat to support foraging by the species.
Birds	<i>Hirundapus caudacutus</i>	White-throated Needletail	Mi, Ma, V	Aerial spring/summer migrant and insectivore, present over most habitat types including disturbed areas (DAWE 2022b).	Likely to be present. Likely to forage over the Project Area seasonally, following low-pressure fronts.

Family	Scientific Name	Common Name	EPBC Act Status	General Habitat Requirements	Likelihood of Occurrence
Birds	<i>Merops ornatus</i>	Rainbow Bee-eater	Ma	Widespread and abundant species frequently present in southern inland Queensland during spring and summer (ALA 2022, Barrett <i>et al.</i> 2003). Feeds on aerial insects and nests in burrows in sandy soils (Pizzey and Knight 2010).	Likely to be present. Spring – Summer visitors are likely to occur regularly in the Project Area.
Birds	<i>Motacilla flava</i>	Yellow Wagtail	Mi, Ma	Summer migrant in small numbers to mostly coastal northern Australia but birds often sighted in southern Australia: it prefers open grassed areas such as wetland margins, pasture and parks (Pizzey and Knight 2010).	Unlikely to be present. There are no existing records of this species from southern inland Queensland (ALA 2022).
Birds	<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Mi, Ma	The Project Area is within the species known range (ALA 2022). A passage migrant in southern Queensland, with birds recorded in a variety of woodland types as well as parks and gardens, but breeding in south-east Australia in more closed forest types (Pizzey and Knight 2010).	Potentially present. Limited suitable habitat is present within remnant and non-remnant woodland. Sparse records of this species within the region represent occasional passage migrants.
Birds	<i>Rhipidura rufifrons</i>	Rufous Fantail	Mi, Ma	Occurs throughout coastal and subcoastal eastern Australia. Most individuals overwinter on Cape York, Islands of Torres Strait and New Guinea (Menkhorst <i>et al.</i> 2019). Occurs as a passage migrant in the southern Brigalow Belt.	Potentially present. Limited suitable habitat is present within remnant and non-remnant woodland. Individuals are occasionally recorded in this region, including a Nov 2020 record from non-remnant riparian woodland near Sundown Rd, 8 km north of the Project Area (BOOBOOK unpubl data).
Birds	<i>Rostratula australis</i> Listed as <i>R. benghalensis</i> (<i>sensu lato</i>)	Australian Painted Snipe	Ma, E	The Project Area is within the species' known range (ALA 2022); forages at shallow edges and adjacent vegetated margins of freshwater wetlands (DAWE 2022b).	Potentially present. Individuals may sometimes occur in the Project Area. However, there is very limited suitable habitat in the Project Area (ephemeral wetlands on drainage lines and farm dams), and this would only support occasional transient visitors.

3.2 State Biodiversity Values & Constraints

3.2.1 Regional Ecosystems & Other Regulated Vegetation

Areas of Queensland state government mapped remnant and regrowth vegetation are shown in Appendix F1.

Ground truthing of vegetation during field surveys found a total area of 810.89 ha of native vegetation from 15 Regional Ecosystems (RE), including 663.98 ha of remnant and 146.91 ha of advanced regrowth vegetation. Ground-truthed vegetation within the Project Area is shown in Appendix F2. Ground-truthed remnant and regrowth vegetation within the Project Area is summarised in Table 6. Representative images of vegetation within the Project Area are shown in Figure 1c-h.

Table 6: Ground-truthed RE detected within the Project Area.

E = Endangered; OC = Of Concern; LC = Least Concern; NCAP = No Concern at Present

RE Code	VM Act Class	Biodiversity Status	Short Description (DES 2021g)	Extent – remnant (ha)	Extent – regrowth (ha)
11.3.2	OC	OC	<i>Eucalyptus populnea</i> woodland on alluvial plains	54.74	18.09
11.3.4	OC	OC	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains	1.57	3.92
11.3.17	OC	E	<i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains	16.42	17.85
11.3.19	LC	NCAP	<i>Callitris glaucophylla</i> , <i>Corymbia</i> spp. and/or <i>Eucalyptus melanophloia</i> woodland on Cainozoic alluvial plains	13.25	0.91
11.3.25	LC	OC	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	267.69	20.63
11.3.27f	LC	OC	Freshwater wetlands: <i>Eucalyptus coolabah</i> and/or <i>E. tereticornis</i> open woodland to woodland fringing swamps	24.81	33.34
11.5.1	LC	NCAP	<i>Eucalyptus crebra</i> and/or <i>E. populnea</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces	11.59	-
11.5.5	LC	NCAP	<i>Eucalyptus melanophloia</i> , <i>Callitris glaucophylla</i> woodland on Cainozoic sand plains and/or remnant surfaces. Deep red sands	5.79	-
11.9.2	LC	NCAP	<i>Eucalyptus melanophloia</i> +/- <i>E. orgadophila</i> woodland to open woodland on fine-grained sedimentary rocks	19.52	5.76
11.9.5	E	E	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	98.96	41.61
11.9.5a	E	E	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks: with <i>Cadellia pentastylis</i> and <i>Brachychiton</i> spp. as emergent or dominant in some places, a dense tall shrub layer and a more open low shrub layer of Semi-evergreen vine thicket species, occurring on undulating plains and rises.	11.40	-
11.9.7	OC	OC	<i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	4.45	3.63
11.9.10	OC	E	<i>Eucalyptus populnea</i> open forest with a secondary tree layer of <i>Acacia harpophylla</i> and sometimes <i>Casuarina cristata</i> on fine-grained sedimentary rocks	25.04	1.18
11.10.7	LC	NCAP	<i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks	103.38	-
11.10.11	LC	NCAP	<i>Eucalyptus populnea</i> , <i>E. melanophloia</i> +/- <i>Callitris glaucophylla</i> woodland on coarse-grained sedimentary rocks	5.38	-

3.2.2 BioCondition Assessment

Vegetation condition was assessed using the BioCondition methodology of Eyre *et al.* (2015) at nine (9) locations representing major vegetation types in the northern part of the Project Area (Appendix F2). BioCondition sites were located in eight (8) Assessment Units (AU), these being a combination of RE and growth status (remnant or regrowth). All BioCondition sites were in remnant vegetation, and these locations were chosen as the best example of each RE within this area. Representative images of BioCondition sites are shown in Figure 1e-f. Raw data and standard images for BioCondition assessments are provided separately to this report. BioCondition site characteristics and scores are summarised in Table 7.

Table 7: Summary of BioCondition assessment sites and results within the Site.

AU	RE	Structural condition	Assessment sites	Averaged BioCondition score
1	11.3.2	remnant	873-B03	0.58
2	11.3.25	remnant	873-B01, 873-B04	0.53
3	11.3.27f	remnant	873-B05	0.56
4	11.5.1	remnant	873-B02	0.67
5	11.5.5	remnant	873-B06	0.60
6	11.9.5	remnant	873-B07	0.67
7	11.9.7	remnant	873-B09	0.61
8	11.9.10	remnant	873-B08	0.73

All AU received moderate (0.40 – 0.60) to high (0.60 – 0.80) BioCondition scores. These results reflect significant disturbance and consequent loss of ecosystem integrity relative to intact areas of each RE. These scores also reflect landscape level fragmentation with small patch size, low connectivity and a low proportion of remnant and regrowth vegetation in the surrounding landscape.

3.2.3 Threatened Flora

A total of 13 species of NC Act listed threatened flora were predicted to potentially occur or known to occur (DAWE 2022a, DES 2022a, DES 2022h ALA 2022) within the Desktop Search Area. Seven (7) of these species are also EPBC Act listed threatened flora, these being Herbaceous Xerothermella, Slender Tylophora, Curly-bark Wattle, Gurulmundi Fringe-myrtle, Hairy-joint Grass, Belson’s Panic and Ooline, which are discussed above in section 3.1.2 including their likelihood of occurrence assessment provided in Table 2.

The remaining six (6) species of NC Act listed threatened flora included Red-soil Woolly Wrinklewort (*Rutidosis lanata*), Thomby Range Wattle (*Acacia wardellii*), Plunkett Mallee (*Eucalyptus curtisii*), Gurulmundi Heath-myrtle (*Micromyrtus carinata*), *Cryptandra ciliata* and Winged Nightshade (*Solanum stenopterum*). Database searches of WildNet (DES 2022a) and ALA (2022) and previous surveys within the Project Area (e.g. BOOBOOK 2014) found records for four (4) of these species within the Desktop Search Area, these being Thomby Range Wattle, Plunkett Mallee, Gurulmundi Heath-myrtle and Winged Nightshade.

One NC Act listed threatened plant species, Ooline, was detected within the Project Area during field surveys. This species is also EPBC Act listed and is addressed in section 3.1.2. Habitat for Ooline is shown in Figure 1e-g and representative images of Ooline are shown in Figure 2a-b. Locations of threatened flora recorded in the Project Area are shown in Appendix C.

Several High-Risk Areas as shown on a Protected Plants Flora Survey Trigger Map (DES 2022b) are mapped within the extensive remnant vegetation at the southern portion of the Project Area (Appendix C). These areas correspond to WildNet (DES 2022a) records of Curly-bark Wattle, Thomby Range Wattle, Gurulmundi Fringe-myrtle, Gurulmundi Heath-myrtle and Ooline.

Details of the desktop search and field survey results are provided below in Table 8 with the likelihood of occurrence assessment of NC Act listed threatened flora that occur or could potentially occur in the Project Area.

Table 8: Likelihood of occurrence assessment for additional NC Act-listed threatened flora in the Project Area.

Key to Status: E = Endangered; V = Vulnerable; NT = Near Threatened; LC = Least Concern.

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Asteraceae	<i>Rutidosis lanata</i> Red-soil Woolly Wrinklewort	-	NT	A perennial forb with a core distribution restricted to the western Darling Downs from Jackson to south of Hannaford, south eastern Queensland (ALA 2022, DES 2022h). An outlying population was recorded southwest of Moura in 2018 (ALA 2022). Occurs along ecotones between Brigalow and Poplar Box woodland on clay or loam soils, and dry sclerophyll eucalypt woodland dominated by <i>Eucalyptus woollsiana</i> , <i>Eucalyptus crebra</i> or <i>E. fibrosa</i> on loam or sand (DES 2022h).	Potentially present. The Project Area is within the species broad distribution and suitable ecotonal habitat occurs within the Project Area.
Mimosaceae	<i>Acacia wardellii</i> Thomby Range Wattle	-	NT	A slender shrub or small tree endemic to south southern inland Queensland from north of Mundubbera to south of Surat (ALA 2022). Occurs in woodland to tall open forest with <i>Corymbia trachyphloia</i> , <i>C. intermedia</i> , <i>Eucalyptus major</i> , <i>E. cloeziana</i> , <i>E. decorticans</i> and <i>E. crebra</i> on gravelly soils from shallow weathered sandstone (DES 2022h). A specimen collection was recorded in 2014 from Gurulmundi State Forest (ALA 2022, DES 2022a).	Potentially present. The species was detected during field surveys within 4 km of the Project Area and has previously been found elsewhere in the Desktop Search Area.
Myrtaceae	<i>Eucalyptus curtisii</i> Plunkett Mallee	-	NT	Occurs in dry sclerophyll woodland on sandy podosols with impeded drainage, shallow stony soils, clay loams and stony clays with a surface layer of loose stones (DES 2022h). Three low precision (+/- 2 km) records occur in Gurulmundi SF area (DES 2022h, ALA 2022).	Unlikely to be present. No suitable habitat (stony, impeded drainage soils) occurs within the Project Area. Gurulmundi SF records are mapped around 14 km from the Project Area boundary. The species has previously been recorded within the Desktop Search Area around 7 km South of the Project Area, along the escarpment in Stones Country RR (C. Eddie, pers. comm.).
Myrtaceae	<i>Micromyrtus carinata</i> Gurulmundi Heath-myrtle	-	E	A pendulous shrub species endemic to the Gurulmundi area with the exception of an outlier southwest of Nudley State Forest, in southern inland Queensland (ALA 2022). Occurs on the tops of laterised ridges, on shallow to deep, yellow or red sands. Grows in heath or open woodland with associated species including <i>Triodia</i> sp., <i>Homalocalyx polyandrus</i> , <i>Corymbia trachyphloia</i> , <i>Acacia triptera</i> and <i>Eucalyptus exserta</i> (DES 2022h).	Unlikely to be present. There is no suitable habitat (heath associated with skeletal soils and rock pavements on land zone 7) within the Project Area. The species is abundant in parts of Gurulmundi SF, Stones Country RR and adjacent properties around the Great Dividing Range.

Class	Scientific and Common Name	EPBC Act Status	NC Act Status	Distribution and Known Habitat Use	Likelihood of Occurrence
Rhamnaceae	<i>Cryptandra ciliata</i>	-	NT	Grows on sandy soil in association with <i>Acacia shirleyi</i> , <i>Corymbia citriodora</i> , <i>C. watsoniana</i> and <i>Eucalyptus acmenoides</i> . Two low precision records from Gurulmundi area (ALA 2022, DES 2022a), northeast of Gurulmundi SF.	Unlikely to be present. There is no suitable habitat (woodland on sandy soils in landzone 7) within the Project Area. Potentially suitable habitat for this species occurs in the Desktop Search Area within Gurulmundi SF, Stones Country RR and adjacent properties around the Great Dividing Range.
Solanaceae	<i>Solanum stenopterum</i> Winged Nightshade	-	V	Occurs in Poplar Box or Belah woodland and in grassland, including disturbed areas, on clay and loam soils (DES 2022h). Occurs in scattered localities from Ashford in northern NSW north to Gayndah and from the Lockyer Valley west to around Jackson (ALA 2022). The species has been recorded from the Condamine floodplain around Dalby, Chinchilla and Condamine and also from two localities along Tchanning Creek (ALA 2022).	Potentially present. The Project Area is within the broad distribution of this species and includes areas of potentially suitable habitat.

3.2.4 Special Least Concern Flora

Three species of selected Special Least Concern (SLC) flora (*Brachychiton* spp.) were detected at locations scattered throughout the Project Area, these being Kurrajong (*Brachychiton populneus*), Narrow-leaved Bottle Tree (*B. rupestris*) and Broad-leaved Bottle Tree (*B. australis*) (Figure 1e-f). Other SLC species observed within the Desktop Search Area include various Orchid species (Orchidaceae), Bluebells (*Wahlenbergia* spp.) and Forest Grass Tree (*Xanthorrhoea johnsonii*). Additional SLC species are likely to occur within the Project Area.

3.2.5 Biosecurity Act Weeds and other weeds of Management Concern

Desktop searches (ALA 2022; DES 2022a) identified records of seven invasive plant species listed under the Queensland *Biosecurity Act 2014* occurring within the Desktop Search Area. In addition, Tiger Pear was detected during field surveys of PL 209 within 3 km of the Project Area, occurring in a single patch of Brigalow woodland around vegetation assessment site 873-S74, where it was moderately common. These eight invasive plant species include the six WoNS given in Table 3 (Section 3.1.3) – Parthenium Weed, Fireweed, Madeira Vine, Tiger Pear, Common Pest Pear and Velvety Tree Pear – along with Mother-of-millions (*Bryophyllum delagoensis*) and Mother-of-millions Hybrid (*Bryophyllum X houghtonii*).

Four species of weeds (invasive plants) proscribed as Category 3 restricted matter under the Biosecurity Act were detected during field surveys within the Project Area. Velvety Tree Pear (*Opuntia tomentosa*) and Common Pest Pear (*O. stricta*) were common throughout the Project Area occurring at low to moderate density in remnant and regrowth woodland and in non-remnant pasture. These two species are also WoNS (see section 3.1.3). Harrisia Cactus (*Harrisia martini*) was detected at low density in two locations in the north of the Project Area. Mother-of-millions (*Bryophyllum delagoensis*) was detected in two locations, each of which are in Poplar Box woodland on floodplains with numerous shallow drainage channels.

Other weeds of management interest detected within the Project Area include: Willows Cactus (*Cereus uruguayanus*), occurring in Narrow-leaved Ironbark woodland in the central part of the Project Area and African Lovegrass (*Eragrostis curvula*), occurring on sandy soils in the central and southern part of the Project Area. Locations for these species is included in spatial data accompanying this report.

WoNS that are also Category 3 restricted matter under the Biosecurity Act are presented in Table 3 (Section 3.1.3). Additional Biosecurity Act listed invasive plants detected or potentially occurring within the Project Area are given in Table 9. Representative images of these invasive plant species are presented in Figure 5a-b. Locations of WoNS and Biosecurity Act listed flora species recorded within the Project Area are shown in Appendix D.

Table 9. Additional Biosecurity Act listed weeds detected or potentially occurring within the Project Area.

Family	Scientific Name	Common Name	WoNS/ Biosecurity Act Status	Comments
Cactaceae	<i>Harrisia martini</i>	Harrisia Cactus	Cat. 3 Restricted Matter	Isolated occurrences recorded in two localities in the north of the Project Area: in Narrow-leaved Ironbark (<i>Eucalyptus crebra</i>) woodland (RE 11.5.1) along Weldons Road and in nearby Poplar Box woodland (RE 11.3.2) on the floodplain of Wandoan Creek.
Crassulaceae	<i>Bryophyllum delagoense</i>	Mother-of-Millions	Cat. 3 Restricted Matter	Isolated occurrences recorded in Poplar Box woodland on alluvial plains (RE 11.3.2) in two localities: a single plant observed in the reserve area along Jackson-Wandoan road near survey site 873-S93; and abundant within a limited patch in a reserve area along Woleebee Creek south of the crossing on Gadsbys Road.
Crassulaceae	<i>Bryophyllum X houghtonii</i>	Mother-of-Millions	Cat. 3 Restricted Matter	Not detected during field surveys. Potentially occurring within the Project Area.



Figure 5a-b: Biosecurity Act listed invasive plants detected in the Project Area included Harrisia cactus (*Harrisia martini*) (left), and Mother-of-Millions (*Bryophyllum delagoense*) (right).

3.2.6 Pest fauna and invasive species

Evidence of pest fauna detected within the Project Area included occasional rabbit (*Oryctolagus cuniculus*) latrines, frequent Dingo or Dog (*Canis familiaris*) tracks, and Pig (*Sus scrofa*) scats and diggings. These species are listed as Category 3,4,5,6 or Category 3,4,6 restricted matter under the Biosecurity Act. Locations for Biosecurity Act listed pest fauna recorded within the Project Area are shown in Appendix G.

3.2.7 Threatened Fauna

Desktop searches (ALA 2022; DES 2022a) revealed records of eight (8) NC Act listed threatened fauna species occurring within the Desktop Search Area. These include six EPBC Act listed threatened fauna species – Glossy Black-Cockatoo, White-throated Needle-tail, Southern Squatter Pigeon, Central Greater Glider, Southern Yellow-bellied Glider and Koala – which are addressed in section 3.1.4. Central Greater Glider and evidence of Koala was found within the Project Area during field surveys. A likelihood of occurrence assessment of three additional NC Act listed threatened fauna species possibly occurring in the Project Area is given in Table 10. None of these additional species were detected during field surveys of the Project Area, however, there were no targeted searches for these species.

Table 10: Likelihood of occurrence assessment for additional NC Act listed threatened fauna within the Project Area.

Key to Status: CE/CR = Critically Endangered; E = Endangered; V = Vulnerable; NT = Near Threatened; LC = Least Concern.

Family	Scientific & Common Name	EPBC Act Status	NC Act Status	General Habitat Requirements	Likelihood of Occurrence
Reptiles	<i>Acanthophis antarcticus</i> Common Death Adder	-	V	A widespread but patchily distributed snake (ALA 2022, DES 2022h). Lives in woodlands, open forests and heathlands; requires abundant shelter/ambush predation cover e.g. low shrubs, rocks, logs and dense leaf litter (Wilson 2022).	Potentially present. Unlikely to occur in the largely cleared and fragmented northern part of the Project Area. Suitable habitat with abundant shelter features occurs on and around the plateau in the southeastern part of the Project Area.
Reptiles	<i>Strophurus taenicauda</i> Golden-tailed Gecko	-	NT	This gecko is endemic to inland southern and central Queensland, where it inhabits a variety of dry woodland and open forest habitats in the Brigalow Belt (DES 2022h). Within these habitats it lives in tree hollows and splits, and under loose bark on live and dead trees (DES 2022h, Wilson 2022). The species also occurs in non-remnant vegetation with abundant <i>Acacia</i> species near to remnant and regrowth habitat patches (BOOBOOK, unpubl. data)	Likely to be present. The species has been recorded nearby in woodland and regrowth areas (ALA 2022; DES 2022a). Suitable remnant and regrowth woodland habitat with <i>Acacia</i> spp. and other species with abundant peeling bark occurs throughout the Project Area, includes corridors of non-remnant vegetation along minor streamlines.
Insects	<i>Jalmenus eubulus</i> Pale Imperial Hairstreak (butterfly)	-	V	This butterfly species is endemic to the Brigalow Belt, distributed from far northern NSW to the Eungella area of central Qld (ALA 2022). Usually associated with mature Brigalow (<i>Acacia harpophylla</i>) open forests and woodlands (Eastwood <i>et al.</i> 2008; Valentine and Johnson 2012). The species has a naturally fragmented habitat and is capable of dispersal over moderate distances, with vagrant individuals found far from patches of Brigalow habitat (Eastwood <i>et al.</i> 2008).	Likely to be present. The species has previously been found within the Desktop Search Area (DES 2022a). The closest publicly accessible record is from Gurulmundi SF near Glenaubyn, around 15 km southeast of the Project Area (ALA 2022). The Project Area includes abundant suitable habitat including isolated patches of Brigalow throughout and more extensive areas, within a matrix of other remnant vegetation, in the south.

3.2.8 Special Least Concern Fauna

Short-beaked Echidna (*Tachyglossus aculeatus*) have previously been recorded elsewhere in the Desktop Search Area (ALA 2022; DES 2022a) and are likely to occur in the Project Area. This common, widespread and adaptable species is likely to occur in remnant and regrowth vegetation and adjacent non-remnant areas throughout the Project Area. Fork-tailed Swift (*Apus pacificus*) has also been recorded in the Desktop Search Area (ALA 2022; DES 2022a) and is likely to be an annual summer non-breeding visitor to this area (see section 3.1.5). These taxa are listed as SLC species under the NC Act.

3.2.9 Fauna Habitat Features & Potential Breeding Places

The results of fauna habitat assessments conducted within the Site are included with the associated spatial data. Habitat assessments found that important features for ground-dwelling fauna, such as leaf-litter, rocks with surface contact, rock crevices and low shrubs are generally sparse within small remnant and regrowth fragments and riparian corridors of vegetation within the Project Area. These features are more abundant in the larger area of woodland in the southeastern corner of the Project Area. Other ground level features, such as large logs with hollows and woody debris, vary among sites in similar situations. Conversely, arboreal features such as large trees with hollows, nests and stags are abundant within riparian woodland (> 50 hollows per hectare) and less common in other patches of remnant and regrowth vegetation. Decorticated trees were particularly abundant in remnant and regrowth areas of Brigalow dominated vegetation. Fauna habitat features associated with vegetation clearing such as windrowed timber piles and scattered timber were common across the Project Area.

3.2.10 Environmentally Sensitive Areas (ESA)

Government mapped and ground-truthed ESA, as defined in the *Environmental Protection Regulation 2019*, are mapped across the Project Area in Appendix H. There are no Category A ESA within the Project Area. Category B ESA within the Project Area are ground-truthed endangered RE (Biodiversity Status), which consists of patches of the following RE: 11.3.17, 11.9.5, 11.9.5a and 11.9.10.

Category C ESA within the Project Area include ground-truthed remnant and regrowth vegetation within government mapped areas of 'essential habitat' or 'essential regrowth habitat', and Of Concern RE (Biodiversity Status), which comprises the following RE: 11.3.2, 11.3.4, 11.3.25, 11.3.27f and 11.9.7.

ESA in the north of the Project Area include the extensive riparian corridors along Wandoan Creek and Woleebee Creek (Category C). ESA in the north also comprise small fragments of Brigalow and/or Belah woodland, including areas with co-dominant Poplar Box, either fringing riparian corridors or scattered across the surrounding undulating downs (Category B). ESA in the south of the Project Area also include scattered fragments of Brigalow/Belah dominant and codominant woodland on rolling downs and around the plateau area in the southeast (Category B) along with a riparian corridor along Hellhole Creek (Category C). ESA in the south also comprises a mapped area of essential habitat (Category C) covering part of the wooded plateau in the southeast of the Project Area, including areas of RE 11.10.7 Narrow-leaved Ironbark open forest.

3.3 Predictive Habitat Mapping

Likelihood of occurrence assessments indicated twenty-two (22) EPBC Act and/or NC Act threatened flora and fauna species that may potentially occur within the Project Area (Tables 2, 4, 8 and 10). The results of site-based habitat assessment plots were combined with desktop searches and ecologist knowledge to develop RE-based predictive habitat mapping for these species. Identified habitat areas were assessed as either Essential or General Habitat using the following definitions:

Essential Habitat – consists of areas that contain resources considered essential for the maintenance of populations of the species (e.g. potential habitat for reproduction, growth, roosting, feeding and/or shelter for either migratory or non-migratory species). Essential Habitat may be defined based on known records and expert knowledge of habitat relationships, as habitat types favoured by the species, within which the species is most frequently recorded and/or the species is most abundant.

Note that this definition, which applies to predictive mapping of all potential habitat within the Project Area, differs from state government mapped 'Essential Habitat', which is based on Queensland government mapped vegetation around known records of threatened species (DES 2019).

General Habitat – consists of less favoured areas that may be used by transient individuals or where a species has been recorded but there is insufficient information to assess the area as essential habitat. General Habitat may be defined from habitat around known records and based on expert knowledge of habitat relationships, despite the absence of specimen backed records. General Habitat may include areas of suboptimal habitat for species and habitat types within which the species is less frequently reported or occurs at lower densities. All areas are mapped as General Habitat where there is no clear identification of essential resources or no clear difference in abundance among habitat types in which the species occurs.

Mapping rules and the estimated total availability of habitat within the survey area for threatened flora species potentially occurring within the Project Area are given in Table 11. Corresponding mapping rules and habitat areas for threatened fauna species potentially occurring within the Project Area are given in Table 12. These tables also include brief statements of essential habitat features that could not readily be mapped in this broadscale survey. Refer to the Likelihood of Occurrence assessments for a summary of distribution and habitat requirements for each species (Table 2, Section 3.1.2; Table 4, Section 3.1.4; Table 8, Section 3.2.3; and Table 10, Section 3.2.7). Predictive habitat maps for threatened species considered potentially occurring within the Project Area are presented in Appendix I.

3.3.1 MNES & MSES Threatened Flora

Predictive habitat maps for threatened flora species considered potentially occurring within the Project Area are presented in Appendix I1a-c.

Table 11: Potentially suitable REs and estimated extent of General Habitat for EPBC and NC Act listed threatened flora species potentially present in the Project Area.

Family	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Apocynaceae	<i>Vincetoxicum forsteri</i> (syn. <i>Tylophora linearis</i>) Slender Tylophora	E	E	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species occurs in shrubby dry sclerophyll woodland and forest.	11.5.1, 11.5.5, 11.10.7	122.7
Asteraceae	<i>Rutidosia lanata</i> Red-soil Woolly Wrinklewort	-	NT	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species favours ecotonal transitions between dry eucalypt woodland or forest and Brigalow vegetation.	11.5.1, 11.5.5, 11.9.2, 11.9.5, 11.9.7, 11.9.10	271.8
Mimosaceae	<i>Acacia wardellii</i> Thomby Range Wattle	-	NT	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species occurs in dry woodlands and forest.	11.5.1, 11.5.5	18.9
Poaceae	<i>Homopholis belsonii</i> Belson's Panic	V	V	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species occurs in Poplar Box and Brigalow dominated woodlands.	11.3.2, 11.3.17, 11.9.5, 11.9.5a, 11.9.7, 11.9.10	366.3
Solanaceae	<i>Solanum stenopterum</i> Winged Nightshade	-	V	Mapped General Habitat comprises all remnant and regrowth of nominated RE. The species habitat preferences are unclear, however, in this region it has been recorded from remnant and regrowth vegetation on clay and clay-loam soils.	11.3.2, 11.3.17, 11.9.2, 11.9.5, 11.9.7, 11.9.10	380.7
Surianaceae	<i>Cadellia pentastylis</i> Ooline	V	V	Mapped Essential Habitat comprises all remnant and regrowth of nominated RE within Southern Downs bioregion. Mapped General Habitat comprises remnant and regrowth of nominated RE and adjacent non-remnant areas of nominated preclear RE, within Southern Downs bioregion. Excludes previously surveyed vegetation patches (e.g. BOOBOOK 2022a).	Essential: 11.9.4, 11.9.5, 11.9.5a General: 11.3.25, 11.5.1, 11.9.2, 11.9.10, 11.10.7 and non-remnant preclear: 11.9.5/11.5.5 80/20, 11.9.10/11.5.5 60/40.	118.7 habitat 3,231.7 potential area of occurrence

3.3.2 MNES & MSES Threatened Fauna

Predictive habitat maps for threatened fauna species considered potentially occurring within the Project Area are presented in Appendix I2a-d.

Table 12: Potentially suitable REs and estimated extent of General Habitat for EPBC and NC Act listed threatened fauna species potentially present in the Project Area.

Class	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Birds	<i>Calyptorhynchus lathamii</i> Glossy Black-Cockatoo	V	V	Mapped General habitat comprises remnant eucalypt dominated RE that typically include large hollow bearing trees along with remnant and regrowth RE with potential feed trees (Casuarinaceae spp.).	Remnant and regrowth: 11.3.17, 11.5.1, 11.5.5, 11.9.5, 11.9.5a, 11.9.10, 11.10.7, 11.10.11 Remnant only: 11.3.2, 11.3.4, 11.3.25, 11.3.27f, 11.9.7	659
Birds	<i>Geophaps scripta scripta</i> Squatter Pigeon (Southern Subspecies)	V	V	Mapped General Habitat comprises remnant and regrowth of eucalypt dominated woodland and open forest within largely wooded landscapes. The species favours grassy woodland areas with patchy ground cover. Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Gilgulgul Road.	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, 11.10.11	164.3
Birds	<i>Grantiella picta</i> Painted Honeyeater	V	V	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.	-	-
Birds	<i>Hirundapus caudacutus</i> White-throated Needletail	V	V	Not mapped. This is an aerial foraging species that follows weather fronts over wooded and cleared landscapes. The species shows a general preference for wooded landscapes but it is not tied to any specific vegetation or habitat features in the Project Area.	All areas, aerial use only	N/A
Birds	<i>Rostratula australis</i> Australian Painted Snipe	E	E	Mapped General habitat comprises wetland areas and wetland associated RE. The species favours wetland areas with dense low vegetation, muddy banks and shallow water.	11.3.27f, mapped wetland areas in other RE and non-remnant vegetation.	69.7

Class	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Mammals	<i>Dasyurus hallucatus</i> Northern Quoll	E	LC	<p>Mapped Essential Habitat comprises contiguous areas of woodland and forest within 1 km of rocky scarps.</p> <p>Mapped 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.</p> <p>Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.</p>	All RE (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, 11.10.11)	226.7
Mammals	<i>Nyctophilus corbeni</i> Southeastern Long-eared Bat	V	V	<p>Mapped General Habitat comprises larger contiguous areas of remnant and regrowth woodland and open forest. The species favours areas with a multilayered shrubby understorey.</p> <p>Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.</p>	All RE except SEVT (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, 11.10.11)	259.7
Mammals	<i>Petauroides armillatus</i> Central Greater Glider	E	E	<p>Mapped 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 Giligulgul Road. The species requires large hollow-bearing trees in areas with eucalypt feed trees.</p> <p>Excludes small isolated fragments and regrowth areas.</p>	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, 11.10.11	528
Mammals	<i>Petaurus australis</i> Yellow-bellied Glider (Southern Subspecies)	V	E	<p>Mapped 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).</p> <p>Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.</p>	11.3.25, 11.5.1, 11.10.7	145.9
Mammals	<i>Phascolarctos cinereus</i> Koala	E	E	<p>Mapped 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.</p>	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, 11.10.11	715.7 foraging and breeding habitat 9,098.3 dispersal habitat

Class	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Reptiles	<i>Acanthophis antarcticus</i> Common Death Adder	-	V	Mapped General Habitat comprises larger contiguous areas of remnant and regrowth woodland and forest. The species favours areas with abundant low shrubs, leaf litter and woody debris. Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.	All RE (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, 11.10.11)	259.7
Reptiles	<i>Delma torquata</i> Collared Delma	V	V	Mapped 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. Excludes SEVT and small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.	All RE except SEVT (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, 11.10.11)	259.7
Reptiles	<i>Egernia rugosa</i> Yakka Skink	V	V	Mapped 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. Excludes SEVT and small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.	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, 11.10.11	228
Reptiles	<i>Furina dunmalli</i> Dunmall's Snake	V	V	Mapped General Habitat comprises larger contiguous areas of remnant and regrowth woodland and forest. The species favours areas with abundant leaf litter and woody debris. Excludes small isolated fragments, narrow corridors and the largely cleared landscape north of Giligulgul Road.	All RE (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, 11.10.11)	259.7

Class	Species Name	EPBC Act status	NC Act Status	Habitat Mapping Rules	Potentially Suitable RE Within the Project Area	Mapped Extent of Potentially Suitable Habitat (ha)
Reptiles	<i>Strophurus taenicauda</i> Golden-tailed Gecko	-	NT	<p>Mapped Essential Habitat comprises remnant and regrowth RE with abundant decorticating trees, stags and woody debris (RE with abundant tall <i>Acacia</i> spp. and/or <i>Callitris</i>)</p> <p>Mapped General Habitat comprises other RE within which the species is occasionally recorded.</p>	<p>Essential: 11.3.17, 11.3.19, 11.5.1, 11.5.5, 11.9.5, 11.9.5a 11.9.10, 11.10.7, 11.10.11</p> <p>General: 11.3.2, 11.3.4, 11.3.25, 11.3.27f, 11.9.7</p>	906.7
Insects	<i>Jalmenus eubulus</i> Pale Imperial Hairstreak (butterfly)	-	V	Mapped General Habitat comprises Brigalow (<i>Acacia harpophylla</i>) dominant remnant woodland.	11.3.17, 11.9.5, 11.9.5a, 11.9.10	180.2
Molluscs	<i>Adclarkia dulacca</i> Dulacca Woodland Snail	E	E	<p>Mapped Essential Habitat comprises remnant and regrowth Brigalow woodland and forest, and SEVT. The species favours areas with abundant leaf litter and woody debris.</p> <p>Mapped General Habitat comprises woodland and open forest of the nominated RE that are connected to patches of essential habitat.</p>	<p>Essential: 11.9.4, 11.9.5, 11.9.5a</p> <p>General: 11.9.10, 11.10.7</p>	305.25

4 Conclusions

An ecological assessment within the Project Area identified the following ecological values/potential constraints:

Matters of National Environmental Significance:

- ✦ Two Threatened Ecological Communities (TEC):
 - Brigalow (*Acacia harpophylla* dominant and co-dominant); and,
 - Poplar Box grassy woodland on alluvial plains.
- ✦ One EPBC Act listed threatened flora species:
 - Ooline (*Cadellia pentastylis*).
- ✦ Two additional EPBC Act listed threatened flora species potentially occur.
- ✦ Two Weeds of National Significance (WoNS) species:
 - Common Pest Pear (*Opuntia stricta*); and,
 - Velvety Tree Pear (*O. tomentosa*).
- ✦ Six WoNS potentially occur.
- ✦ Two EPBC Act listed threatened fauna species detected:
 - Central Greater Glider (*Petauroides armillatus*); and,
 - Koala (*Phascolarctos cinereus*).
- ✦ Nine EPBC Act listed threatened fauna species likely occur.
- ✦ Five EPBC Act listed threatened fauna species potentially occur.
- ✦ Two EPBC Act listed migratory and marine fauna species likely occur.
- ✦ Ten EPBC Act listed migratory and marine fauna species potentially occur.

Queensland Biodiversity Values and Constraints:

- ✦ Four Endangered RE present as remnant and/or regrowth.
 - ✦ Five Of Concern RE present as remnant and/or regrowth.
 - ✦ Six No Concern at Present RE present as remnant and/or regrowth.
 - ✦ One NC Act listed threatened flora species detected.
 - ✦ Three NC Act listed threatened flora species potentially occur.
 - ✦ Three targeted SLC flora (*Brachychiton populneus*, *B. rupestris* and *B. australis*) present.
 - ✦ Four Biosecurity Act Category 3 Restricted Matter invasive plants present.
 - ✦ Nine Biosecurity Act Category 3 Restricted Matter invasive plants potentially occur.
 - ✦ Two NC Act listed threatened fauna species were detected.
- Seven NC Act listed threatened fauna species likely to occur.
- ✦ Ten NC Act listed threatened fauna species may potentially occur.
 - ✦ Category B ESA within the Project Area includes: Ground-truthed Endangered RE
 - ✦ Category C ESA within the Project Area includes: Ground-truthed Essential Habitat Areas and Ground-truthed Of Concern RE.

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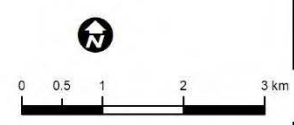
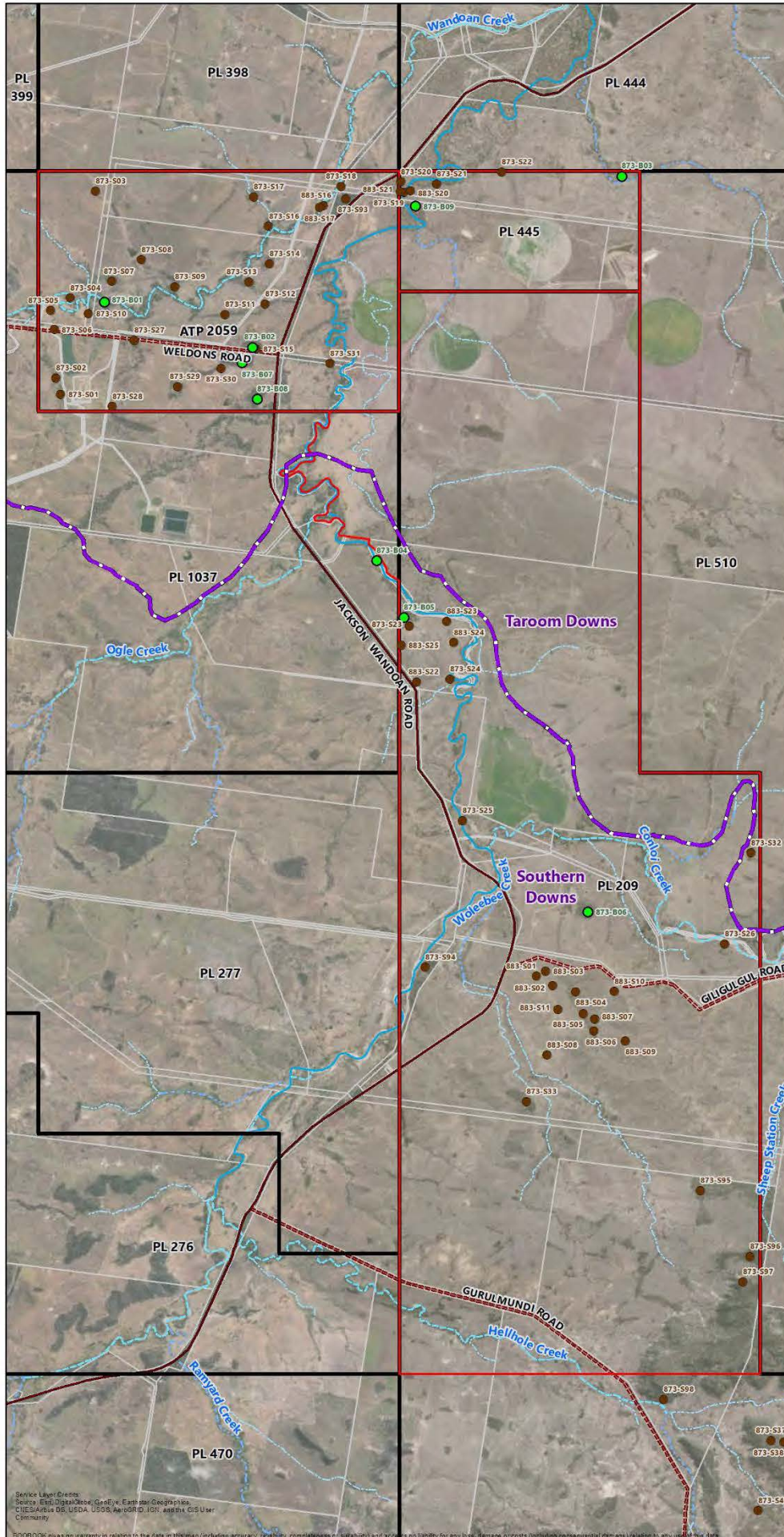
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<https://www.legislation.qld.gov.au/view/html/inforce/current/act-1999-090>

Appendix A. Overview of Project Area.

Appendix A: Overview of Project Area and Assessment Sites.

- Project Area
- Cadastre
- Tenement
- Assessment Sites**
- Biocondition
- Vegetation & Habitat
- Biogeographic Subregion
- Secondary Road
- Local Road
- Ordered Streams**
- 2
- 3
- 4
- 5



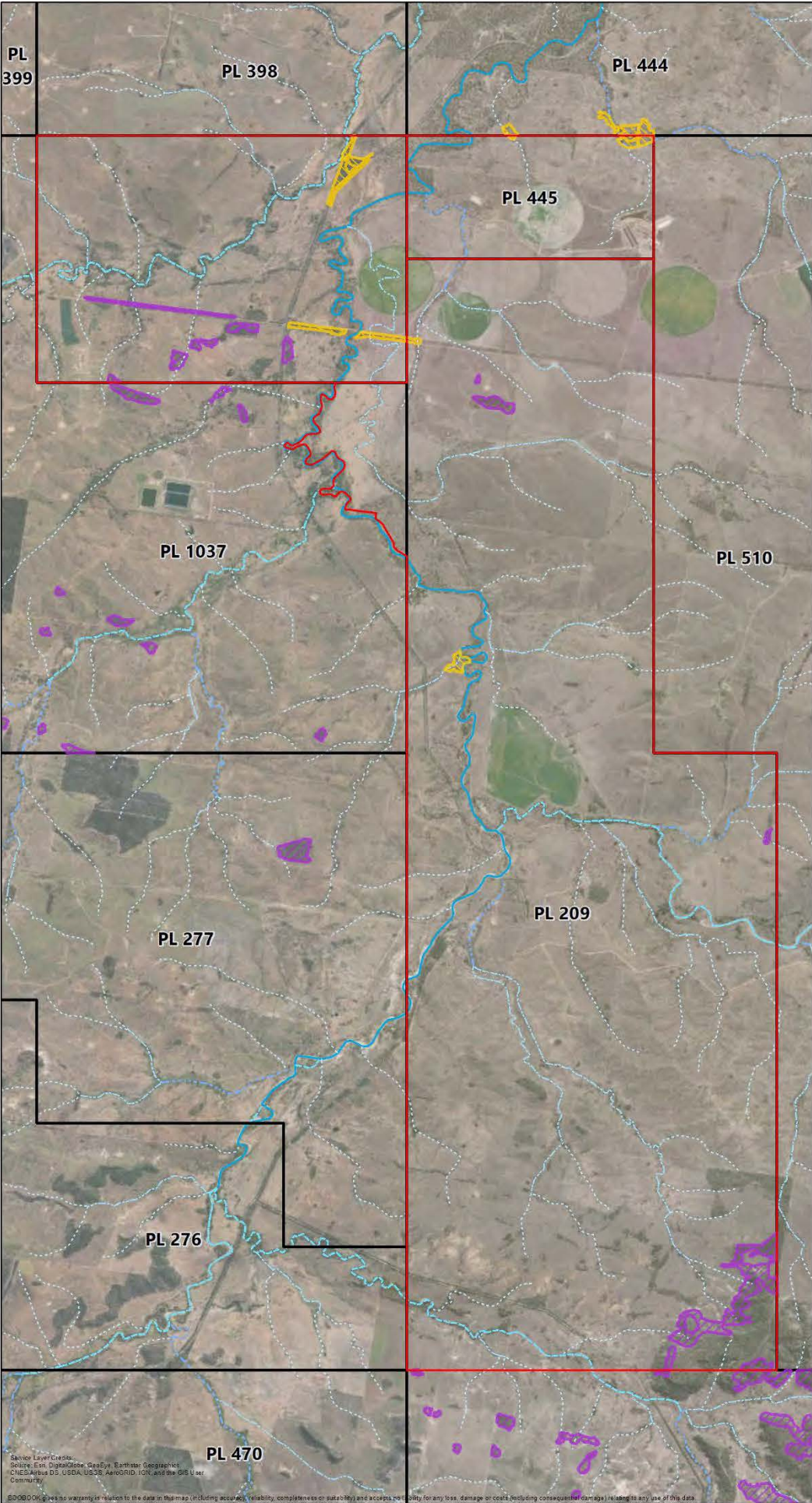
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 Ecological Assessment
 Map No: PC873_AppA
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 58,000 @ A3
 Datum: GDA94



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Appendix B. Threatened Ecological Communities Occurring within the Project Area.

Appendix B: Threatened Ecological Communities (TEC) occurring within the Project Area.



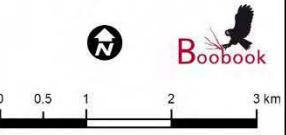
Project Area

TEC

- Brigalow
- Poplar Box grassy woodland

Ordered Streams

- 1
- 2
- 3
- 4
- 5



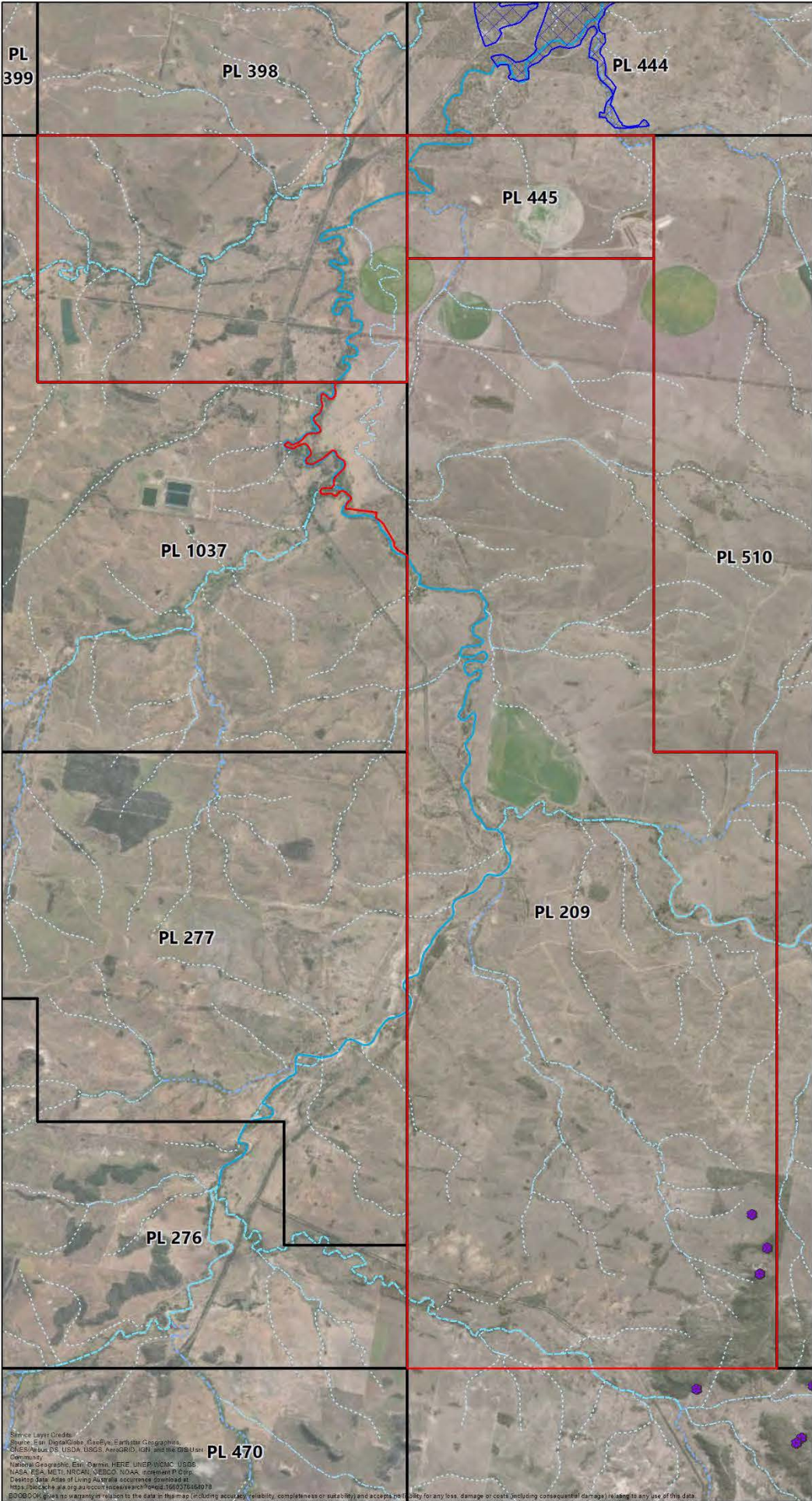
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Map No:	PC873_AppB
Date:	23/09/2022
Drawn:	L. Hardwick
Approv:	C. Eddie
Scale:	1: 55,000 @ A3
Datum:	GDA94



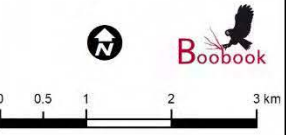
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 CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User
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Appendix C. Threatened Flora Occurring within the Project Area

Appendix C: Threatened Flora occurring within the Project Area



- Project Area
- Threatened Flora**
- Survey records**
- Ooline (*Cadellia pentastylis*)
- Protected Plants**
- Flora Trigger**
- High Risk Area
- Ordered Streams**
- 1
- 2
- 3
- 4
- 5

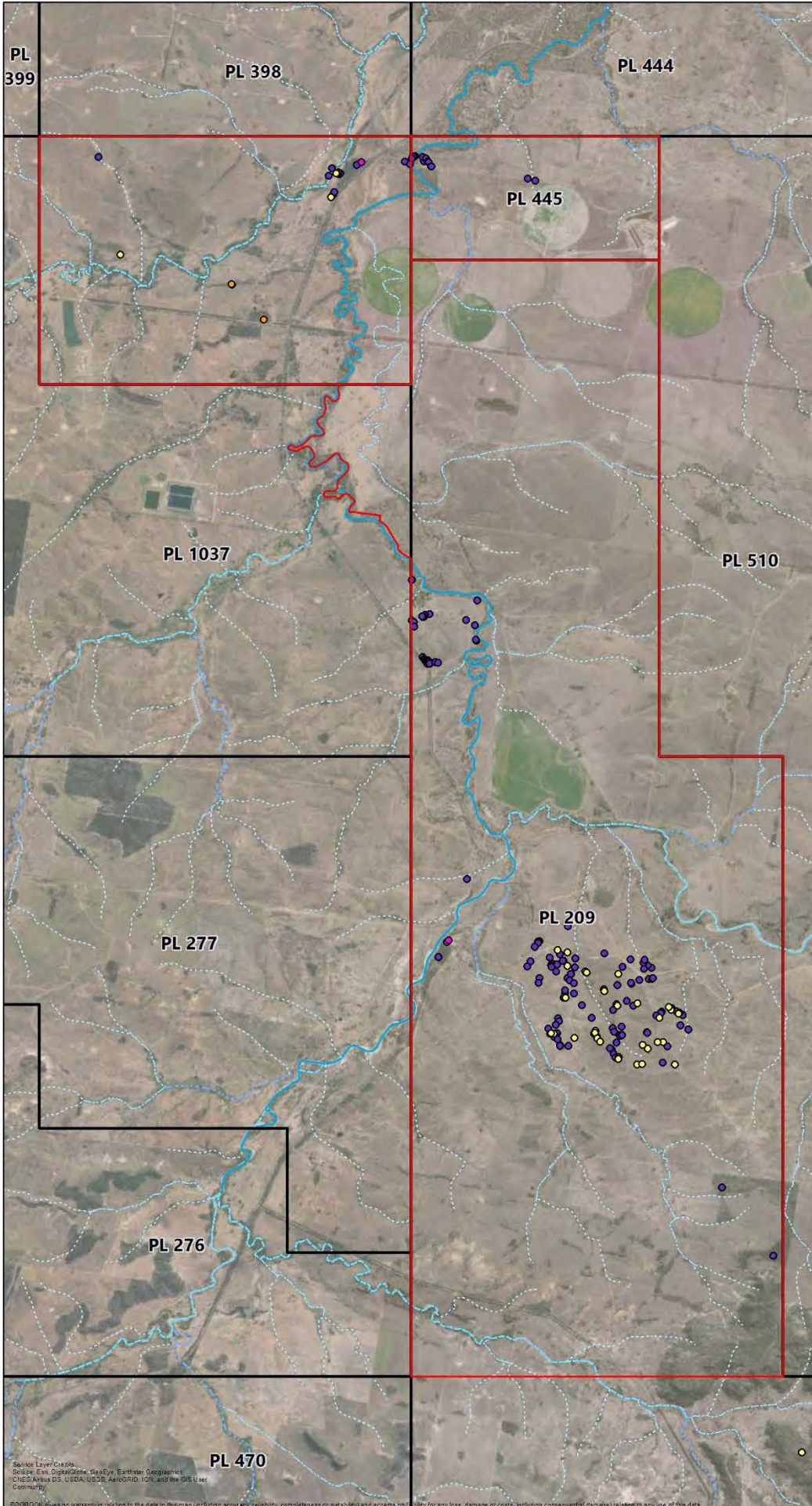


Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppC
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 55,000 @ A3
 Datum: GDA94



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 National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, SWAN, iNaturalist, and the GIS User Community
 Desktop Data: Atlas of Living Australia occurrence downloaded at: https://biocache.ala.org.au/occurrences/search?record=166927645078
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Appendix D. WoNS and other Pest Flora Occurring within the Project Area.



Appendix D: WoNS and other Pest Flora occurring within the Project Area.

- Project Area
- Category 3 Weeds**
- **Harrisia Cactus** (*Harrisia martinii*)
- **Mother-of-milli...** (*Bryophyllum delagoense*)
- WoNS and Category 3 Weeds**
- Common Pest Pear** (*Opuntia stricta*)
- Velvety Tree Pear** (*Opuntia tomentosa*)
- Ordered Streams**
- 1
- 2
- 3
- 4
- 5



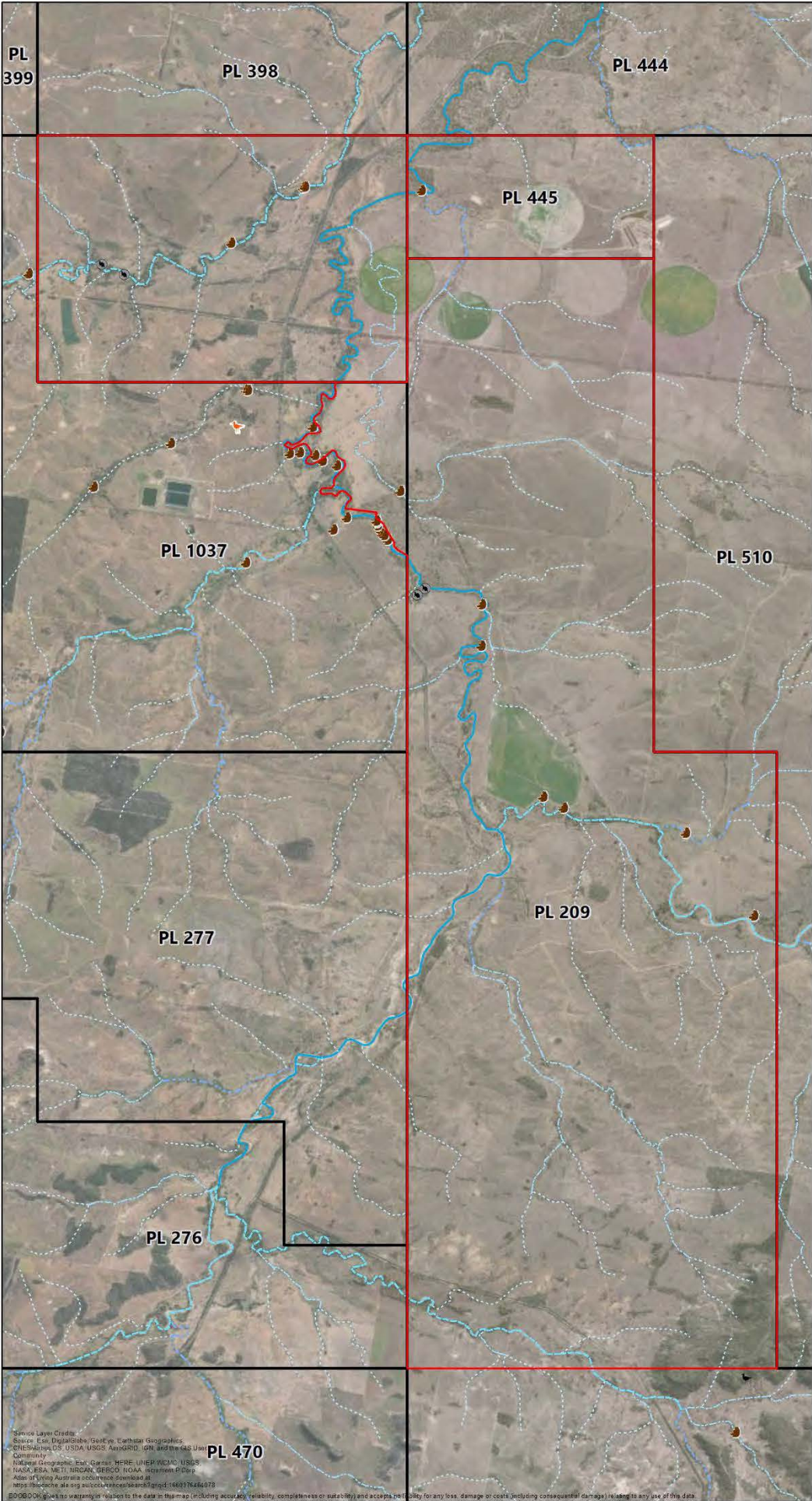
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Map No:	PC873_AppD
Date:	23/09/2022
Drawn:	L. Hardwick
Approv:	C. Eddie
Scale:	1: 55,000 @ A3
Datum:	GDA94



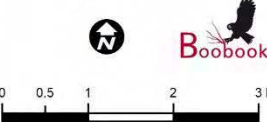
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Appendix E. Threatened Fauna Occurring within the Project Area.

Appendix E: Threatened Fauna occurring within the Project Area.



- Project Area
- Threatened Fauna**
- Survey Records**
- ▲ Glossy Black-Cockatoo (*Calyptrorhynchus lathamii*)
- Central Greater Glider (*Petauroides armillatus*)
- ▲ Koala (*Phascolarctos cinereus*)
- Desktop Records**
- ▲ Glossy Black-Cockatoo (*Calyptrorhynchus lathamii*)
- Ordered Streams**
- 1
- 2
- 3
- 4
- 5

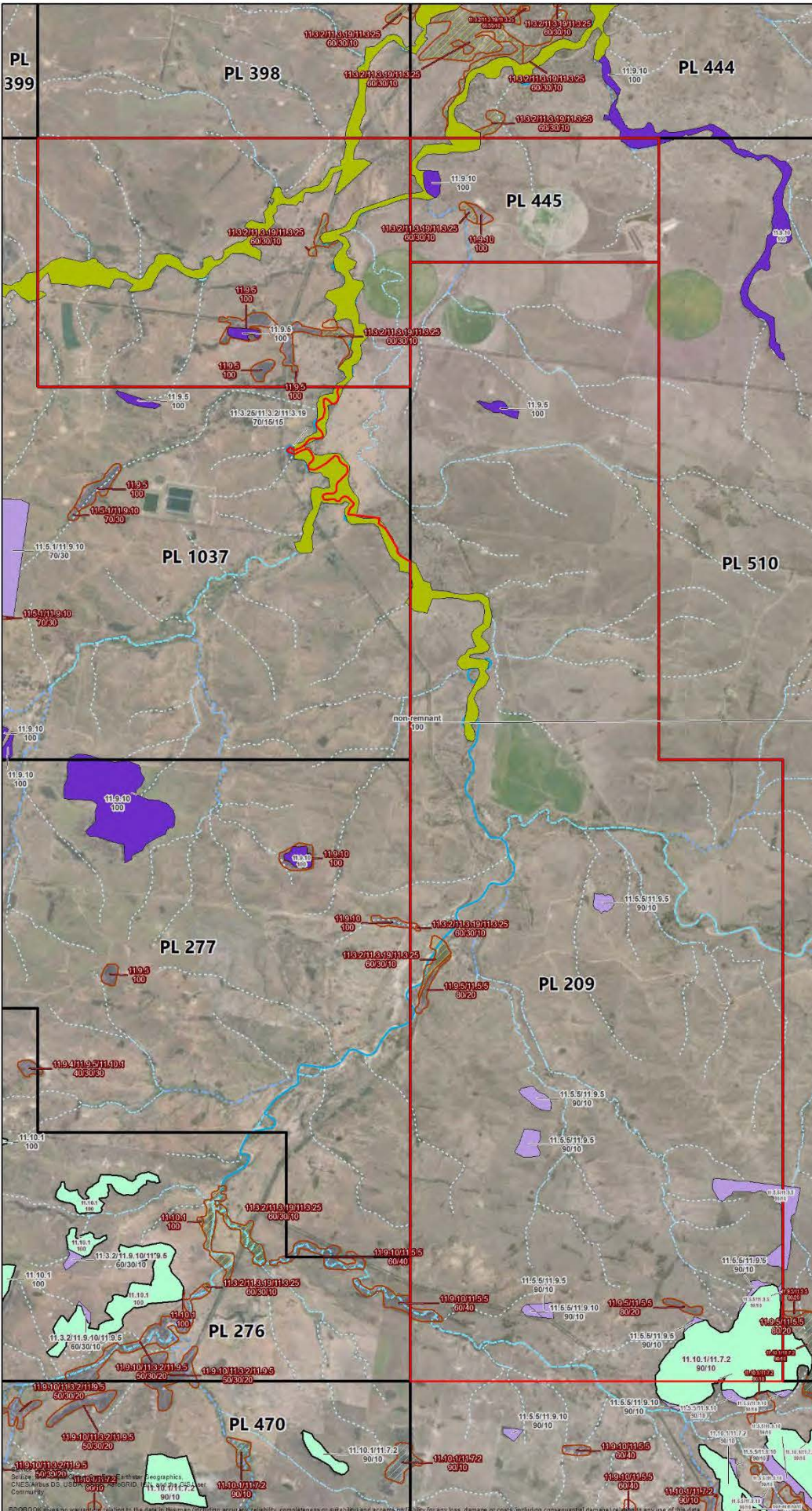


Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppE
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 55,000 @ A3
 Datum: GDA94



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 NASA, ESA, METI, Swire, GEBCO, NOAA, CNR/Smithsonian
 Atlas of Living Australia occurrence download at
 https://biocache.ala.org.au/occurrences/search?query=168978&lat=37.0
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Appendix F. Regional Ecosystems Occurring within the Project Area.



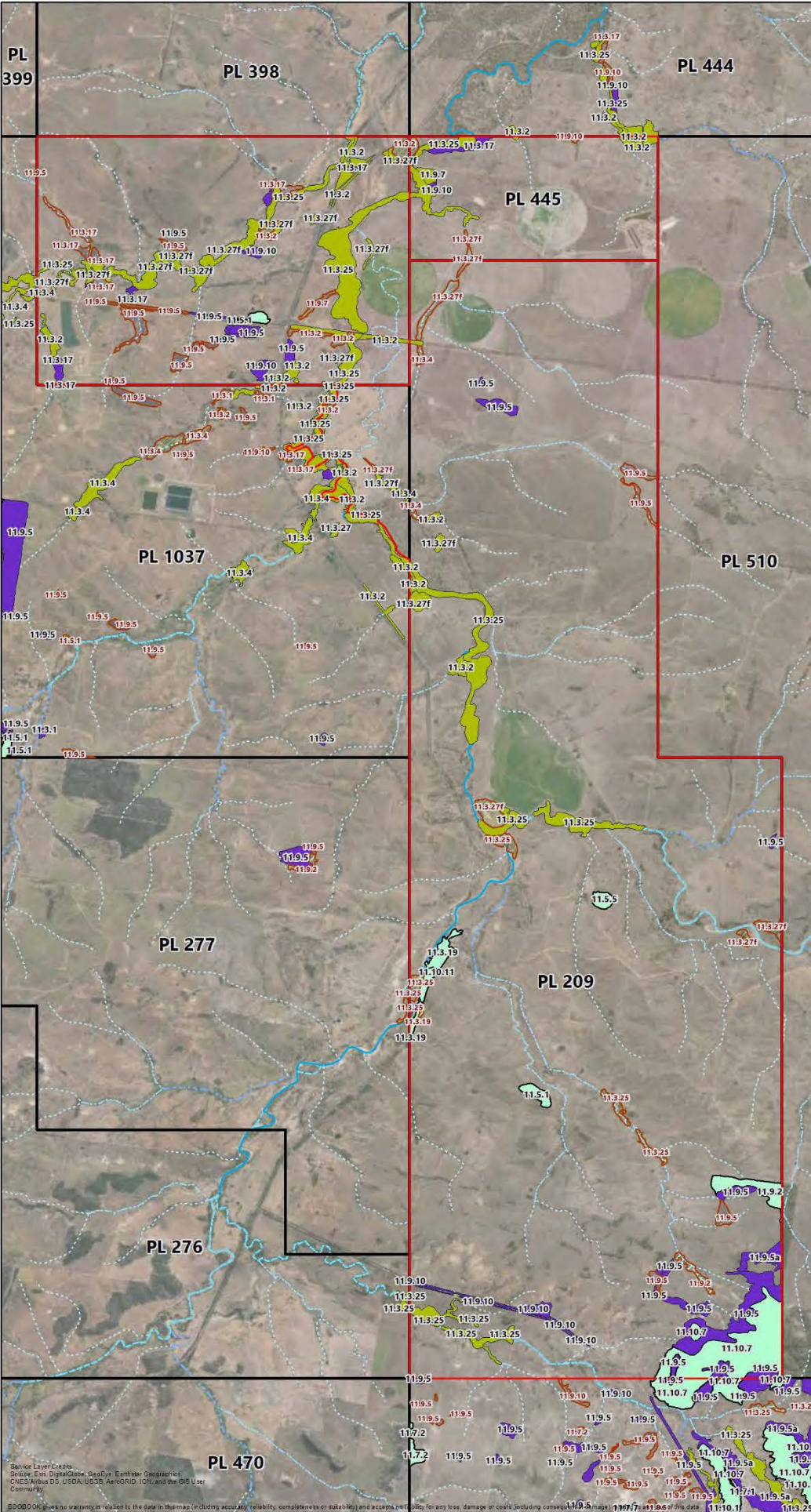
Appendix F1: Desktop Regional Ecosystems occurring within the Project Area.

- Project Area
- Remnant Regional Ecosystems (Biodiversity Status)**
- Endangered, Dominant
- Endangered, Sub-dominant
- Of Concern, Dominant
- No Concern At Present
- High Value Regrowth (Biodiversity Status)**
- Endangered, Dominant
- Endangered, Sub-dominant
- Of Concern, Dominant
- No concern At Present
- Ordered Streams**
- 1
- 2
- 3
- 4
- 5



Project:	Atlas3 Ecological Assessment
Map No:	PC873_AppF1
Date:	23/09/2022
Drawn:	L. Hardwick
Approv:	C. Eddie
Scale:	1: 55,000 @ A3
Datum:	GDA94





**Appendix F2:
Ground-truthed
Regional Ecosystems
occurring within the
Project Area.**

- Project Area
- Ground-truthed Remnant Regional Ecosystem (Biodiversity Status)**
 - Endangered, Dominant
 - Of Concern, Dominant
 - No Concern At Present
- Ground-truthed Advanced Regrowth (Biodiversity Status)**
 - Endangered, Dominant
 - Of Concern, Dominant
 - No Concern At Present
- Ordered Streams**
 - 1
 - 2
 - 3
 - 4
 - 5

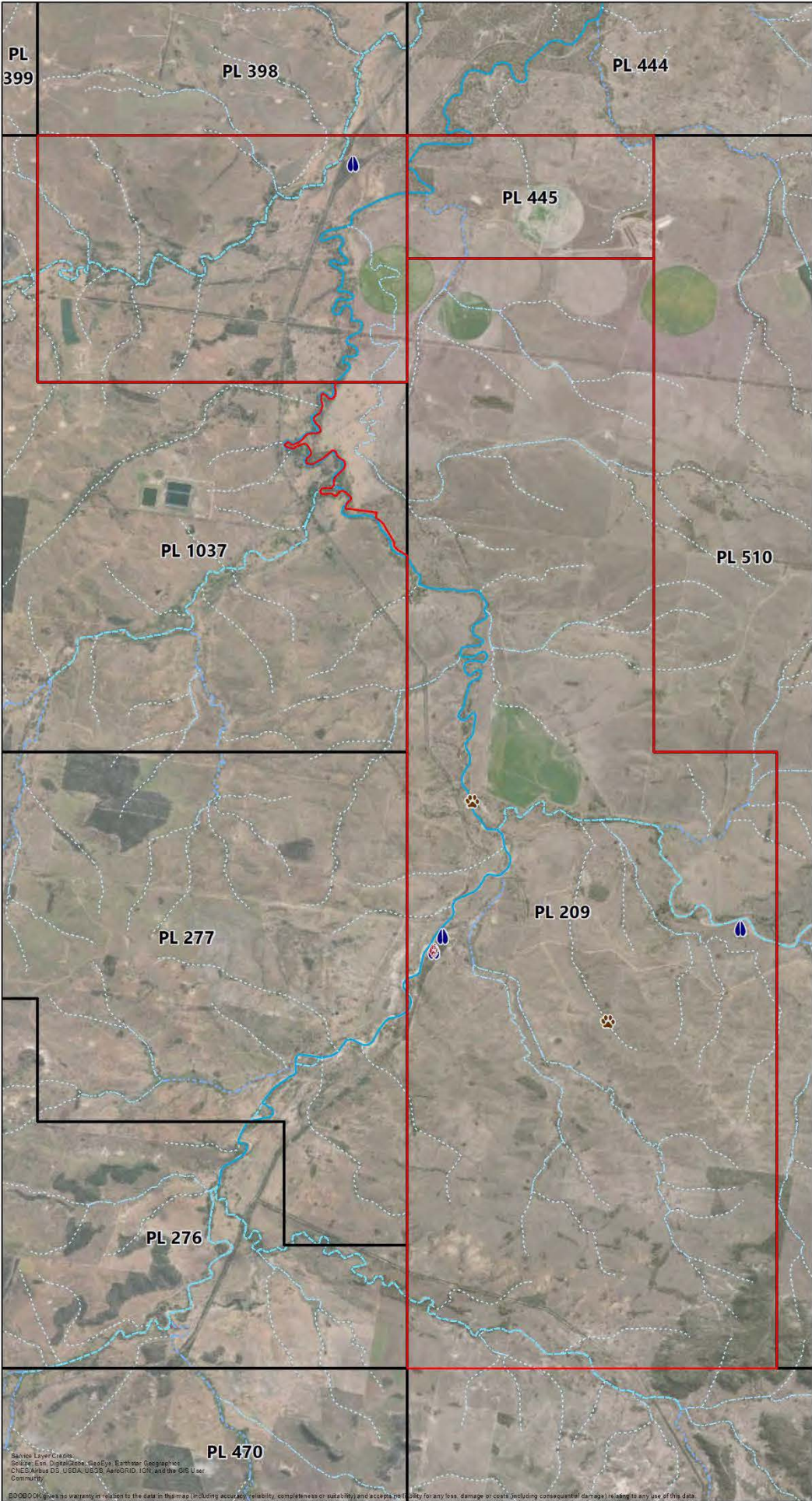


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Ecological Assessment	
Map No:	PC873_AppF2
Date:	23/09/2022
Drawn:	L. Hardwick
Approved:	C. Eddie
Scale:	1: 55,000 @ A3
Datum:	GDA94



Appendix G. Pest Fauna Occurring within the Project Area.

Appendix G: Pest Fauna occurring within the Project Area



Project Area

Pest Fauna Survey Record

- Dingo (*Canis familiaris*)
- Rabbit (*Oryctolagus cuniculus*)
- Pig (*Sus scrofa*)

Ordered Streams

- 1
- 2
- 3
- 4
- 5

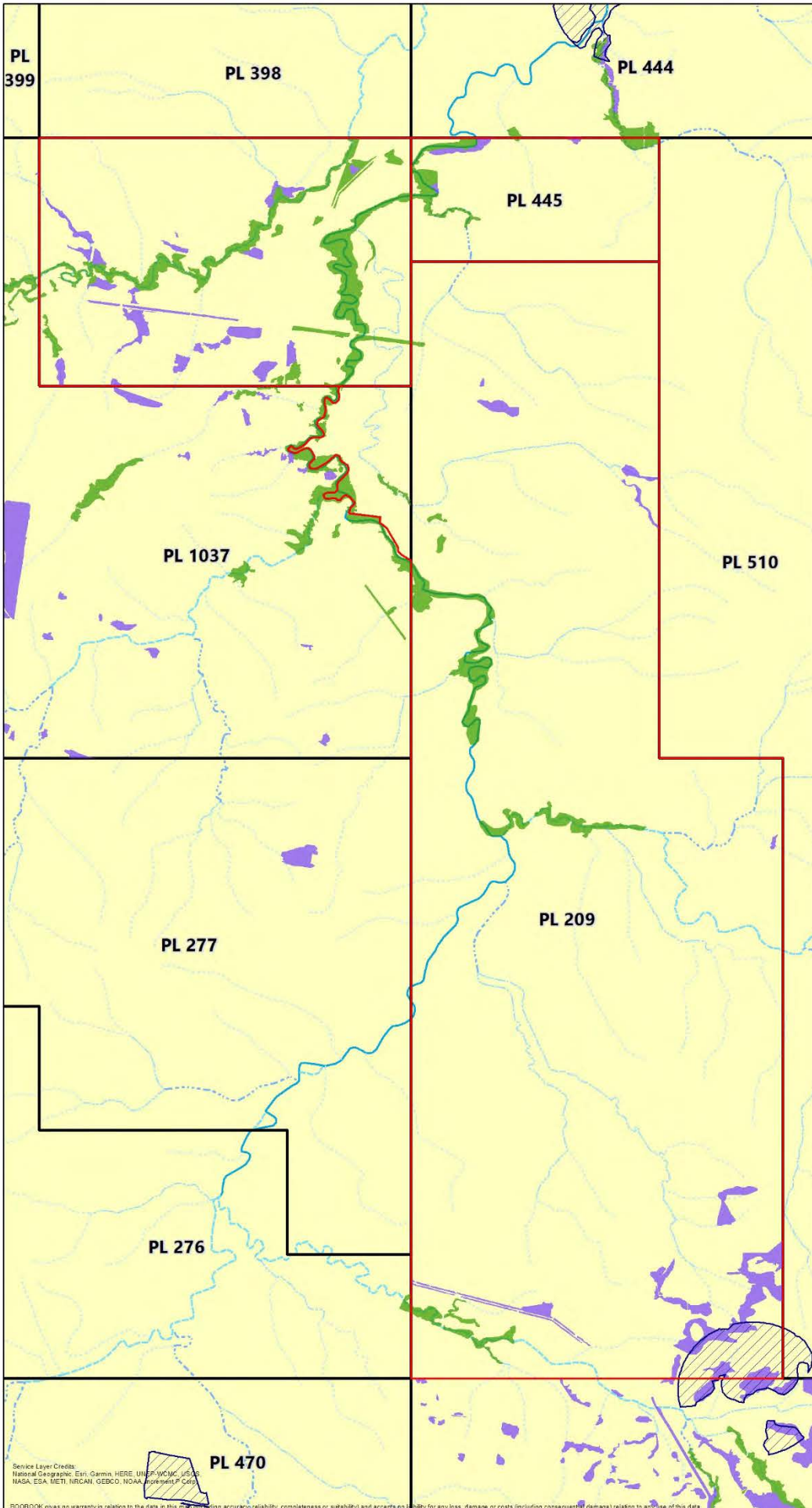


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	Ecological Assessment
Map No:	PC873_AppG
Date:	23/09/2022
Drawn:	L. Hardwick
Approv:	C. Eddie
Scale:	1: 55,000 @ A3
Datum:	GDA94



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Appendix H. Environmentally Sensitive Areas Occurring within the Project Area.



**Appendix H:
Environmentally Sensitive
Areas occurring
within the Project Area.**

- Project Area
- CATEGORY B**
- Ground-truthed
- Endangered RE -
Remnant & Regrowth
- CATEGORY C**
- Essential Habitat
- Ground-truthed
- Of Concern RE -
Remnant
- Ordered Streams**
- 1
- 2
- 3
- 4
- 5



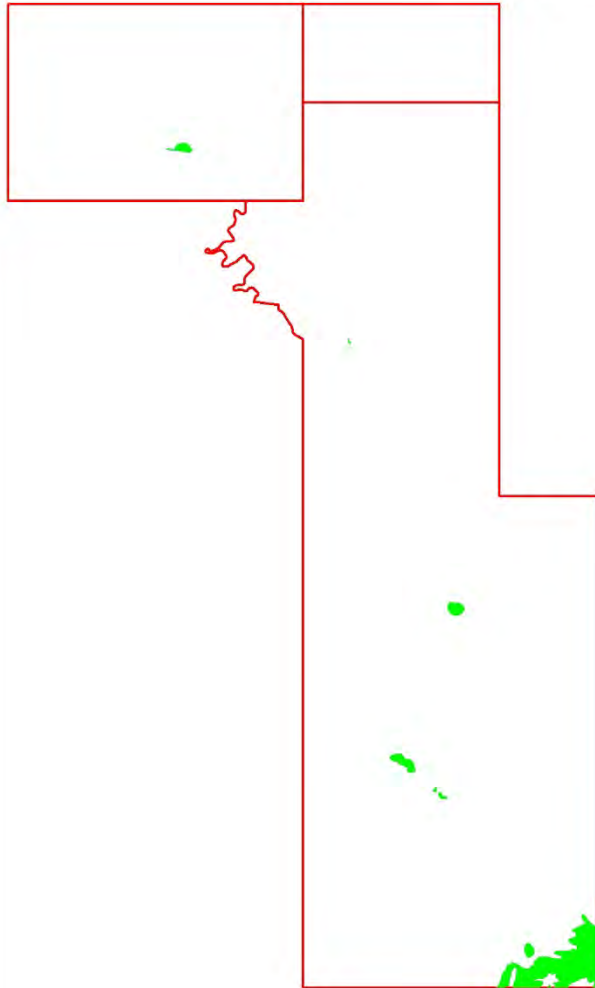
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Approved:	C. Eddle
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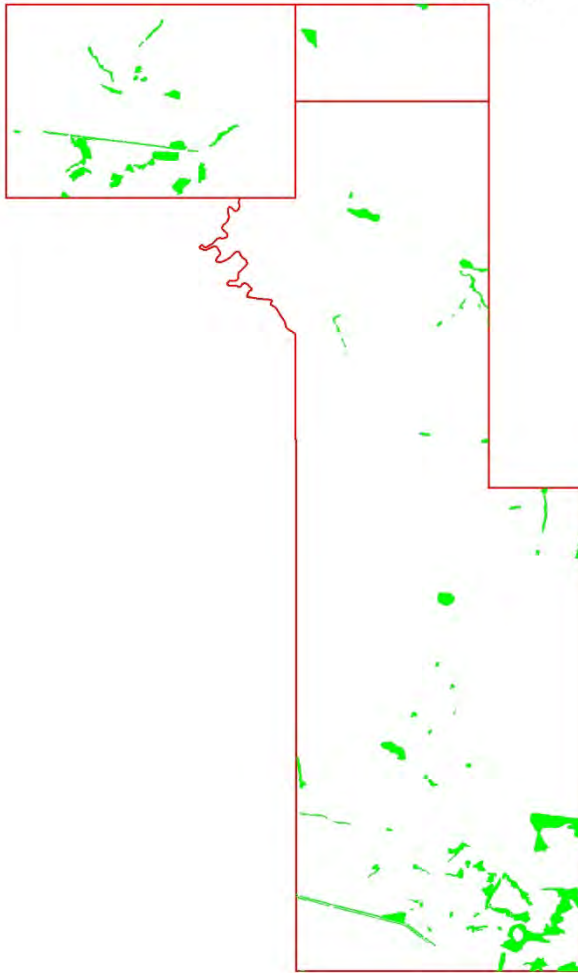
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Appendix I. Predictive Habitat Mapping of Threatened Flora and Fauna.

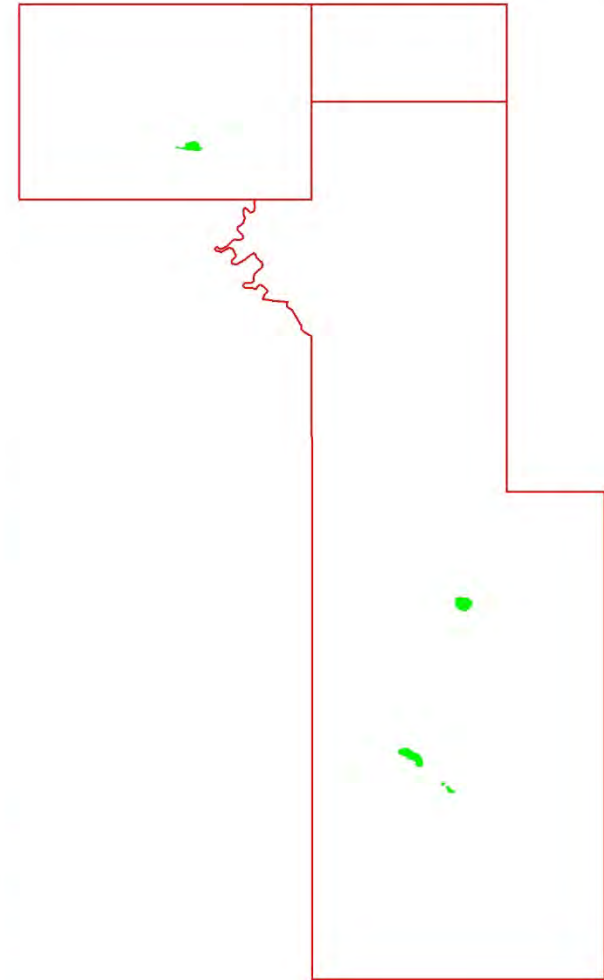
Slender Tylophora



Red-soil Woolly
Wrinklewort



Thomby Range Wattle



Appendix I1a: Predictive Habitat Mapping of Threatened Flora.

- General Habitat
- The Site

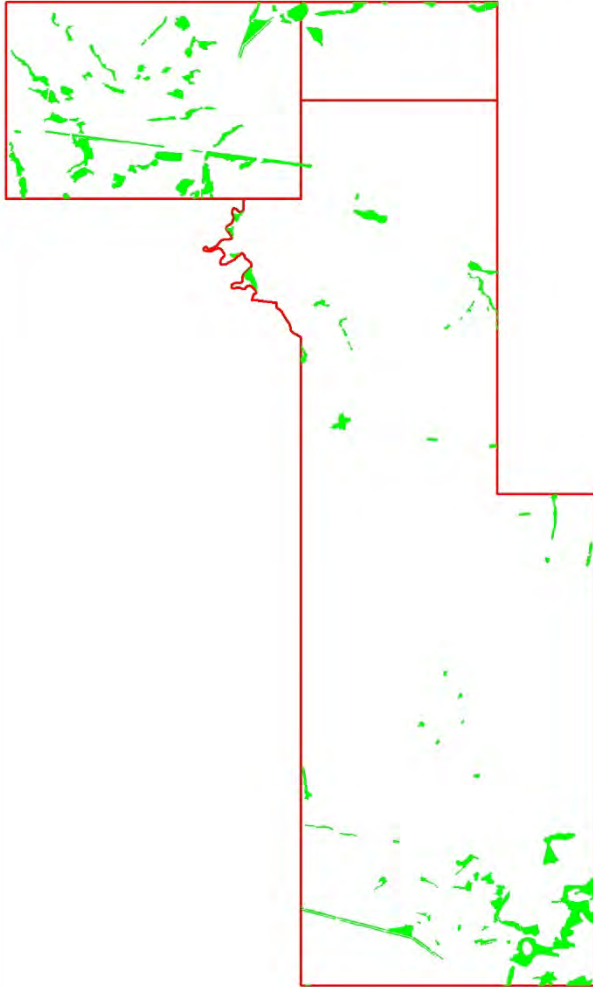
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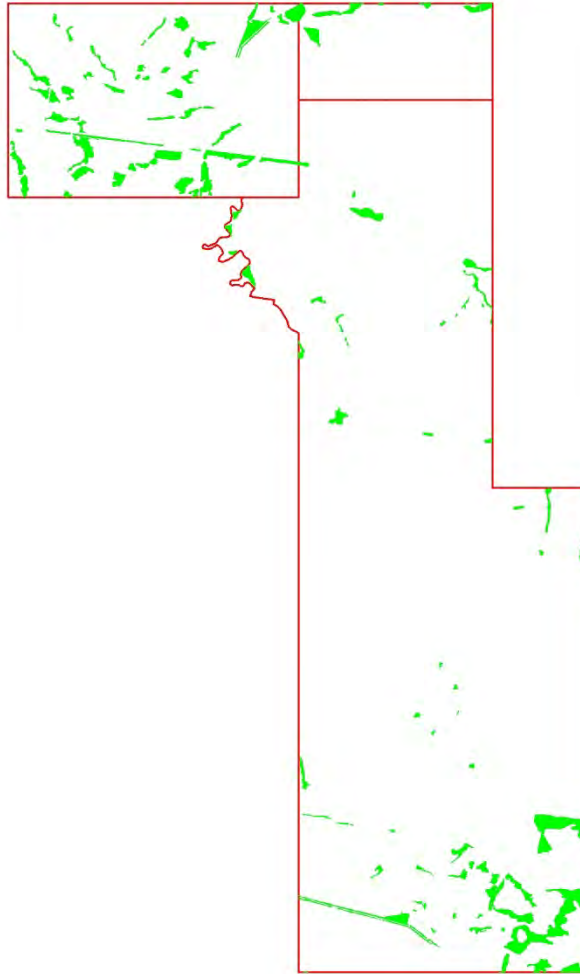
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 Map No: PC873_App11a
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 89,265 @ A3
 Datum: GDA94



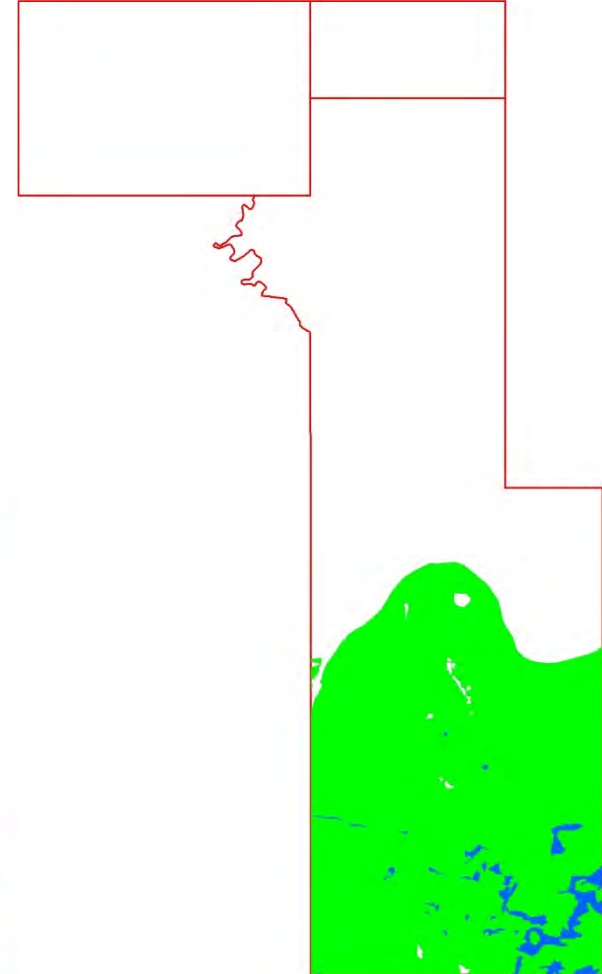
Belsons Panic



Winged Nightshade



Ooline



Appendix 11b: Predictive Habitat Mapping of Threatened Flora.

- Essential Habitat
- General Habitat
- The Site

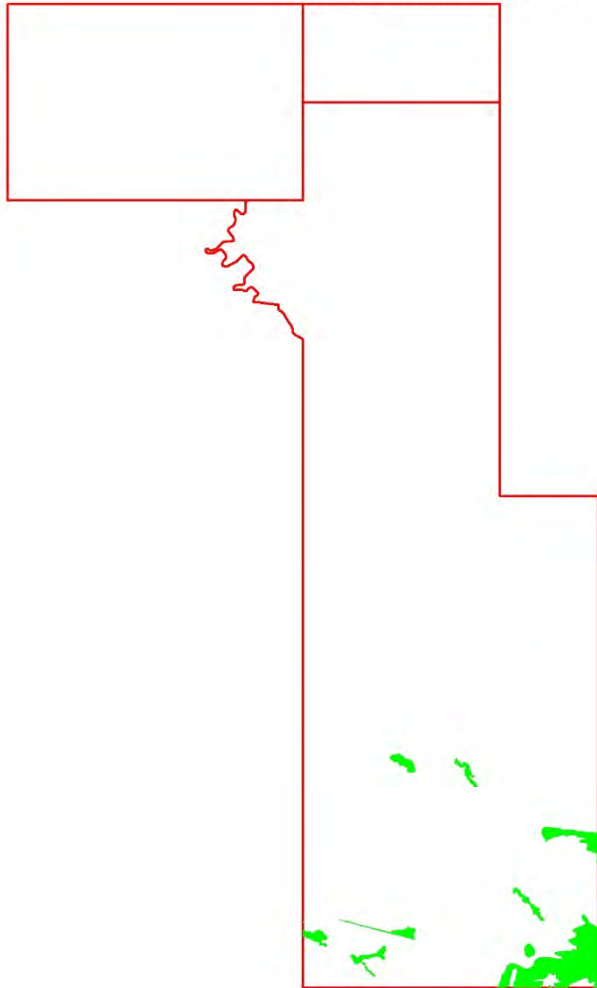
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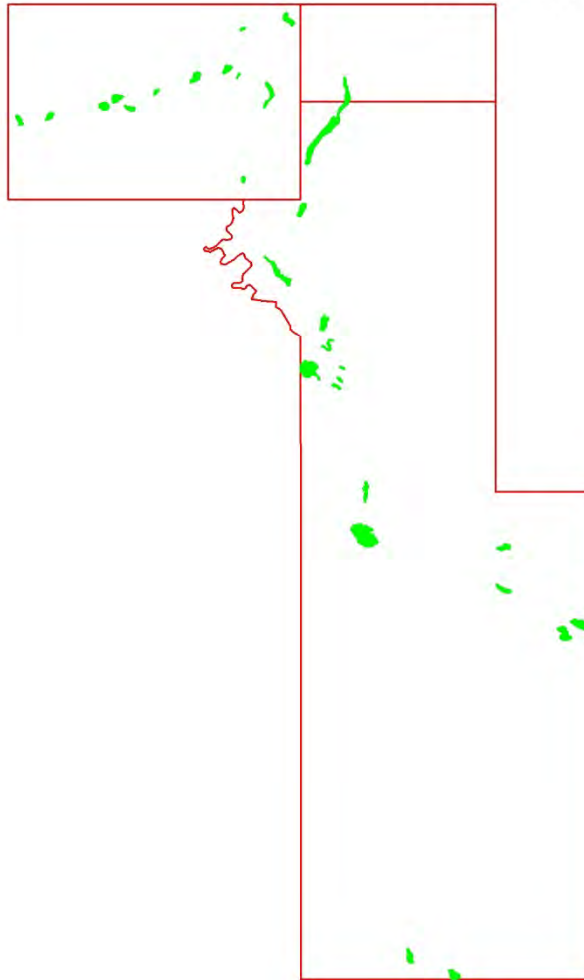
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 Map No: PC873_App11b
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approved: C. Eddie
 Scale: 1: 89,420 @ A3
 Datum: GDA94



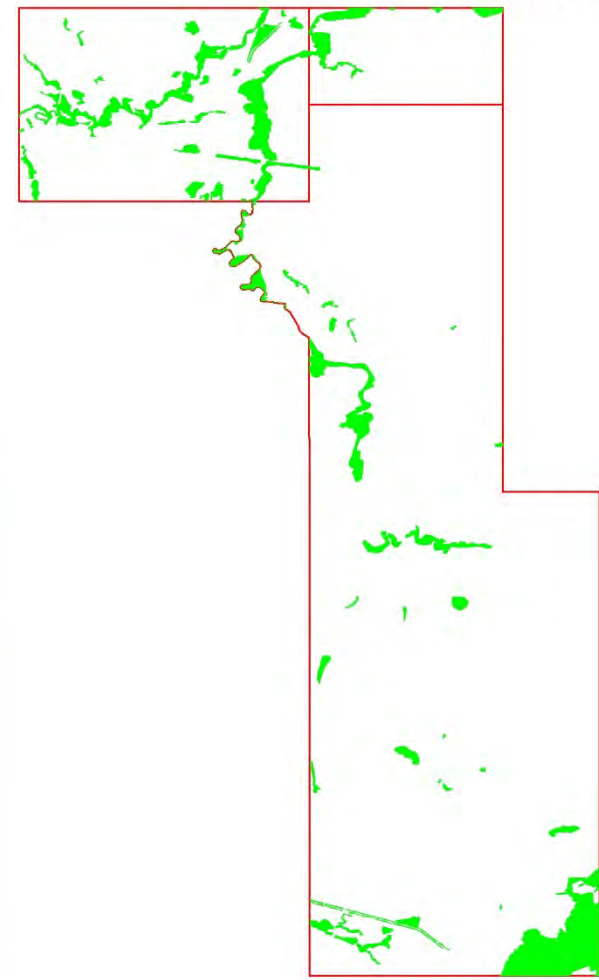
**Squatter Pigeon
(Southern Subspecies)**



**Australian
Painted Snipe**



**Glossy
Black-Cockatoo**

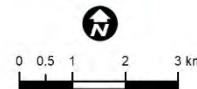


Appendix I2a: Predictive threatened fauna habitat mapping within the Site.

- The Site
- General Habitat

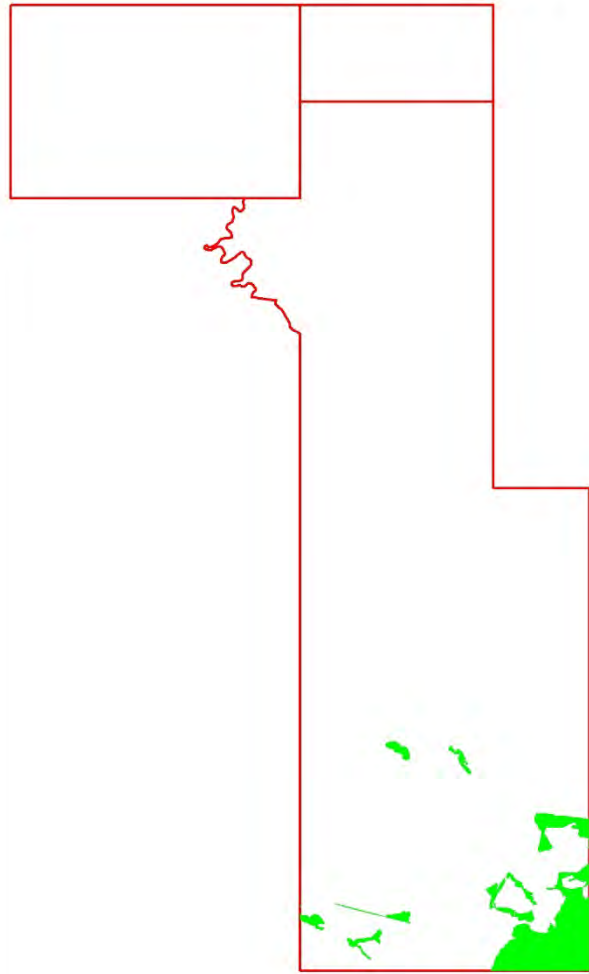


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 Ecological Assessment
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 Drawn: L. Hardwick
 Approv: C. Eddie
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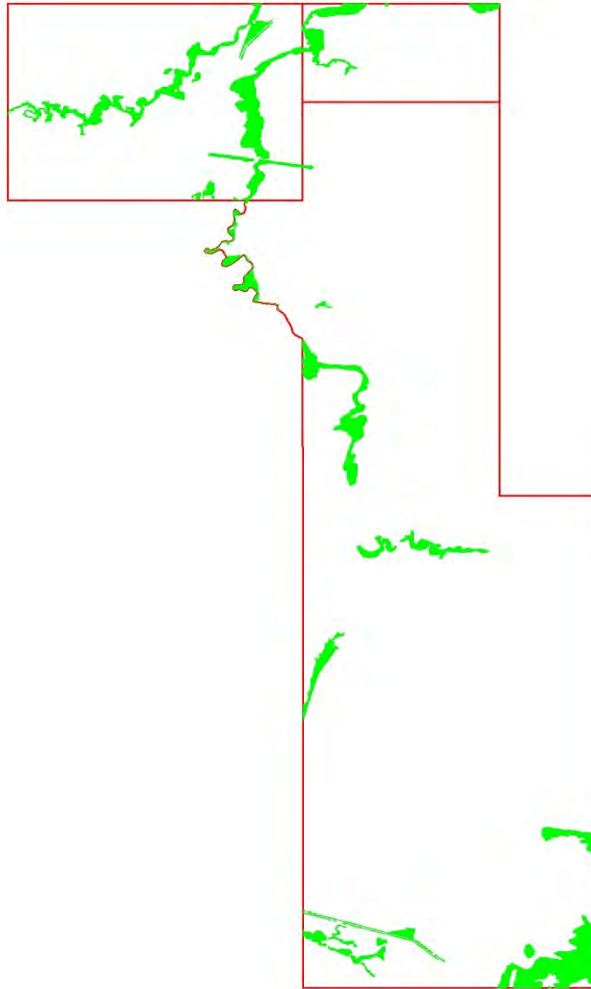


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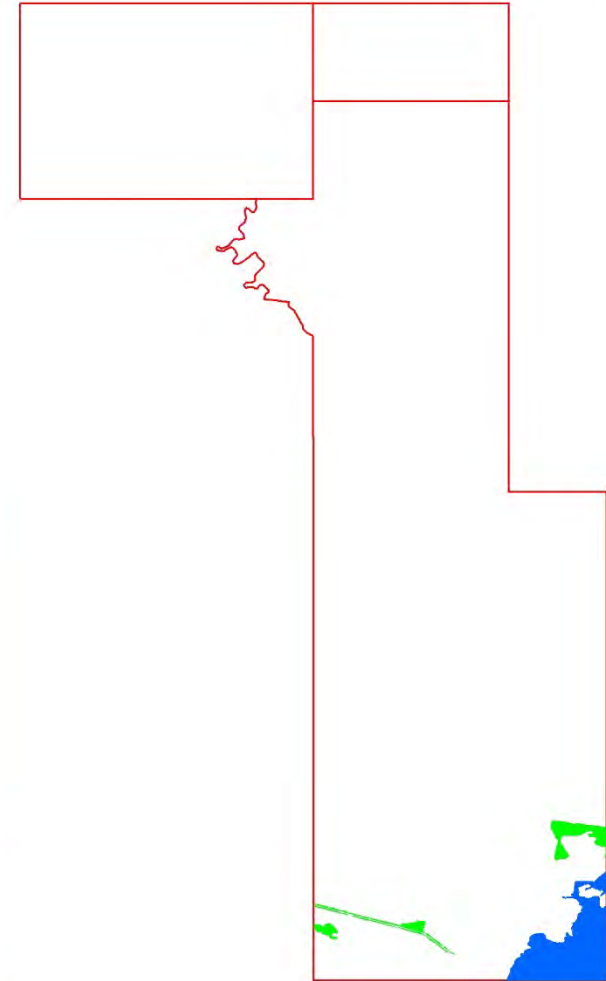
Southeastern Long-eared Bat



Central Greater Glider



Northern Quoll



Appendix I2b: Predictive Habitat Mapping of Threatened Fauna.

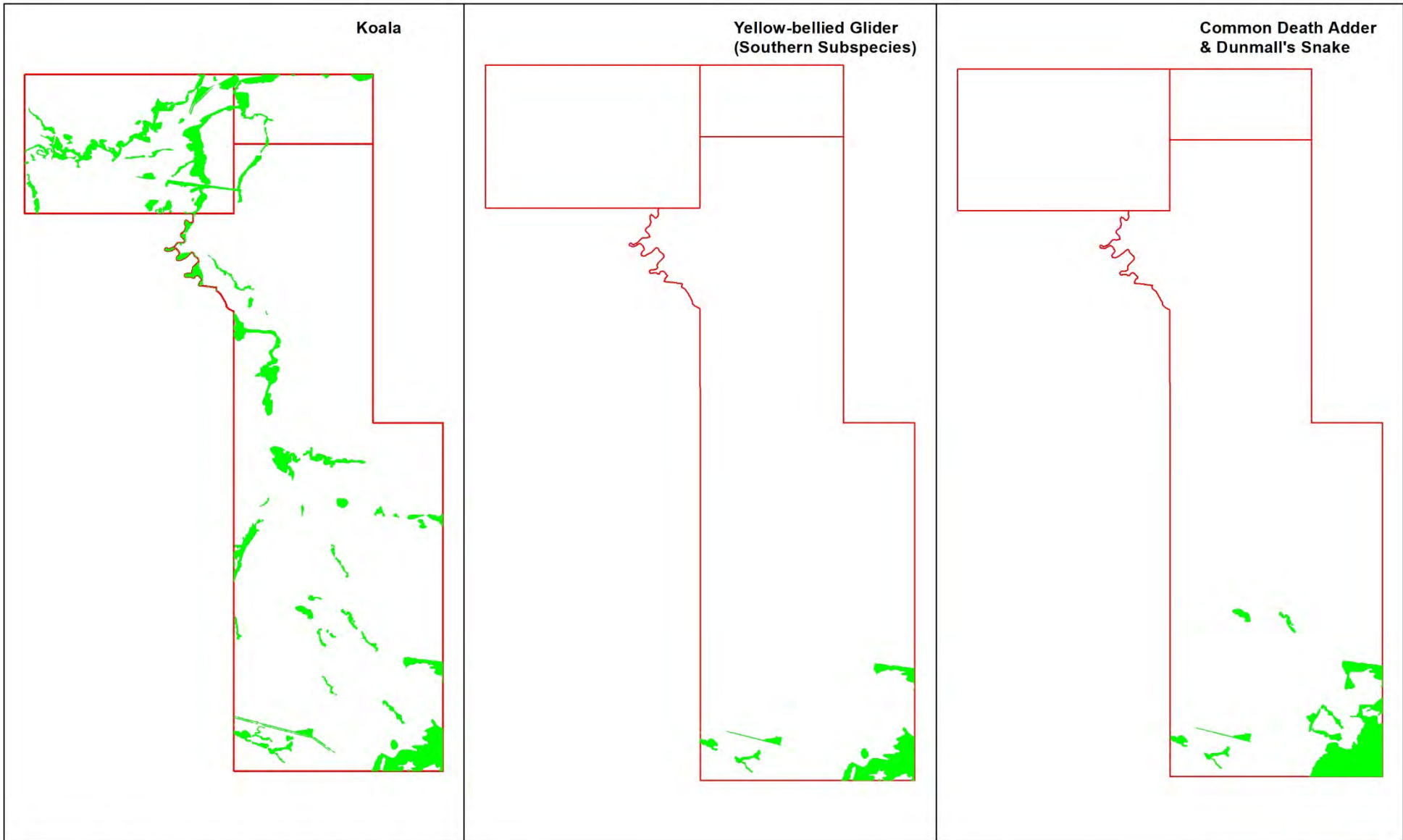
- The Site
- Essential habitat
- General habitat



Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppI2b
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 89,141 @ A3
 Datum: GDA94

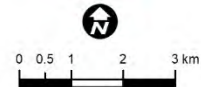


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Appendix I2c: Predictive Habitat Mapping of Threatened Fauna.

- The Site
- General Habitat

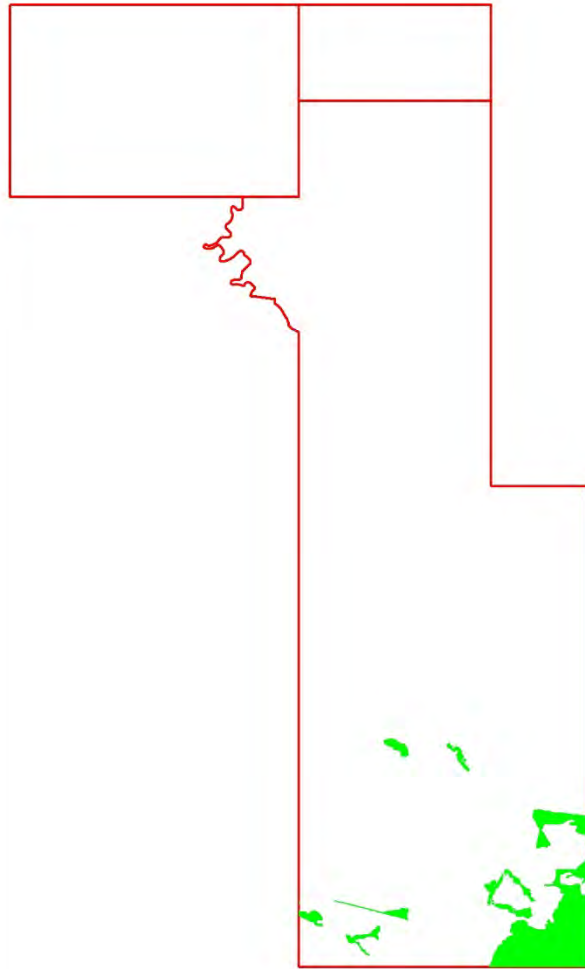


Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppI2c
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 89,141 @ A3
 Datum: GDA94

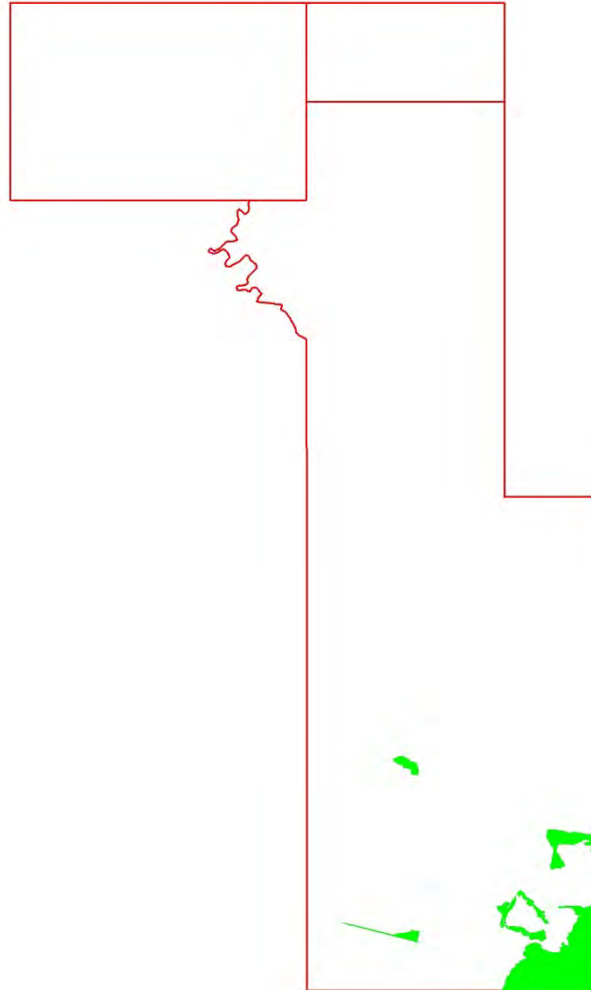


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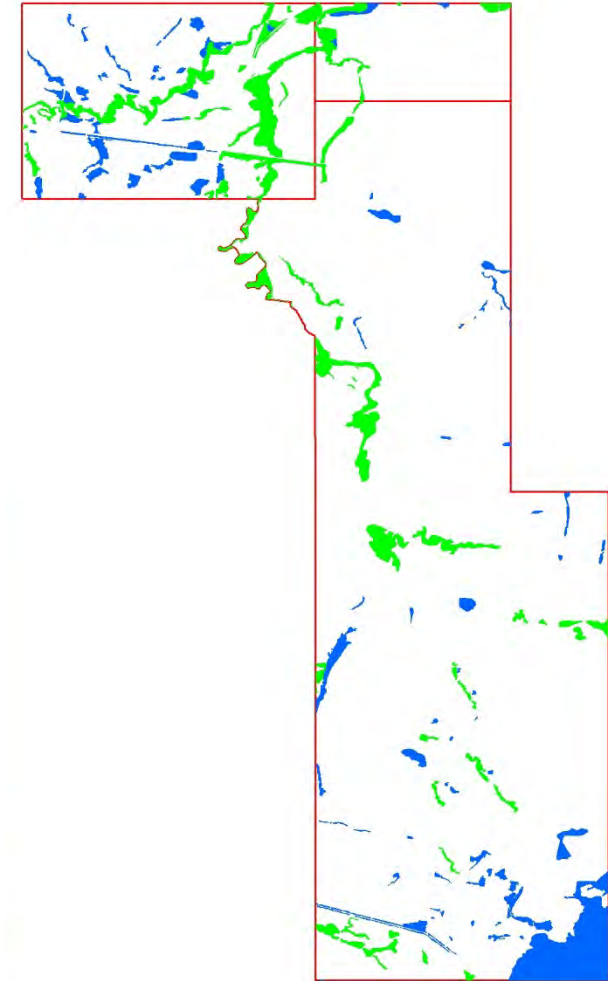
Collared Delma



Yakka Skink



Golden-tailed Gecko



Appendix I2d: Predictive Habitat Mapping of Threatened Fauna.

- Essential Habitat
- General Habitat
- The Site

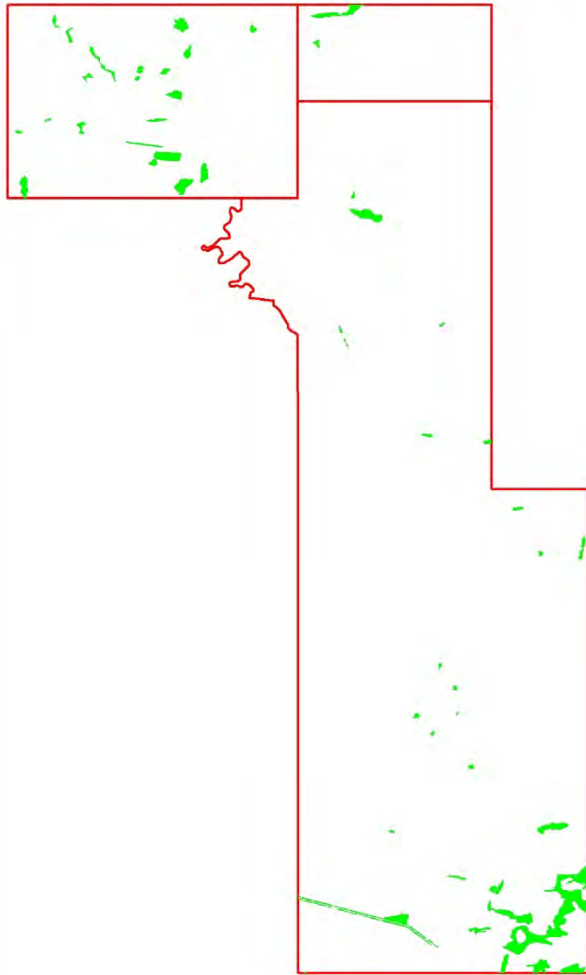


Project: Atlas3
 Ecological Assessment
 Map No: PC873_AppI2d
 Date: 23/09/2022
 Drawn: L. Hardwick
 Approv: C. Eddie
 Scale: 1: 89,141 @ A3
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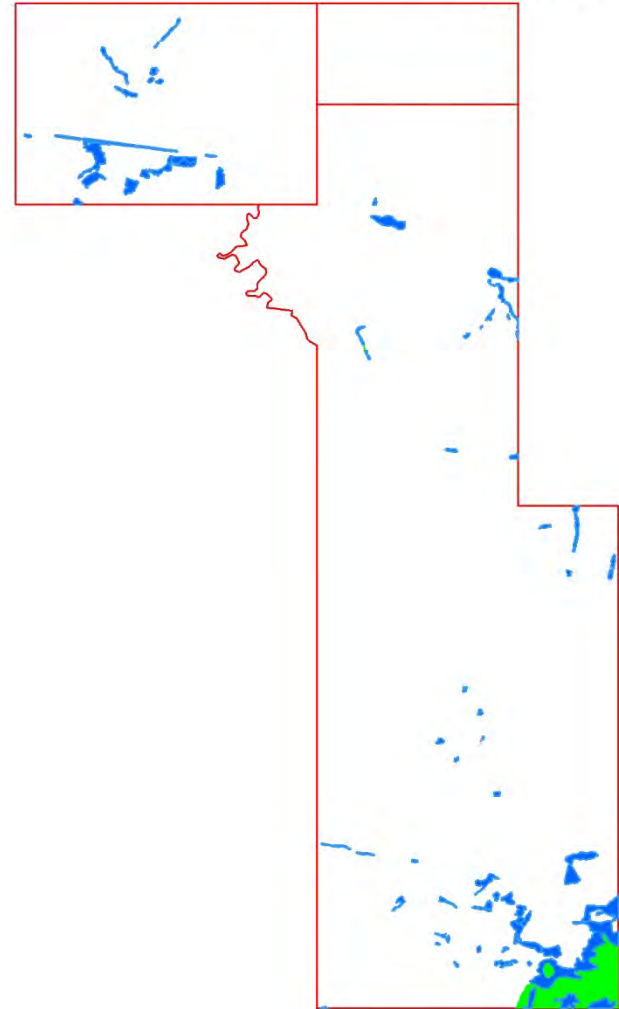


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**Pale Imperial
Hairstreak (butterfly)**



**Dulacca
Woodland Snail**



Appendix I2e: Predictive Habitat Mapping of Threatened Fauna.

- The Site
- Essential Habitat
- General Habitat



Project: Atlas3
Ecological Assessment
Map No: PC873_AppI2e
Date: 23/09/2022
Drawn: L. Hardwick
Approv: C. Eddie
Scale: 1: 90,001 @ A3
Datum: GDA94



APPENDIX D FRESHWATER ECOLOGY AQUATIC ECOLOGY REPORT



**Senex - Atlas Stage 3 Gas Project
Aquatic Ecology Assessment
2022**



**Prepared for ERM
March 2022**

Document Control Summary

Document Revisions

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Executive Summary

Freshwater Ecology Consulting was engaged by ERM to undertake the aquatic ecology component of the ecological surveys for the Atlas Stage 3 Gas Project. Sampling was conducted across waterways of the Project Area in March 2022. The purpose of this report is to provide the results of this sampling and to identify aquatic ecological values present within the Project Area.

Twenty-six sites were selected to represent all waterways across the Project Area. Further visual assessments of other reaches were conducted to ensure the selected sites were representative of each waterway. Waterways across the Project Area were ephemeral with some waterways retaining small amounts of flow from rainfall in the months preceding sampling. The main existing stressors on aquatic ecosystems are driven by historical land clearance and current grazing and cropping practices.

Sampling was undertaken in a wetter than normal year with typical rainfall in most months leading up to sampling and much higher rainfall in November 2021 and February 2022. *In situ* water quality across the Project Area was variable but alkaline at all sites (from slightly to strongly). Waterways across the Atlas Stage 3 Project Area are ephemeral, with most waterways anecdotally drying completely in dry periods and few waterways retaining refugial pools after extended dry periods. Habitat bioassessments determined that the habitat quality at sites sampled ranged from 'poor' to 'fair'.

Nineteen aquatic macrophyte species were recorded across all sites; comprised of four floating attached and 15 emergent species. At most sites coverage of macrophytes was very low. No free floating or submerged macrophyte species were detected. No aquatic macrophytes were recorded at five sites.

Aquatic macroinvertebrate communities were relatively poor across all sites with low abundance, diversity, Plecoptera-Ephemeroptera-Tricoptera (PET) taxa and Signal2. Three families of macrocrustaceans were recorded across the sites; Palaemonidae (prawns) and Paratascidae (crayfish) were widespread while Atyidae (shrimps) was recorded at only one site.

Eight species of fish were recorded, five of which were relatively widespread. Only one non-native species was recorded at a single site (tilapia – *Oreochromis mossambicus*). Tilapia is a restricted noxious fish under the Biosecurity Act 2014.

A single specimen of eastern long-necked turtle (*Chelodina longicollis*) was recorded. An assessment of platypus (*Ornithorhynchus anatinus*) habitat suitability was undertaken at each site which held water. Four sites recorded average quality at the time of sampling, all others were considered poor habitat. Considering the ephemeral nature of the waterways and the large amount of rainfall in the months preceding sampling, as well as the distance to any historical records, it is considered unlikely that platypus would inhabit waterways with the Project Area. Three species of frog were noted as incidental observations during the aquatic ecology sampling.

A desktop review was undertaken on available existing information available for the potentially threatened aquatic flora known, or with potential, to be present in proximity to the Project Area. Following the field surveys an assessment on the likelihood of occurrence for aquatic Endangered, Vulnerable and Near Threatened (EVNT) species was undertaken. All EVNT species identified in the desktop assessment were considered unlikely to occur within the Project Area.

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1. Introduction

Senex's Atlas Stage 3 Gas Project is located in the Surat Basin, 20 kilometres south-west of the town of Wandoan in Queensland.

ERM was engaged by Senex to coordinate ecological surveys and complete the required impact assessments to support State and Commonwealth environmental approvals for the Atlas Stage 3 Gas project. Freshwater Ecology Consulting was engaged by ERM to undertake the aquatic ecology component of the surveys, that included:

- A desktop assessment to the review the environmental values and aquatic flora and fauna species that could occur in and adjacent to the project area;
- Field sampling of aquatic habitat values at 26 sites across the Project Area, consisting of:
 - Habitat assessment
 - In situ water quality sampling
 - Macrophytes
 - Macroinvertebrate
 - Backpack electrofishing
 - Visual observations
 - fyke netting using large nets
- Preparation of this report to describe the aquatic habitat values within the Project Area, including completing an assessment of the likelihood of occurrence of listed threatened species under the Queensland *Nature Conservation Act 1992* (NC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

2. Project location and site selection

2.1. Project area

The Project Area is located in the upper Dawson River catchment in the Fitzroy River Basin, Central Queensland. The waterways present are ephemeral, although several retain waterholes for extended periods of time following the cessation of rain. The largest waterway that passes through the Project Area is Wooleebee Creek which drains into Juandah Creek approximately 15 kilometres to the north before confluencing with the Dawson River approximately 55 kilometres north of the Project Area. The named tributaries which flow in Wooleebee Creek with the Project Area are Conloi Creek and Hellhole Creek. Wandoan Creek intersects the northwest section of the Project Area and confluences with Wooleebee Creek north to the north of the Project Area.

Much of the Project Area has been historically cleared for grazing and agricultural activities. This has led to widespread erosion, particularly along waterways, and in turn has generated large amounts of mobile sediment in many of the waterway channels. These activities have also reduced the extent of riparian vegetation across many waterways across the Project Area.

2.2. Site selection

Twenty-six sites were selected across the Project Area to be assessed (**Table 1, Figure 1**). Initial desktop assessments allocated sampling sites for those considered likely to hold water and habitat assessments for sites considered likely to be dry. However, site examination determined that some of the sampling sites did not contain water and several of the sites designated as habitat assessments only were suitable for sampling. Further visual assessments of other reaches were conducted to ensure the selected sites were representative of each waterway.

2.3. Timing

Aquatic ecology sampling was undertaken from the 14th to the 21st of March 2022.

Table 1: Sampling site details (ordered south to north)

Site code	Waterway	Wetland type	Stream order	Waterway barrier determination	Elevation	Coordinates (UTM 55J)	
						Easting	Northing
LAQ2	Hellhole Creek	Riverine	4	Major	321	786148	7083942
LAQ3	Hellhole Creek	Riverine	4	Major	310	783755	7085063
LH5	Unnamed creek	Riverine	2	Moderate	310	786429	7087531
LH6	Unnamed creek	Riverine	2	Moderate	283	784257	7090324
LAQ4	Conloi Creek	Riverine	4	Major	287	787875	7090806
LAQ7	Woleebee Creek	Riverine	5	Major	280	783693	7091442
LAQ10	Unnamed creek	Riverine	2	Moderate	285	786328	7091373
LAQ8	Woleebee Creek	Riverine	5	Major	276	784508	7092058
LAQ6	Unnamed billabong	Riverine	3	High	283	786897	7092375
LAQ5	Unnamed creek	Palustrine	-	-	277	784944	7092562
LH11	Unnamed creek	Riverine	2	Moderate	274	783417	7094813
LH7	Unnamed creek	Riverine	2	Moderate	271	784519	7095038
LAQ11	Unnamed creek	Riverine	2	Moderate	275	785327	7098360
TAQ4	Woleebee Creek	Riverine	5	Major	262	782643	7100015
LH8	Unnamed creek	Riverine	2	Moderate	257	784135	7100197
TAQ5	Unnamed billabong	Palustrine	-	-	269	778770	7100820
TAQ1	Wandoan Creek	Riverine	4	Major	268	778781	7101064
TAQ2	Wandoan Creek	Riverine	4	Major	261	780904	7101380
TH3	Unnamed creek	Riverine	2	Moderate	257	783131	7100821
LH9	Unnamed creek	Riverine	3	High	256	784091	7101291
TH4	Unnamed billabong	Palustrine	-	-	258	782119	7101726
TH1	Unnamed creek	Riverine	2	Moderate	276	778682	7101830
TAQ3	Wandoan Creek	Riverine	4	Major	256	781924	7102194
TH2	Unnamed creek	Riverine	2	Moderate	258	781497	7102372
LH12	Unnamed billabong	Palustrine	-	-	254	783236	7102518
LAQ9	Woleebee Creek	Riverine	5	Major	256	783331	7102502

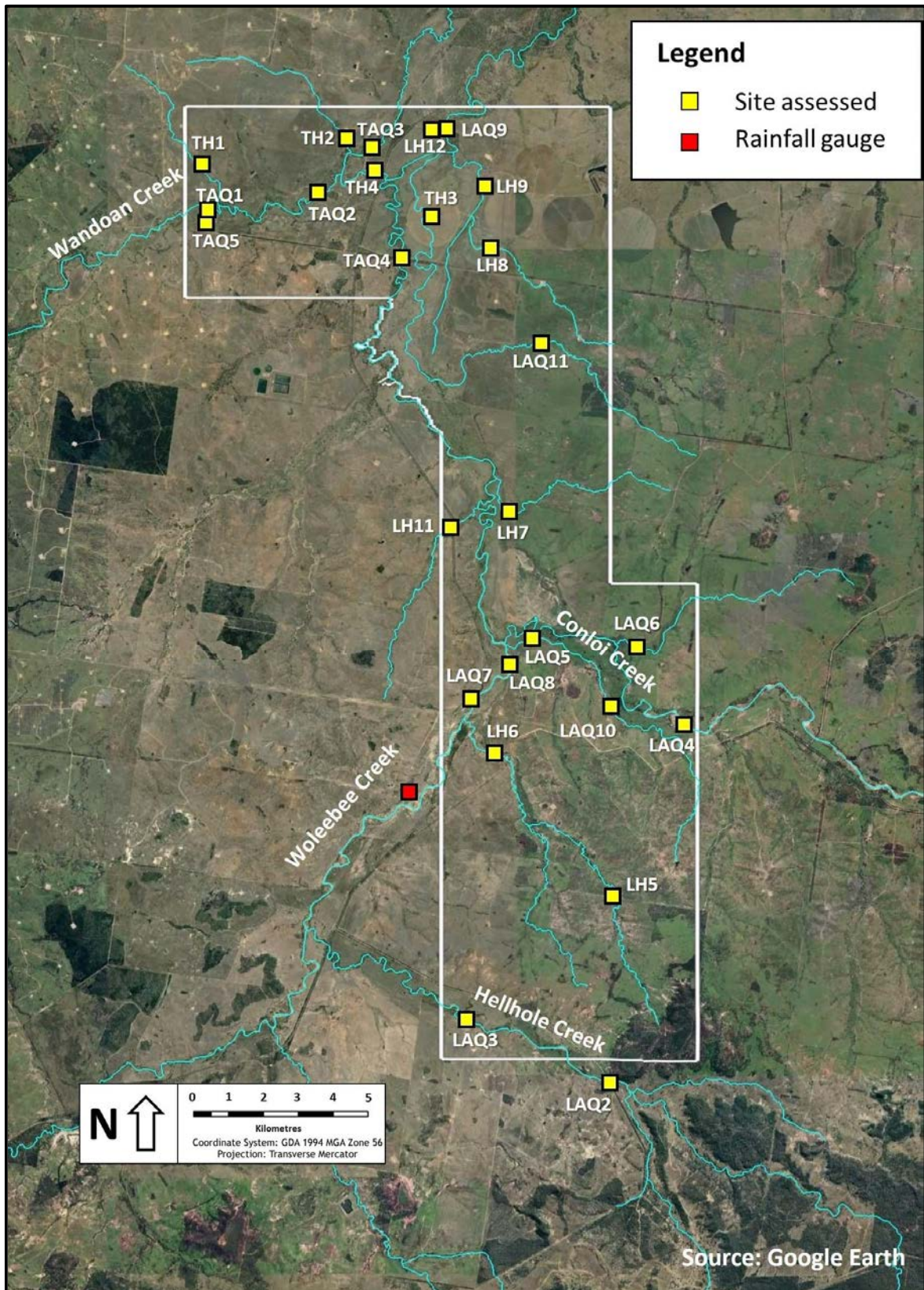


Figure 1: Location of sites sampled across Atlas 3 Project Area

3. Methods

3.1. Desktop assessment

A literature review was undertaken to assess the environmental values and aquatic flora and fauna species that could occur in and adjacent to the project area. The online searches included:

- EPBC Act Protected Matters Report (**Appendix E**)
- A Wildlife Online search (NC Act) (**Appendix F**)
- An Atlas of Living Australia search for records of Endangered, Vulnerable and Near Threatened (EVNT) species (Atlas of Living Australia 2021)
- The Fitzroy NRM Back-on-track Actions for Biodiversity
- Aquatic Conservation Assessments for the Riverine and non-Riverine wetlands of the Dawson section of the Great Barrier Reef catchment (Inglis & Howell 2009, Rollason & Howell 2011)

3.1.1. EVNT species likelihood of occurrence determination

EVNT species identified from the desktop assessment (and subsequent field surveys) were assigned a likelihood of occurrence based on the criteria identified in **Table 2**. The assessment was based on the knowledge of ecologists, habitat suitability, previous surveys/records near the study area and available scientific literature.

Table 2: Likelihood of occurrence determination criteria

Likelihood of occurrence	Criteria
Unlikely	No suitable habitat; few records from desktop assessment and records > 20 km from the Study Area.
Possible	Suitable habitat within or adjacent Study Area; numerous records from desktop assessment Project Site but records > 20 km away or > 20 years old OR Marginal habitat within or adjacent the Study Area; few, but recent (<20 yrs) records within 20 km of Project Site
Likely	Suitable habitat within or adjacent Study Area; numerous relevant records (less than 20 years old and within 20 km of the Project Site) from desktop assessment.
Known	Recorded within and/or immediately adjacent Study Area.

3.2. Field sampling

Sampling was conducted under General Fisheries Permit No. 207913, scientific user permit for non-protected areas WISP18336317, and Animal Ethics Approval No. CA 2020/02/1352, held by Freshwater Ecology.

The sampling techniques used were in line with the Monitoring and Sampling Manual: Environmental Protection (Water) Policy (DES 2018) and are summarised in **Table 3** for each site.

Table 3: Sampling methods used for each site

Site	Habitat assessment	<i>In situ</i> water quality	Macrophytes	Macroinvertebrate	Backpack electrofishing	Visual observations	fyke netting (large nets)
LAQ2	✓	✓	✓	✓	✓		
LAQ3	✓	✓	✓				
LH5	✓		✓				
LH6	✓	✓	✓				
LAQ4	✓	✓	✓				
LAQ7	✓	✓	✓	✓	✓		
LAQ10	✓	✓	✓	✓	✓		✓
LAQ8	✓	✓	✓	✓		✓	
LAQ6	✓	✓	✓	✓	✓		
LAQ5	✓	✓	✓	✓	✓		✓
LH11	✓	✓	✓				
LH7	✓		✓				
LAQ11	✓	✓	✓	✓	✓		
TAQ4	✓	✓	✓	✓	✓		✓
LH8	✓						
TAQ5	✓	✓	✓	✓	✓		
TAQ1	✓	✓	✓	✓	✓		
TAQ2	✓	✓	✓	✓	✓		✓
TH3	✓						
LH9	✓	✓	✓	✓	✓		
TH4	✓		✓				
TH1	✓	✓	✓				
TAQ3	✓	✓	✓	✓	✓		✓
TH2	✓	✓	✓				
LH12	✓		✓				
LAQ9	✓	✓	✓	✓	✓		✓

3.3. Aquatic habitat

An aquatic habitat assessment was undertaken following the Australian River Assessment System (AusRivAS) protocols (DNRM 2001). The assessment was undertaken by Dr. Timothy Howell from Freshwater Ecology (FE) who is an AusRivAS accredited ecologist. The habitat assessment included recording quantitative and qualitative measurements and observations of:

- substrate composition;
- flow, water depth and wetted width, noting if surface water was connected or comprised of one or more disconnected pools in the channel;
- channel morphology;
- physical habitat features, such as large woody debris, undercut banks and aquatic plants;
- riparian vegetation cover and condition;
- any notable disturbances including bank erosion, cattle access to waterway and barriers associated with nearby road crossings or dams; and
- other on-site features, such as presence of filamentous or benthic algae, surface scums, unusual sediment deposits, or fish kills.

An aquatic habitat inventory was undertaken at each monitoring location to assist in the interpretation of ecological data. This inventory included a general description of the environment within, and immediately surrounding each site, including:

- Channel characteristics
 - reach length, bankfull bank height, bankfull stream width, mean water depth, mean wetted width.
- Riparian vegetation characteristics
 - riparian vegetation height (max.), riparian zone width (both banks), bare ground, grass, shrubs, trees (< 10 m and > 10 m), canopy cover.
- Mesohabitat composition (%)
 - riffle, run, rocky pool, sandy pool, dry.
- Substrate composition (%)
 - bedrock, boulder (>256 mm), cobble (64-256 mm), pebble (4-64 mm), gravel (2-4 mm), sand (2-4 mm), silt/clay (<0.05 mm).
- Macrophytes (None, Little 1-10%, Some 10-50%, Moderate 50-75%, Extensive >75%)
 - free floating, attached floating, submerged, emergent (as per section 3.5).
- In-stream wood (None, Little 1-10%, Some 10-50%, Moderate 50-75%, Extensive >75%)
 - detritus (leaves etc), sticks (<2 cm diameter), branches (<15 cm diameter), logs (>15 cm diameter).
- Microhabitat (None, Little 1-10%, Some 10-50%, Moderate 50-75%, Extensive >75%)
 - periphyton, filamentous algae, submerged macrophytes, bank overhang vegetation, trailing bank vegetation, blanketing silt, substrate anoxia, bank undercuts.

Aquatic habitat was assessed in accordance with Queensland Australian River Assessment System (AusRivAS) Sampling and Processing Manual (DNRM 2001). Habitat bioassessment score datasheets (DNRM 2001) were used to numerically score nine criteria, which were then allocated to one of four categories (excellent, good, moderate and poor). The sum of the numerical rating from each category produced an overall habitat condition assessment score (**Table 4**).

According to this system sites with scores:

- >110 were considered to be in excellent condition
- Between 75 and 110 were considered to be in good condition
- Between 39 and 74 were considered to be in moderate condition
- ≤38 were considered to be in poor condition.

Whilst the AusRivAS method is an accepted standard for undertaking aquatic habitat assessments, it is less appropriate for ephemeral systems in Queensland than for more permanent waterways; using this method, even pristine ephemeral systems are rarely classed as being in excellent condition, due to the nature of the ephemeral waterways. Nevertheless, it is a useful system for comparing sites within the Project Area.

Table 4: Habitat bioassessment scores

Habitat Category	Category Score Range			
	Excellent	Good	Fair	Poor
Bottom substrate/available cover	16–20	11–15	6–10	0–5
Embeddedness	16–20	11–15	6–10	0–5
Velocity/depth category	16–20	11–15	6–10	0–5
Channel alteration	12–15	8–11	4–7	0–3
Bottom scouring & deposition	12–15	8–11	4–7	0–3
Pool/riffle, run/bend ratio	12–15	8–11	4–7	0–3
Bank stability	9–10	6–8	3–5	0–2
Bank vegetative stability	9–10	6–8	3–5	0–2
Streamside cover	9–10	6–8	3–5	0–2
TOTAL Score for the Site	111–135	75–110	39–74	0–38

3.4. Surface water quality

In situ water quality data was recorded using portable multiparameter water quality meters that had been calibrated in accordance with the manufacturer’s specifications. Calibrations were regularly checked in the field. Parameters tested *in situ* were: temperature, electrical conductivity (EC), pH, turbidity and dissolved oxygen (DO). *In situ* water quality testing was undertaken in conjunction with macroinvertebrate sampling to assist with the interpretation of results.

All sample collection was completed in accordance with the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy* (DES 2018) and *AS/NZ 5667.6:1998 Guidance on sampling of rivers and streams* (AS/NZS 1998).

A summary of the *in situ* parameters measured and their associated measurement precision are presented in **Table 5**. *In situ* water quality data was recorded using a portable multiparameter water quality meter that had been calibrated in accordance with the manufacturer’s specifications.

Calibrations were regularly checked in the field. *In situ* water quality testing was undertaken to assist with the interpretation of ecological results.

Table 5: *In situ* water quality measurement parameters

Parameter	Units	Measurement precision
Water temperature	°C	± 0.1
pH	pH units	± 0.1
Dissolved oxygen	% saturation	± 1
Electrical conductivity	µS/cm	± 1
Turbidity	NTU	± 0.1

3.5. Aquatic flora

Macrophyte surveys were undertaken following completion of the fish and macroinvertebrate surveys to increase the chance of observing macrophytes that were not abundant throughout the reach. All native and exotic macrophyte species at the site were recorded. Species were identified using Stephens & Dowling (2002), Sainty & Jacobs (2003) and MacDonald & Haslam (2016). The relative site coverage of each macrophyte species was recorded (E – extensive, M – moderate, S – some, L - little). Non-macrophyte species also contributed to riparian vegetation but were not assessed within the scope of this project.

Macrophyte species were categorised by growth form in accordance with definitions provided in Sainty and Jacobs (2003), as follows:

- **Free floating** – Species that are normally unattached and float on the surface but may become attached and rooted in drying mud when water levels drop.
- **Floating attached** – Species that are rooted in the substrate but normally have at least the mature leaves floating on the water surface.
- **Submerged**– Species rooted in the substrate or free-floating submerged.
- **Emergent** – Species rooted in the bank substrate with stems, flowers and most of the mature leaves projecting above the water surface.

No free floating or submerged macrophytes were recorded.

3.6. Aquatic macroinvertebrates

Freshwater macroinvertebrates were sampled in accordance with the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy* (DES 2018) which defaults to those methods adopted by the Queensland Australian River Assessment System (AusRivAS) *Sampling and Processing Manual* (DNRM 2001). Fourteen sites were sampled in the Project Area, with each including a separate riffle and an edge sample.

A 250 micron (μm) mesh dip net fitted to a triangular frame (250 mm x 250 mm x 250 mm) was used to collect samples. Samples were collected by disturbing the benthos using a kicking or shuffling technique and sweeping the net through the water above the disturbed benthos. The sample was rinsed clean from the net into a bucket and then evenly distributed into sorting trays. Field (live) picking was completed for each sample for a minimum of 30 minutes and a maximum of one hour. Picked macroinvertebrates were placed into a single vial and preserved in a 70% methylated spirits solution. Each vial was labelled with the monitoring site code, replicate number, sampler, habitat, date and time of sampling.

In the laboratory, macroinvertebrates were sorted, identified to the family taxonomic level and relative abundance enumerated. Organisms were identified to family level with the exception of lower phyla (e.g. porifera, nematoda), oligochaetes (freshwater worms), acarina (freshwater mites) and microcrustacea (ostracoda, copeopoda and cladocera). Chironomids were identified to sub-family level in accordance with standard AusRivAS protocols (DNRM 2001).

Enumeration and identification of macroinvertebrate samples was conducted by Susan Jones, an experienced AusRivAS accredited taxonomist. Sorting, enumeration and data entry was cross-checked by a second ecologist for 10% of the samples.

3.7. Fish

Fish sampling was conducted at 14 monitoring locations in line with the approach outlined in the *Monitoring and Sampling Manual: Environmental Protection (Water) Policy* (DES 2018).

Backpack electrofishing was undertaken in waterways that held water. A Smith-Root backpack unit (LR20B model) was utilised by a Senior Electrofishing Operator while an appropriately trained assistant aided in the collection of fish for identification and measurement. Sampling was carried out over a site reach spanning at least 100 m (where sufficient water was available), with care being taken to sample all macro and microhabitat types. Settings for the backpack electrofisher varied between sites, depending on water conductivity, depth, fish size and species.

All electrofishing was undertaken in compliance with the Australian Code of Electrofishing Practice (NSW Fisheries 1997) with the minimum power setting used to effectively attract and stun the fish. The settings used for each site sampled for fish and turtles are detailed in **Appendix C**.

Unbaited box trapping is a passive fish sampling technique that targets small bodied pelagic and benthic species. Five to ten unbaited box traps were strategically placed at all sites for between 30 minutes and 2 hours. Extensive field survey experience has shown that most fish enter the traps within the first 30 minutes and removing them after 2 hours minimises the chance of predation within the traps (by both predatory fish and larger macroinvertebrates). Between sampling sites all box nets were cleared of any plant matter and dried to ensure aquatic plants were not inadvertently transferred between sites.

Fyke nets used for sampling turtles were also captured fish that were included in the fish sampling.

3.8. Turtles

There was only sufficient water at sites TAQ2, TAQ3, LAQ9, LAQ10, LAQ5 and TAQ4 to potentially support turtles. At these sites double winged two fyke nets (one large and one small) were set overnight. At sites LAQ9, LAQ10, LAQ5 and TAQ4 there was sufficient depth to also deploy two cathedral traps. The nets and traps were baited with tinned sardines and were buoyed with the cod end suspended above the water line with ropes to prevent drowning of air breathing animals. Nets were set in the late afternoon and were checked early the following morning.

3.9. Platypus

The habitat at each site was assessed for the suitability for supporting platypus. The criteria used to assess each site are shown in **Table 6** and included water permanency, volume of water present, water quality, microhabitat diversity, submerged macrophytes, foraging habitat and burrowing habitat (Grant 2007).

Table 6: Platypus habitat suitability criteria

Suitability	Reason
Good	Sections dominated by deeper pools with steep undercut banks, overhanging vegetation and flowing water. Water is known, or likely, to be permanent. These areas are considered likely to be frequented by platypus.
Average	A mix of deeper pools and stretches of shallower water (<0.5m). Some pools of water may be semi-permanent, possibly drying during severe drought. Undercut banks and overhanging vegetation is frequent, though water may be turbid. Platypus should not be excluded from these areas, though the likelihood that they could occur is lower than in 'good' habitat. These sections may not permanently support platypus through periods of prolonged drought.
Poor	Sections with shallow water; widely separated or no deep pools. Water flow is likely to be less frequent, possibly drying on a regular basis. Undercut banks and overhanging vegetation is infrequent. Poor sections are unlikely to permanently support platypus but may provide access between good and average quality habitat.

3.10. Frogs

Sampling of frogs was restricted to opportunistic visual encounter surveys and call surveys. These were undertaken during general aquatic ecology surveys. At each site suitable habitat searched for any frogs present. No frogs were heard calling and no tadpoles were recorded during the assessment.

4. Results

4.1. Desktop assessment

The literature review identified several environmental values and aquatic flora and fauna species that could occur in and adjacent to the Project Area. These are summarised below.

Matters of National Environmental Significance (MNES) – EPBC Act listed threatened species

- White-throated Snapping Turtle (*Elseya albagula*) - listed as Critically Endangered under the EPBC Act.
- Fitzroy River Turtle (*Rheodytes leukops*) – listed as Vulnerable under the EPBC Act.
- No listed aquatic flora species were identified in the protected matters search.

Matters of State Environmental Significance (MSES) - NC Act listed threatened species

- No listed aquatic flora or fauna were identified in the wildlife online search.

Matters of Local Environmental Significance (MLES) - Back on Track flora and fauna

- Ornate rainbowfish (*Rhadinocentrus ornatus*)
- Fitzroy River Turtle (*Rheodytes leukops*)
- White-throated Snapping Turtle (*Elseya albagula*)
- Spikerush species (*Eleocharis blakeana*)
- Salt Pipewort (*Eriocaulon carsonii*)
- Myriophyllum species (*Myriophyllum artesium*)

4.2. Rainfall

Monthly rainfall at the Bureau of Meteorology’s Woleebee rain gauge (station 35081) located just outside the eastern boundary of the Project Area for the 12 months preceding sampling is presented in **Figure 2** along with mean monthly totals between 1912 and 2022.

The monthly rainfall totals were comparable to the long term means for most months in the 12 months preceding sampling. The exceptions were in November 2021 and, to a lesser extent, in February 2022. In these months the monthly rainfall was notably higher than the means. As a result, the November rainfall is more likely to have saturated the area and increased the surface water availability in the following months in comparison to a typical year.

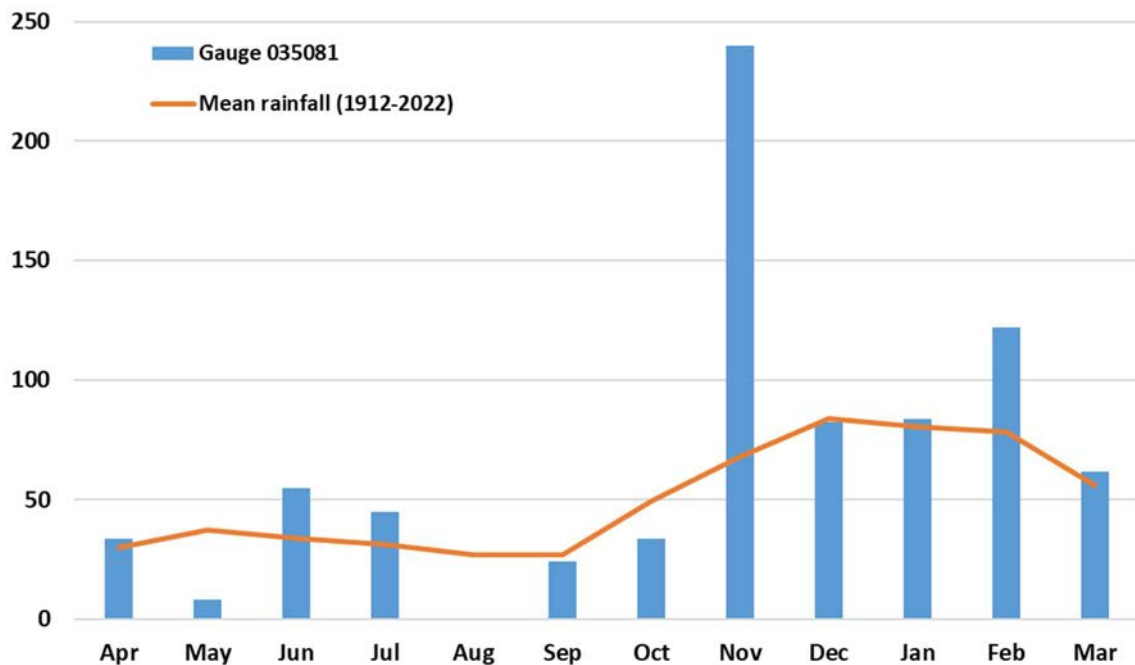


Figure 2: Total monthly rainfall collected at Woleebee weather station in the 12 months preceding sampling

4.3. *In situ* water quality

The *in situ* water quality parameters recorded for the 18 sites containing surface water in March 2022 are presented in **Table 7**.

Water temperatures ranged from 20.7 – 32.8°C during the late wet sampling period. Variation in temperature between sites also appeared to largely relate to the time of day that temperature was recorded (i.e. morning values were lower than later in the day) and the degree of riparian shading (i.e. sites with moderate instream shading were generally slightly cooler).

Dissolved oxygen (DO) fluctuated between sites ranging from 9.1 – 200 % saturation. There are a large range of factors that can influence DO concentrations in water including temperature, decomposing organic matter, as well as aquatic macrophyte and algal growth.

The pH of the surface waters ranged from weakly to strongly alkaline (7.3 – 9.4). The pH values recorded along Wandoan Creek were fairly consistent (i.e. 7.7 – 8.1), however those recorded along Woleebee Creek were more variable (7.9 – 9.0) and were high (> 8.0) for three of the four sites sampled.

Electrical conductivity of the sites sampled ranged from 198 to 2,540 $\mu\text{s}/\text{cm}$. The highest conductivities measured were along Woleebee Creek itself (1,950-639 $\mu\text{s}/\text{cm}$) as well as two tributaries of Woleebee Creek (LH6 2,540 $\mu\text{s}/\text{cm}$ and LAQ10 768 $\mu\text{s}/\text{cm}$). The elevated conductivities in Woleebee Creek decreased downstream, possibly due to inflows from tributaries or groundwater with lower conductivities diluting the water. The remaining tributaries were moderately to very fresh (198-534 $\mu\text{s}/\text{cm}$).

Turbidity was widely variable across all sites ranging from 11.9 to 620 NTU. Sites along Wandoan Creek were amongst the most turbid (i.e. 363 – 620 NTU), as well as site LAQ2 on Hellhole Creek. Sites along Woleebee Creek were relatively clear (22.8-35.5 NTU). Turbidity across the tributaries varied which appeared to be due to differences in substrates and timing since last flows.

Table 7: *In situ* water quality

	Date	Time	Temperature (°C)	Dissolved oxygen (%)	Conductivity (µs/cm@25°C)	pH	Turbidity (NTU)
LAQ2	19/03/2022	1220	28.2	32.1	331	7.3	307
LH6	17/03/2022	1515	32.8	200	2,540	9.4	36.3
LAQ7	16/03/2022	1530	28.5	112.1	1,970	7.9	22.8
LAQ10	17/03/2022	1115	23.8	47.6	768	8.1	295
LAQ8	18/03/2022	1200	31.4	133.4	1,510	8.6	25.3
LAQ6	18/03/2022	1545	27.9	108.3	198	7.8	16.3
LAQ5	17/03/2022	1630	31.4	100.6	241	8.3	477
LH11	16/03/2022	1715	26.2	114	248	8.9	17.2
LAQ11	21/03/2022	1230	26.5	162.3	288	8.9	32.6
TAQ4	21/03/2022	800	21.7	81.5	1,171	9.0	26
TAQ5	20/03/2022	1130	24.9	94.5	214	7.8	20.2
TAQ1	14/03/2022	1415	29.8	78	284	8.1	363
TAQ2	15/03/2022	810	20.7	55.7	243	7.7	476
LH9	21/03/2022	1000	25.3	53.2	231	7.9	87.4
TH1	14/03/2022	1245	23.2	68.6	273	8.1	312
TAQ3	15/03/2022	1035	23.1	50.3	249	8.0	620
TH2	16/03/2022	745	22.9	9.1	276	7.7	11.9
LAQ9	15/03/2022	1430	26.4	97.6	639	8.7	35.5

4.4. Aquatic habitat

Full descriptions of physical parameters and habitat for each site in March 2022 are provided in **Appendix A**. The availability and quality of aquatic habitat is strongly influenced by water permanency. Eighteen of the 26 sites held water in March 2022 while all other sites were dry.

Waterways across the Project Area are ephemeral, with most waterways anecdotally drying completely in dry periods and few waterways retaining refugial pools after extended dry periods (various landholders pers. comm.). At the time of sampling most waterways had already ceased surface flows with disconnected pools noted along the watercourses, although subsurface flow was apparent at sites along most creeks with sandy substrates. Along the with clay substrates the disconnection between pools was often separated by open grassland and poorly defined channels. The riparian vegetation density along the sites varied from moderate to non-existent, with most sites having a relatively low coverage of riparian vegetation.

The habitat bioassessment results are presented in **Figure 3**. Sites LH7, LH8 and TH3 were not included in the assessment as they were drainage features and sites TAQ5, TH4, LH12 are wetlands neither of which the habitat bioassessment approach is applicable to. Instream habitat, using habitat bioassessment, found more than half the sites to be in 'fair' condition across all sites sampled (12 of the 20 sites). The remaining eight sites were determined to be in 'poor' condition.

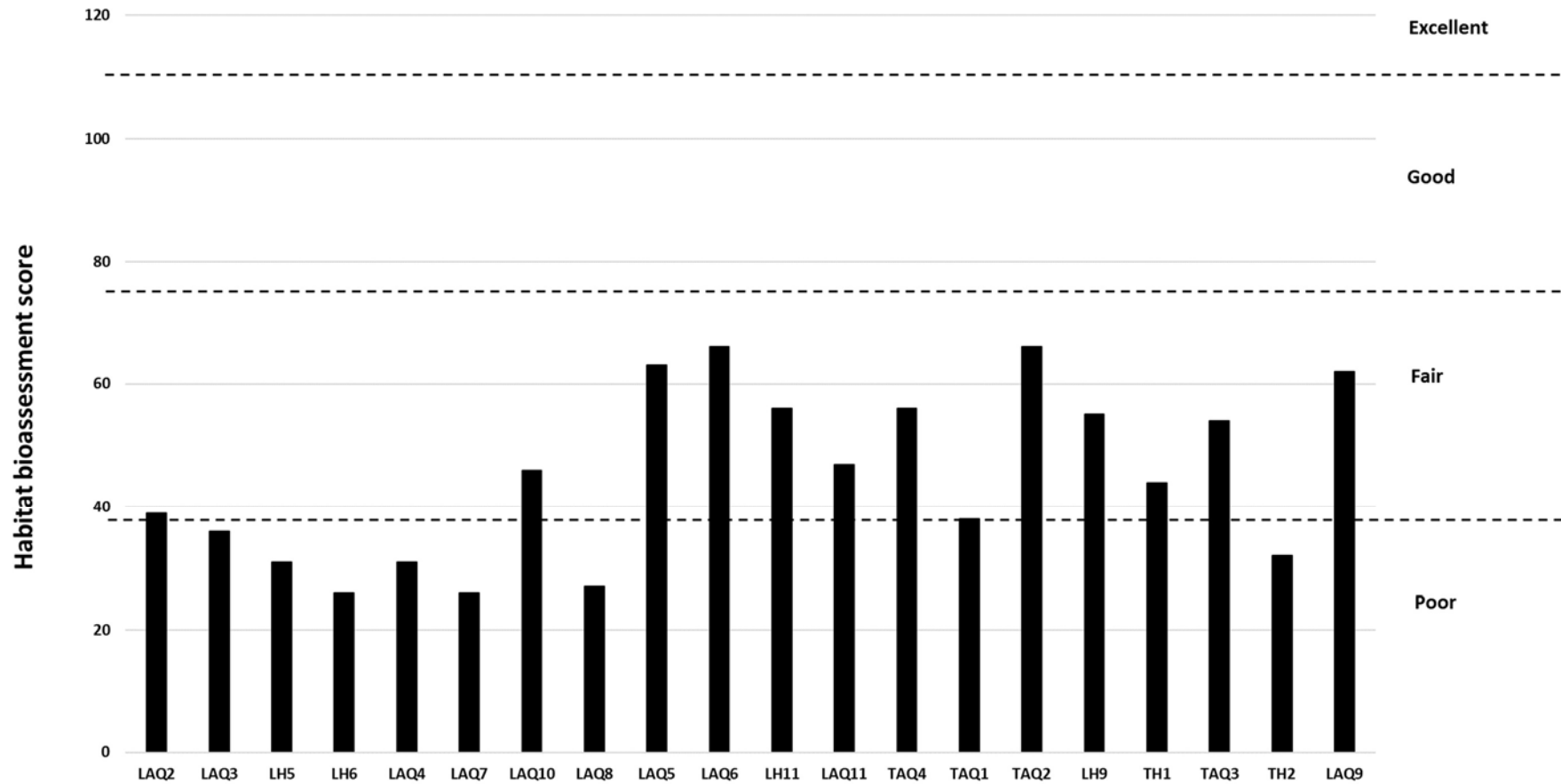


Figure 3: Habitat bioassessment scores for riverine sites

4.5. Aquatic flora

A total of four floating attached macrophyte species and 15 emergent macrophyte species were recorded across all sites (**Table 8**). Floating attached macrophytes were recorded at five sites. No submerged or floating attached macrophyte species were detected. The highest diversity of aquatic macrophytes was recorded at site TA5 which was located on a billabong adjacent to Wandoan Creek. Across all sites, aquatic macrophyte diversity was relatively poor with none being recorded at five sites and between one and three recorded at a further 21 sites. At these sites coverage was sparse and dominated by aquatic macrophytes which can tolerate the absence of water for extended periods of time.

Most macrophyte species recorded are widespread and abundant along eastern Australia and none are listed under state or federal legislation as threatened. No aquatic weeds of national significance (WONS) were recorded.

Table 10a: Aquatic macrophytes and relative coverage in March 2022

Growth form	Floating Attached				Emergent														
	<i>Ludwigia peploides</i>	<i>Marsilea drummondii</i>	<i>Ottelia ovalifolia</i>	<i>Triglochin multifractum</i>	<i>Cyperus difformis</i>	<i>Cyperus difformis</i>	<i>Cyperus exaltatus</i>	<i>Cyperus gymnocaulos</i>	<i>Cyperus spp</i>	<i>Echinochloa colona</i>	<i>Eleocharis acuta</i>	<i>Eleocharis plana</i>	<i>Eleocharis spaelata</i>	<i>Juncus spp.</i>	<i>Leptochloa digitata</i>	<i>Monochoria cyanea</i>	<i>Persicaria spp.</i>	<i>Phragmites australis</i>	<i>Typha orientalis</i>
Scientific name	Water primrose	Nardoo	Swamp lily	Water-ribbon	Dirty dora	Sedge sp.	Giant sedge	Sedge sp.	Sedge sp.	Awnless barnyard grass	Spikerush	Flat spike-sedge	Sedge sp.	Common rush	Umbrella canegrass	Monochoria	Persicaria species	Common reed	Bullrush
LAQ2						L				L							L		
LAQ3							L												
LH5															L				
LH6								L										S	
LAQ4															L				
LAQ7					L			L									L		
LAQ10															L				L
LAQ8					L			L		L							L	L	
LAQ6					L		L		L		S			L	S				
LAQ5	L						S	L			L			S	L		L		
LH11																			
LH7																			
LAQ11	S				L		L			L	L								

L – little, S – some, M – moderate, E - extensive

Table 10b: Aquatic macrophytes and relative coverage in March 2022 (continued)

Growth form	Floating Attached			Emergent															
	<i>Ludwigia peploides</i>	<i>Marsilea drummondii</i>	<i>Ottelia ovalifolia</i>	<i>Triglochin multifractum</i>	<i>Cyperus difformis</i>	<i>Cyperus difformis</i>	<i>Cyperus exaltatus</i>	<i>Cyperus gymnocaulos</i>	<i>Cyperus spp</i>	<i>Echinochloa colona</i>	<i>Eleocharis acuta</i>	<i>Eleocharis plana</i>	<i>Eleocharis spicelata</i>	<i>Juncus spp.</i>	<i>Leptochloa digitata</i>	<i>Monochoria cyanea</i>	<i>Persicaria spp.</i>	<i>Phragmites australis</i>	<i>Typha orientalis</i>
Scientific name	Water primrose	Nardoo	Swamp lily	Water-ribbon	Dirty dora	Sedge sp.	Giant sedge	Sedge sp.	Sedge sp.	Awnless barnyard grass	Spikerush	Fiat spike-sedge	Sedge sp.	Common rush	Umbrella canegrass	Monochoria	Persicaria species	Common reed	Bullrush
TAQ4					L			L						L					
LH8																			
TAQ5		S	M	S	L		S				S	S		L	S	L			
TAQ1					L									L					
TAQ2														L					
TH3																			
LH9						L	L			L	L			L	S				
TH4		S			L		S					S		L	S				
TH1					L									L					
TAQ3																			
TH2					L		L			L	L				L				
LH12			S		L		S						E		S	L			
LAQ9								L						L					

L – little, S – some, M – moderate, E - extensive

4.6. Aquatic macroinvertebrates

A total of 2,871 aquatic macroinvertebrate individuals from 52 taxa (mainly family level) were collected from the 14 sites that held sufficient water across the Project Area (**Appendix B**). In addition to the macroinvertebrates recorded, three groups of microcrustacea (Cladocera, Copepoda, Ostracoda) were recorded.

Macroinvertebrate relative abundance and taxonomic richness for all sites is presented in **Figure 4**. Abundance values were not absolute but in line with the live picking procedures of the AusRivAS methodology (DNRM 2001). Abundance varied across all sites and samples, ranging from 20 to 350 individuals. Abundances were typically higher for edge samples than bed samples, which is typical for ephemeral waterways. For 20 of the 26 samples collected abundances were less than 150 individuals. AusRivAS methods aim to collect approximately 200 individuals (without over collection of abundant taxa). This illustrates the overall low abundances of aquatic macroinvertebrates across the Project Area. The low abundances are likely to be due to the largely ephemeral nature of the waterways. Taxa diversity across all samples ranged from 6 to 28 (with a mean of 16.3 taxa across all samples) and was typically higher in edge samples than bed samples. These results are also typical for ephemeral streams in central Queensland.

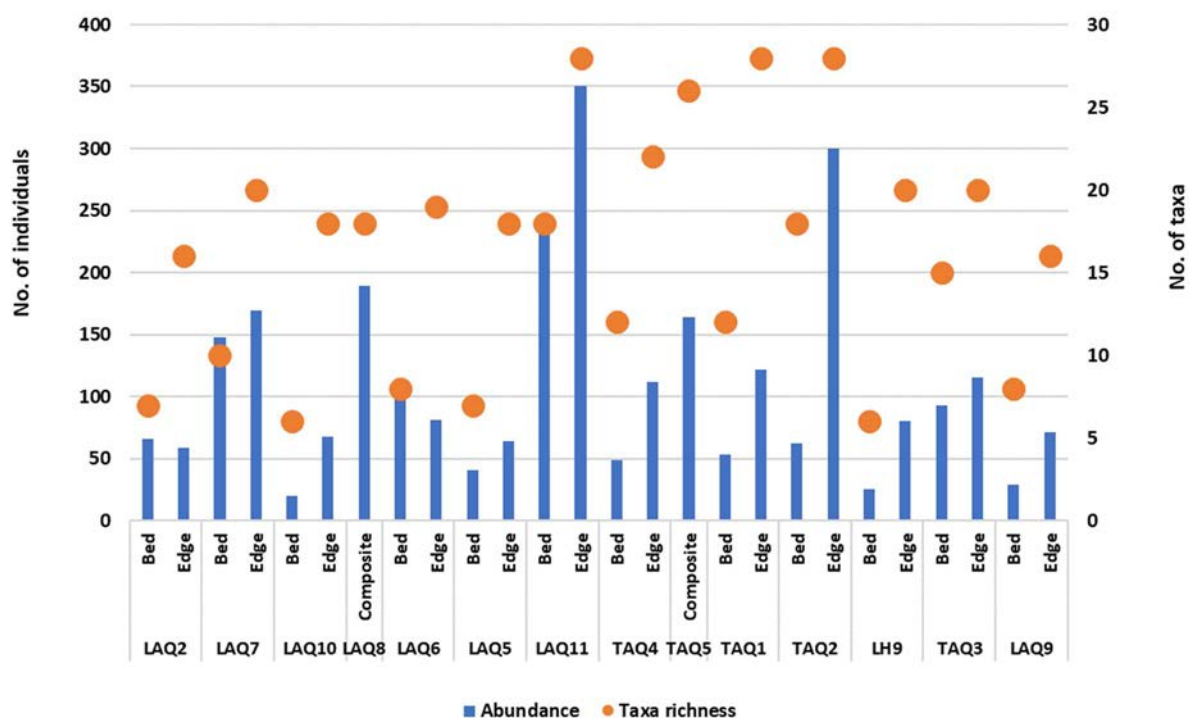


Figure 4: Macroinvertebrate abundance and taxa richness

Macroinvertebrate PET richness and Signal2 scores for all samples for both seasons is presented in **Figure 5**. Two families of ephemeroptera – mayfly (Baetidae and Caenidae) and three families of tricoptera – caddisfly and (Ecnomidae, Hydroptilidae and Leptoceridae) were recorded across all sites. PET richness ranged from 0 to four taxa across all samples, with a mean of 2.0 taxa. This represents a relatively low PET taxa diversity. Signal2 scores ranged from 2.53 to 3.82 across all samples with a mean of 3.27. These Signal2 scores are relatively low indicating the aquatic macroinvertebrate assemblages were relatively depauperate.

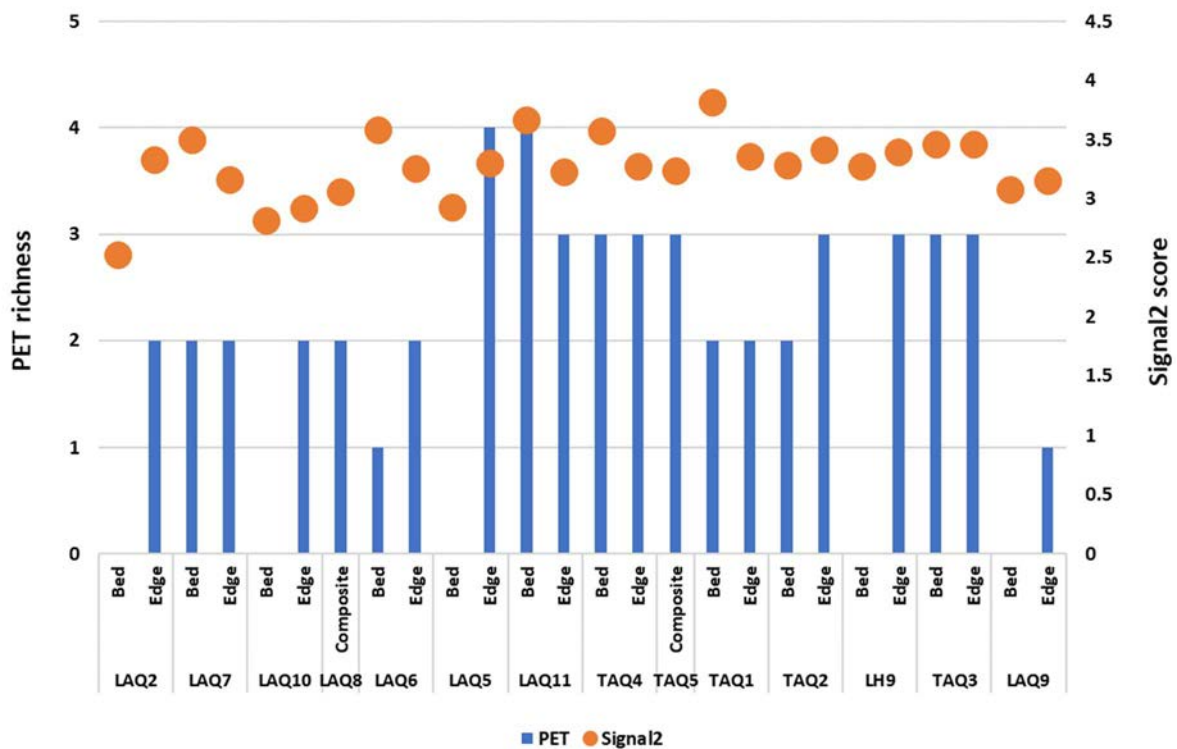


Figure 5: Macroinvertebrate PET richness and Signal2 scores

4.7. Macrocrustaceans

Macrocrustaceans were collected during both macroinvertebrate and fish sampling. Three families of macrocrustacean were detected across the Project Area; Atyidae (glass shrimp), Palaemonidae (freshwater prawns) and Paratacidae (freshwater crayfish) (**Table 9**). Palaemonidae and Paratacidae were widespread across the sites sampled, with Atyidae recorded at only one site (LAQ5 which may represent a more permanent waterhole). The Palaemonidae species was *Macrobrachium australiense*, a common and widespread species across eastern Australia. The Paratacidae species recorded was part of the *Cherax destructor* complex. The natural distribution of this species extends across the Murray-Darling and Lake Eyre Basins, with one population recorded in the Dawson River catchment.

Table 11: Macrocrustacean family and abundance recorded in March 2022

Family	Paratacidae	Palaemonidae	Atyidae
LAQ2	Y	Y	-
LAQ7	-	Y	-
LAQ10	Y	Y	-
LAQ6	-	Y	-
LAQ5	Y	Y	Y
LAQ11	Y	Y	-
TAQ4	Y	Y	-
TAQ5	Y	-	-
TAQ1	Y	Y	-
TAQ2	Y	Y	-
LH9	Y	Y	-
TAQ3	Y	Y	-
LAQ9	Y	Y	-

4.8. Fish

A total of 2,192 fish from eight species were collected from 14 sites that were sampled across the Project Area (**Table 10**). A further nine sites held water but in insufficient amounts to support fish. Eight of the species of fish recorded were native species, with the only introduced specie (tilapia – *Oreochromis mossambicus*) recorded as juveniles at a single site. Tilapia is a restricted noxious fish under the Biosecurity Act 2014.

The most abundant species was spangled perch (*Leiopotherapon unicolor*) which accounted for nearly half of all fish recorded was found at all sites sampled for fish. Other widespread species recorded were Agassiz's glassfish (*Ambassis agassizii*), Midgely's carp gudgeon (*Hypseleotris bucephalus*), eastern rainbowfish (*Melanotaenia splendida splendida*) and bony bream (*Nematalosa erebi*) which were recorded at 79%, 79%, 71% and 50% of sites sampled respectively. Single specimens of eel-tailed catfish (*Tandanus tandanus*) and sleepy cod (*Oxyeleotris lineolata*) were recorded in the March 2022 sampling.

All the native fish species recorded are relatively common and widespread across their distributions.

Table 10: Fish species and abundance recorded March 2022. Exotic species demoted in red.

Scientific name	<i>Ambassis agassizii</i>	<i>Hypseleotris bucephalus</i>	<i>Leiopotherapon unicolor</i>	<i>Melanotaenia splendida splendida</i>	<i>Nematalosa erebi</i>	<i>Tandanus tandanus</i>	<i>Oxyeleotris lineolata</i>	<i>Oreochromis mossambicus</i>	
Common name	Agassiz's Glassfish	Boofhead carp gudgeon	Spangled perch	Eastern rainbowfish	Bony bream	Eel-tailed catfish	Sleepy cod	Tilapia	Totals
LAQ2	-	-	73	-	-	-	-	-	73
LAQ7	-	-	3	-	-	-	-	-	3
LAQ10	19	97	52	30	-	-	-	-	198
LAQ8	-	-	20	-	-	-	-	-	20
LAQ6	8	46	61	9	-	-	-	-	124
LAQ5	11	13	118	13	12	-	-	-	167
LAQ11	7	6	13	10	1	-	-	11	48
TAQ4	14	8	126	23	5	4	2	-	182
TAQ5	10	170	111	-	-	-	-	-	291
TAQ1	21	63	87	76	5	-	-	-	252
TAQ2	3	52	66	117	5	-	-	-	243
LH9	1	42	90	20	36	-	-	-	189
TAQ3	7	26	108	38	-	-	-	-	179
LAQ9	15	10	94	81	19	4	-	-	223
Totals	116	533	1,022	417	83	8	2	11	2,192

4.9. Turtles and platypus

A single specimen of eastern long-necked turtle (*Chelodina longicollis*) was captured at site LAQ9. This species is capable of moving long distances overland between waterholes, particularly after heavy rainfall.

No platypus (*Ornithorhynchus anatinus*) were recorded in the March 2022 surveys. An assessment of potential habitat suitability was undertaken at each site that was sampled for fish (Table 11).

Table 11: Platypus habitat suitability assessment

Site	Rating	Comments
LAQ2	Poor	Poor habitat conditions. Shallow at the time of sampling. Water permanency is low at both the site and for some distance downstream.
LAQ7	Poor	Poor habitat conditions. Shallow at the time of sampling. Water permanency is low at both the site and for some distance downstream.
LAQ10	Average	Water depth and habitat suitable but not of high quality. This site was largely disconnected from other permanent / semi-permanent pools.
LAQ8	Poor	Poor habitat conditions. Shallow at the time of sampling. Water permanency is low at both the site and for some distance downstream.
LAQ6	Poor	Poor habitat conditions. Water permanency is low at both the site and for some distance downstream.
LAQ5	Average	Water depth and habitat suitable but not of high quality. This site was largely disconnected from other permanent / semi-permanent pools.
LAQ11	Poor	Poor habitat conditions. Water permanency is low at both the site and for some distance downstream.
TAQ4	Average	Water depth and habitat suitable. Unknown how many pools within proximity are semi-permanent.
TAQ5	Poor	A small billabong that is likely to dry out regularly. Good feeding habitat but disconnected from the main waterway and no suitable nesting banks.
TAQ1	Poor	Shallow and highly ephemeral.
TAQ2	Poor	Shallow through most of the reach with some deeper pools at the time of sampling and highly ephemeral.
LH9	Poor	Water depth suitable but habitat not of high quality. This site was largely disconnected from other permanent / semi-permanent pools.
TAQ3	Poor	Shallow through most of the reach with some deeper pools at the time of sampling and highly ephemeral.
LAQ9	Average	Water depth and habitat suitable. Unknown how many pools within proximity are semi-permanent.

Based on habitat characteristics alone three sites were assessed as being average for habitat suitability for platypus, while all remaining sites were considered poor habitat suitability for platypus. There were no available historical records for platypus within 50 kilometres of the Project Area, with single records approximately 50 kilometres away from the Project Area in both the Dawson River to the north and Condamine River to the south. Considering the generally poor habitat suitability and the distance from existing records it is considered unlikely that platypus would occur across the Project Area.

4.10. Frogs

A single specimen of eastern long-necked turtle (*Chelodina longicollis*) was captured at site LAQ9. This species is capable of moving long distances overland between waterholes, particularly after heavy rainfall.

Only three species of frog were recorded in the March 2022 sampling. The green-stripe frog (*Cyclorana albugutta*) was recorded at sites (LAQ5, LAQ11, TAQ1, TAQ2, TAQ3, TAQ4 and TAQ5). The specimen at site TAQ4 was observed being consumed by a keelback snake (*Tropidonophis mairii*). The broad-palmed rocket frog (*Litoria latopalmata*) was recorded only at site TAQ1. The broad-palmed frog and green-stripe frog are native species are common and widespread. Cane toads (*Rhinella marina*) were recorded at sites LAQ11 and TAQ1. Cane toads are an introduced pest species.

4.11. Likelihood of occurrence of EVNT species

An assessment of likelihood determined that all but three of the EVNT species identified in the desktop assessment are unlikely to occur in the Project Area (**Table 12** for EVNT and priority aquatic flora and **Table 13** EVNT and priority aquatic fauna). None of the EVNT or priority species were detected during the surveys, neither was suitable habitat identified.

Table 12: Likelihood of occurrence for EVNT and priority aquatic flora

Species	Status			Preferred habitat	Likelihood of occurrence
	EPBC	NC Act	Back on track (Fitzroy NRM region)		
Spikerush species <i>Eleocharis blakeana</i>	-	-	H	<i>Eleocharis blakeana</i> occurs on plains and low undulating country on poorly drained, clayey soils. It commonly grows in ephemeral wet habitats in melon hole country in brigalow and belah woodlands, and in small depressions along drainage lines in open forest and woodland communities.	<u>Unlikely</u> No suitable habitat or records with 50 km.
Salt Pipewort <i>Eriocaulon carsonii</i>	-	-	H	<i>Eriocaulon carsonii</i> is confined to the vents and tails of mound-spring wetlands.	<u>Unlikely</u> No suitable habitat or records with 50 km.
Myriophyllum species <i>Myriophyllum artesium</i>	-	-	H	<i>Myriophyllum artesium</i> is generally restricted to the wetlands associated with springs emanating from the Great Artesian Basin and associated basins.	<u>Unlikely</u> No suitable habitat or records with 50 km.

Table 14: Likelihood of occurrence for EVNT and priority aquatic fauna

Species	Status			Preferred habitat	Likelihood of occurrence
	EPBC	NC Act	Back on track (Fitzroy NRM region)		
White-throated Snapping Turtle <i>Elseya albagula</i>	CE	CE	H	The white-throated snapping turtle is recognised as a habitat specialist. Within the river system the white-throated snapping turtle prefers clear, flowing, well-oxygenated waters. The species prefers waterways with permanent flowing water, with undercut banks, large woody debris, deep pools (6 m deep) and shallow riffle zones.	<u>Unlikely</u> No suitable habitat and no records with 20 km.
Fitzroy River Turtle <i>Rheodytes leukops</i>	V	V	H	The Fitzroy River Turtle is found in rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. Preferred areas have high water clarity, and are often associated with Ribbonweed (<i>Vallisneria</i> sp.) beds.	<u>Unlikely</u> No suitable habitat and no records with 20 km.
Ornate rainbowfish <i>Rhadinocentrus ornatus</i>	-	-	H	Creeks, backwaters of larger streams, ponds and dune lakes, usually in sandy coastal lowland wallum and rainforest.	<u>Unlikely</u> No suitable habitat and no records with 20 km.

5. Conclusions



The key findings of the aquatic surveys across the Project Area are;



- The sampling was undertaken in a year of above average rainfall
- Historical vegetation clearing and current grazing practices appear to be the most significant stressors on aquatic ecosystems
- *In situ* water quality measured during sampling was highly variable across the Project Area due to; natural variation of the underlying geology, the ephemeral nature of the watercourses and historical/current land use activities
- All the watercourses present across the Project Area are ephemeral in nature, the smaller watercourses are unlikely to retain any water for extended periods and the larger watercourses are likely to be reduced to dispersed refugial pools
- Several wetlands were noted but these appeared to be partially modified for stock watering
- Aquatic macrophyte diversity and coverage was relatively low at all but a small number of wetland sites. Emergent macrophytes species dominated the diversity of species
- Aquatic macroinvertebrates had relatively low abundance, diversity, PET scores and Singnal2 scores reflective of the ephemeral nature of the watercourses and current stressors
- Fish abundance and diversity was relatively low and was represented by highly dispersive species typically found in ephemeral watercourses in central Queensland
- A single turtle specimen was recorded in Woleebee Creek (the largest watercourse that passes through the Project Area). This species (eastern long-necked turtle) is known to be highly mobile and capable of moving overland and capable of utilising ephemeral watercourses
- The habitat suitability for platypus was poor at all but four sites which have no connectivity within 50 kilometres to previous records of platypus
- All of the EVNT flora and fauna species identified in the desktop assessment were considered unlikely to occur within (or within proximity to) the Project Area.



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Appendix A – Site Profiles March 2022



LAQ2 Hellhole Creek 19/3/2022		Co-ordinates (UTM 55J) E 786148 S 7083942	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	4.0 m	Run	-
Bankfull stream width	35 m	Shallow pool (<1m)	80 %
Mean water depth	0.3 m	Deep pool (>1m)	-
Maximum water depth	0.5 m	Dry	20 %
Mean wetted width	5.0		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	22 m	Periphyton	-
Riparian width (left bank)	10 m	Filamentous algae	little
Riparian width (right bank)	10 m	Submerged macrophytes	-
Bare ground	10 %	Bank overhang veg	-
Grass	75 %	Trailing bank veg	some
Shrubs	5 %	Blanketing silt	some
Trees < 10 m	10 %	Substrate anoxia	-
Trees > 10 m	40 %	Bank undercuts	-
Canopy cover	5 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	some	Emergent	little
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
In situ water quality		Substrate composition	
Temperature	28.2°C	Bedrock	-
Conductivity	331 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	32 %	Cobble (64-256 mm)	-
pH	7.3	Pebble (4-64 mm)	-
Turbidity	307 NTU	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	60%
		Silt/clay (<0.05 mm)	35 %
Comments: Road crossing recently damaged by flooding, closed to road traffic. Large amounts of concrete and debris immediately below crossing. Extensive bank erosion downstream.			



LAQ3 Hellhole Creek 20/3/2022		<u>Co-ordinates (UTM 55J)</u> E 783755 S 7085063	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	2.0 m	Run	-
Bankfull stream width	25 m	Shallow pool (<1m)	-
Mean water depth	-	Deep pool (>1m)	-
Maximum water depth	-	Dry	100 %
Mean wetted width	-		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	20 m	Periphyton	-
Riparian width (left bank)	20 m	Filamentous algae	-
Riparian width (right bank)	20 m	Submerged macrophytes	-
Bare ground	5 %	Bank overhang veg	-
Grass	95 %	Trailing bank veg	-
Shrubs	-	Blanketing silt	-
Trees < 10 m	10 %	Substrate anoxia	-
Trees > 10 m	80 %	Bank undercuts	-
Canopy cover	40 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	little
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
<i>In situ</i> water quality		Substrate composition	
Temperature	-	Bedrock	-
Conductivity	-	Boulder (>256 mm)	-
Dissolved oxygen	-	Cobble (64-256 mm)	1 %
pH	-	Pebble (4-64 mm)	4 %
Turbidity	-	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	90 %
		Silt/clay (<0.05 mm)	-
Comments: Dry site, unlikely to hold water for extended periods immediately following heavy rainfall.			



LH5 Unnamed creek 17/3/2022		Co-ordinates (UTM 56J) E 786429 S 7087531	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	2.0 m	Run	-
Bankfull stream width	40 m	Shallow pool (<1m)	-
Mean water depth	-	Deep pool (>1m)	-
Maximum water depth	-	Dry	100 %
Mean wetted width	-		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	18 m	Periphyton	-
Riparian width (left bank)	5 m	Filamentous algae	-
Riparian width (right bank)	5 m	Submerged macrophytes	-
Bare ground	5 %	Bank overhang veg	-
Grass	80 %	Trailing bank veg	-
Shrubs	15 %	Blanketing silt	-
Trees < 10 m	10 %	Substrate anoxia	-
Trees > 10 m	5 %	Bank undercuts	-
Canopy cover	5 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	-
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	-	Floating attached	-
Logs (>15cm diam)	-	Submerged	-
In situ water quality		Substrate composition	
Temperature	-	Bedrock	-
Conductivity	-	Boulder (>256 mm)	-
Dissolved oxygen	-	Cobble (64-256 mm)	-
pH	-	Pebble (4-64 mm)	-
Turbidity	-	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	95 %
		Silt/clay (<0.05 mm)	-
Comments: Dry site, unlikely to hold water for extended periods immediately following heavy rainfall.			



LH6 Unnamed creek 17/3/2022		Co-ordinates (UTM 55J) E 784257 S 7090324	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	2.0 m	Run	-
Bankfull stream width	20 m	Shallow pool (<1m)	1 %
Mean water depth	0.15 m	Deep pool (>1m)	-
Maximum water depth	0.3 m	Dry	99 %
Mean wetted width	1 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	4 m	Periphyton	little
Riparian width (left bank)	5 m	Filamentous algae	little
Riparian width (right bank)	1 m	Submerged macrophytes	-
Bare ground	5 %	Bank overhang veg	little
Grass	90 %	Trailing bank veg	little
Shrubs	5 %	Blanketing silt	-
Trees < 10 m	1 %	Substrate anoxia	-
Trees > 10 m	-	Bank undercuts	-
Canopy cover	-		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	-	Emergent	some
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	-	Floating attached	-
Logs (>15cm diam)	-	Submerged	-
In situ water quality		Substrate composition	
Temperature	32.8°C	Bedrock	-
Conductivity	2,540 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	200 %	Cobble (64-256 mm)	-
pH	9.4	Pebble (4-64 mm)	-
Turbidity	36.3 NTU	Gravel (2-4 mm)	2 %
		Sand (0.05-2 mm)	90 %
		Silt/clay (<0.05 mm)	8 %
Comments: Largely dry site. Two small pools. Likely to retain subsurface (hyporheic flows) for some time after the cessation of heavy rainfall.			



LAQ4 Conloi Creek 17/3/2022		<u>Co-ordinates (UTM 55J)</u> E 787875 S 7090806	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	1.5 m	Run	-
Bankfull stream width	35 m	Shallow pool (<1m)	-
Mean water depth	-	Deep pool (>1m)	-
Maximum water depth	-	Dry	100 %
Mean wetted width	-		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	20 m	Periphyton	-
Riparian width (left bank)	5 m	Filamentous algae	-
Riparian width (right bank)	5 m	Submerged macrophytes	-
Bare ground	10 %	Bank overhang veg	-
Grass	60 %	Trailing bank veg	-
Shrubs	30 %	Blanketing silt	-
Trees < 10 m	5 %	Substrate anoxia	-
Trees > 10 m	10 %	Bank undercuts	-
Canopy cover	5 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	little
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	-	Floating attached	-
Logs (>15cm diam)	-	Submerged	-
<i>In situ</i> water quality		Substrate composition	
Temperature	-	Bedrock	-
Conductivity	-	Boulder (>256 mm)	-
Dissolved oxygen	-	Cobble (64-256 mm)	-
pH	-	Pebble (4-64 mm)	-
Turbidity	-	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	80 %
		Silt/clay (<0.05 mm)	10 %
Comments: Dry site. May retain subsurface (hyporheic flows) for some time after the cessation of heavy rainfall.			



LAQ7 Woleebee Creek 16/3/2022		<u>Co-ordinates (UTM 55J)</u> E 783693 S 7091442	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	4.0 m	Run	-
Bankfull stream width	40 m	Shallow pool (<1m)	40 %
Mean water depth	0.2 m	Deep pool (>1m)	-
Maximum water depth	0.4 m	Dry	60 %
Mean wetted width	3.5 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	8 m	Periphyton	extensive
Riparian width (left bank)	15 m	Filamentous algae	-
Riparian width (right bank)	-	Submerged macrophytes	-
Bare ground	30 %	Bank overhang veg	-
Grass	60 %	Trailing bank veg	-
Shrubs	10 %	Blanketing silt	-
Trees < 10 m	40 %	Substrate anoxia	-
Trees > 10 m	-	Bank undercuts	-
Canopy cover	0 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	-	Emergent	little
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	-	Floating attached	-
Logs (>15cm diam)	-	Submerged	-
<i>In situ</i> water quality		Substrate composition	
Temperature	28.8°C	Bedrock	-
Conductivity	1,970 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	112 %	Cobble (64-256 mm)	-
pH	7.9	Pebble (4-64 mm)	-
Turbidity	22.8 NTU	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	75 %
		Silt/clay (<0.05 mm)	20 %
Comments: Likely to retain subsurface (hyporheic flows) for some time after the cessation of heavy rainfall.			



LAQ10 Unnamed creek 17-18/3/2022		Co-ordinates (UTM 55J) E 786328 S 7091373	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	3.0 m	Run	-
Bankfull stream width	30 m	Shallow pool (<1m)	50 %
Mean water depth	0.8 m	Deep pool (>1m)	50 %
Maximum water depth	> 1.5 m	Dry	-
Mean wetted width	12 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	22 m	Periphyton	-
Riparian width (left bank)	10 m	Filamentous algae	little
Riparian width (right bank)	15 m	Submerged macrophytes	-
Bare ground	30 %	Bank overhang veg	little
Grass	60 %	Trailing bank veg	little
Shrubs	10 %	Blanketing silt	little
Trees < 10 m	10 %	Substrate anoxia	little
Trees > 10 m	30 %	Bank undercuts	little
Canopy cover	10 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	little
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
In situ water quality		Substrate composition	
Temperature	23.8°C	Bedrock	-
Conductivity	768 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	48 %	Cobble (64-256 mm)	-
pH	8.1	Pebble (4-64 mm)	-
Turbidity	295 NTU	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	55 %
		Silt/clay (<0.05 mm)	40 %
Comments: A large lagoon / billabong. Several hundred metres upstream of the site significant erosion noted, above which point there was no defined channel.			



LAQ8 Woleebee Creek 18/3/2022		Co-ordinates (UTM 55J) E 784508 S 7092058	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	2.5 m	Run	-
Bankfull stream width	40 m	Shallow pool (<1m)	20 %
Mean water depth	0.1 m	Deep pool (>1m)	-
Maximum water depth	0.3 m	Dry	80 %
Mean wetted width	4 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	8 m	Periphyton	extensive
Riparian width (left bank)	5 m	Filamentous algae	-
Riparian width (right bank)	5 m	Submerged macrophytes	-
Bare ground	10 %	Bank overhang veg	-
Grass	80 %	Trailing bank veg	little
Shrubs	10 %	Blanketing silt	little
Trees < 10 m	5 %	Substrate anoxia	-
Trees > 10 m	-	Bank undercuts	-
Canopy cover	0 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	some
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	-	Floating attached	-
Logs (>15cm diam)	-	Submerged	-
In situ water quality		Substrate composition	
Temperature	31.4°C	Bedrock	-
Conductivity	1,510 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	133 %	Cobble (64-256 mm)	-
pH	8.6	Pebble (4-64 mm)	2 %
Turbidity	25.3 NTU	Gravel (2-4 mm)	3 %
		Sand (0.05-2 mm)	85 %
		Silt/clay (<0.05 mm)	10 %
Comments: Likely to retain subsurface (hyporheic flows) for some time after the cessation of heavy rainfall.			

LAQ6 Unnamed creek 18/3/2022		Co-ordinates (UTM 55J) E 786897 S 7092375	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	0.8 m	Run	-
Bankfull stream width	10 m	Shallow pool (<1m)	40 %
Mean water depth	0.4 m	Deep pool (>1m)	-
Maximum water depth	0.8 m	Dry	60 %
Mean wetted width	6 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	18 m	Periphyton	-
Riparian width (left bank)	5 m	Filamentous algae	little
Riparian width (right bank)	5 m	Submerged macrophytes	-
Bare ground	-	Bank overhang veg	-
Grass	85 %	Trailing bank veg	extensive
Shrubs	15 %	Blanketing silt	-
Trees < 10 m	-	Substrate anoxia	-
Trees > 10 m	15 %	Bank undercuts	little
Canopy cover	10 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	some	Emergent	moderate
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
In situ water quality		Substrate composition	
Temperature	27.9°C	Bedrock	-
Conductivity	198 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	108 %	Cobble (64-256 mm)	-
pH	7.8	Pebble (4-64 mm)	-
Turbidity	16.3 NTU	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	-
		Silt/clay (<0.05 mm)	100 %
Comments: Clay base likely to facilitate water retention for at least weeks following heavy rainfall.			



LAQ5 Unnamed billabong 17-18/3/2022		Co-ordinates (UTM 55J) E 784944 S 7092562	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	0.5 m	Run	-
Bankfull stream width	60 m	Shallow pool (<1m)	60 %
Mean water depth	80 cm	Deep pool (>1m)	20 %
Maximum water depth	> 1.5 m	Dry	20 %
Mean wetted width	12 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	8 m	Periphyton	-
Riparian width (left bank)	5 m	Filamentous algae	little
Riparian width (right bank)	5 m	Submerged macrophytes	-
Bare ground	-	Bank overhang veg	-
Grass	95 %	Trailing bank veg	extensive
Shrubs	5 %	Blanketing silt	-
Trees < 10 m	5 %	Substrate anoxia	-
Trees > 10 m	-	Bank undercuts	little
Canopy cover	0 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	some
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
In situ water quality		Substrate composition	
Temperature	31.4°C	Bedrock	-
Conductivity	241 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	101 %	Cobble (64-256 mm)	2 %
pH	8.3	Pebble (4-64 mm)	3 %
Turbidity	477 NTU	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	50 %
		Silt/clay (<0.05 mm)	40 %
Comments: A large billabong off the main channel of Conloi Creek.			



LH11 Unnamed creek 16/3/2022		<u>Co-ordinates (UTM 55J)</u> E 783417 S 7094813	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	1.5 m	Run	-
Bankfull stream width	8 m	Shallow pool (<1m)	10 %
Mean water depth	0.3 m	Deep pool (>1m)	-
Maximum water depth	0.8 m	Dry	90 %
Mean wetted width	3 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	25 m	Periphyton	some
Riparian width (left bank)	15 m	Filamentous algae	little
Riparian width (right bank)	15 m	Submerged macrophytes	-
Bare ground	-	Bank overhang veg	little
Grass	95 %	Trailing bank veg	some
Shrubs	5 %	Blanketing silt	-
Trees < 10 m	20 %	Substrate anoxia	some
Trees > 10 m	30 %	Bank undercuts	little
Canopy cover	25 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	little
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
<i>In situ</i> water quality		Substrate composition	
Temperature	26.2°C	Bedrock	-
Conductivity	248 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	114 %	Cobble (64-256 mm)	-
pH	8.9	Pebble (4-64 mm)	-
Turbidity	17.2 NTU	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	60 %
		Silt/clay (<0.05 mm)	40 %
Comments: Largely dry. A pipe passing under the road and into the pool below suggests potential for the pool present to a result of an external source (potentially bore water).			



LH7 Unnamed creek 18/3/2022		Co-ordinates (UTM 55J) E 784519 S 7095038	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	0.5 m	Run	-
Bankfull stream width	-	Shallow pool (<1m)	-
Mean water depth	-	Deep pool (>1m)	-
Maximum water depth	-	Dry	100 %
Mean wetted width	-		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	1 m	Periphyton	-
Riparian width (left bank)	-	Filamentous algae	-
Riparian width (right bank)	-	Submerged macrophytes	-
Bare ground	5 %	Bank overhang veg	-
Grass	95 %	Trailing bank veg	-
Shrubs	5 %	Blanketing silt	-
Trees < 10 m	-	Substrate anoxia	-
Trees > 10 m	-	Bank undercuts	-
Canopy cover	0 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	-	Emergent	little
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	-	Floating attached	-
Logs (>15cm diam)	-	Submerged	-
In situ water quality		Substrate composition	
Temperature	-	Bedrock	-
Conductivity	-	Boulder (>256 mm)	-
Dissolved oxygen	-	Cobble (64-256 mm)	-
pH	-	Pebble (4-64 mm)	-
Turbidity	-	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	20 %
		Silt/clay (<0.05 mm)	80 %
Comments: Dry site. No defined channel but within the marked watercourse.			



LAQ11 Unnamed creek 21/3/2022		Co-ordinates (UTM 55J) E 785327 S 7098360	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	1.8 m	Run	-
Bankfull stream width	6 m	Shallow pool (<1m)	80 %
Mean water depth	0.5 m	Deep pool (>1m)	-
Maximum water depth	0.8 m	Dry	20 %
Mean wetted width	1.2 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	3 m	Periphyton	moderate
Riparian width (left bank)	1 m	Filamentous algae	moderate
Riparian width (right bank)	1 m	Submerged macrophytes	-
Bare ground	10 %	Bank overhang veg	little
Grass	80 %	Trailing bank veg	some
Shrubs	10 %	Blanketing silt	-
Trees < 10 m	5 %	Substrate anoxia	-
Trees > 10 m	-	Bank undercuts	-
Canopy cover	0 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	some	Emergent	some
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	-	Floating attached	little
Logs (>15cm diam)	-	Submerged	-
In situ water quality		Substrate composition	
Temperature	26.5°C	Bedrock	-
Conductivity	288 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	162 %	Cobble (64-256 mm)	-
pH	8.9	Pebble (4-64 mm)	-
Turbidity	32.6 NTU	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	2 %
		Silt/clay (<0.05 mm)	92 %
Comments: 7 juvenile tilapia (<i>Oreochromis mossambicus</i>) recorded. Clay base may allow water to be retained for an extended period of time following heavy rainfall (as evidenced in the presence of the floating attached water primrose (<i>Ludwigia peploides</i>)).			



TAQ4 Woleebee Creek 20-21/3/2022		Co-ordinates (UTM 55J) E 782643 S 7100015	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	4 m	Run	-
Bankfull stream width	28 m	Shallow pool (<1m)	80 %
Mean water depth	0.3 m	Deep pool (>1m)	10 %
Maximum water depth	1.5 m	Dry	10 %
Mean wetted width	10 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	20 m	Periphyton	little
Riparian width (left bank)	15 m	Filamentous algae	some
Riparian width (right bank)	15 m	Submerged macrophytes	-
Bare ground	15 %	Bank overhang veg	-
Grass	85 %	Trailing bank veg	moderate
Shrubs	-	Blanketing silt	-
Trees < 10 m	-	Substrate anoxia	-
Trees > 10 m	70 %	Bank undercuts	little
Canopy cover	30 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	little
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	some	Submerged	-
In situ water quality		Substrate composition	
Temperature	21.7°C	Bedrock	-
Conductivity	1,171 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	82 %	Cobble (64-256 mm)	-
pH	9.0	Pebble (4-64 mm)	5 %
Turbidity	26.0 NTU	Gravel (2-4 mm)	10 %
		Sand (0.05-2 mm)	80 %
		Silt/clay (<0.05 mm)	5 %
Comments:			



LH8 Unnamed creek 21/3/2022		<u>Co-ordinates (UTM 56J)</u> E 784135 S 7100197	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	-	Riffle	-
Bankfull bank height	-	Run	-
Bankfull stream width	-	Shallow pool (<1m)	-
Mean water depth	-	Deep pool (>1m)	-
Maximum water depth	-	Dry	100 %
Mean wetted width	-		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	-	Periphyton	-
Riparian width (left bank)	-	Filamentous algae	-
Riparian width (right bank)	-	Submerged macrophytes	-
Bare ground	90 %	Bank overhang veg	-
Grass	10 %	Trailing bank veg	-
Shrubs	-	Blanketing silt	-
Trees < 10 m	-	Substrate anoxia	-
Trees > 10 m	-	Bank undercuts	-
Canopy cover	-		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	-	Emergent	-
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	-	Floating attached	-
Logs (>15cm diam)	-	Submerged	-
<i>In situ</i> water quality		Substrate composition	
Temperature	-	Bedrock	-
Conductivity	-	Boulder (>256 mm)	-
Dissolved oxygen	-	Cobble (64-256 mm)	-
pH	-	Pebble (4-64 mm)	-
Turbidity	-	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	30 %
		Silt/clay (<0.05 mm)	60 %
Comments: Dry site. No channel or sign of a waterway. Paddock has been heavily tilled.			


TAQ5 Unnamed billabong 20/3/2022		<u>Co-ordinates (UTM 55J)</u> E 778770 S 7100820	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	20 x 50 m	Riffle	-
Bankfull bank height	-	Run	-
Bankfull stream width	-	Shallow pool (<1m)	100 %
Mean water depth	0.3 m	Deep pool (>1m)	-
Maximum water depth	0.6 m	Dry	-
Mean wetted width	-		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	18 m	Periphyton	some
Riparian width (left bank)	-	Filamentous algae	moderate
Riparian width (right bank)	-	Submerged macrophytes	-
Bare ground	-	Bank overhang veg	-
Grass	100 %	Trailing bank veg	extensive
Shrubs	-	Blanketing silt	-
Trees < 10 m	-	Substrate anoxia	-
Trees > 10 m	40 %	Bank undercuts	-
Canopy cover	30 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	some	Emergent	moderate
Sticks (<2cm diam)	some	Floating	-
Branches (<15cm diam)	little	Floating attached	extensive
Logs (>15cm diam)	little	Submerged	-
<i>In situ</i> water quality		Substrate composition	
Temperature	24.9°C	Bedrock	-
Conductivity	214 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	94 %	Cobble (64-256 mm)	-
pH	7.8	Pebble (4-64 mm)	-
Turbidity	20.2 NTU	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	-
		Silt/clay (<0.05 mm)	100 %
Comments: Billabong on Wandoan Creek floodplain.			



TAQ1 Wandoan Creek 14/3/2022		Co-ordinates (UTM 55J) E 778781 S 7101064	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	5 m	Run	5 %
Bankfull stream width	18 m	Shallow pool (<1m)	80 %
Mean water depth	0.4 m	Deep pool (>1m)	10 %
Maximum water depth	1.2 m	Dry	5 %
Mean wetted width	4 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	20 m	Periphyton	-
Riparian width (left bank)	5 m	Filamentous algae	-
Riparian width (right bank)	20 m	Submerged macrophytes	-
Bare ground	20 %	Bank overhang veg	-
Grass	80 %	Trailing bank veg	moderate
Shrubs	-	Blanketing silt	some
Trees < 10 m	10 %	Substrate anoxia	-
Trees > 10 m	50 %	Bank undercuts	little
Canopy cover	20 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	-	Emergent	little
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
In situ water quality		Substrate composition	
Temperature	29.8°C	Bedrock	-
Conductivity	284 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	78 %	Cobble (64-256 mm)	2 %
pH	8.1	Pebble (4-64 mm)	3 %
Turbidity	363 NTU	Gravel (2-4 mm)	10 %
		Sand (0.05-2 mm)	75 %
		Silt/clay (<0.05 mm)	10 %
Comments: Subsurface flows expressing in some reaches. Uncertain whether these were hyporheic or groundwater expressions.			

TAQ2 Wandoan Creek 15-16/3/2022		<u>Co-ordinates (UTM 55J)</u> E 780904 S 7101380	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	5 m	Run	-
Bankfull stream width	18 m	Shallow pool (<1m)	80 %
Mean water depth	0.6 m	Deep pool (>1m)	20 %
Maximum water depth	1.3 m	Dry	-
Mean wetted width	3.5 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	20 m	Periphyton	-
Riparian width (left bank)	15 m	Filamentous algae	-
Riparian width (right bank)	15 m	Submerged macrophytes	-
Bare ground	5 %	Bank overhang veg	little
Grass	90 %	Trailing bank veg	extensive
Shrubs	5 %	Blanketing silt	little
Trees < 10 m	10 %	Substrate anoxia	-
Trees > 10 m	30 %	Bank undercuts	some
Canopy cover	10 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	some
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
<i>In situ</i> water quality		Substrate composition	
Temperature	20.7°C	Bedrock	-
Conductivity	243 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	56 %	Cobble (64-256 mm)	20 %
pH	7.7	Pebble (4-64 mm)	5 %
Turbidity	476 NTU	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	60 %
		Silt/clay (<0.05 mm)	10 %
Comments:			



TH3 Unnamed creek 21/3/2022		Co-ordinates (UTM 55J) E 783131 S 7100821	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	-	Riffle	-
Bankfull bank height	-	Run	-
Bankfull stream width	-	Shallow pool (<1m)	-
Mean water depth	-	Deep pool (>1m)	-
Maximum water depth	-	Dry	100 %
Mean wetted width	-		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	-	Periphyton	-
Riparian width (left bank)	-	Filamentous algae	-
Riparian width (right bank)	-	Submerged macrophytes	-
Bare ground	95 %	Bank overhang veg	-
Grass	5 %	Trailing bank veg	-
Shrubs	-	Blanketing silt	-
Trees < 10 m	-	Substrate anoxia	-
Trees > 10 m	-	Bank undercuts	-
Canopy cover	-		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	-	Emergent	-
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	-	Floating attached	-
Logs (>15cm diam)	-	Submerged	-
In situ water quality		Substrate composition	
Temperature	-	Bedrock	-
Conductivity	-	Boulder (>256 mm)	-
Dissolved oxygen	-	Cobble (64-256 mm)	-
pH	-	Pebble (4-64 mm)	-
Turbidity	-	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	10 %
		Silt/clay (<0.05 mm)	90 %
Comments: Dry site. No channel or sign of a waterway. Paddock has been heavily tilled.			



LH9 Unnamed creek 21/3/2022		<u>Co-ordinates (UTM 55J)</u> E 784091 S 7101291	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	1.0 m	Run	-
Bankfull stream width	25 m	Shallow pool (<1m)	65 %
Mean water depth	0.8 m	Deep pool (>1m)	30 %
Maximum water depth	1.5 m	Dry	5 %
Mean wetted width	12 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	22 m	Periphyton	-
Riparian width (left bank)	10 m	Filamentous algae	moderate
Riparian width (right bank)	5 m	Submerged macrophytes	-
Bare ground	15 %	Bank overhang veg	-
Grass	75 %	Trailing bank veg	some
Shrubs	10 %	Blanketing silt	-
Trees < 10 m	5 %	Substrate anoxia	some
Trees > 10 m	20 %	Bank undercuts	little
Canopy cover	20 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	some
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
<i>In situ</i> water quality		Substrate composition	
Temperature	25.3°C	Bedrock	-
Conductivity	231 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	53 %	Cobble (64-256 mm)	-
pH	7.9	Pebble (4-64 mm)	-
Turbidity	87.4 NTU	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	5 %
		Silt/clay (<0.05 mm)	90 %
Comments: A string of billabong like pools along a lower order stream. Possibly topped up artificially for watering stock.			



TH1 Unnamed creek 14/3/2022		Co-ordinates (UTM 55J) E 778682 S 7101830	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	2.0 m	Run	-
Bankfull stream width	8 m	Shallow pool (<1m)	30 %
Mean water depth	0.3 m	Deep pool (>1m)	-
Maximum water depth	0.5 m	Dry	70 %
Mean wetted width	1.5 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	10 m	Periphyton	-
Riparian width (left bank)	5 m	Filamentous algae	-
Riparian width (right bank)	5 m	Submerged macrophytes	-
Bare ground	30 %	Bank overhang veg	-
Grass	60 %	Trailing bank veg	little
Shrubs	5 %	Blanketing silt	little
Trees < 10 m	30 %	Substrate anoxia	-
Trees > 10 m	15 %	Bank undercuts	little
Canopy cover	25 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	little
Sticks (<2cm diam)	some	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
In situ water quality		Substrate composition	
Temperature	23.2°C	Bedrock	-
Conductivity	273 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	69 %	Cobble (64-256 mm)	-
pH	8.1	Pebble (4-64 mm)	5 %
Turbidity	312 NTU	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	40 %
		Silt/clay (<0.05 mm)	40 %
Comments: A small number of pools remaining after recent rainfall. No signs of water persistence.			

TH4 Unnamed billabong 15/3/2022		Co-ordinates (UTM 55J) E 782119 S 7101726	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	1.0 m	Run	-
Bankfull stream width	30 m	Shallow pool (<1m)	-
Mean water depth	-	Deep pool (>1m)	-
Maximum water depth	-	Dry	100 %
Mean wetted width	-		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	18 m	Periphyton	-
Riparian width (left bank)	5 m	Filamentous algae	-
Riparian width (right bank)	10 m	Submerged macrophytes	-
Bare ground	20 %	Bank overhang veg	-
Grass	60 %	Trailing bank veg	-
Shrubs	20 %	Blanketing silt	-
Trees < 10 m	20 %	Substrate anoxia	-
Trees > 10 m	30 %	Bank undercuts	-
Canopy cover	20 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	some	Emergent	little
Sticks (<2cm diam)	some	Floating	-
Branches (<15cm diam)	little	Floating attached	little
Logs (>15cm diam)	little	Submerged	-
In situ water quality		Substrate composition	
Temperature	-	Bedrock	-
Conductivity	-	Boulder (>256 mm)	-
Dissolved oxygen	-	Cobble (64-256 mm)	-
pH	-	Pebble (4-64 mm)	-
Turbidity	-	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	-
		Silt/clay (<0.05 mm)	100 %
Comments: Dry lagoon. Appears to be a channel that connects Wandoan Creek and Woleebee Creeks during floods rather than a waterway in its own right.			

TAQ3 Wandoan Creek 15-16/3/2022		Co-ordinates (UTM 55J) E 781924 S 7102194	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	5 m	Run	-
Bankfull stream width	18 m	Shallow pool (<1m)	90 %
Mean water depth	0.4 m	Deep pool (>1m)	5 %
Maximum water depth	1.0 m	Dry	5 %
Mean wetted width	5 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	25 m	Periphyton	-
Riparian width (left bank)	30 m	Filamentous algae	-
Riparian width (right bank)	20 m	Submerged macrophytes	-
Bare ground	5 %	Bank overhang veg	-
Grass	90 %	Trailing bank veg	some
Shrubs	5 %	Blanketing silt	some
Trees < 10 m	20 %	Substrate anoxia	-
Trees > 10 m	40 %	Bank undercuts	little
Canopy cover	10 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	little
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
In situ water quality		Substrate composition	
Temperature	23.1°C	Bedrock	-
Conductivity	249 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	50 %	Cobble (64-256 mm)	-
pH	8.0	Pebble (4-64 mm)	5 %
Turbidity	620 NTU	Gravel (2-4 mm)	15 %
		Sand (0.05-2 mm)	60 %
		Silt/clay (<0.05 mm)	20 %
Comments:			

TH2 Unnamed creek 16/3/2022		Co-ordinates (UTM 55J) E 781497 S 7102372	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	50 m	Riffle	-
Bankfull bank height	0.5 m	Run	-
Bankfull stream width	25 m	Shallow pool (<1m)	10 %
Mean water depth	0.3 m	Deep pool (>1m)	-
Maximum water depth	0.5 m	Dry	90 %
Mean wetted width	3 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	8 m	Periphyton	little
Riparian width (left bank)	5 m	Filamentous algae	-
Riparian width (right bank)	5 m	Submerged macrophytes	-
Bare ground	5 %	Bank overhang veg	-
Grass	85 %	Trailing bank veg	moderate
Shrubs	10 %	Blanketing silt	little
Trees < 10 m	15 %	Substrate anoxia	some
Trees > 10 m	-	Bank undercuts	-
Canopy cover	10 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	some	Emergent	little
Sticks (<2cm diam)	little	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
In situ water quality		Substrate composition	
Temperature	22.9°C	Bedrock	-
Conductivity	276 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	9 %	Cobble (64-256 mm)	-
pH	7.7	Pebble (4-64 mm)	-
Turbidity	11.9 NTU	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	-
		Silt/clay (<0.05 mm)	100 %
Comments: A single pool remaining sustained by a clay base.			

LH12 Unnamed billabong 16/3/2022		Co-ordinates (UTM 55J) E 783236 S 7102518	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	20 x 5 m	Riffle	-
Bankfull bank height	-	Run	-
Bankfull stream width	-	Shallow pool (<1m)	100 %
Mean water depth	0.2 m	Deep pool (>1m)	-
Maximum water depth	0.8 m	Dry	-
Mean wetted width	-		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	-	Periphyton	moderate
Riparian width (left bank)	-	Filamentous algae	moderate
Riparian width (right bank)	-	Submerged macrophytes	-
Bare ground	-	Bank overhang veg	-
Grass	100 %	Trailing bank veg	moderate
Shrubs	-	Blanketing silt	some
Trees < 10 m	-	Substrate anoxia	some
Trees > 10 m	-	Bank undercuts	-
Canopy cover	-		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	little	Emergent	extensive
Sticks (<2cm diam)	-	Floating	-
Branches (<15cm diam)	-	Floating attached	moderate
Logs (>15cm diam)	-	Submerged	-
In situ water quality		Substrate composition	
Temperature	-	Bedrock	-
Conductivity	-	Boulder (>256 mm)	-
Dissolved oxygen	-	Cobble (64-256 mm)	-
pH	-	Pebble (4-64 mm)	-
Turbidity	-	Gravel (2-4 mm)	-
		Sand (0.05-2 mm)	-
		Silt/clay (<0.05 mm)	100 %
Comments: A small wetland formed on the floodplain adjacent to Woleebee Creek.			

LAQ9 Woleebee Creek 16-17/3/2022		<u>Co-ordinates (UTM 55J)</u> E 783331 S 7102502	
			
Upstream		Downstream	
Channel characteristics		Mesohabitat composition	
Reach length	100 m	Riffle	-
Bankfull bank height	7 m	Run	-
Bankfull stream width	40 m	Shallow pool (<1m)	60 %
Mean water depth	0.6 m	Deep pool (>1m)	40 %
Maximum water depth	> 1.5 m	Dry	-
Mean wetted width	6 m		
Riparian characteristics		Microhabitat present	
Riparian veg height (max)	20 m	Periphyton	some
Riparian width (left bank)	10 m	Filamentous algae	little
Riparian width (right bank)	20 m	Submerged macrophytes	-
Bare ground	15 %	Bank overhang veg	-
Grass	80 %	Trailing bank veg	some
Shrubs	5 %	Blanketing silt	little
Trees < 10 m	10 %	Substrate anoxia	-
Trees > 10 m	50 %	Bank undercuts	little
Canopy cover	20 %		
Instream wood		Macrophyte coverage	
Detritus (leaves etc)	some	Emergent	little
Sticks (<2cm diam)	some	Floating	-
Branches (<15cm diam)	little	Floating attached	-
Logs (>15cm diam)	little	Submerged	-
<i>In situ</i> water quality		Substrate composition	
Temperature	26.4°C	Bedrock	-
Conductivity	639 µS/cm	Boulder (>256 mm)	-
Dissolved oxygen	98 %	Cobble (64-256 mm)	-
pH	8.7	Pebble (4-64 mm)	-
Turbidity	35.5 NTU	Gravel (2-4 mm)	5 %
		Sand (0.05-2 mm)	75 %
		Silt/clay (<0.05 mm)	20 %
Comments:			

Appendix B – Macroinvertebrate data March 2022

Site	LH9	LH9	LAQ2	LAQ2	LAQ4	LAQ4	LAQ5	LAQ5	LAQ6	LAQ6	LAQ7	LAQ7	LAQ8
Habitat	Bed	Edge	Bed	Edge	Bed	Edge	Bed	Edge	Bed	Edge	Bed	Edge	Composite
Microcrustacea													
Cladocera		1	24	50	3	34	16	6	1	4	150	45	250
Copepoda	6	33	27	60	60	145	29	15	35	2	550	17	100
Ostracoda	1	1		1							13		7
Turbellaria	Turbellaria												
	Termoncephalidae						2						
Nematoda	Nematoda									1			
Gastropoda	Ancylidae												
	Lymnaeidae												
	Physidae												
	Planorbidae									3			
Oligochaeta	Oligochaeta								2				
Araneae	Araneae		2										
Acari	Acari		10	1	1	1	8		18	17	5	7	5
Decapoda	Atyidae							1	1				
	Palaemonidae	3		13	2		6	14	8			2	
	Parastacidae												
Coleoptera	Carabidae	3	12	14	3	1	14	17	9	20	21	5	9
	Curculionidae												
	Dytiscidae		1	1	10	2	12			14	7		3
	Gyrinidae												
	Halplidae												
	Hydraenidae	1	13		2		4				4		8
	Hydrochidae		1		2		2				7		7
	Hydrophilidae								1		1		11
	Noteridae												
	Scirtidae												
	Spercheidae												
Diptera	Ceratopogonidae	1				1		4	7	3	1	6	3
	Chaoboridae			35								1	
	s-f Chironominae	1	8	1	5	16	11	2	16	37	3	46	38
	s-f Orthodadiinae		1		1	3	1					1	
	s-f Tanypodinae	16	1		1	5	4			6	1	55	6
	Culicidae				4		5		1		1		13
	Tabanidae						1				1		1
Ephemeroptera	Baetidae		1		4	1	16		7	1	1		26
	Caenidae		4			12	8		2		2	2	8
Hemiptera	Belostomatidae												
	Gerridae		10		4		3		1				4
	Hydrometridae		4				1			1			
	Mesoveliidae		1					1	2				
	Micronectidae		1	1	2	4	6		1			25	11
	Nepidae		1		1		3						
	Notonectidae						1						1
	Ochteridae		1				1						1
	Pleidae		3								5		
	Veliidae		4		13		2		3		3		3
Odonata	Coenagrionidae								1		1		3
	S.O. Anisoptera					2							2
	Aeshnidae												
	Gomphidae								1				
	Libellulidae						1		1				11
Trichoptera	Ecnomidae		1			1			1				
	Hydroptilidae												
	Leptoceridae				4		2		1			2	
Abundance	25	80	66	59	49	112	41	64	101	81	148	169	189
Taxonomic Richness	6	20	7	16	12	22	7	18	8	19	10	20	18
PET Richness	0	3	0	2	3	3	0	4	1	2	2	2	2
Signal2	3.27	3.40	2.53	3.33	3.57	3.28	2.93	3.30	3.58	3.26	3.50	3.16	3.06

Site Habitat	LAQ9 Bed	LAQ9 Edge	LAQ11 Bed	LAQ11 Edge	LAQ10 Bed	LAQ10 Edge	TAQ5 Composite	TAQ1 Bed	TAQ1 Edge	TAQ2 Bed	TAQ2 Edge	TAQ3 Bed	TAQ3 Edge
Microcrustacea													
Cladocera			41	10	50	110	22	1	5	17	21		11
Copepoda	22	4	100	6	50	105	10	25	28	95	39	5	34
Ostracoda			2		1	5	3		1		7		1
Turbellaria							1						
Ternnocephalidae										2		16	
Nematoda			1	1		1	2		2	1			
Gastropoda				1							1		1
Lymnaeidae				2					1				
Physidae											3		
Planorbidae											1		
Oligochaeta			3	4			6		1				
Araneae													
Araneae													
Acar	2	6	68	86		1	16	14	18	5	91	2	16
Decapoda													
Atyidae													
Palaemonidae		5	2	1	7	6		2	1	2		3	
Parastacidae									1			1	
Coleoptera	2	11	74	95	7	8	25	16	24	10	96	22	17
Carabidae							1						
Curculionidae													
Dytiscidae		12	15	8			13	1	5	10	9	10	11
Gyrinidae													1
Halplidae							1						
Hydraenidae	2	1		5		1	6		3	2	7		7
Hydrochidae		2		1		1	3		2		3		2
Hydrophilidae			1	1			10		3		2		2
Noteridae									2				
Scirtidae												1	
Spercheidae												1	
Diptera	3	1	5	15	1		7	4	2	2	5		1
Ceratopogonidae								2	1	6			
Chaoboridae													
s-f Chironominae	8	2	11	15	3	12	15	1	16	10	16	2	5
s-f Orthocladinae		1	2	1					2	1	1		
s-f Tanyptodinae	2		30	9	1		17	6	8	1	5	2	2
Culicidae		11		14			1		1		1	1	3
Tabanidae							4			1	2		
Ephemeroptera		4	11	14			5	6	2	2	11		6
Baetidae			6	4			12	3	6	3	3	23	9
Caenidae													
Hemiptera							2						
Belostomatidae													
Gerridae		5		2		5	1		7	1	6		1
Hydrometridae		1		4		1			1		2		
Mesoveliidae				8		1	2						
Micronectidae	9	1	5	1	1	7	3	1	1	1	3	5	9
Nepidae				1		1			1		2	1	2
Notonectidae	1								1		1		2
Ochteridae											1		
Pleidae				17		1	10						
Veliidae		7		13		9			1	2	17		10
Odonata			1	17			1		3		6		2
Coenagrionidae													
S.O. Anisoptera			1										
Aeshnidae				6									
Gomphidae		1					1						
Libellulidae							1	1	4				
Trichoptera													2
Ecnomidae													
Hydroptilidae			1										
Leptoceridae			3	4		1	1		4		3	2	7
Abundance	29	71	240	350	20	68	164	53	122	62	300	93	115
Taxonomic Richness	8	16	18	28	6	18	26	12	28	18	28	15	20
PET Richness	0	1	4	3	0	2	3	2	2	2	3	3	3
Signal2	3.08	3.16	3.67	3.23	2.82	2.92	3.24	3.82	3.36	3.29	3.42	3.47	3.47

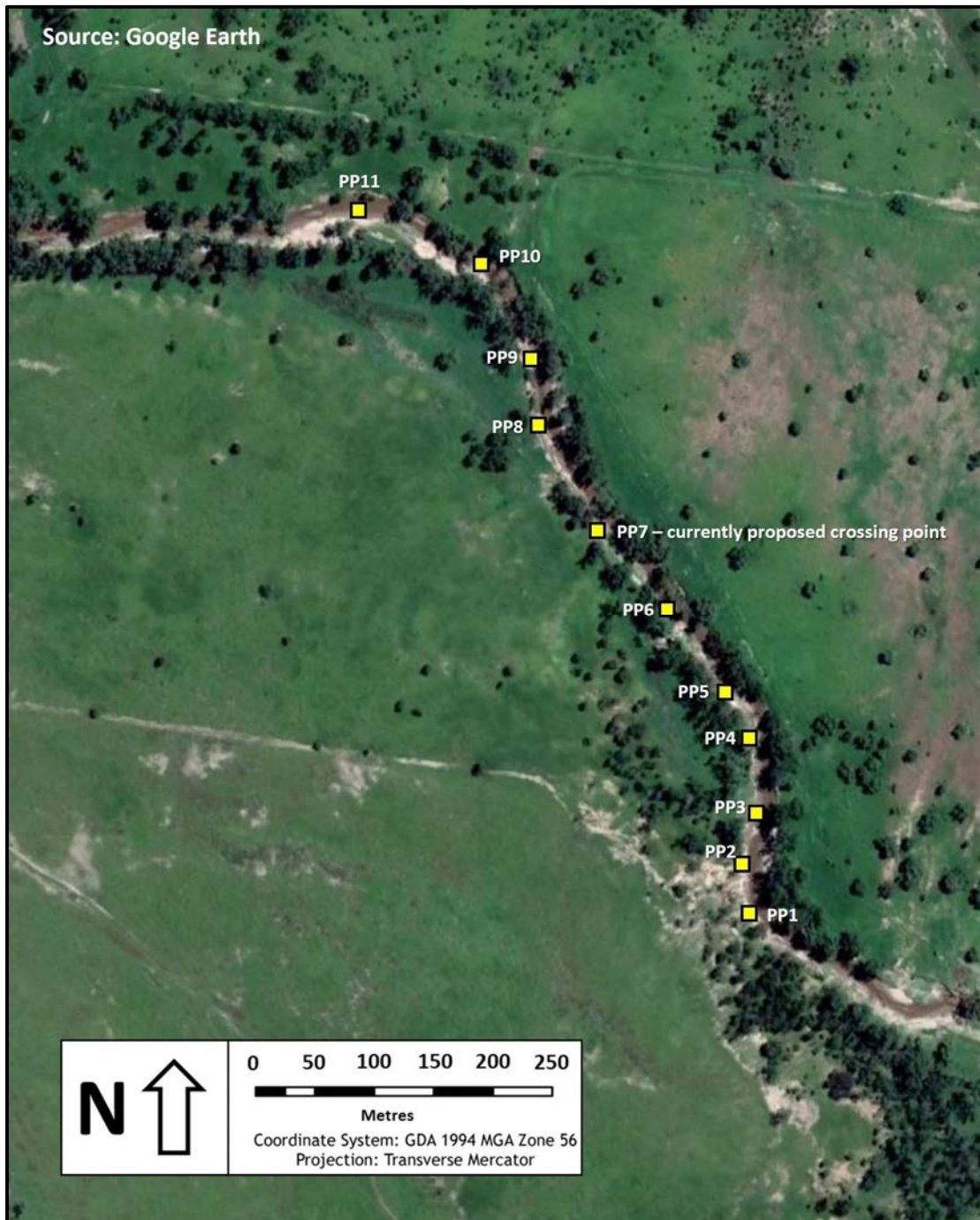
Appendix C – Fish and turtle sampling effort


Site number	Method	Conductivity (µS/cm)	Time start	Time end	Effort time (minutes)	Electrofishing on-time (seconds)	Volts	% duty cycle	Frequency (Hz)
LAQ2	BPE	331	1250	1310	20	558	250	20	100
LAQ7	BPE	1,970	1610	1615	5	60	100	20	100
LAQ10	BPE	768	1145	1215	30	614	150	20	100
	FN / CT		1300	1030	1170				
LAQ8	VO	1,510	1202	1215					
LAQ6	BPE	198	1600	1610	10	423	300	20	100
LAQ5	BPE	241	810	900	50	1168	300	20	100
	FN / CT		1430	740	850				
LAQ11	BPE	288	1255	1305	10	408	250	20	100
TAQ4	BPE	1,171	815	845	30	628	150	20	100
	FN / CT		1630	800	930				
TAQ5	BPE	214	1150	1220	30	684	350	20	100
TAQ1	BPE	284	1430	1525	55	1198	300	20	100
TAQ2	BPE	243	815	905	50	1241	300	20	100
	FN		1630	830	960				
LH9	BPE	231	1020	1050	30	721	300	20	100
TAQ3	BPE	249	1120	1215	55	1247	300	20	100
	FN		1600	730	930				
LAQ9	BPE	639	1030	1050	20	660	200	20	100
	FN / CT		1600	945	1065				













BPE – backpack electrofisher, FN – fyke net, VO – visual observations, CT – cathedral traps

Appendix D – Woleebee Creek Crossing

A site inspection was undertaken at eleven sites at the proposed pipeline crossing point over Woleebee Creek as well as upstream and downstream (figure below) to provide any recommendations to inform the location least likely to impact on aquatic ecosystems. At each site photographs were taken, and notes taken on the bank forma and stability, existing root protection provided within the riparian zone and channel width (table below). It is our contention that the existing proposed site (PP7) would likely impact on bank stability the least (thus impacts to aquatic ecosystems) of the eleven sites inspected. Senex have subsequently committed to utilise horizontal directional drilling to cross the Creek in this area so that impacts are avoided.



Upstream	Downstream	Notes
<p>PP1</p> 	<p>Co-ordinates (UTM 55J) E 782967 S 7096740</p> 	<p>Bend, likely unstable. Some existing bank erosion.</p>
<p>PP2</p> 	<p>Co-ordinates (UTM 55J) E 782962 S 7096776</p> 	<p>Bend, likely unstable. Some existing bank erosion.</p>
<p>PP3</p> 	<p>Co-ordinates (UTM 55J) E 782970 S 7096810</p> 	<p>Straight, better channel gradient, adjacent floodplain. Some existing bank erosion.</p>
<p>PP4</p> 	<p>Co-ordinates (UTM 55J) E 782972 S 7096859</p> 	<p>Bend, likely unstable. Some existing bank erosion.</p>
<p>PP5</p> 	<p>Co-ordinates (UTM 55J) E 782954 S 7096892</p> 	<p>Bend, likely unstable. Some existing bank erosion.</p>

Upstream	Downstream	Notes
<p>PP6</p> 	<p>Co-ordinates (UTM 55J) E 782915 S 7096960</p> 	<p>Straight, good root protection in many areas of the banks.</p>
<p>PP7</p> 	<p>Co-ordinates (UTM 55J) E 782862 S 7097020</p> 	<p>Straight, good tree root protection in many areas of banks, thinner floodplain, approximately 20 m gap between existing large trees.</p>
<p>PP8</p> 	<p>Co-ordinates (UTM 55J) E 782822 S 7097095</p> 	<p>Bend, likely unstable. Some existing bank erosion.</p>
<p>PP9</p> 	<p>Co-ordinates (UTM 55J) E 782815 S 7097144</p> 	<p>Bend, likely unstable. Some existing bank erosion.</p>
<p>PP10</p> 	<p>Co-ordinates (UTM 55J) E 782778 S 7097216</p> 	<p>Bend, likely unstable. Some existing bank erosion.</p>
<p>PP11</p> 	<p>Co-ordinates (UTM 55J) E 782696 S 7097255</p> 	<p>Bend, likely unstable. Some existing bank erosion.</p>

Appendix E – EPBC Protected Matters Report



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 15-Aug-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	31
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	12
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

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

Ramsar Site Name	Proximity
Banrock station wetland complex	1200 - 1300km upstream from Ramsar site
Narran lake nature reserve	400 - 500km upstream from Ramsar site
Riverland	1100 - 1200km upstream from Ramsar site
The coorong, and lakes alexandrina and albert wetland	1400 - 1500km upstream from Ramsar site

Listed Threatened Ecological Communities [\[Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species [\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
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Scientific Name	Threatened Category	Presence Text
BIRD		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
MAMMAL		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area
PLANT		
Acacia curranii Curly-bark Wattle [3908]	Vulnerable	Species or species habitat known to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat known to occur within area
Calytrix gurlmundensis [24241]	Vulnerable	Species or species habitat known to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Homopholis belsonii Belson's Panic [2406]	Vulnerable	Species or species habitat may occur within area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
-----------------	---------------------	---------------

[Vincetoxicum forsteri listed as Tylophora linearis](#)

[92384]	Endangered	Species or species habitat may occur within area
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[Xerothamnella herbacea](#)

[4146]	Endangered	Species or species habitat may occur within area
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REPTILE

[Delma torquata](#)

Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
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[Egernia rugosa](#)

Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
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[Elseya albagula](#)

Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat may occur within area
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[Furina dunmali](#)

Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
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[Rheodytes leukops](#)

Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat likely to occur within area
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SNAIL

[Adclarkia cameroni](#)

Brigalow Woodland Snail [83886]	Endangered	Species or species habitat likely to occur within area
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[Adclarkia dulacca](#)

Dulacca Woodland Snail [83885]	Endangered	Species or species habitat known to occur within area
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Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text
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Migratory Marine Birds

[Apus pacificus](#)

Fork-tailed Swift [678]		Species or species habitat likely to occur within area
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Migratory Terrestrial Species

Scientific Name	Threatened Category	Presence Text
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Stones Country	Resources Reserve	QLD

EPBC Act Referrals [[Resource Information](#)]

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Construct and operate 447km high pressure gas transmission pipeline	2009/4976	Controlled Action	Post-Approval
Development of Existing Coal Seam Gas Fields	2008/4398	Controlled Action	Post-Approval
Expansion of Coal Seam Gas Fields	2009/4974	Controlled Action	Post-Approval
Queensland Curtis LNG Project - Pipeline Network	2008/4399	Controlled Action	Post-Approval
Reedy Creek to Glebe Weir Pipeline Project	2011/6181	Controlled Action	Post-Approval
Santos GLNG Gas Field Development Project, QLD	2012/6615	Controlled Action	Post-Approval
Wandoan Coal Mine and Infrastructure Project	2008/4284	Controlled Action	Post-Approval
Wandoan Coal Project - Coal Seam Methane Water Supply South	2008/4287	Controlled Action	Post-Approval

Not controlled action			
High Voltage Transmission line Development	2007/3230	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Project Atlas CSG Project, between Wollumbilla and Wandoan, Qld	2018/8329	Not Controlled Action	Completed

Referral decision			
Development of an underground longwall coal mine	2011/6129	Referral Decision	Completed

Bioregional Assessments

SubRegion	BioRegion	Website
Maranoa-Balonne-Condamine	Northern Inland Catchments	BA website

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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Appendix F – Wildnet search



Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point

Species: All

Type: All

Queensland status: All

Records: All

Date: All

Latitude: -26.2765

Longitude: 149.8568

Distance: 20

Email: tim@freshwaterecology.com.au

Date submitted: Monday 15 Aug 2022 15:46:40

Date extracted: Monday 15 Aug 2022 15:50:01

The number of records retrieved = 844

Disclaimer

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

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Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.

The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (<https://www.qld.gov.au/environment/plants-animals/species-information/wildnet>) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufo	<i>Rhinella marina</i>	cane toad	Y			20
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		8
animals	amphibians	Hylidae	<i>Cyclorana brevipes</i>	superb collared frog		C		3
animals	amphibians	Hylidae	<i>Cyclorana novaehollandiae</i>	eastern snapping frog		C		4
animals	amphibians	Hylidae	<i>Cyclorana sp.</i>			C		1
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		22
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		2
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		11
animals	amphibians	Hylidae	<i>Litoria peronii</i>	emerald spotted treefrog		C		9
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		5
animals	amphibians	Limnodynastidae	<i>Limnodynastes fletcheri</i>	barking frog		C		2
animals	amphibians	Limnodynastidae	<i>Limnodynastes salmini</i>	salmon striped frog		C		9
animals	amphibians	Limnodynastidae	<i>Limnodynastes sp.</i>			C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		21
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		4
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		14
animals	amphibians	Myobatrachidae	<i>Uperoleia rugosa</i>	chubby gungan		C		4
animals	birds	Acanthizidae	<i>Acanthiza apicalis</i>	inland thornbill		C		10
animals	birds	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill		C		8
animals	birds	Acanthizidae	<i>Acanthiza lineata</i>	striated thornbill		C		2
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		12
animals	birds	Acanthizidae	<i>Acanthiza pusilla</i>	brown thornbill		C		3
animals	birds	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill		C		7
animals	birds	Acanthizidae	<i>Acanthiza uropygialis</i>	chestnut-rumped thornbill		C		2
animals	birds	Acanthizidae	<i>Gerygone fusca</i>	western gerygone		C		3
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		20
animals	birds	Acanthizidae	<i>Pyrrholaemus sagittatus</i>	speckled warbler		C		3
animals	birds	Acanthizidae	<i>Sericornis frontalis</i>	white-browed scrubwren		C		1
animals	birds	Acanthizidae	<i>Smicronis brevirostris</i>	weebill		C		49
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		1
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		19
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		1
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		1/1
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		2
animals	birds	Accipitridae	<i>Hieraaetus morphnoides</i>	little eagle		C		2
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		1
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		4
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owlet-nightjar		C		14
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		8
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		11
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		5
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		6
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		2
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		1
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		2
animals	birds	Anatidae	<i>Malacorhynchus membranaceus</i>	pink-eared duck		C		1

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animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		9
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		4
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	2
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		4
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		2
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		5
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		4
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		2
animals	birds	Artamidae	<i>Artamus cyanopterus</i>	dusky woodswallow		C		2
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		11
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		3
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		3
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		40
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		65
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		46
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		40
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		47/1
animals	birds	Cacatuidae	<i>Calyptorhynchus funereus</i>	yellow-tailed black-cockatoo		C		1
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)		V	V	3
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		52
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		21
animals	birds	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike		C		3
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		23
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		2
animals	birds	Campephagidae	<i>Edolisoma tenuirostre</i>	common cicadabird		C		2
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		1
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		1
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		4
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel		C		4
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		3
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		C		4
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		5
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			1
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		16
animals	birds	Columbidae	<i>Geopelia placida</i>	peaceful dove		C		8
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	1
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		23
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		7
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		6
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		6
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		33
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		23
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		64
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		8
animals	birds	Cuculidae	<i>Chalcites basalus</i>	Horsfield's bronze-cuckoo		C		1

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animals	birds	Cuculidae	<i>Chalcites osculans</i>	black-eared cuckoo		C		1
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		2
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		1
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		5
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		16
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		5
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		6
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		11
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		1
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		36
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		1
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		2
animals	birds	Hirundinidae	<i>Cheramoeca leucosterna</i>	white-backed swallow		C		1
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		4
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		5
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		1
animals	birds	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren		C		13
animals	birds	Maluridae	<i>Malurus lamberti sensu lato</i>	variegated fairy-wren		C		3
animals	birds	Maluridae	<i>Malurus leucopterus</i>	white-winged fairy-wren		C		1
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		11
animals	birds	Megaluridae	<i>Cincloramphus timoriensis</i>	tawny grassbird		C		1
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey		C		7
animals	birds	Meliphagidae	<i>Acanthagenys rufogularis</i>	spiny-cheeked honeyeater		C		9
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		12
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		14
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		11
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		7
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		90
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		8
animals	birds	Meliphagidae	<i>Melithreptus brevirostris</i>	brown-headed honeyeater		C		4
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		1
animals	birds	Meliphagidae	<i>Nesoptilotis leucotis</i>	white-eared honeyeater		C		18
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		18
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		27
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		36
animals	birds	Meliphagidae	<i>Ptilotula penicillata</i>	white-plumed honeyeater		C		1
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		10
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		36
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		5
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		8
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		2
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		28
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		2
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		11
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		2
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		6

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animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		14
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		2
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		26
animals	birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote		C		9
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		56
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			3
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		10
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		5
animals	birds	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin		C		1
animals	birds	Petroicidae	<i>Petroica rosea</i>	rose robin		C		1
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		3
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		1
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		4
animals	birds	Phasianidae	<i>Synoicus ypsilophorus</i>	brown quail		C		1
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		5
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		6
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		21
animals	birds	Psittacidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		12
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		16
animals	birds	Psittacidae	<i>Melopsittacus undulatus</i>	budgerigar		C		3
animals	birds	Psittacidae	<i>Northiella haematogaster</i>	blue bonnet		C		2
animals	birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		1
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		42
animals	birds	Psittacidae	<i>Psephotus haematonotus</i>	red-rumped parrot		C		10
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		22
animals	birds	Psittacidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		22
animals	birds	Psophodidae	<i>Psophodes olivaceus</i>	eastern whipbird		C		1
animals	birds	Ptilonorhynchidae	<i>Chlamydera maculata</i>	spotted bowerbird		C		8
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		3
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		5
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		26
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		29
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		4
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		1
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		3
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		1
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		5
animals	birds	Turnicidae	<i>Turnix pyrrhothorax</i>	red-chested button-quail		C		1
animals	birds	Turnicidae	<i>Turnix sp.</i>			C		2
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		2
animals	birds	Tytonidae	<i>Tyto javanica</i>	eastern barn owl		C		5
animals	insects	Aeshnidae	<i>Anax papuensis</i>	Australian Emperor				4
animals	insects	Coenagrionidae	<i>Ischnura aurora</i>	aurora bluetail				1
animals	insects	Corduliidae	<i>Hemicordulia tau</i>	tau emerald				1
animals	insects	Hesperiidae	<i>Ocybadistes walkeri sothis</i>	green grass-dart				1

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animals	insects	Libellulidae	<i>Crocothemis nigrifrons</i>	black-headed skimmer				1
animals	insects	Libellulidae	<i>Diplacodes bipunctata</i>	wandering percher				3
animals	insects	Libellulidae	<i>Diplacodes haematodes</i>	scarlet percher				1
animals	insects	Libellulidae	<i>Orthetrum caledonicum</i>	blue skimmer				6
animals	insects	Libellulidae	<i>Pantala flavescens</i>	wandering glider				1
animals	insects	Libellulidae	<i>Rhyothemis graphiptera</i>	graphic flutterer				1
animals	insects	Libellulidae	<i>Tramea loewii</i>	common glider				1
animals	insects	Lindeniiidae	<i>Ictinogomphus australis</i>	Australian tiger				1
animals	insects	Lycaenidae	<i>Nacaduba berenice berenice</i>	large purple line-blue				1
animals	insects	Lycaenidae	<i>Psychonotis caelius taygetus</i>	small green-banded blue				1
animals	insects	Lycaenidae	<i>Zizina otis labradus</i>	common grass-blue (Australian subspecies)				2
animals	insects	Nymphalidae	<i>Acraea andromacha andromacha</i>	glasswing				2
animals	insects	Nymphalidae	<i>Charaxes sempronius sempronius</i>	tailed emperor				2
animals	insects	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer				5
animals	insects	Nymphalidae	<i>Danaus plexippus</i>	monarch	Y			1
animals	insects	Nymphalidae	<i>Euploea corinna</i>	common crow				8
animals	insects	Nymphalidae	<i>Hypocysta pseudirius</i>	grey ringlet				1
animals	insects	Nymphalidae	<i>Hypolimnas bolina nerina</i>	varied eggfly				3
animals	insects	Nymphalidae	<i>Junonia orithya albicincta</i>	blue argus				1
animals	insects	Nymphalidae	<i>Junonia villida villida</i>	meadow argus				5
animals	insects	Nymphalidae	<i>Melanitis leda bankia</i>	evening brown				1
animals	insects	Nymphalidae	<i>Tirumala hamata hamata</i>	blue tiger				4
animals	insects	Papilionidae	<i>Cressida cressida cressida</i>	clearwing swallowtail				1
animals	insects	Papilionidae	<i>Papilio aegaeus</i>					5
animals	insects	Papilionidae	<i>Papilio aegaeus aegaeus</i>	orchard swallowtail (Australian subspecies)				3
animals	insects	Papilionidae	<i>Papilio anactus</i>	dainty swallowtail				2
animals	insects	Papilionidae	<i>Papilio demoleus sthenelus</i>	chequered swallowtail				4
animals	insects	Pieridae	<i>Belenois java teutonia</i>	caper white				5
animals	insects	Pieridae	<i>Catopsilia gorgophone gorgophone</i>	yellow migrant				1
animals	insects	Pieridae	<i>Catopsilia pomona</i>	lemon migrant				2
animals	insects	Pieridae	<i>Catopsilia pyranthe crokera</i>	white migrant				2
animals	insects	Pieridae	<i>Cepora perimale</i>					1
animals	insects	Pieridae	<i>Delias argenthona argenthona</i>	scarlet jezebel				1
animals	insects	Pieridae	<i>Delias nysa nysa</i>	yellow-spotted jezebel (Australian subspecies)				1
animals	insects	Pieridae	<i>Elodina parthia</i>	striated pearl-white				1
animals	insects	Pieridae	<i>Eurema hecabe</i>	large grass-yellow				2
animals	insects	Pieridae	<i>Eurema smilax</i>	small grass-yellow				3
animals	malacostracans	Parastacidae	<i>Cherax destructor</i>	common yabbie				1
animals	mammals	Acrobatidae	<i>Acrobates pygmaeus</i>	feathertail glider			C	1
animals	mammals	Bovidae	<i>Bos taurus</i>	European cattle	Y			1
animals	mammals	Bovidae	<i>Capra hircus</i>	goat	Y			1
animals	mammals	Canidae	<i>Canis familiaris</i>	dog	Y			2
animals	mammals	Canidae	<i>Canis familiaris (dingo)</i>	dingo				1

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animals	mammals	Canidae	<i>Canis sp.</i>		Y			2
animals	mammals	Canidae	<i>Vulpes vulpes</i>	red fox	Y			1
animals	mammals	Dasyuridae	<i>Sminthopsis murina</i>	common dunnart			C	1
animals	mammals	Emballonuridae	<i>Saccolaimus flaviventris</i>	yellow-bellied sheath-tail bat			C	9
animals	mammals	Equidae	<i>Equus caballus</i>	horse	Y			1
animals	mammals	Felidae	<i>Felis catus</i>	cat	Y			4
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			4
animals	mammals	Leporidae	<i>Oryctolagus cuniculus</i>	rabbit	Y			6
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo			C	30
animals	mammals	Macropodidae	<i>Notamacropus dorsalis</i>	black-striped wallaby			C	3
animals	mammals	Macropodidae	<i>Notamacropus parryi</i>	whiptail wallaby			C	2
animals	mammals	Macropodidae	<i>Notamacropus rufogriseus</i>	red-necked wallaby			C	16
animals	mammals	Macropodidae	<i>Osphranter robustus</i>	common wallaroo			C	7
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby			C	9
animals	mammals	Molossidae	<i>Austronomus australis</i>	white-striped freetail bat			C	4
animals	mammals	Molossidae	<i>Mormopterus lumsdenae</i>	northern free-tailed bat			C	2
animals	mammals	Molossidae	<i>Mormopterus petersi</i>	inland free-tailed bat			C	8
animals	mammals	Molossidae	<i>Mormopterus ridei</i>	eastern free-tailed bat			C	1
animals	mammals	Molossidae	<i>Mormopterus sp.</i>				C	3
animals	mammals	Muridae	<i>Mus musculus</i>	house mouse	Y			13
animals	mammals	Muridae	<i>Pseudomys patrius</i>	eastern pebble-mound mouse			C	1
animals	mammals	Petauridae	<i>Petaurus australis australis</i>	yellow-bellied glider (southern subspecies)			V V	12
animals	mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider			C	3
animals	mammals	Petauridae	<i>Petaurus notatus</i>	Kreff's glider			C	3
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum			C	32
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala			E E	3
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong			C	7
animals	mammals	Pseudocheiridae	<i>Petauroides armillatus</i>	central greater glider			E E	2
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox			C	1
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			8
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna			SL	7
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat			C	10
animals	mammals	Vespertilionidae	<i>Chalinolobus picatus</i>	little pied bat			C	3
animals	mammals	Vespertilionidae	<i>Nyctophilus geoffroyi</i>	lesser long-eared bat			C	1
animals	mammals	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat			C	6
animals	mammals	Vespertilionidae	<i>Nyctophilus sp.</i>				C	2
animals	mammals	Vespertilionidae	<i>Scotorepens greyii</i>	little broad-nosed bat			C	12
animals	mammals	Vespertilionidae	<i>Scotorepens sp.</i>				C	1
animals	mammals	Vespertilionidae	<i>Scotorepens sp. (Parnaby)</i>	central-eastern broad-nosed bat			C	1
animals	mammals	Vespertilionidae	<i>Vespadelus baverstocki</i>	inland forest bat			C	1
animals	mammals	Vespertilionidae	<i>Vespadelus troughtoni</i>	eastern cave bat			C	8
animals	mammals	Vespertilionidae	<i>Vespadelus vulturnus</i>	little forest bat			C	5
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris species 1</i>	Midgley's carp gudgeon				1
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				1

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animals	ray-finned fishes	Plotosidae	<i>Tandanus tandanus</i>	freshwater catfish				1
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				1
animals	reptiles	Agamidae	<i>Amphibolurus muricatus</i>	jacky lizard		C		2
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		1
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		6
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python		C		3
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python		C		3
animals	reptiles	Carphodactylidae	<i>Underwoodisaurus milii</i>	thick-tailed gecko		C		3
animals	reptiles	Chelidae	<i>Chelodina longicollis</i>	eastern snake-necked turtle		C		2
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake		C		3
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		2/1
animals	reptiles	Diplodactylidae	<i>Diplodactylus vittatus</i>	wood gecko		C		1
animals	reptiles	Diplodactylidae	<i>Lucasium steindachneri</i>	Steindachner's gecko		C		4
animals	reptiles	Diplodactylidae	<i>Nebulifera robusta</i>	robust velvet gecko		C		4
animals	reptiles	Diplodactylidae	<i>Strophurus taenicauda</i>	golden-tailed gecko			NT	13
animals	reptiles	Elapidae	<i>Brachyurophis australis</i>	coral snake		C		2/1
animals	reptiles	Elapidae	<i>Cryptophis boschmai</i>	Carpentaria whip snake		C		4
animals	reptiles	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake		C		4
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake		C		5
animals	reptiles	Elapidae	<i>Furina diadema</i>	red-naped snake		C		1/1
animals	reptiles	Elapidae	<i>Hoplocephalus bitorquatus</i>	pale-headed snake		C		2/2
animals	reptiles	Elapidae	<i>Pseudechis australis</i>	king brown snake		C		1
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		3
animals	reptiles	Elapidae	<i>Suta suta</i>	myall snake		C		1
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		95/1
animals	reptiles	Gekkonidae	<i>Gehyra sp.</i>			C		1
animals	reptiles	Gekkonidae	<i>Gehyra versicolor</i>			C		9
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		47/2
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		1
animals	reptiles	Pygopodidae	<i>Paradelma orientalis</i>	brigalow scaly-foot		C		9
animals	reptiles	Scincidae	<i>Anomalopus leuckartii</i>	two-clawed worm-skink		C		1/1
animals	reptiles	Scincidae	<i>Carlia munda</i>	shaded-litter rainbow-skink		C		3
animals	reptiles	Scincidae	<i>Carlia pectoralis</i>	open-litter rainbow skink		C		6/1
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		17
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		2
animals	reptiles	Scincidae	<i>Carlia sp.</i>			C		3
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		4
animals	reptiles	Scincidae	<i>Cryptoblepharus australis</i>	inland snake-eyed skink		C		2
animals	reptiles	Scincidae	<i>Cryptoblepharus metallicus</i>	metallic snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus plagiocephalus sensu lato</i>			C		4
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		41
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		6
animals	reptiles	Scincidae	<i>Eremiascincus fasciolatus</i>	narrow-banded sand swimmer		C		1
animals	reptiles	Scincidae	<i>Lerista fragilis</i>	eastern mulch slider		C		27/1
animals	reptiles	Scincidae	<i>Lerista punctatovittata</i>	eastern robust slider		C		6

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animals	reptiles	Scincidae	<i>Lerista sp.</i>			C		2
animals	reptiles	Scincidae	<i>Lerista timida</i>	timid slider		C		3
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		23/2
animals	reptiles	Scincidae	<i>Menetia greyii</i>	common dwarf skink		C		3
animals	reptiles	Scincidae	<i>Morethia boulengeri</i>	south-eastern morethia skink		C		2
animals	reptiles	Scincidae	<i>Pygmaeascincus timlowi</i>	dwarf litter-skink		C		3
animals	reptiles	Scincidae	<i>Tiliqua scincoides</i>	eastern blue-tongued lizard		C		1
animals	reptiles	Typhlopidae	<i>Anilius proximus</i>	proximus blind snake		C		2/2
animals	reptiles	Varanidae	<i>Varanus gouldii</i>	sand monitor		C		6
animals	reptiles	Varanidae	<i>Varanus panoptes</i>	yellow-spotted monitor		C		2
animals	reptiles	Varanidae	<i>Varanus tristis</i>	black-tailed monitor		C		7
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		9
animals	snails	Camaenidae	<i>Adclarkia cameroni</i>			V	E	1
animals	snails	Camaenidae	<i>Lynfergusonia mundubbera</i>					1
animals	uncertain	Indeterminate	<i>Indeterminate</i>	Unknown or Code Pending				50
fungi	lecanoromycetes	Caliciaceae	<i>Dirinaria batavica</i>			C		1/1
fungi	lecanoromycetes	Caliciaceae	<i>Pyxine berteriana</i>			C		2/2
fungi	lecanoromycetes	Caliciaceae	<i>Pyxine petricola</i>			C		1/1
fungi	lecanoromycetes	Caliciaceae	<i>Pyxine rugulosa</i>			C		1/1
fungi	lecanoromycetes	Caliciaceae	<i>Pyxine subcinerea</i>			C		2/2
fungi	lecanoromycetes	Collemataceae	<i>Collema rugosum</i>			C		1/1
fungi	lecanoromycetes	Lecanoraceae	<i>Lecanora helva</i>			C		2/2
fungi	lecanoromycetes	Lecanoraceae	<i>Lecanora novaehollandiae</i>			C		2/2
fungi	lecanoromycetes	Ochrolechiaceae	<i>Ochrolechia africana</i>			C		1/1
fungi	lecanoromycetes	Ochrolechiaceae	<i>Ochrolechia hawaiiensis</i>			C		1/1
fungi	lecanoromycetes	Parmeliaceae	<i>Parmotrema subsumptum</i>			C		2/2
fungi	lecanoromycetes	Parmeliaceae	<i>Punctelia subflava</i>			C		1/1
fungi	lecanoromycetes	Pertusariaceae	<i>Pertusaria pertusella</i>			C		1/1
fungi	lecanoromycetes	Pertusariaceae	<i>Pertusaria planaica</i>			C		1/1
fungi	lecanoromycetes	Pertusariaceae	<i>Pertusaria ternata</i>			C		1/1
fungi	lecanoromycetes	Physciaceae	<i>Physcia nubila</i>			C		2/2
fungi	lecanoromycetes	Physciaceae	<i>Physcia undulata</i>			C		1/1
fungi	lecanoromycetes	Stereocaulaceae	<i>Lepraria</i>					1/1
fungi	lecanoromycetes	Teloschistaceae	<i>Caloplaca flavorubescens</i>			C		2/2
fungi	lecanoromycetes	Teloschistaceae	<i>Caloplaca fraserensis</i>			C		1/1
plants	land plants	Acanthaceae	<i>Brunoniella australis</i>	blue trumpet		C		2
plants	land plants	Acanthaceae	<i>Dipteracanthus australasicus subsp. corynothecus</i>			C		1/1
plants	land plants	Acanthaceae	<i>Hypoestes floribunda var. floribunda</i>			C		1/1
plants	land plants	Acanthaceae	<i>Pseuderanthemum variabile</i>	pastel flower		C		1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens</i>			C		1/1
plants	land plants	Alismataceae	<i>Echinodorus cordifolius</i>		Y			1/1
plants	land plants	Amaranthaceae	<i>Achyranthes aspera</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera denticulata var. denticulata</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		2
plants	land plants	Amaranthaceae	<i>Alternanthera pungens</i>	khaki weed	Y			2/1
plants	land plants	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry		C		1

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plants	land plants	Amaranthaceae	<i>Gomphrena celosioides</i>	gomphrena weed	Y			1
plants	land plants	Amaranthaceae	<i>Nyssanthes erecta</i>			C		3/2
plants	land plants	Amaranthaceae	<i>Ptilotus semilanatus</i>			C		2/1
plants	land plants	Anacardiaceae	<i>Schinus terebinthifolius</i>		Y			1/1
plants	land plants	Apocynaceae	<i>Alstonia constricta</i>	bitterbark		C		8
plants	land plants	Apocynaceae	<i>Carissa ovata</i>	currantbush		C		6
plants	land plants	Apocynaceae	<i>Gomphocarpus</i>			C		1
plants	land plants	Apocynaceae	<i>Gomphocarpus physocarpus</i>	balloon cottonbush	Y			1
plants	land plants	Apocynaceae	<i>Leichhardtia micradenia</i>			C		3
plants	land plants	Apocynaceae	<i>Leichhardtia viridiflora subsp. viridiflora</i>			C		1
plants	land plants	Apocynaceae	<i>Parsonsia eucalyptophylla</i>	gargaloo		C		3/1
plants	land plants	Apocynaceae	<i>Parsonsia rotata</i>	veinless silkpod		C		4/2
plants	land plants	Araliaceae	<i>Astrotricha longifolia</i>	star hair bush		C		1
plants	land plants	Araliaceae	<i>Hydrocotyle acutiloba</i>			C		3/3
plants	land plants	Asteraceae	<i>Apowollastonia spilanthisoides</i>			C		1/1
plants	land plants	Asteraceae	<i>Bidens biternata</i>		Y			1/1
plants	land plants	Asteraceae	<i>Brachyscome dalbyensis</i>			C		1/1
plants	land plants	Asteraceae	<i>Brachyscome microcarpa subsp. darlingensis</i>			C		2/2
plants	land plants	Asteraceae	<i>Brachyscome multifida</i>			C		1/1
plants	land plants	Asteraceae	<i>Calyptocarpus vialis</i>	creeping cinderella weed	Y			1
plants	land plants	Asteraceae	<i>Camptacra barbata</i>			C		1/1
plants	land plants	Asteraceae	<i>Cassinia laevis</i>			C		1
plants	land plants	Asteraceae	<i>Centaurea solstitialis</i>	St. Barnaby's thistle	Y			1/1
plants	land plants	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons		C		2
plants	land plants	Asteraceae	<i>Cirsium vulgare</i>	spear thistle	Y			2
plants	land plants	Asteraceae	<i>Cyanthillium cinereum</i>			C		1
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			1/1
plants	land plants	Asteraceae	<i>Flaveria trinervia</i>		Y			1/1
plants	land plants	Asteraceae	<i>Olearia</i>					1
plants	land plants	Asteraceae	<i>Olearia canescens</i>			C		1
plants	land plants	Asteraceae	<i>Olearia canescens subsp. discolor</i>			C		1/1
plants	land plants	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			1/1
plants	land plants	Asteraceae	<i>Pluchea dentex</i>	bowl daisy		C		1/1
plants	land plants	Asteraceae	<i>Podolepis longipedata</i>	tall copper-wire daisy		C		1/1
plants	land plants	Asteraceae	<i>Pterocaulon sphacelatum</i>	applebush		C		1
plants	land plants	Asteraceae	<i>Pycnosorus globosus</i>			C		1
plants	land plants	Asteraceae	<i>Rutidosia murchisonii</i>			C		3/3
plants	land plants	Asteraceae	<i>Senecio brigalowensis</i>			C		1/1
plants	land plants	Asteraceae	<i>Senecio madagascariensis</i>	fireweed	Y			1
plants	land plants	Asteraceae	<i>Sigesbeckia orientalis</i>	Indian weed		C		1
plants	land plants	Asteraceae	<i>Sonchus oleraceus</i>	common sowthistle	Y			1
plants	land plants	Asteraceae	<i>Vittadinia sulcata</i>	native daisy		C		3/1
plants	land plants	Asteraceae	<i>Xanthium occidentale</i>		Y			1
plants	land plants	Asteraceae	<i>Xanthium spinosum</i>	Bathurst burr	Y			1
plants	land plants	Asteraceae	<i>Zinnia peruviana</i>	wild zinnia	Y			1/1
plants	land plants	Basellaceae	<i>Anredera cordifolia</i>	Madeira vine	Y			1

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plants	land plants	Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine		C		5
plants	land plants	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		1
plants	land plants	Brassicaceae	<i>Lepidium bonariense</i>	Argentine peppergrass	Y			1
plants	land plants	Brassicaceae	<i>Rorippa laciniata</i>			C		1/1
plants	land plants	Brassicaceae	<i>Sisymbrium</i>					1
plants	land plants	Brassicaceae	<i>Sisymbrium thellungii</i>	African turnip-weed	Y			1/1
plants	land plants	Byttneriaceae	<i>Commersonia pedleyi</i>			C		7/7
plants	land plants	Cactaceae	<i>Opuntia tomentosa</i>	velvety tree pear	Y			19
plants	land plants	Campanulaceae	<i>Wahlenbergia capillaris</i>			SL		1
plants	land plants	Campanulaceae	<i>Wahlenbergia gracilis</i>	sprawling bluebell		SL		1
plants	land plants	Campanulaceae	<i>Wahlenbergia graniticola</i>	granite bluebell		SL		1/1
plants	land plants	Capparaceae	<i>Capparis anomala</i>			C		6
plants	land plants	Capparaceae	<i>Capparis arborea</i>	brush caper berry		C		6
plants	land plants	Capparaceae	<i>Capparis canescens</i>			C		4
plants	land plants	Capparaceae	<i>Capparis lasiantha</i>	nipan		C		8
plants	land plants	Capparaceae	<i>Capparis loranthifolia</i> var. <i>loranthifolia</i>			C		1
plants	land plants	Capparaceae	<i>Capparis mitchellii</i>			C		1/1
plants	land plants	Casuarinaceae	<i>Allocasuarina inophloia</i>			C		25/1
plants	land plants	Casuarinaceae	<i>Allocasuarina luehmannii</i>	bull oak		C		6
plants	land plants	Casuarinaceae	<i>Casuarina cristata</i>	belah		C		7
plants	land plants	Casuarinaceae	<i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i>			C		1
plants	land plants	Celastraceae	<i>Denhamia cunninghamii</i>			C		5/1
plants	land plants	Celastraceae	<i>Denhamia disperma</i>			C		2
plants	land plants	Celastraceae	<i>Denhamia silvestris</i>			C		3
plants	land plants	Celastraceae	<i>Elaeodendron australe</i>			C		2
plants	land plants	Celastraceae	<i>Elaeodendron australe</i> var. <i>integrifolium</i>			C		1
plants	land plants	Celastraceae	<i>Siphonodon australis</i>	ivorywood		C		1
plants	land plants	Chenopodiaceae	<i>Atriplex muelleri</i>	lagoon saltbush		C		2/1
plants	land plants	Chenopodiaceae	<i>Atriplex semibaccata</i>	creeping saltbush		C		1/1
plants	land plants	Chenopodiaceae	<i>Chenopodium desertorum</i>			C		1
plants	land plants	Chenopodiaceae	<i>Dysphania carinata</i>			C		1
plants	land plants	Chenopodiaceae	<i>Einadia hastata</i>			C		2
plants	land plants	Chenopodiaceae	<i>Einadia nutans</i> subsp. <i>nutans</i>			C		1
plants	land plants	Chenopodiaceae	<i>Enchylaena tomentosa</i>			C		3
plants	land plants	Chenopodiaceae	<i>Maireana microphylla</i>			C		5
plants	land plants	Chenopodiaceae	<i>Salsola australis</i>			C		2
plants	land plants	Chenopodiaceae	<i>Sclerolaena bicornis</i> var. <i>horrida</i>			C		1
plants	land plants	Chenopodiaceae	<i>Sclerolaena birchii</i>	galvanised burr		C		2
plants	land plants	Chenopodiaceae	<i>Sclerolaena lanicuspis</i>			C		1
plants	land plants	Chenopodiaceae	<i>Sclerolaena muricata</i> var. <i>muricata</i>			C		1/1
plants	land plants	Commelinaceae	<i>Commelina diffusa</i>	wandering jew		C		1
plants	land plants	Commelinaceae	<i>Commelina ensifolia</i>	scurvy grass		C		1
plants	land plants	Convolvulaceae	<i>Convolvulus arvensis</i>		Y			2/1
plants	land plants	Convolvulaceae	<i>Convolvulus graminetinus</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			C		1
plants	land plants	Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			C		1

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plants	land plants	Crassulaceae	<i>Bryophyllum delagoense</i>		Y			6
plants	land plants	Crassulaceae	<i>Bryophyllum x houghtonii</i>		Y			3
plants	land plants	Cucurbitaceae	<i>Citrullus amarus</i>		Y			1/1
plants	land plants	Cupressaceae	<i>Callitris endlicheri</i>	black cypress pine			C	9
plants	land plants	Cupressaceae	<i>Callitris glaucophylla</i>	white cypress pine			C	8
plants	land plants	Cyperaceae	<i>Abildgaardia ovata</i>				C	1/1
plants	land plants	Cyperaceae	<i>Bulbostylis barbata</i>				C	2
plants	land plants	Cyperaceae	<i>Bulbostylis pyriformis</i>				C	1/1
plants	land plants	Cyperaceae	<i>Carex appressa</i>				C	1
plants	land plants	Cyperaceae	<i>Carex inversa</i>	knob sedge			C	1/1
plants	land plants	Cyperaceae	<i>Cyperus</i>					1
plants	land plants	Cyperaceae	<i>Cyperus betchei subsp. betchei</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus bowmanni</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus flaccidus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus fulvus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus gracilis</i>				C	2/1
plants	land plants	Cyperaceae	<i>Cyperus leptocarpus</i>				C	1/1
plants	land plants	Cyperaceae	<i>Cyperus squarrosus</i>	bearded flatsedge			C	1/1
plants	land plants	Cyperaceae	<i>Eleocharis cylindrostachys</i>				C	3/3
plants	land plants	Cyperaceae	<i>Eleocharis pallens</i>	pale spikerush			C	1
plants	land plants	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush			C	1
plants	land plants	Cyperaceae	<i>Gahnia aspera</i>				C	12/1
plants	land plants	Cyperaceae	<i>Schoenus kennyi</i>				C	4
plants	land plants	Cyperaceae	<i>Scleria mackaviensis</i>				C	4/1
plants	land plants	Cyperaceae	<i>Scleria sphacelata</i>				C	6/1
plants	land plants	Dicranaceae	<i>Sclerodontium clavinerve</i>				C	1/1
plants	land plants	Dilleniaceae	<i>Hibbertia cistoidea</i>				C	3/3
plants	land plants	Dilleniaceae	<i>Hibbertia stricta var. stricta</i>				C	1
plants	land plants	Droseraceae	<i>Drosera hookeri</i>				SL	2/2
plants	land plants	Droseraceae	<i>Drosera lunata</i>				SL	1/1
plants	land plants	Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony			C	2
plants	land plants	Elatinaceae	<i>Elatine gratiolooides</i>	waterwort			C	1/1
plants	land plants	Ericaceae	<i>Agortia pleiosperma</i>				C	3/3
plants	land plants	Ericaceae	<i>Lissanthe pluriloculata</i>				C	6/5
plants	land plants	Ericaceae	<i>Melichrus adpressus</i>				C	1/1
plants	land plants	Ericaceae	<i>Melichrus sp. (Isla Gorge P.Sharpe+ 601)</i>				C	4/2
plants	land plants	Ericaceae	<i>Melichrus urceolatus</i>	honey gorse			C	6/4
plants	land plants	Ericaceae	<i>Styphelia blakei</i>				C	2/2
plants	land plants	Ericaceae	<i>Styphelia mitchellii</i>				C	5/3
plants	land plants	Ericaceae	<i>Styphelia mutica</i>				C	1
plants	land plants	Euphorbiaceae	<i>Acalypha capillipes</i>	small-leaved acalypha			C	3
plants	land plants	Euphorbiaceae	<i>Acalypha eremorum</i>	soft acalypha			C	2/1
plants	land plants	Euphorbiaceae	<i>Bertya oleifolia</i>				C	1/1
plants	land plants	Euphorbiaceae	<i>Croton insularis</i>	Queensland cascarilla			C	10
plants	land plants	Euphorbiaceae	<i>Croton phebalioides</i>	narrow-leaved croton			C	2
plants	land plants	Euphorbiaceae	<i>Euphorbia dallachyana</i>				C	1/1

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plants	land plants	Euphorbiaceae	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Brunonia australis</i>	blue pincushion		SL		1/1
plants	land plants	Goodeniaceae	<i>Dampiera adpressa</i>			C		6/4
plants	land plants	Goodeniaceae	<i>Dampiera discolor</i>			C		5/1
plants	land plants	Goodeniaceae	<i>Goodenia bellidifolia</i> subsp. <i>argentea</i>			C		1
plants	land plants	Goodeniaceae	<i>Goodenia caroliniana</i>			C		2/2
plants	land plants	Goodeniaceae	<i>Goodenia glabra</i>			C		3
plants	land plants	Goodeniaceae	<i>Scaevola spinescens</i>	prickly fan flower		C		1/1
plants	land plants	Haloragaceae	<i>Gonocarpus urceolatus</i>			C		2/2
plants	land plants	Haloragaceae	<i>Myriophyllum verrucosum</i>	water milfoil		C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i>			C		2/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i> var. <i>protensa</i>			C		1
plants	land plants	Hemerocallidaceae	<i>Dianella longifolia</i>			C		2
plants	land plants	Hemerocallidaceae	<i>Dianella longifolia</i> var. <i>longifolia</i>			C		2
plants	land plants	Hemerocallidaceae	<i>Dianella rara</i>			C		6/1
plants	land plants	Hemerocallidaceae	<i>Dianella revoluta</i> var. <i>revoluta</i>			C		5
plants	land plants	Hypoxidaceae	<i>Hypoxis pratensis</i> var. <i>tuberculata</i>			C		1/1
plants	land plants	Isoetaceae	<i>Isoetes muelleri</i>	quillwort		C		1/1
plants	land plants	Johnsoniaceae	<i>Tricoryne anceps</i> subsp. <i>anceps</i>			C		3
plants	land plants	Johnsoniaceae	<i>Tricoryne elatior</i>	yellow autumn lily		C		1
plants	land plants	Juncaceae	<i>Juncus aridicola</i>	tussock rush		C		3
plants	land plants	Juncaceae	<i>Juncus</i> sp. (Nindigully R.Roe AQ139509)			C		1
plants	land plants	Lamiaceae	<i>Coleus australis</i>			C		2
plants	land plants	Lamiaceae	<i>Prostanthera cryptandroides</i> subsp. <i>euphrasioides</i>			C		2/2
plants	land plants	Lamiaceae	<i>Prostanthera ringens</i>			C		1
plants	land plants	Lamiaceae	<i>Teucrium junceum</i>			C		3/1
plants	land plants	Lamiaceae	<i>Westringia cheelii</i>			C		6/6
plants	land plants	Laxmanniaceae	<i>Eustrephus latifolius</i>	wombat berry		C		5
plants	land plants	Laxmanniaceae	<i>Laxmannia gracilis</i>	slender wire lily		C		2/2
plants	land plants	Laxmanniaceae	<i>Lomandra confertifolia</i> subsp. <i>pallida</i>			C		4/1
plants	land plants	Laxmanniaceae	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>			C		10
plants	land plants	Laxmanniaceae	<i>Lomandra longifolia</i>			C		5
plants	land plants	Laxmanniaceae	<i>Lomandra multiflora</i> subsp. <i>multiflora</i>			C		7
plants	land plants	Leguminosae	<i>Acacia</i>					5
plants	land plants	Leguminosae	<i>Acacia blakei</i> subsp. <i>blakei</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia burbridgeae</i>			C		2/2
plants	land plants	Leguminosae	<i>Acacia burrowii</i>			C		3
plants	land plants	Leguminosae	<i>Acacia buxifolia</i> subsp. <i>pubiflora</i>			C		3/3
plants	land plants	Leguminosae	<i>Acacia caroleae</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia complanata</i>	flatstem wattle		C		1/1
plants	land plants	Leguminosae	<i>Acacia conferta</i>			C		2/1
plants	land plants	Leguminosae	<i>Acacia crassa</i>			C		1
plants	land plants	Leguminosae	<i>Acacia crassa</i> subsp. <i>crassa</i>			C		4/1
plants	land plants	Leguminosae	<i>Acacia crassa</i> subsp. <i>longicoma</i>			C		23/2
plants	land plants	Leguminosae	<i>Acacia curranii</i>	curly-bark wattle		V	V	9/9
plants	land plants	Leguminosae	<i>Acacia deanei</i>			C		1/1

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plants	land plants	Leguminosae	<i>Acacia decora</i>	pretty wattle		C		2
plants	land plants	Leguminosae	<i>Acacia excelsa</i>			C		1
plants	land plants	Leguminosae	<i>Acacia excelsa subsp. excelsa</i>			C		2
plants	land plants	Leguminosae	<i>Acacia hakeoides</i>	hakea wattle		C		2
plants	land plants	Leguminosae	<i>Acacia harpophylla</i>	brigalow		C		6
plants	land plants	Leguminosae	<i>Acacia julifera subsp. julifera</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia juncifolia</i>			C		3/2
plants	land plants	Leguminosae	<i>Acacia leiocalyx subsp. leiocalyx</i>			C		3/1
plants	land plants	Leguminosae	<i>Acacia longispicata</i>			C		4/2
plants	land plants	Leguminosae	<i>Acacia nerifolia</i>	pechey wattle		C		2/2
plants	land plants	Leguminosae	<i>Acacia oswaldii</i>	miljee		C		2/1
plants	land plants	Leguminosae	<i>Acacia penninervis var. penninervis</i>			C		1/1
plants	land plants	Leguminosae	<i>Acacia podalyriifolia</i>	Queensland silver wattle		C		1
plants	land plants	Leguminosae	<i>Acacia salicina</i>	doolan		C		2
plants	land plants	Leguminosae	<i>Acacia shirleyi</i>	lancewood		C		85
plants	land plants	Leguminosae	<i>Acacia sparsiflora</i>			C		12
plants	land plants	Leguminosae	<i>Acacia triptera</i>			C		10/4
plants	land plants	Leguminosae	<i>Acacia wardellii</i>			NT		2/2
plants	land plants	Leguminosae	<i>Chorizema parviflorum</i>	eastern flame pea		C		1
plants	land plants	Leguminosae	<i>Daviesia genistifolia</i>	broom bitter pea		C		1/1
plants	land plants	Leguminosae	<i>Desmodium brachypodum</i>	large ticktrefoil		C		1/1
plants	land plants	Leguminosae	<i>Desmodium varians</i>	slender tick trefoil		C		2
plants	land plants	Leguminosae	<i>Glycine clandestina</i>			C		1
plants	land plants	Leguminosae	<i>Glycine clandestina var. sericea</i>			C		1
plants	land plants	Leguminosae	<i>Glycine tabacina</i>	glycine pea		C		1
plants	land plants	Leguminosae	<i>Glycine tomentella</i>	woolly glycine		C		1
plants	land plants	Leguminosae	<i>Hovea tholiformis</i>			C		1/1
plants	land plants	Leguminosae	<i>Indigofera linnaei</i>	Birdsville indigo		C		1/1
plants	land plants	Leguminosae	<i>Jacksonia rhadinoclona</i>	Miles dogwood		C		5/5
plants	land plants	Leguminosae	<i>Jacksonia scoparia</i>			C		1/1
plants	land plants	Leguminosae	<i>Labichea digitata</i>			C		3/1
plants	land plants	Leguminosae	<i>Lotus australis</i>	Australian trefoil		C		1
plants	land plants	Leguminosae	<i>Lysiphyllum carronii</i>	ebony tree		C		1
plants	land plants	Leguminosae	<i>Macroptilium</i>					1
plants	land plants	Leguminosae	<i>Melilotus indicus</i>	hexham scent		Y		1/1
plants	land plants	Leguminosae	<i>Neptunia gracilis forma gracilis</i>			C		3/2
plants	land plants	Leguminosae	<i>Rhynchosia minima var. australis</i>			C		2/2
plants	land plants	Leguminosae	<i>Senna acclinis</i>			C		1/1
plants	land plants	Leguminosae	<i>Senna artemisioides</i>			C		1
plants	land plants	Leguminosae	<i>Senna artemisioides subsp. coriacea</i>			C		1
plants	land plants	Leguminosae	<i>Senna barclayana</i>			C		6
plants	land plants	Leguminosae	<i>Sesbania cannabina var. cannabina</i>			C		1/1
plants	land plants	Leguminosae	<i>Swainsona galegifolia</i>	smooth Darling pea		C		1
plants	land plants	Leguminosae	<i>Vachellia bidwillii</i>			C		1
plants	land plants	Leguminosae	<i>Vachellia farnesiana</i>			Y		12
plants	land plants	Linderniaceae	<i>Lindernia hyssopoides</i>			C		1/1

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plants	land plants	Loranthaceae	<i>Amyema</i>					1
plants	land plants	Loranthaceae	<i>Amyema biniflora</i>			C		1/1
plants	land plants	Loranthaceae	<i>Amyema quandang</i> var. <i>bancroftii</i>	broad-leaved grey mistletoe		C		1
plants	land plants	Loranthaceae	<i>Amyema quandang</i> var. <i>quandang</i>			C		1/1
plants	land plants	Loranthaceae	<i>Lysiana subfalcata</i>			C		1/1
plants	land plants	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry		C		2/2
plants	land plants	Lythraceae	<i>Rotala mexicana</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon oxycarpum</i>			C		4
plants	land plants	Malvaceae	<i>Abutilon oxycarpum</i> var. <i>incanum</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon oxycarpum</i> var. <i>oxycarpum</i>			C		3
plants	land plants	Malvaceae	<i>Hibiscus brachysiphonius</i>			C		1
plants	land plants	Malvaceae	<i>Hibiscus sturtii</i>			C		1
plants	land plants	Malvaceae	<i>Hibiscus sturtii</i> var. <i>sturtii</i>			C		4
plants	land plants	Malvaceae	<i>Malvastrum americanum</i> var. <i>americanum</i>		Y			1/1
plants	land plants	Malvaceae	<i>Sida cordifolia</i>		Y			4/1
plants	land plants	Malvaceae	<i>Sida hackettiana</i>			C		2
plants	land plants	Malvaceae	<i>Sida trichopoda</i>			C		3
plants	land plants	Marsileaceae	<i>Marsilea</i>					1
plants	land plants	Meliaceae	<i>Owenia acidula</i>	emu apple		C		8
plants	land plants	Meliaceae	<i>Owenia venosa</i>	crow's apple		C		1
plants	land plants	Menispermaceae	<i>Tinospora smilacina</i>	snakevine		C		1
plants	land plants	Meteoriaceae	<i>Papillaria crocea</i>			C		1/1
plants	land plants	Moraceae	<i>Ficus virens</i> var. <i>virens</i>			C		7
plants	land plants	Moraceae	<i>Trophis scandens</i>			C		1
plants	land plants	Moraceae	<i>Trophis scandens</i> subsp. <i>scandens</i>			C		1
plants	land plants	Myrtaceae	<i>Angophora floribunda</i>	rough-barked apple		C		2
plants	land plants	Myrtaceae	<i>Angophora leiocarpa</i>	rusty gum		C		4
plants	land plants	Myrtaceae	<i>Calytrix gurlumundensis</i>			V	V	22/21
plants	land plants	Myrtaceae	<i>Calytrix tetragona</i>	fringe myrtle		C		7/5
plants	land plants	Myrtaceae	<i>Corymbia bloxsomei</i>			C		1
plants	land plants	Myrtaceae	<i>Corymbia citriodora</i>	spotted gum		C		1
plants	land plants	Myrtaceae	<i>Corymbia citriodora</i> subsp. <i>variegata</i>			C		184
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		2
plants	land plants	Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay ash		C		1
plants	land plants	Myrtaceae	<i>Corymbia trachyphloia</i>			C		2
plants	land plants	Myrtaceae	<i>Corymbia trachyphloia</i> subsp. <i>trachyphloia</i>			C		21/1
plants	land plants	Myrtaceae	<i>Eucalyptus apothalassica</i>			C		6/4
plants	land plants	Myrtaceae	<i>Eucalyptus camaldulensis</i> subsp. <i>acuta</i>			C		1
plants	land plants	Myrtaceae	<i>Eucalyptus chloroclada</i>	Baradine red gum		C		1
plants	land plants	Myrtaceae	<i>Eucalyptus crebra</i>	narrow-leaved red ironbark		C		77/3
plants	land plants	Myrtaceae	<i>Eucalyptus curtisii</i>	Plunkett mallee		NT		3/3
plants	land plants	Myrtaceae	<i>Eucalyptus elegans</i>			C		1
plants	land plants	Myrtaceae	<i>Eucalyptus exserta</i>	Queensland peppermint		C		25/8
plants	land plants	Myrtaceae	<i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i>			C		5
plants	land plants	Myrtaceae	<i>Eucalyptus fibrosa</i> subsp. <i>nubilis</i>			C		36
plants	land plants	Myrtaceae	<i>Eucalyptus longirostrata</i>			C		6

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plants	land plants	Myrtaceae	<i>Eucalyptus melanophloia</i>			C		2
plants	land plants	Myrtaceae	<i>Eucalyptus melliodora</i>	yellow box		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus microcarpa</i>	inland grey box		C		2
plants	land plants	Myrtaceae	<i>Eucalyptus orgadophila</i>	mountain coolibah		C		3/2
plants	land plants	Myrtaceae	<i>Eucalyptus panda</i>			C		4/4
plants	land plants	Myrtaceae	<i>Eucalyptus populnea</i>	poplar box		C		4/2
plants	land plants	Myrtaceae	<i>Eucalyptus tenuipes</i>	narrow-leaved white mahogany		C		34/6
plants	land plants	Myrtaceae	<i>Eucalyptus tereticornis</i>			C		1
plants	land plants	Myrtaceae	<i>Eucalyptus tereticornis subsp. tereticornis</i>			C		3/1
plants	land plants	Myrtaceae	<i>Eucalyptus thozetiana</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus woollsiana</i>			C		1
plants	land plants	Myrtaceae	<i>Harmogia densifolia</i>			C		3/3
plants	land plants	Myrtaceae	<i>Homalocalyx polyandrus</i>			C		11/10
plants	land plants	Myrtaceae	<i>Homoranthus melanostictus</i>			C		1/1
plants	land plants	Myrtaceae	<i>Kardomia jucunda</i>			C		2/2
plants	land plants	Myrtaceae	<i>Kunzea opposita</i>			C		3
plants	land plants	Myrtaceae	<i>Kunzea opposita var. opposita</i>			C		3/3
plants	land plants	Myrtaceae	<i>Leptospermum polygalifolium</i>	tantoon		C		2
plants	land plants	Myrtaceae	<i>Lysicarpus angustifolius</i>	budgeroo		C		6
plants	land plants	Myrtaceae	<i>Melaleuca nodosa</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca thymifolia</i>	thyme honeymyrtle		C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca uncinata</i>			C		4/1
plants	land plants	Myrtaceae	<i>Micromyrtus carinata</i>	Gurulmundi heath-myrtle		E		31/28
plants	land plants	Myrtaceae	<i>Micromyrtus sessilis</i>			C		5/3
plants	land plants	Nyctaginaceae	<i>Boerhavia dominii</i>			C		1
plants	land plants	Oleaceae	<i>Jasminum didymum</i>			C		1
plants	land plants	Oleaceae	<i>Jasminum didymum subsp. lineare</i>			C		2
plants	land plants	Oleaceae	<i>Jasminum simplicifolium subsp. australiense</i>			C		3
plants	land plants	Oleaceae	<i>Notelaea microcarpa</i>			C		9/1
plants	land plants	Orchidaceae	<i>Cyanicula caerulea</i>			SL		1/1
plants	land plants	Orchidaceae	<i>Cymbidium canaliculatum</i>			SL		4
plants	land plants	Orchidaceae	<i>Dipodium hamiltonianum</i>	yellow hyacinth orchid		SL		1/1
plants	land plants	Orchidaceae	<i>Diuris tricolor</i>			SL		2/2
plants	land plants	Oxalidaceae	<i>Oxalis corniculata</i>			Y		2
plants	land plants	Papaveraceae	<i>Argemone mexicana</i>	prickly poppy		Y		1
plants	land plants	Pentapetaceae	<i>Melhania oblongifolia</i>			C		1
plants	land plants	Phyllanthaceae	<i>Breynia oblongifolia</i>			C		1
plants	land plants	Phyllanthaceae	<i>Phyllanthus occidentalis</i>			C		1
plants	land plants	Picrodendraceae	<i>Petalostigma pachyphyllum</i>			C		1
plants	land plants	Picrodendraceae	<i>Petalostigma pubescens</i>	quinine tree		C		10/1
plants	land plants	Pittosporaceae	<i>Auranticarpa rhombifolia</i>			C		2
plants	land plants	Pittosporaceae	<i>Bursaria spinosa subsp. spinosa</i>			C		6
plants	land plants	Pittosporaceae	<i>Pittosporum angustifolium</i>			C		4/3
plants	land plants	Pittosporaceae	<i>Pittosporum lancifolium</i>			C		3
plants	land plants	Pittosporaceae	<i>Pittosporum spinescens</i>			C		4
plants	land plants	Plantaginaceae	<i>Gratiola pedunculata</i>			C		1/1

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plants	land plants	Poaceae	<i>Ancistrachne uncinulata</i>	hooky grass		C		8/2
plants	land plants	Poaceae	<i>Aristida blakei</i>			C		1
plants	land plants	Poaceae	<i>Aristida calycina</i>			C		1
plants	land plants	Poaceae	<i>Aristida calycina</i> var. <i>calycina</i>			C		1/1
plants	land plants	Poaceae	<i>Aristida caput-medusae</i>			C		10
plants	land plants	Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>			C		1
plants	land plants	Poaceae	<i>Aristida jerichoensis</i>			C		1
plants	land plants	Poaceae	<i>Aristida jerichoensis</i> var. <i>jerichoensis</i>			C		2/2
plants	land plants	Poaceae	<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>			C		3
plants	land plants	Poaceae	<i>Aristida leichhardtiana</i>			C		4
plants	land plants	Poaceae	<i>Aristida personata</i>			C		6/1
plants	land plants	Poaceae	<i>Aristida queenslandica</i> var. <i>dissimilis</i>			C		1
plants	land plants	Poaceae	<i>Aristida queenslandica</i> var. <i>queenslandica</i>			C		1
plants	land plants	Poaceae	<i>Aristida ramosa</i>	purple wiregrass		C		2
plants	land plants	Poaceae	<i>Aristida vagans</i>			C		2
plants	land plants	Poaceae	<i>Arundinella nepalensis</i>	reedgrass		C		3
plants	land plants	Poaceae	<i>Austrostipa ramosissima</i>	bamboo grass		C		5/1
plants	land plants	Poaceae	<i>Bothriochloa pertusa</i>		Y			1
plants	land plants	Poaceae	<i>Brachyachne convergens</i>	common native couch		C		1/1
plants	land plants	Poaceae	<i>Cenchrus ciliaris</i>		Y			3
plants	land plants	Poaceae	<i>Cenchrus spinifex</i>		Y			1/1
plants	land plants	Poaceae	<i>Chloris divaricata</i>			C		1
plants	land plants	Poaceae	<i>Chloris gayana</i>	rhodes grass	Y			1
plants	land plants	Poaceae	<i>Chloris ventricosa</i>	tall chloris		C		3
plants	land plants	Poaceae	<i>Chloris virgata</i>	feathertop rhodes grass	Y			1
plants	land plants	Poaceae	<i>Cymbopogon bombycinus</i>	silky oilgrass		C		1
plants	land plants	Poaceae	<i>Cymbopogon refractus</i>	barbed-wire grass		C		5
plants	land plants	Poaceae	<i>Cynodon dactylon</i>		Y			1
plants	land plants	Poaceae	<i>Dactyloctenium radulans</i>	button grass		C		1
plants	land plants	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>			C		3/1
plants	land plants	Poaceae	<i>Digitaria breviglumis</i>			C		1
plants	land plants	Poaceae	<i>Digitaria didactyla</i>	Queensland blue couch	Y			1
plants	land plants	Poaceae	<i>Digitaria divaricatissima</i>	spreading umbrella grass		C		1/1
plants	land plants	Poaceae	<i>Digitaria parviflora</i>			C		2
plants	land plants	Poaceae	<i>Dimorphochloa rigida</i>			C		2/2
plants	land plants	Poaceae	<i>Dinebra decipiens</i> var. <i>asthenes</i>			C		1/1
plants	land plants	Poaceae	<i>Dinebra decipiens</i> var. <i>peacockii</i>			C		2/1
plants	land plants	Poaceae	<i>Enneapogon</i>					1
plants	land plants	Poaceae	<i>Enneapogon lindleyanus</i>			C		5/1
plants	land plants	Poaceae	<i>Enneapogon nigricans</i>	niggerheads		C		1
plants	land plants	Poaceae	<i>Enteropogon acicularis</i>	curly windmill grass		C		1
plants	land plants	Poaceae	<i>Enteropogon unispiceus</i>			C		2/2
plants	land plants	Poaceae	<i>Entolasia stricta</i>	wiry panic		C		5
plants	land plants	Poaceae	<i>Eragrostis</i>					3/1
plants	land plants	Poaceae	<i>Eragrostis curvula</i>		Y			2/1
plants	land plants	Poaceae	<i>Eragrostis lacunaria</i>	purple lovegrass		C		3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Poaceae	<i>Eragrostis megalosperma</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis sororia</i>			C		4
plants	land plants	Poaceae	<i>Eragrostis speciosa</i>			C		1/1
plants	land plants	Poaceae	<i>Eriachne mucronata forma (Alpha C.E.Hubbard 7882)</i>			C		3/2
plants	land plants	Poaceae	<i>Eriachne pallescens</i>			C		1
plants	land plants	Poaceae	<i>Eriochloa pseudoacrotricha</i>			C		1/1
plants	land plants	Poaceae	<i>Eulalia aurea</i>	silky browntop		C		1/1
plants	land plants	Poaceae	<i>Heteropogon contortus</i>	black speargrass		C		2
plants	land plants	Poaceae	<i>Homopholis belsonii</i>	Belson's panic		E	V	1/1
plants	land plants	Poaceae	<i>Imperata cylindrica</i>	blady grass		C		1
plants	land plants	Poaceae	<i>Iseilema macratherum</i>			C		3
plants	land plants	Poaceae	<i>Leptochloa digitata</i>			C		1
plants	land plants	Poaceae	<i>Megathyrsus maximus</i>		Y			1
plants	land plants	Poaceae	<i>Megathyrsus maximus var. pubiglumis</i>		Y			1
plants	land plants	Poaceae	<i>Melinis repens</i>	red natal grass	Y			3
plants	land plants	Poaceae	<i>Panicum buncei</i>			C		2/2
plants	land plants	Poaceae	<i>Panicum decompositum</i>			C		2
plants	land plants	Poaceae	<i>Panicum effusum</i>			C		4
plants	land plants	Poaceae	<i>Paspalidium caespitosum</i>	brigalow grass		C		2/1
plants	land plants	Poaceae	<i>Perotis rara</i>	comet grass		C		1/1
plants	land plants	Poaceae	<i>Rytidosperma indutum</i>			C		1
plants	land plants	Poaceae	<i>Sarga leiocladum</i>			C		2
plants	land plants	Poaceae	<i>Setaria paspalidioides</i>			C		1/1
plants	land plants	Poaceae	<i>Setaria surgens</i>			C		3/2
plants	land plants	Poaceae	<i>Sorghum arundinaceum</i>	Rhodesian Sudan grass	Y			1
plants	land plants	Poaceae	<i>Sporobolus caroli</i>	fairy grass		C		3/1
plants	land plants	Poaceae	<i>Sporobolus coromandelianus</i>		Y			1/1
plants	land plants	Poaceae	<i>Sporobolus elongatus</i>			C		3
plants	land plants	Poaceae	<i>Thellungia advena</i>	coolibah grass		C		2
plants	land plants	Poaceae	<i>Themeda intermedia</i>		Y			1
plants	land plants	Poaceae	<i>Themeda quadrivalvis</i>	grader grass	Y			1
plants	land plants	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		3
plants	land plants	Poaceae	<i>Triodia scariosa</i>			C		5/3
plants	land plants	Poaceae	<i>Urochloa mosambicensis</i>	sabi grass	Y			1
plants	land plants	Portulacaceae	<i>Calandrinia pickeringii</i>			C		1/1
plants	land plants	Portulacaceae	<i>Portulaca oleracea</i>	pigweed	Y			2
plants	land plants	Proteaceae	<i>Grevillea floribunda subsp. floribunda</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea longistyla</i>			C		2/2
plants	land plants	Proteaceae	<i>Grevillea striata</i>	beefwood		C		2
plants	land plants	Proteaceae	<i>Hakea lorea subsp. lorea</i>			C		3
plants	land plants	Proteaceae	<i>Hakea purpurea</i>			C		3/3
plants	land plants	Proteaceae	<i>Persoonia sericea</i>	silky geebung		C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes distans</i>	bristly cloak fern		C		4/1
plants	land plants	Pteridaceae	<i>Cheilanthes sieberi subsp. sieberi</i>			C		3
plants	land plants	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		9
plants	land plants	Rhamnaceae	<i>Cryptandra</i>			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Rubiaceae	<i>Cyclophyllum coprosmoides</i>			C		1
plants	land plants	Rubiaceae	<i>Cyclophyllum coprosmoides</i> var. <i>coprosmoides</i>			C		1
plants	land plants	Rubiaceae	<i>Pomax umbellata</i>			C		1
plants	land plants	Rubiaceae	<i>Psydrax odorata</i>			C		5
plants	land plants	Rubiaceae	<i>Psydrax odorata</i> forma <i>buxifolia</i>			C		2
plants	land plants	Rubiaceae	<i>Psydrax odorata</i> forma <i>subnitida</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psydrax oleifolia</i>			C		4
plants	land plants	Rubiaceae	<i>Richardia brasiliensis</i>	white eye	Y			1
plants	land plants	Rubiaceae	<i>Scleromitron galioides</i>			C		1/1
plants	land plants	Rutaceae	<i>Acronychia pauciflora</i>	soft acronychia		C		1
plants	land plants	Rutaceae	<i>Boronia glabra</i>			C		5/3
plants	land plants	Rutaceae	<i>Citrus glauca</i>			C		4
plants	land plants	Rutaceae	<i>Cyanothamnus bipinnatus</i>			C		1
plants	land plants	Rutaceae	<i>Cyanothamnus occidentalis</i>			C		5/5
plants	land plants	Rutaceae	<i>Flindersia australis</i>	crow's ash		C		3
plants	land plants	Rutaceae	<i>Geijera parviflora</i>	wilga		C		11
plants	land plants	Rutaceae	<i>Geijera salicifolia</i>	brush wilga		C		2
plants	land plants	Rutaceae	<i>Phebalium squamulosum</i> subsp. <i>gracile</i>			C		5/3
plants	land plants	Rutaceae	<i>Zieria aspalathoides</i> subsp. <i>aspalathoides</i>			C		1/1
plants	land plants	Santalaceae	<i>Anthobolus leptomerioides</i>			C		2/2
plants	land plants	Santalaceae	<i>Exocarpos cupressiformis</i>	native cherry		C		1
plants	land plants	Santalaceae	<i>Exocarpos latifolius</i>			C		1/1
plants	land plants	Santalaceae	<i>Santalum lanceolatum</i>			SL		4
plants	land plants	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		3/1
plants	land plants	Sapindaceae	<i>Alectryon diversifolius</i>	scrub boonaree		C		8/1
plants	land plants	Sapindaceae	<i>Alectryon oleifolius</i> subsp. <i>elongatus</i>			C		1
plants	land plants	Sapindaceae	<i>Atalaya hemiglauca</i>			C		4
plants	land plants	Sapindaceae	<i>Dodonaea</i>					4/4
plants	land plants	Sapindaceae	<i>Dodonaea filifolia</i>			C		2/2
plants	land plants	Sapindaceae	<i>Dodonaea triangularis</i>			C		6/1
plants	land plants	Sapindaceae	<i>Dodonaea viscosa</i>			C		2
plants	land plants	Sapotaceae	<i>Planchonella cotinifolia</i>			C		4
plants	land plants	Scrophulariaceae	<i>Eremophila debilis</i>	winter apple		C		1
plants	land plants	Scrophulariaceae	<i>Eremophila deserti</i>			C		4/2
plants	land plants	Scrophulariaceae	<i>Eremophila longifolia</i>	berrigan		C		1
plants	land plants	Scrophulariaceae	<i>Eremophila mitchellii</i>			C		4/1
plants	land plants	Solanaceae	<i>Nicotiana forsteri</i>			C		1/1
plants	land plants	Solanaceae	<i>Nicotiana megalosiphon</i>			C		1/1
plants	land plants	Solanaceae	<i>Physalis lanceifolia</i>		Y			1/1
plants	land plants	Solanaceae	<i>Solanum</i>					2
plants	land plants	Solanaceae	<i>Solanum aviculare</i>	kangaroo apple		C		1
plants	land plants	Solanaceae	<i>Solanum coracinum</i>			C		3/3
plants	land plants	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		3/2
plants	land plants	Solanaceae	<i>Solanum jucundum</i>			C		3/3
plants	land plants	Solanaceae	<i>Solanum mitchellianum</i>			C		4/2
plants	land plants	Solanaceae	<i>Solanum nemophilum</i>			C		12/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Solanaceae	<i>Solanum parvifolium</i>			C		2
plants	land plants	Solanaceae	<i>Solanum parvifolium</i> subsp. <i>parvifolium</i>			C		1/1
plants	land plants	Solanaceae	<i>Solanum semiarmatum</i>	prickly nightshade		C		5
plants	land plants	Solanaceae	<i>Solanum stenopterum</i>			V		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia latifolia</i>	dysentery plant		C		4/1
plants	land plants	Sterculiaceae	<i>Brachychiton australis</i>	broad-leaved bottle tree		SL		2
plants	land plants	Sterculiaceae	<i>Brachychiton populneus</i>			C		2
plants	land plants	Sterculiaceae	<i>Brachychiton populneus</i> subsp. <i>populneus</i>			SL		2
plants	land plants	Sterculiaceae	<i>Brachychiton populneus</i> subsp. <i>trilobus</i>			SL		3
plants	land plants	Sterculiaceae	<i>Brachychiton rupestris</i>			SL		14
plants	land plants	Stylidiaceae	<i>Stylidium debile</i>	frail trigger plant		SL		1/1
plants	land plants	Surianaceae	<i>Cadellia pentastylis</i>	ooline		V	V	37/10
plants	land plants	Thymelaeaceae	<i>Pimelea</i>					1/1
plants	land plants	Verbenaceae	<i>Glandularia aristigera</i>		Y			5
plants	land plants	Verbenaceae	<i>Phyla nodiflora</i>	carpetweed		C		1
plants	land plants	Verbenaceae	<i>Verbena halei</i>		Y			1/1
plants	land plants	Viscaceae	<i>Viscum articulatum</i>	flat mistletoe		C		1/1
plants	land plants	Vitaceae	<i>Causonis clematidea</i>			C		1
plants	land plants	Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>			SL		14
plants	land plants	Zygophyllaceae	<i>Roepera glauca</i>			C		1/1

CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*.

The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.

The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).

This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

APPENDIX E ATTEXO OOLINE HABITAT SURVEY

13 February 2023













To:	Steve Fox
From:	Chris Beavon, Principal Ecologist
Subject:	Ooline (<i>Cadellia pentastylis</i>) and threatened flora survey
Ref:	SEN-003

1.0 Introduction

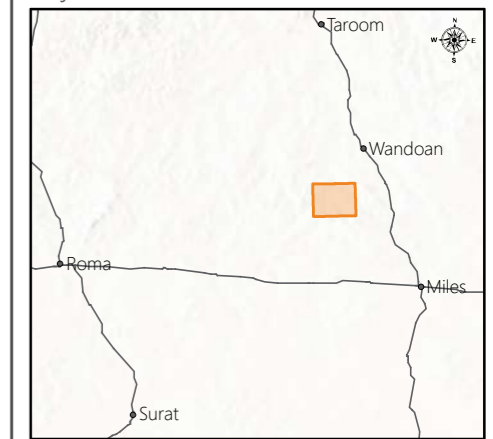
Senex Energy Limited (Senex) commissioned Attexo Group Pty Ltd to undertake targeted surveys for the Environment Protection and Biodiversity Conservation Act 1999 listed plant Ooline (*Cadellia pentastylis*) within part of the Atlas 3 Project Area (Survey area) (**Figure 1**). The scope of this targeted survey was primarily to identify any Ooline within the Survey area and to build on ecological advice provided by ERM that outlines areas that will be avoided by future development. The Survey area is largely cleared and covers an area of approximately 5 by 5 km.

Attexo has prepared this memo to present the results of the targeted Ooline and threatened flora survey within the Survey area.

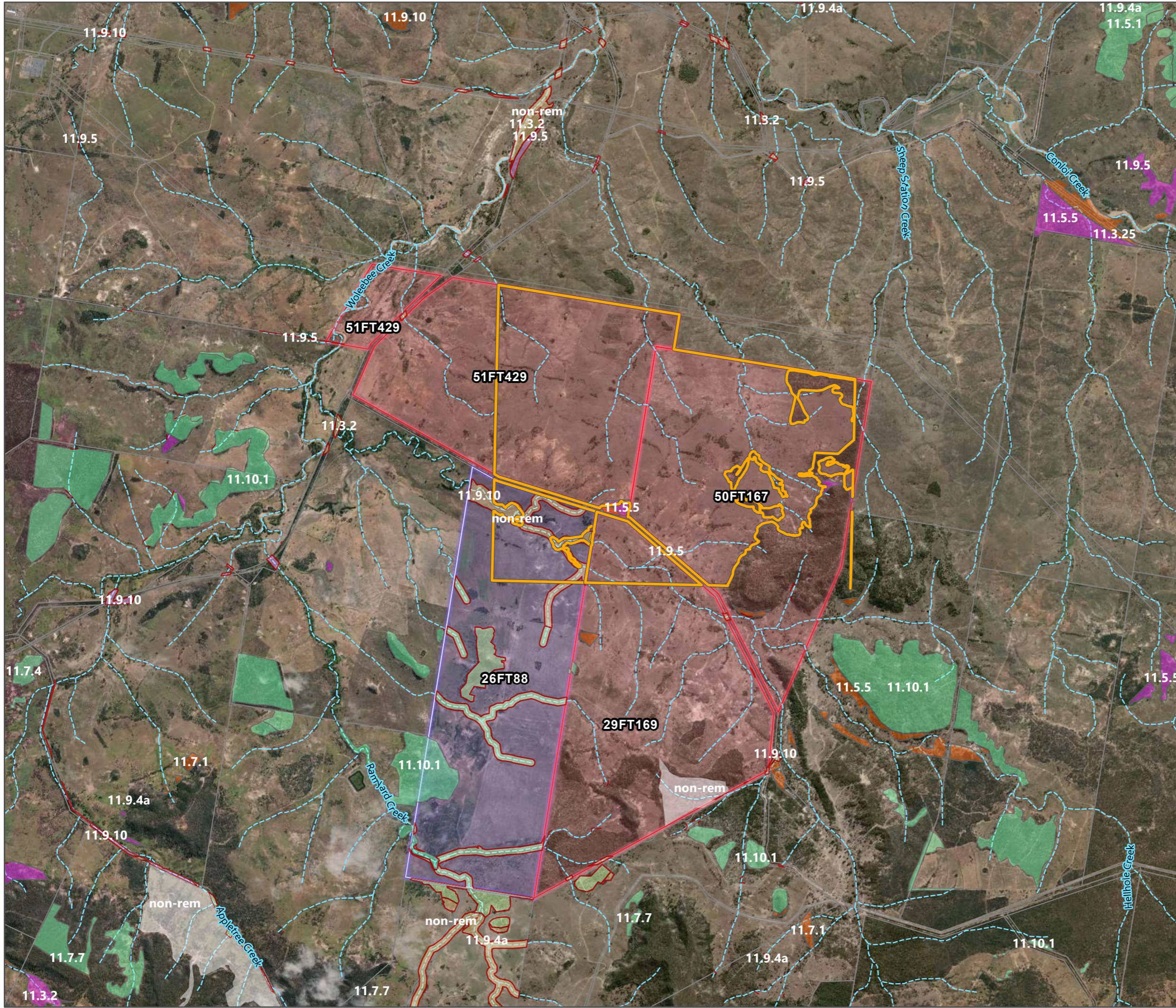
Figure 1

-  Ooline Survey Areas
-  Category A or B area containing endangered
-  Category A or B area containing of concern
-  Category A or B area that is least concern
-  Category C or R area containing endangered
-  Category C or R area containing of concern
-  Category C or R area that is of least concern
-  Non-remnant
-  Watercourse
-  Cadastral Parcels - All
- Landholders**
-  Hillandale
-  Springside

Date: 10/02/2023
 Author: VD
 Reviewed: CB
 Project: SEN-003



Scale: 1:50,000@A3
 Data Source(s):
 Digital Cadastral Database - Department of Natural Resources,
 Mines and Energy (2021)
 Esri, USGS, Maxar





2.0 Methodology

Desktop Assessment

Prior to undertaking the vegetation community surveys, a desktop assessment was completed to identify any additional ecological values with the potential to occur within the Project area. The following resources were reviewed:

- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST);
- Queensland Department of Environment and Science (DES) WildNet database to identify previously recorded flora, including non-native species within the Project area;
- Department of Resources (DoR) regulated vegetation mapping (including remnant, high-value regrowth and non-remnant vegetation);
- DCCEEW's Species Profile and Threats Database (SPRAT);
- DES mapping for essential habitat, protected plant trigger areas, wetlands, watercourses and drainage features;
- Atlas of Living Australia (ALA) database;
- Queensland Regional Ecosystem (RE) mapping; and
- Published ecological information on threatened flora and fauna species where available.

Field Assessment

Survey Timing and Conditions

Threatened flora surveys were undertaken from 31 January to 3 February 2023 to sufficiently cover the Survey area. Access tracks within each property were in fair condition with most areas of the site being accessible via 4WD, however, large portions of the survey area were required to be covered by foot where vegetation was not observable from tracks. Survey areas south of Gurulmundi Road were also covered by foot following heavy rain in accordance with land access requirements.

Relevant guidelines and conservation advice outline that detection and identification of Ooline is suitable all year round due this species distinct growth habit and foliage.

Weather conditions leading up to and during the flora survey are summarised in **Table 1** and **Figure 2**. Rainfall and minimum and maximum temperatures for 2022/23 were recorded at the Miles Constance Street weather gauge (station number 042112) approximately 53 km away.

Table 1. Weather conditions indicative of the Project area (BOM 2023)

Statistics	September	October	November	December	January	February
Mean maximum temperature (°C)	23.6	26.7	28.2	30.8	33.7	35.4 ¹
Mean minimum temperature (°C)	10.3	14.1	14.0	16.1	20.2	21.1 ¹



Statistics	September	October	November	December	January	February
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Notes: † For the first eight days of February.

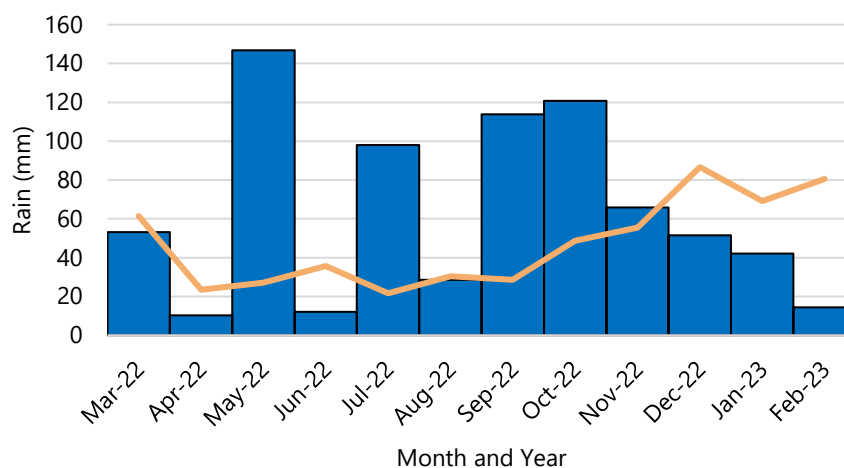


Figure 2. Average rainfall (mm) at the closest weather station to the survey area for the past 21 years (orange line) and total rainfall (mm) for the past year (blue bars). Rainfall for February 2023 only shows rainfall for the first eight days of the year. Data: station 042112, BOM 2023.

Threatened Flora Surveys

The proposed methodology for survey of Ooline included meandering survey techniques. These methods were not in total compliance with the Queensland Flora Survey Guidelines – Protected Plants, Version 2.01 (DES 2020). However, extensive coverage of the site was completed with a high confidence of recording all individuals. Incidental records of other threatened flora species identified as potentially present and incidental records of threatened fauna species or evidence of their presence (e.g. Koala (*Phascolarctos cinereus*) and associated scats/scratches, Glossy-black Cockatoo (*Calyptorhynchus lathami*) and associated orts) were recorded (**Table 2**).

Two ecologists traversed areas on foot where trees and shrubs are visibly denser, utilising meandering transects at approximately 100-200 m intervals, and traversed by vehicle (where access was available) areas where trees and shrubs were not present. Binoculars were used to aid in the identification of Ooline from a distance, however, denser vegetation or potential Ooline in the Survey areas were approached and thoroughly searched or correctly identified.

Where threatened species are identified, the following attributes were recorded:

- GPS location (points or polygons);
- total number of individuals and maturity (eg juvenile, mature);
- habitat description;
- overall health of individuals;
- reproductive status; and



- photos of individuals and habitat.

GPS track data was recorded for all search areas (**Figure 3**).

3.0 Results

Desktop Results

Desktop assessment identified 11 threatened flora species including Ooline. Their protection status under the Commonwealth (EPBC Act) and Queensland (NC Act) are listed in **Table 2**.

Table 1. Desktop Results for Potential Threatened Species

Group	Common Name	Scientific Name	EPBC Act	NC Act
Plant	Curly-bark Wattle	<i>Acacia curranii</i>	V	V
Plant	Hairy-joint Grass	<i>Arthraxon hispidus</i>	V	V
Plant	Ooline	<i>Cadellia pentastylis</i>	V	V
Plant	Yellow calytrix	<i>Calytrix gurlmundensis</i>	V	V
Plant	Bluegrass	<i>Dichanthium setosum</i>	V	
Plant	Belson's Panic	<i>Homopholis belsonii</i>	V	E
Plant	Winged Pepper-cress	<i>Lepidium monoplacoides</i>	E	
Plant	Gurulmundi Hearth-myrtle	<i>Micromyrtus carinata</i>		E
Plant	Austral Toadflax	<i>Thesium australe</i>	V	V
Plant	Slender Tylophora	<i>Vincetoxicum forsteri / Tylophora linearis</i>	E	E
Plant	-	<i>Xerothamnella herbacea</i>	E	E

Key: V (vulnerable), E (endangered)

Field Survey Results

Threatened Flora

Field surveys were conducted within the investigation areas by Attexo Principal Ecologist Chris Beavon and Professional Ecologist Kye Chamberlain between 31 and 3 February 2023. These surveys identified the presence of 35 Ooline within the eastern portion of the Survey area adjacent existing Ooline records (**Figure 3**). The Ooline individuals identified ranged from juveniles to mature plants from 1 to 18 metres in height (**Table 3**). No other threatened plant species were identified during the survey. A comprehensive flora list of 191 recorded species is provided in **Appendix A**.

Tracks recorded by both ecologists show a comprehensive coverage of the Survey area (**Figure 3**).

Table 3 Examples of Ooline (*Cadellia pentastylis*) identified within Survey area



Large specimen approx. 16 m height



Juvenile specimen approx. 2.5 m height.



Small stand of approx. 12 individuals



Leaves and bark





Incidental Fauna and Fauna Habitat Observations

No threatened fauna or evidence of threatened species were observed during this survey. An incidental fauna list including 43 birds, 3 mammals, 3 reptiles, 1 amphibian and 4 introduced species is provided in **Appendix A**.

A number of habitat features that may provide the necessary microhabitats for Matters of National Environmental Significance (MNES) species were recorded (**Figure 3**). The abundance of these key resources and microhabitats was determined to be in greater abundance in riparian areas and when compared to more open areas.

Terrestrial habitat features observed on site included the following features:

- Hollow bearing trees;
- Hollow logs;
- Woody debris;
- Stick and cup nests; and
- Dams.

While not a direct indicator of the presence of any listed species, these features have the potential to provide habitat for a range of conservation significant species. For example, Greater Glider (*Petauroides volans*) and Yellow-bellied Glider (*Petaurus australis australis*) utilise hollows, various listed reptiles hide within woody debris and logs, and many threatened birds are often sighted around dams and stick nests.

Ooline Wandoan Survey

Threatened flora and habitat features identified within the project area

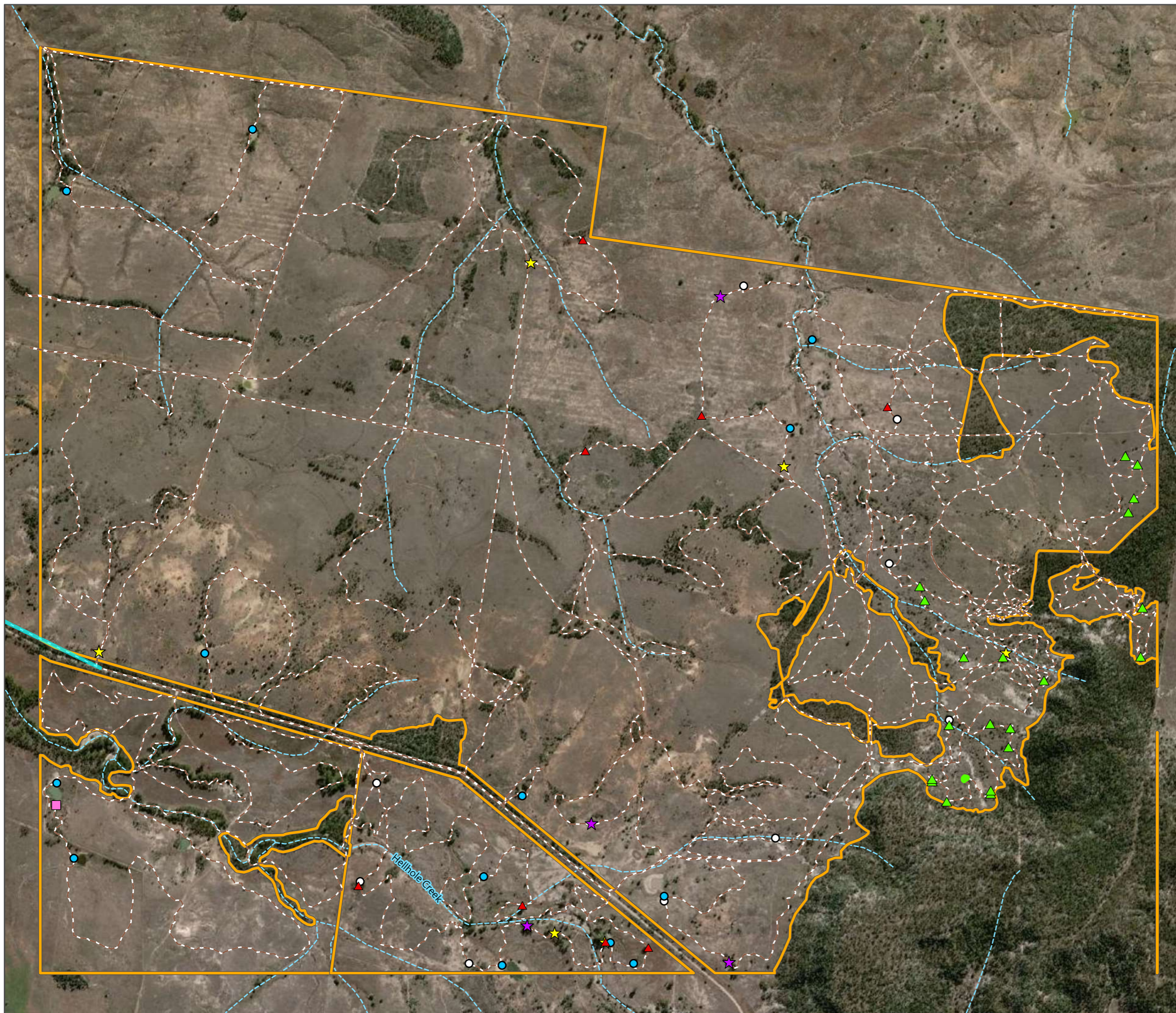
Figure 3

- Survey Tracks
- Watercourse
- ▭ Ooline Survey Areas
- Threatened Flora**
- ▲ Ooline (*Cadellia pentasytlis*)
- Ooline (*Cadellia pentasytlis*)
- Habitat Features**
- Cup nests
- Dam
- Hollow log
- ★ Hollow bearing tree
- ★ Woody debris
- ▲ Stick nest

Date: 10/02/2023
 Author: VD
 Reviewed: CB
 Project: SEN-003



Data Source(s):
 Digital Cadastral Database - Department of Natural Resources,
 Mines and Energy (2021)
 Esri, USGS, Maxar





Incidental Introduced Species Observations

Invasive Flora Species

The recording of all invasive species present within the survey area fell outside the scope of this survey, however, two (2) flora species classified as restricted matter under the Queensland *Biosecurity Act 2014* were identified within the Survey area (**Table 4**).

Table 4 Invasive flora species incidentally observed within the Survey area

Name	Biosecurity Act Status	WoNS ¹
Common Prickly Pear <i>Opuntia stricta</i>	3 – must not be given away, sold, or released into the environment. Under general biosecurity obligation (GBO) persons must take all reasonable and practical measures to minimise the biosecurity risks associated with dealing with <i>Opuntia</i> under your control.	Yes
Velvety Tree Pear <i>Opuntia tomentosa</i>	3 – must not be given away, sold, or released into the environment. Under general biosecurity obligation (GBO) persons must take all reasonable and practical measures to minimise the biosecurity risks associated with dealing with <i>Opuntia</i> under your control.	Yes

Notes: ¹WoNS – Weeds of National Significance. Under the National Weeds Strategy, 32 introduced plants were identified as Weeds of National Significance.

Additionally, large areas of the following introduced species were also identified:

- Mimosa bush (*Vachellia farnesiana*);
- Galvanised Burr (*Sclerolaena birchii*);
- Noogoora Burr (*Xanthium occidentale*);
- Bathurst Burr (*Xanthium spinosum*);
- Fierce Thornapple (*Datura ferox*);
- Stinking Roger (*Tagetes minuta*); and
- Balloon Cotton Bush (*Gomphocarpus physocarpus*).

These species are not declared noxious by the State or Commonwealth government, however, can cause considerable environmental and agricultural impact to landowners and the local environment.

Invasive Fauna Species

Three (3) fauna species classified as a restricted matter under the Queensland *Biosecurity Act 2014* was identified within the Survey area (**Table 5**). Dog (*Canis familiaris*) footprints were also found on the "Springside" property within the Survey area, however, it is unknown as to whether these belong to wild dogs or working dogs on the property.



Table 5. Invasive fauna species incidentally observed within the Survey area

Name	Biosecurity Act Status
Feral Cat <i>Felis catus</i>	Category 3, 4 and 6 restricted invasive animal under the <i>Biosecurity Act 2014</i> – must not be move, keep, feed, give away, sell, or release into the environment. Under general biosecurity obligation (GBO) persons must take all reasonable and practical measures to minimise the biosecurity risks associated with dealing with Feral Cat under your control.
Feral Pig <i>Sus scrofa</i>	Category 3, 4 and 6 restricted invasive animal under the <i>Biosecurity Act 2014</i> – must not be move, keep, feed, give away, sell, or release into the environment. Under general biosecurity obligation (GBO) persons must take all reasonable and practical measures to minimise the biosecurity risks associated with dealing with Feral Pig under your control.
Rabbit <i>Oryctolagus cuniculus</i>	Category 3, 4, 5 and 6 restricted invasive animal under the <i>Biosecurity Act 2014</i> – must not be move, keep, feed, give away, sell, or release into the environment. Under general biosecurity obligation (GBO) persons must take all reasonable and practical measures to minimise the biosecurity risks associated with dealing with Rabbit under your control.

Cane Toad (*Rhinella marina*) were also identified within the Survey area. Although not restricted or prohibited under the *Biosecurity Act 2014*, everyone has a general biosecurity obligation (GBO) to take all reasonable and practical measures to minimise the biosecurity risks associated with dealing with Cane Toad under their control.



4.0 Key Findings

Field surveys identified the following ecological values within the Survey area:

- 35 Ooline individuals restricted to the eastern portion of the Survey area;
- Numerous habitat features, with the potential to provide habitat for a range of conservation significant species, including:
 - Hollow bearing trees;
 - Hollow logs;
 - Woody debris;
 - Stick and cup nests; and
 - Dams.
- Two (2) flora species classified as restricted matter under the Queensland *Biosecurity Act 2014*:
 - Common Prickly Pear (*Opuntia stricta*)
 - Velvety Tree Pear (*Opuntia tomentosa*)
- Seven (7) additional introduced flora species, with large areas, that can cause considerable environmental and agricultural impact:
 - Mimosa bush (*Vachellia farnesiana*);
 - Galvanised Burr (*Sclerolaena birchii*);
 - Noogoora Burr (*Xanthium occidentale*);
 - Bathurst Burr (*Xanthium spinosum*);
 - Fierce Thornapple (*Datura ferox*);
 - Stinking Roger (*Tagetes minuta*); and
 - Balloon Cotton Bush (*Gomphocarpus physocarpus*).
- Three (3) fauna species classified as a restricted matter under the Queensland *Biosecurity Act 2014*:
 - Feral Cat (*Felis catus*);
 - Feral Pig (*Sus scrofa*); and
 - Rabbit (*Oryctolagus cuniculus*).
- One (1) additional introduced fauna species:
 - Cane Toad (*Rhinella marina*).



5.0 Conclusions and Recommendations

The survey methods utilised were not in total compliance with the Queensland Flora Survey Guidelines – Protected Plants, Version 2.01 (DES 2020). However, extensive coverage of the site allowed for a high confidence of recording the majority of threatened species.

The timing of the flora field survey (summer) coincided with flowering or fruiting periods of many of the threatened species identified as potentially occurring within the Survey area. Identification of large woody threatened flora species (i.e. Ooline) can usually be achieved year-round as identification is not dependent on the availability of reproductive material.

Detection and identification of herbaceous species such as grasses (Poaceae) relies on the presence of reproductive material that may only be present during optimal conditions such as after a rainfall event. In particular Belson's Panic, this species grows under shrubs and trees and can be easily overlooked. Flowers are the most reliable way to identify this species and the survey timing coincided with the flowering period for this species (December - April). As such, this species may have the potential to occur within the Survey area based on suitable habitat and records within the broader region, however, it would be of limited extent.

Given the extensive project area and that additional Ooline individuals were identified, including outside the existing 'high-risk' flora trigger mapping areas, it is likely that there are additional undocumented individuals within the Project area. As the design of the Project becomes more refined and prior to any clearing, it is recommended that a protected plant survey be undertaken in compliance with the Queensland Flora Survey Guidelines to confirm the presence/absence of any additional Ooline or other additional conservation significant flora species within the infrastructure footprint. These surveys should be undertaken within timeframes in accordance with the relevant biology of flora species and in line with species specific survey guidelines.



Appendix A

Flora and Fauna Lists



Flora List

Family	Scientific Name	Common Name
Amaranthaceae	<i>Gomphrena celosioides</i> *	Gomphrena Weed
Amaranthaceae	<i>Ptilotus polystachyus</i>	Longtails
Amaranthaceae	<i>Ptilotus semilanatus</i>	Lamb's Tail
Apocynaceae	<i>Alstonia constricta</i>	Bitterbark
Apocynaceae	<i>Carissa ovata</i>	Currantbush
Apocynaceae	<i>Gomphocarpus physocarpus</i> *	Balloon Cottonbush
Apocynaceae	<i>Parsonsia eucalyptophylla</i>	Gargaloo
Apocynaceae	<i>Parsonsia rotata</i>	Veinless Silkpod
Asteraceae	<i>Bidens pilosa</i> *	Cobblers Pegs
Asteraceae	<i>Brachyscome microcarpa</i> subsp. <i>darlingensis</i>	Forest Daisy
Asteraceae	<i>Calotis cuneata</i>	Blue Burr Daisy
Asteraceae	<i>Calotis dentex</i>	White Burr Daisy
Asteraceae	<i>Calotis lappulacea</i>	Yellow Burr Daisy
Asteraceae	<i>Calyptocarpus vialis</i> *	Creeping Cinderella Weed
Asteraceae	<i>Chrysocephalum apiculatum</i>	Yellow Buttons
Asteraceae	<i>Cirsium vulgare</i> *	Spear Thistle
Asteraceae	<i>Erigeron bonariensis</i> *	Flaxleaf Fleabane
Asteraceae	<i>Lactuca serriola</i> *	Prickly Lettuce
Asteraceae	<i>Podolepis longipedata</i>	Tall Copper-wire Daisy
Asteraceae	<i>Senecio pinnatifolius</i> var. <i>pinnatifolius</i>	A fireweed
Asteraceae	<i>Sphaeromorphaea australis</i>	Spreading Nutheads
Asteraceae	<i>Tagetes minuta</i> *	Stinking Roger
Asteraceae	<i>Verbesina encelioides</i> *	Crown-beard
Asteraceae	<i>Vittadinia dissecta</i> var. <i>hirta</i>	Common New Holland Daisy
Asteraceae	<i>Vittadinia sulcata</i>	Native Daisy
Asteraceae	<i>Xanthium occidentale</i> *	Noogoora Burr
Asteraceae	<i>Xanthium spinosum</i> *	Bathurst Burr
Asteraceae	<i>Xerochrysum bracteatum</i>	Golden Everlasting Daisy
Asteraceae	<i>Zinnia peruviana</i> *	Wild Zinnia
Bignoniaceae	<i>Pandorea pandorana</i>	Wonga Vine
Brassicaceae	<i>Lepidium africanum</i> *	Common Peppergrass
Brassicaceae	<i>Lepidium bonariense</i> *	Argentine Peppergrass
Cactaceae	<i>Opuntia stricta</i> *	Common Prickly Pear
Cactaceae	<i>Opuntia tomentosa</i> *	Velvety Tree Pear
Campanulaceae	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell
Capparaceae	<i>Capparis anomala</i>	Broom Bush
Capparaceae	<i>Capparis arborea</i>	Brush Caper Berry
Capparaceae	<i>Capparis canescens</i>	Wild Orange
Capparaceae	<i>Capparis lasiantha</i>	Nipan



Capparaceae	<i>Capparis loranthifolia</i> var. <i>loranthifolia</i>	Narrow-leaved Bumble Tree
Capparaceae	<i>Capparis mitchellii</i>	Bumblebush
Casuarinaceae	<i>Allocasuarina luehmannii</i>	Bull Oak
Casuarinaceae	<i>Casuarina cristata</i>	Belah
Celastraceae	<i>Denhamia cunninghamii</i>	Yellow Berry Bush
Celastraceae	<i>Denhamia disperma</i>	Orange Boxwood
Chenopodiaceae	<i>Atriplex muelleri</i>	Lagoon Saltbush
Chenopodiaceae	<i>Dysphania carinata</i>	Green Crumbweed
Chenopodiaceae	<i>Dysphania littoralis</i>	Red Crumbweed
Chenopodiaceae	<i>Enchylaena tomentosa</i>	Ruby Saltbush
Chenopodiaceae	<i>Salsola australis</i>	Soft Roly-poly
Chenopodiaceae	<i>Sclerolaena bicornis</i> var. <i>horrida</i>	Goathead Burr
Chenopodiaceae	<i>Sclerolaena birchii</i>	Galvanised Burr
Convolvulaceae	<i>Evolvulus alsinoides</i>	Tropical Speedwell
Cucurbitaceae	<i>Cucumis myriocarpus</i> subsp. <i>myriocarpus</i> *	Prickly Pademelon
Cyperaceae	<i>Cyperus exaltatus</i>	Tall Flatsedge
Cyperaceae	<i>Cyperus gracilis</i>	Slender Flatsedge
Cyperaceae	<i>Eleocharis cylindrostachys</i>	Hairgrass
Cyperaceae	<i>Fimbristylis dichotoma</i>	Common Finge-rush
Ebenaceae	<i>Diospyros humilis</i>	Small-leaved Ebony
Gentianaceae	<i>Centaurium tenuiflorum</i> *	Branched Centaury
Juncaceae	<i>Juncus aridicola</i> x <i>Juncus usitatus</i>	
Juncaceae	<i>Juncus usitatus</i>	Soft Rush
Lamiaceae	<i>Teucrium junceum</i>	Native Broom
Laxmanniaceae	<i>Eustrephus latifolius</i>	Wombat Berry
Laxmanniaceae	<i>Lomandra filiformis</i>	Wattle Matrush
Laxmanniaceae	<i>Lomandra leucocephala</i> subsp. <i>leucocephala</i>	Woolly-headed Matrush
Laxmanniaceae	<i>Lomandra longifolia</i>	Spiny-headed Matrush
Laxmanniaceae	<i>Lomandra multiflora</i> subsp. <i>multiflora</i>	Many-flowered Matrush
Leguminosae (Caesalpinioideae)	<i>Senna artemisioides</i>	Desert Cassia
Leguminosae (Caesalpinioideae)	<i>Senna barclayana</i>	Pepper Leaf Senna
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia amblygona</i>	Fan-leaf Wattle
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia conferta</i>	Crowded-leaf Wattle
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia crassa</i> subsp. <i>longicoma</i>	Curracabah Wattle
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia decora</i>	Pretty Wattle
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia excelsa</i> subsp. <i>excelsa</i>	Falcate Wattle
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia hakeoides</i>	Hakea Wattle



Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia harpophylla</i>	Brigalow
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia leiocalyx</i> subsp. <i>leiocalyx</i>	Early-flowering Black Wattle
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia longispicata</i>	Black Wattle
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia nerifolia</i>	Pechey Wattle
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia pendula</i>	Weeping Myall
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Acacia salicina</i>	Sally Wattle
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Neptunia gracilis forma gracilis</i>	Native Sensitive Plant
Leguminosae (Caesalpinioideae, mimosoid clade)	<i>Vachellia farnesiana</i> *	Mimosa Bush
Leguminosae (Papilionoideae)	<i>Macroptilium atropurpureum</i> *	Siratro
Leguminosae (Papilionoideae)	<i>Stylosanthes scabra</i> *	Shrubby Stylo
Loranthaceae	<i>Amyema bifurcata</i>	Long-leaved Mistletoe
Loranthaceae	<i>Amyema cangei</i>	Needle-leaf Mistloe
Loranthaceae	<i>Amyema congener</i> subsp. <i>rotundifolia</i>	Round-leaved Mistletoe
Loranthaceae	<i>Amyema miquelii</i>	Box Mistletoe
Loranthaceae	<i>Amyema quandang</i>	Grey Mistletoe
Loranthaceae	<i>Dendrophthoe glabrescens</i>	Orange Mistletoe
Loranthaceae	<i>Lysiana exocarpi</i> subsp. <i>tenuis</i>	Harlequin Mistletoe
Loranthaceae	<i>Lysiana subfalcata</i>	Northern Mistletoe
Loranthaceae	<i>Muellerina bidwillii</i>	Cypress Mistletoe
Malvaceae	<i>Abutilon oxycarpum</i> var. <i>oxycarpum</i>	Flannel Weed
Malvaceae	<i>Sida cordifolia</i> *	Flannelweed
Malvaceae	<i>Sida corrugata</i>	Corrugated Sida
Malvaceae	<i>Sida hackettiana</i>	Queensland Hemp
Meliaceae	<i>Melia azedarach</i>	White Cedar
Meliaceae	<i>Owenia acidula</i>	Emu Apple
Moraceae	<i>Ficus platypoda</i>	Rock Fig
Myrtaceae	<i>Angophora floribunda</i>	Rough-barked Apple
Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay Ash
Myrtaceae	<i>Eucalyptus camaldulensis</i>	River Red Gum
Myrtaceae	<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark
Myrtaceae	<i>Eucalyptus exserta</i>	Queensland Peppermint
Myrtaceae	<i>Eucalyptus melanophloia</i>	Silver-leaved Ironbark
Myrtaceae	<i>Eucalyptus melliodora</i>	Yellow Box
Myrtaceae	<i>Eucalyptus orgadophila</i>	Mountain Coolibah
Myrtaceae	<i>Eucalyptus populnea</i>	Poplar Box
Myrtaceae	<i>Eucalyptus sideroxylon</i>	Red Ironbark
Myrtaceae	<i>Eucalyptus tereticornis</i>	Forest Red Gum



Oleaceae	<i>Notelaea microcarpa</i>	Native Olive
Onagraceae	<i>Ludwigia peploides</i> subsp. <i>montevidensis</i>	Water Primrose
Orchidaceae	<i>Cymbidium canaliculatum</i>	Black Orchid
Phyllanthaceae	<i>Breynia oblongifolia</i>	Coffee Bush
Picrodendraceae	<i>Petalostigma pubescens</i>	Quinine Tree
Pittosporaceae	<i>Bursaria spinosa</i>	Black Thorn
Pittosporaceae	<i>Pittosporum spinescens</i>	Orange Thorn
Poaceae	<i>Aristida calycina</i> var. <i>calycina</i>	Dark Wiregrass
Poaceae	<i>Aristida caput-medusae</i>	Many-headed Wiregrass
Poaceae	<i>Aristida personata</i>	Purple Wiregrass
Poaceae	<i>Arundinella nepalensis</i>	Reedgrass
Poaceae	<i>Austrostipa ramosissima</i>	Bamboo Grass
Poaceae	<i>Bothriochloa bladhii</i>	Forest Bluegrass
Poaceae	<i>Bothriochloa decipiens</i> var. <i>decipiens</i>	Pitted Bluegrass
Poaceae	<i>Cenchrus ciliaris</i> *	Buffel Grass
Poaceae	<i>Chloris divaricata</i> var. <i>divaricata</i>	Slender Chloris
Poaceae	<i>Chloris gayana</i> *	Rhodes Grass
Poaceae	<i>Chloris ventricosa</i>	Tall Chloris
Poaceae	<i>Chloris virgata</i> *	Feathertop Rhodes Grass
Poaceae	<i>Cymbopogon refractus</i>	Barbed-wire Grass
Poaceae	<i>Cynodon dactylon</i> *	Green Couch
Poaceae	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>	Queensland Bluegrass
Poaceae	<i>Digitaria breviglumis</i>	Short-glumed Umbrella Grass
Poaceae	<i>Digitaria divaricatissima</i>	Spreading Umbrella Grass
Poaceae	<i>Digitaria parviflora</i>	Small-flower Fingergrass
Poaceae	<i>Enneapogon lindleyanus</i>	Canetop Nine-awn Grass
Poaceae	<i>Enteropogon acicularis</i>	Curly Windmill Grass
Poaceae	<i>Eragrostis cilianensis</i> *	Stinkgrass
Poaceae	<i>Eragrostis elongata</i>	Clustered Lovegrass
Poaceae	<i>Eragrostis lacunaria</i>	Purple Lovegrass
Poaceae	<i>Eragrostis parviflora</i>	Weeping Lovegrass
Poaceae	<i>Eragrostis sororia</i>	Woodland Lovegrass
Poaceae	<i>Eragrostis trichophora</i> *	Hairyflower Lovegrass
Poaceae	<i>Eriachne mucronata</i>	Mountain Wanderie Grass
Poaceae	<i>Eulalia aurea</i>	Silky Browntop
Poaceae	<i>Heteropogon contortus</i>	Black Speargrass
Poaceae	<i>Imperata cylindrica</i>	Blady Grass
Poaceae	<i>Megathyrsus maximus</i> var. <i>pubiglumis</i> *	Green Panic
Poaceae	<i>Melinis repens</i> *	Red Natal Grass
Poaceae	<i>Panicum effusum</i>	Hairy Panic
Poaceae	<i>Paspalidium gracile</i>	Slender Panic



Poaceae	<i>Perotis rara</i>	Comet Grass
Poaceae	<i>Setaria sphacelata*</i>	South African Pigeon Grass
Poaceae	<i>Setaria surgens</i>	Annual Pigeon Grass
Poaceae	<i>Sporobolus creber</i>	Slender Ratstail Grass
Poaceae	<i>Themeda triandra</i>	Kangaroo Grass
Portulacaceae	<i>Portulaca oleracea*</i>	Pigweed
Portulacaceae	<i>Portulaca Pilosa*</i>	Hairy Pigweed
Proteaceae	<i>Grevillea striata</i>	Beefwood
Ranunculaceae	<i>Clematis microphylla</i>	Small-leaved Clematis
Rhamnaceae	<i>Alphitonia excelsa</i>	Soap Tree
Rubiaceae	<i>Psydrax odorata</i>	Shiny-leaved Canthium
Rubiaceae	<i>Psydrax oleifolia</i>	Myrtle Tree
Rutaceae	<i>Citrus glauca</i>	Desert Lime
Rutaceae	<i>Geijera parviflora</i>	Wilga
Santalaceae	<i>Santalum lanceolatum</i>	Sandalwood
Sapindaceae	<i>Alectryon diversifolius</i>	Scrub Boonaree
Sapindaceae	<i>Alectryon oleifolius</i>	Inland Rosewood
Sapindaceae	<i>Atalaya hemiglauca</i>	Whitewood
Sapindaceae	<i>Dodonaea viscosa</i>	Sticky Hopbush
Scrophulariaceae	<i>Eremophila deserti</i>	Ellangowan Poison Bush
Scrophulariaceae	<i>Eremophila mitchellii</i>	False Sandalwood
Scrophulariaceae	<i>Myoporum acuminatum</i>	Boobialla
Solanaceae	<i>Datura ferox*</i>	Fierce Thornapple
Solanaceae	<i>Nicotiana forsteri</i>	Native Tobacco
Solanaceae	<i>Solanum ellipticum</i>	Potato Bush
Solanaceae	<i>Solanum nemophilum</i>	Granite Nightshade
Sterculiaceae	<i>Brachychiton australis</i>	Broad-leaved Bottle Tree
Sterculiaceae	<i>Brachychiton populneus</i>	Kurrajong
Sterculiaceae	<i>Brachychiton rupestris</i>	Narrow-leaved Bottle Tree
Surianaceae	<i>Cadellia pentastylis</i>	Ooline
Verbenaceae	<i>Glandularia aristigera*</i>	Mayne's Pest
Verbenaceae	<i>Verbena africana</i>	Common Verbena
Verbenaceae	<i>Verbena gaudichaudii</i>	Native Verbena
Vitaceae	<i>Clematicissus opaca</i>	Slender Grape
Cupressaceae	<i>Callitris endlicheri</i>	Black Cypress Pine
Cupressaceae	<i>Callitris glaucophylla</i>	White Cypress Pine
Pteridaceae	<i>Cheilanthes distans</i>	Bristly Cloak Fern

* Denotes introduced species



Fauna List

Family	Scientific Name	Common Name
Amphibians		
Bufoinae	<i>Rhinella marina</i>	Cane Toad
Hylidae	<i>Litoria caerulea</i>	Common Green Tree Frog
Birds		
Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle
Accipitridae	<i>Elanus axillaris</i>	Black-shouldered Kite
Alaudidae	<i>Mirafra javanica</i>	Horsfield's Bushlark
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra
Alcedinidae	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher
Alcedinidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck
Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow
Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird
Artamidae	<i>Gymnorhina tibicen</i>	Australian Magpie
Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckooshrike
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing
Corcoracidae	<i>Struthidea cinerea</i>	Apostlebird
Corvidae	<i>Corvus orru</i>	Torresian Crow
Cuculidae	<i>Centropus phasianinus</i>	Pheasant Coucal
Estrildidae	<i>Stizoptera bichenovii</i>	Double-barred Finch
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel
Falconidae	<i>Falco longipennis</i>	Australian Hobby
Maluridae	<i>Malurus cyaneus</i>	Superb Fairywren
Maluridae	<i>Malurus melanocephalus</i>	Red-backed Fairywren
Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater
Meliphagidae	<i>Philemon citreogularis</i>	Little Friarbird
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark
Motacillidae	<i>Anthus australis</i>	Australian Pipit



Otididae	<i>Ardeotis australis</i>	Australian Bustard
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrikethrush
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote
Phasianidae	<i>Synoicus ypsilophorus</i>	Brown Quail
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe
Pomatostomidae	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler
Psittaculidae	<i>Aprosmictus erythropterus</i>	Red-winged Parrot
Psittaculidae	<i>Platycercus adscitus</i>	Pale-headed Rosella
Mammals		
Felidae	<i>Felis catus*</i>	Feral Cat
Leporidae	<i>Oryctolagus cuniculus*</i>	Rabbit
Macropodidae	<i>Macropus giganteus</i>	Eastern Grey Kangaroo
Macropodidae	<i>Notamacropus rufogriseus</i>	Red-necked Wallaby
Macropodidae	<i>Osphranter robustus</i>	Common Wallaroo
Suidae	<i>Sus scrofa*</i>	Feral Pig
Reptiles		
Elapidae	<i>Pseudonaja textilis</i>	Eastern Brown Snake
Scincidae	<i>Concinnia tenuis</i>	Barred-Sided Skink
Varanidae	<i>Varanus varius</i>	Lace Monitor

* Denotes introduced species

APPENDIX F MNES SIGNIFICANT IMPACT ASSESSMENT

Listed Threatened Ecological Communities

Brigalow (*Acacia harpophylla* dominant and co-dominant) (Brigalow TEC)

The Project in the Project Area is unlikely to result in a significant impact to the Brigalow TEC.

Brigalow (*Acacia harpophylla* dominant and co-dominant) is listed as Endangered under the EPBC Act. There is a total of 95.8 ha of Brigalow TEC within the Project Area. There will be no impact to Brigalow TEC within the disturbance footprint. Senex will further ensure avoidance of TEC through implementation of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001]. Mapping for this TEC is presented in Figure 4-3.

Based on this information, a significant impact assessment in accordance with the SIG 1.1 for the Endangered Brigalow TEC is presented in Table 10-1.

Table 10-1: Significant Impact Assessment for the Brigalow Threatened Ecological Community

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Critically Endangered or Endangered ecological community if there is a real chance or possibility that it will:</i>		
Reduce the extent of an ecological community	No TEC will be cleared to accommodate project infrastructure with avoidance measures to preferentially site infrastructure to be implemented. Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC.	No
Fragment or increase fragmentation of an ecological community	No TEC will be cleared to accommodate project infrastructure with avoidance measures to preferentially site infrastructure to be implemented. TEC within the Project Area is already fragmented and as such disturbance in neighbouring areas is unlikely to materially affect the spread of seed and other propagative material throughout the TEC patches.	No
Adversely affect habitat critical to the survival of an ecological community	There will be no disturbance to TEC. Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC. Buffer zones will also be avoided by infrastructure, except for low impact petroleum activities and linear infrastructure, and mitigation measures will be applied to buffer zones that are not able to be avoided.	No
Modify or destroy abiotic factors necessary for an ecological community's survival	Based on the assumption that the environmental management measures described in Section 6 and the SSMP will be implemented during clearing activities, such as erosion and sediment control measures, the construction of the project infrastructure would be unlikely to substantially modify abiotic factors required for TEC.	No

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Critically Endangered or Endangered ecological community if there is a real chance or possibility that it will:</i>		
	During operation, the presence of project infrastructure is expected to have negligible impacts on surface water or groundwater flows.	
Cause a substantial change in the species composition of an occurrence of an ecological community	Impacts to the TEC are expected to be limited. No active disturbance to areas of TEC will be undertaken. Potential impacts to TEC composition related to pest and weed management are negligible and discussed further below. The potential for indirect impacts from weeds and pest is limited due to the existing land uses and disturbed nature of the TEC patches and present ground layer dominance of exotic pasture grasses in areas around the TEC patches. This includes a vehicle hygiene procedure to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to the disturbance footprint.	No
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community	Vehicle hygiene procedures will be implemented during construction and continue through operation to minimise risk of introduction of weed species propagating in TEC patches. Weed monitoring activities will include assessment of TEC patches nearby construction activities to allow for early detection. Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC.	No
Interfere with the recovery of an ecological community	Given no TEC will be cleared as part of the Project, it is unlikely to interfere with the recovery of the TEC. Areas of regrowth Brigalow within the Project Area that do not currently meet the condition threshold have also been mapped and will be preferentially avoided through the development of the final layout and constraints protocol.	No

Significant Impact: Not Significant

Poplar Box Grassy Woodland on Alluvial Plains (Poplar Box TEC)

The Project in the Project Area is unlikely to result in a significant impact to the Poplar Box TEC.

Poplar Box Grassy Woodland in Alluvial Plains is listed as Endangered under the EPBC Act. There is a total of 32.3 ha of Poplar Box TEC within the Project Area. There will be no impact to the areas shown as Poplar Box TEC in Figure 4-3. Senex Environmental Management will further ensure avoidance of direct and indirect impacts to this TEC through implementation of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] as well as the other plans and procedures listed in the Mitigation and Management Measures Section Table 10-2. Based on this information, a significant impact assessment in accordance with the SIG 1.1 for a Threatened Ecological Community is in Table 10-2.

Table 10-2: Significant Impact Assessment for the Poplar Box Threatened Ecological Community

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Critically Endangered or Endangered ecological community if there is a real chance or possibility that it will:</i>		
Reduce the extent of an ecological community	No TEC will be cleared to accommodate project infrastructure with avoidance measures to preferentially site infrastructure to be implemented. Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC.	No
Fragment or increase fragmentation of an ecological community	No TEC will be cleared to accommodate project infrastructure with avoidance measures to preferentially site infrastructure to be implemented. TEC within the Project Area is already fragmented and as such disturbance in neighbouring areas is unlikely to materially affect the spread of seed and other propagative material throughout the TEC patches.	No
Adversely affect habitat critical to the survival of an ecological community	There will be no disturbance to TEC. Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC. Buffer zones will also be avoided by infrastructure, with the exception of low impact petroleum activities and linear infrastructure, and mitigation measures will be applied to buffer zones that are not able to be avoided.	No
Modify or destroy abiotic factors necessary for an	Based on the implementation of mitigation and management measures described in Section in Section 6 and the SSMP during clearing activities, such as erosion and sediment control	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Critically Endangered or Endangered ecological community if there is a real chance or possibility that it will:</i></p>		
ecological community's survival	<p>measures, the construction of the project infrastructure would be unlikely to substantially modify abiotic factors required for TEC.</p> <p>During operation, the presence of project infrastructure is expected to have negligible impacts on surface water or groundwater flows.</p>	
Cause a substantial change in the species composition of an occurrence of an ecological community	<p>Impacts to the TEC are expected to be limited. No active disturbance to areas of TEC will be undertaken. Potential impacts to TEC composition related to pest and weed management are negligible and discussed further below. The potential for indirect impacts from weeds and pest are limited due to the existing land uses and disturbed nature of the TEC patches and present ground layer dominance of exotic pasture grasses in areas around the TEC patches. This includes a vehicle hygiene procedure to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to the disturbance footprint.</p>	No
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community	<p>Vehicle hygiene procedures will be implemented during construction and continue through operation to minimise risk of introduction of weed species propagating in TEC patches.</p> <p>Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of TEC will be undertaken by a suitably qualified person. Infrastructure will avoid TEC.</p>	No
Interfere with the recovery of an ecological community	<p>Given no TEC will be cleared as part of the Project, it is unlikely to interfere with the recovery of the TEC. Areas of regrowth Poplar Box Grassy Woodland on Alluvial Plains within the Project Area that do not currently meet the condition threshold have also been mapped and will be preferentially avoided through the development of the final layout and constraints protocol.</p>	No

Significant Impact: Not Significant

Listed Threatened Species Known or Likely to Occur

Dulacca Woodland Snail (*Adclarkia dulacca*)

The Project in the Project Area is unlikely to result in a significant impact to the Dulacca woodland Snail.

The Dulacca Woodland Snail was listed as Endangered under the EPBC Act on 7 of December 2016 (TSSC, 2016). The likelihood of occurrence has concluded this species is likely to occur within the Project Area due to the presence of suitable habitat and previous records within the Project Area, however, the species was not detected during preliminary ecology surveys.

The Dulacca Woodland Snail inhabits vine thicket, Brigalow (*Acacia harpophylla*) woodland/open forest, Ironbark (*Eucalyptus* spp.) woodland, Lancewood (*Acacia shirleyi*) woodland and Gum-topped Box (*E. woollsiana*) woodland (TSSC, 2016). It is largely confined to the Dulacca Downs subregion where it is found in a highly fragmented landscape, living in patches or strips of habitat retained on roadsides, shade lines and/or ridges (Stanisic et al. 2010; ALA 2022). 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 features remain (TSSC, 2016).

The Project Area includes several small patches of suitable habitat for the Dulacca Woodland Snail (Brigalow woodland), and the species has previously been collected from an area of RE 11.9.5a and 11.7.2 to the south of the Project Area (ALA, 2022). The total area of Dulacca Woodland Snail habitat within the Project Area is 666.3 ha. Senex has committed to not clearing any areas confirmed as Dulacca Woodland Snail or areas confirmed as habitat for the species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 10-3.

Table 10-3: Significant Impact Assessment for the Dulacca Woodland Snail

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of a population	Senex has committed to not clearing any areas confirmed as Dulacca Woodland Snail or areas confirmed as potential habitat for the species. The species occurs mostly in small remnant vegetation patches (TSSC, 2016). Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence/absence of threatened species in the area to be disturbed will be undertaken by a suitably qualified person. This will include searches for snails in microhabitat (logs, timber and leaf litter). Infrastructure will avoid threatened species locations. Using this approach, a long-term decrease in the size of the population, reduced area of occupancy, or fragmentation of populations is unlikely. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least	No
Reduce the area of occupancy of the species		No
Fragment an existing population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will:</i></p>		
	<p>daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Habitat with tree or shrub cover and ground debris is critical to the survival of native land snails and increases the species ability to disperse and recolonise (Stanisic, 2011, cited in TSSC, 2016). The Project Area is majority cleared and infrastructure will be located in already disturbed areas. Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence/absence of threatened species in the area to be disturbed will be undertaken by a suitably qualified person. Infrastructure will avoid threatened species locations. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP will ensure that both direct and indirect impacts are further minimised to the species. Therefore, it is unlikely that the impacts to Dulacca Woodland Snail habitat will lead to a decrease in the size of the species population. Thus, the Project is unlikely to adversely affect habitat critical to the survival of the species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population</p>	<p>Senex has committed to not clearing any areas confirmed as Dulacca Woodland Snail or areas confirmed as potential habitat for the species. Therefore, the ecological functions and extent of the habitat for the species will remain and ensure it is able to breed and will not decline.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>		<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Critically Endangered or Endangered species if there is a real chance or possibility that it will:</i></p>		
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Buffel Grass is a known threat to the species as it has replaced native grasses and increases fuel loads. This weed has been found to occur within the disturbed northern area of the Project Area. The construction and operation of the infrastructure is unlikely to increase the establishment of Buffel Grass. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline</p>	<p>The construction and operation of the infrastructure is unlikely to lead to introduction of a disease relevant to the species.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species</p>	<p>Key threats to the species relate to habitat loss, predation by rats, mice and pigs, invasion of Buffel Grass, trampling by cattle and horses and an increase in fire intensity.</p> <p>Project infrastructure will preferentially avoid Dulacca Woodland Snail habitat locations, and the construction and operation of the infrastructure is not expected to change the occurrence or prevalence of pest species. Therefore, it is unlikely that the Project will interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Glossy Black-cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*)

The Project in the Project Area is unlikely to result in a significant impact to the Glossy Black-cockatoo.

The Glossy Black-cockatoo (south-eastern) is currently listed as Vulnerable under the EPBC Act, as of 10 August 2022. It has previously been recorded within the Project Area (BOOBOOK, 2021a, DES, 2022a), and two recent sightings (2009) have been reported within the adjoining areas (10 km buffer area) of the Project Area (ALA, 2022).

This is a specialised feeder dependent on seeds of Casuarinaceae (She-oak) trees. Breeding pairs nest in large hollows generally high up in large eucalypt trees or stags near water and food sources (Pavey et al., 2016). The species is capable of moving among isolated trees and small habitat patches within fragmented landscapes (Pavey et al., 2016; Holmes, 2012). Casuarinaceae food trees are abundant within the Project Area including Belah (*Casuarina cristata*), which occurs throughout the Project Area and Bull Oak (*Allocasuarina luehmannii*), which occurs in scattered woodland patches on sandy soils, however no individuals and no evidence of feeding (chewed cones) were observed during field surveys. Potential nest trees also occur in remnant Eucalypt woodland and forest and in well-developed riparian corridors across the Project Area (BOOBOOK, 2022).

The total area of habitat for this species within the Project Area is 1,003 ha. Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 10-4.

Table 10-4: Significant Impact Assessment for the Glossy Black-cockatoo

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	There are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. There are two records of the species within close proximity to the Project Area. The Project Area is however unlikely to support an important population of the Glossy Black-cockatoo. Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. It is therefore unlikely that the Project will lead to a long-term decrease in the size of, reduce the area of occupancy of, or fragment an important population. Climate change is a threat for the species based on the Conservation Advice in the form that rainfall is correlated with the breeding success for the species (DCCEEW, 2022b). The Project will not contribute to or exacerbate the impacts of climate change on this species. This is because the Project will not fragment vegetated corridors or inhibit the Glossy Black-cockatoo's ability to move across the landscape in response to potential climate change induced changes to rainfall patterns. Mitigation measures such as preferential use of previously cleared	No
Reduce the area of occupancy of an important population		No
Fragment an existing important population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>There are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. There are two records of the species in proximity to the Project Area. The Project Area is however unlikely to support an important population of the Glossy Black-cockatoo. Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. It is therefore unlikely that habitat critical to the survival of this species will be adversely affected. Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP).</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>There is no evidence that the Project Area supports an important population of this species. In addition, Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. This Project is therefore unlikely to disrupt the breeding cycle of an important population, modify or decrease the availability or quality of habitat to the extent that it will cause species decline. Further, mitigation measures to reduce impacts to the breeding cycle of the species as well as no impact the quality or availability of habitat include preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers and the implementation of Senex's suite of management</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>There is no evidence that the Project Area supports an important population of this species. In addition, Senex has committed to not clearing any areas known to be occupied by Glossy Black-cockatoo (south-eastern) individuals or areas confirmed as potential habitat for the species. This Project is therefore unlikely to disrupt the breeding cycle of an important population, modify or decrease the availability or quality of habitat to the extent that it will cause species decline. Further, mitigation measures to reduce impacts to the breeding cycle of the species as well as no impact the quality or availability of habitat include preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers and the implementation of Senex's suite of management</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
	plans (as detailed in in Section 6 and the SSMP). It is also with the implementation of these mitigation measures, that indirect impacts are also unlikely to be significant to the species.	
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Invasive species such as Feral Cats (<i>Felis catus</i>) and European Red Foxes (<i>Vulpes vulpes</i>) are common pests encountered Queensland and are particularly harmful to native, threatened birds. This invasive species is known to occur in the Project Area. The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.	No
Introduce disease that may cause the species to decline	There is currently limited evidence of diseases causing detrimental effects on Glossy Black-cockatoo populations in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.	No
Interfere substantially with the recovery of the species	There is no formal adopted, or made, Recovery Plan for this species. Additionally, Project activities will still enable habitat to remain connected between the network of State Forests and remnant vegetation in the adjoining areas and the Project Area, ensuring the species will not be substantially interfered with if they were to land and roost within the Project Area.	No

Significant Impact: Not Significant

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

The Project in the Project Area is unlikely to result in a significant impact to the Greater Glider.

The Greater Glider was upgraded from a listing of Vulnerable to Endangered under the EPBC Act, on 5 July 2022. This species has been assessed as known to occur within the Project Area as the species was detected during spotlighting surveys of riparian woodland along Wandoan Creek and along Woleebee Creek (BOOBOOK, 2022). The updated Conservation Advice for *Petauroides volans* (Greater Glider (southern and central)) has been considered for this analysis (DCCEEW, 2022a).

Greater Glider habitat consists of tall, montane Eucalypt forests with mature hollow-bearing trees (Eyre, 2004). Eyre et al., 2022 has listed habitat for the species that are REs with confirmed Greater Glider records that contain habitat attributes such as live and dead-hollowing bearing denning trees, feed and large trees and habitat connectivity. Habitat critical to survival for the Greater Glider has been defined in *Conservation Advice for Petauroides volans (Greater Glider (southern and central))* (DCCEEW, 2022a). Greater Glider habitat within the Project Area aligns with the conservation advice description of “*large contiguous areas of Eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species’ preferred food species*”. Suitable Greater Glider foraging habitat has been identified within the Project Area based on ground-truthing of REs listed in Eyre et al. Therefore, Greater Glider habitat within the Project Area is considered habitat critical to survival of the species.

The Greater Glider was observed during spotlighting in the 2022 field investigation within mature forests with hollow bearing trees. Reviews of ALA shows only one recent record in the locality, located in the Cherwondah State Forest from 2002. Thus, species density is likely to be low in the Project Area. While there was generally a low number of records and observations of the species, it was conservatively concluded that an important population occurs in the Project Area and the surrounding landscape.

The Project has been assessed in the following ways. Initially, field investigations and mapping have designated a total of 528 ha of Greater Glider foraging habitat within the Project Area. The mapped Greater Glider foraging habitat includes mature Eucalypt woodland to open forests and woodlands to open forest associated with stream channels and rivers. From this, the first component of the layout design phase will be to avoid remnant vegetation identified as Greater Glider foraging habitat. The second component of the layout design will involve on the ground micro-siting that may result in infrastructure locations being adjusted if necessary to avoid suitable hollow bearing trees (i.e., those that contain large hollows >10 cm in diameter) that act as potential roosting and denning sites for the Greater Glider. This ensures that maximum avoidance of impact is assured for this species within the Project Area.

It must be noted that other areas currently not mapped as Greater Glider foraging habitat, may be used for movement and dispersal purposes. It is also noted that areas of foraging habitat will contain occasional hollow bearing trees that can be used for denning purposes.

Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 10-5.

Table 10-5: Significant Impact Assessment for the Greater Glider

Criteria	Description	Criteria Triggered?
<p><i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i></p>		
<p>Lead to a long-term decrease in the size of a population</p>	<p>There will be no impact to Greater Glider foraging habitat within the Project Area. Additionally, surveys will be undertaken prior to construction at proposed infrastructure locations, further avoiding any hollow-bearing trees. The Project Area is largely cleared however the avoidance of impact ensures that it will remain connected to adjacent, larger remnant forests, such as Hinchley State Forest. Climate change has been identified in the Conservation Advice as a threat to this species in the way that high temperatures and low rainfall affect the species (DCCEEW, 2022a). This includes increased night temperatures resulting in the decline of the Greater Glider. The Project will not contribute to or exacerbate the impacts of climate change on this species. This is because the Project will not fragment vegetated corridors or inhibit the Greater Glider’s ability to move across the landscape in response to potential climate change induced changes to rainfall patterns and temperatures. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and elsewhere as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex’s suite of management plans (as detailed in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species. Therefore, the Project is unlikely to lead to a long-term decrease in the size of the population.</p>	<p>No</p>
<p>Reduce the area of occupancy of the species</p>	<p>This species is predicated to have an area of occupancy of 15,960 km² (Woinarski <i>et al.</i>, 2014). Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. Furthermore, indirect impacts will be avoided through the application of environmental management measures such as the designation of ‘no go’ areas and implementation of weed and pest procedures. Therefore, the Project will not reduce the area of occupancy of the species.</p>	<p>No</p>
<p>Fragment an existing population into two or more populations</p>	<p>Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. No vegetated corridors will be severed, and HDD will be used for crossing of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered).</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p><i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i></p>		
	<p>Furthermore, given the infrastructure type, the disbursed layout of wells (averaging 500-750 m apart), burial of gathering pipes and post-construction rehabilitation of disturbed areas, light traffic movements at limited speeds, etc. will ensure that Greater Glider foraging habitat remains connected, both within and outside of the Project Area.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>The habitat for Greater Gliders within the Project Area has been concluded to be habitat critical to the survival of the species. This is because the presence of tall, mature Eucalyptus forests with hollow bearing trees, meets the criterion of being habitat necessary for foraging, breeding, roosting or dispersal of the species. Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. Therefore, the Project will not result in an adverse impact to habitat critical to the survival of the species. Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP).</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population</p>	<p>The design phase as well as micro siting will preferentially avoid hollow-bearing trees that are necessary for the successful breeding cycle of the species. Greater Gliders generally have a home range of 1-4 ha or up to 16 ha in more open forests (Henry, 1984; Eyre, 2004). The Project's small impact to Greater Glider foraging habitat, as well as the design and micro siting efforts to avoid suitable Greater Glider foraging habitat, will not reduce the home ranges of the species. Thus, the species will still be able to successfully breed in the Project Area. Furthermore indirect impacts are unlikely to disrupt the breeding cycle of a population due to the implementation of mitigation measures including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
	open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans.	
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Senex has committed to not clearing any areas known to be occupied by Greater Glider (southern and central) individuals or areas confirmed as potential habitat for the species. The habitat within the Project Area will therefore remain connected to larger remnant patches outside of the Project Area. Therefore, the avoidance of impact to Greater Glider foraging habitat will not remove/isolate or decrease the quality of habitat that would result in species decline.	No
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Invasive species such as Feral Cats and European Red Foxes are common pests encountered in Queensland and are particularly harmful to native threatened mammals. Both of these invasive species are known to occur in the Project Area. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.	No
Introduce disease that may cause the species to decline	There is currently limited evidence of diseases causing detrimental effects on Greater Glider populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.	No
Interfere with the recovery of the species	There is no formal adopted, or made, Recovery Plan for this species. However, the avoidance of clearing of remnant patches and linear areas will not effect the recovery of this species. Additionally, the Project Area will remain connected to adjacent State Forests, which are known to be habitat for Greater Gliders. This will enable the species to be able to continually traverse the landscape, ensuring genetic viability of the population.	No

Significant Impact: Not Significant

Koala (*Phascolarctos cinereus*)

The Project in the Project Area is unlikely to result in a significant impact to the Koala.

The Koala is currently listed as Endangered under the EPBC Act, as of the 12 February 2022. The Koala is generally found in temperate to tropical forests as well as woodlands and semi-arid communities dominated by Eucalyptus species (Martin and Handasyde, 1999). The species can be found in habitat broadly defined as woodlands and open forests, as long as food trees are present (DOE, 2022). The Koala has one of the broadest distributions of threatened terrestrial species under the EPBC Act with a range extending from north-eastern Queensland to the south-east corner of Southern Australia. The biological species distribution is widespread in coastal and inland areas that extends over approximately one million square kilometres (Martin & Handasyde, 1999).

Under the revised *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022c), released on 12th February 2022, habitat for the koala is described as:

Koala habitat includes both coastal and inland areas that are typically characterised by Eucalyptus forests and woodlands. Biophysical habitat attributes for the koala include places that contain the resources necessary for individual foraging, survival (including predator avoidance), growth, reproduction and movement.

Habitat critical to the survival of the species is defined as those that the species relies on to avoid or halt decline and promote the recovery of the species. Under the EPBC Act, the following factors are considered when identifying habitat that is critical to the survival of the species:

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

Koalas are known to occur within urban and rural landscapes, utilising regrowth and remnant eucalypt dominated vegetation communities for foraging and breeding resources. Targeted searches for the species were conducted in suitable habitat throughout the Project Area. The field investigations conducted throughout 2022 did not directly record an individual Koala but did find evidence of Koalas through indirect signs of scratch marks on riparian Queensland Blue Gum trees in several locations along Wandoan Creek, Woleebee Creek and a tributary of Hellhole Creek.

Due to the indirect observations of Koala in the form of scratch marks in the Project Area, it has been conservatively concluded that habitat critical to the survival of the species does occur within the Project Area. Habitat has been classified and mapped based on recent habitat guidance for the species (Youngentob et al, 2022). In this case the vegetated areas of the Project Area containing koala food trees (e.g., *E. tereticornis*, *E. populnea*, *E. crebra*, *E. longirostrata*, *E. melanophloia*, *E.*

exserta and *Corymbia citriodora subsp. variegata*) were mapped as Koala foraging and breeding habitat. This habitat mapping method and the corresponding three potential habitat types of foraging and breeding is presented in Table 10-6 Table 10-6.

Table 10-6: Koala Habitat Types within the Project Area

	Potential Foraging and Breeding Habitat	Potential Dispersal Habitat	Potential Non-koala Habitat
Description	<ul style="list-style-type: none"> ■ Any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees that also provides adequate shelter and refuge from predators. ■ This includes remnant and regrowth vegetation. 	<ul style="list-style-type: none"> ■ Part of the broader landscape that includes grass/bare ground, rural land-uses, dwellings/towns, buildings, farm dams, sealed or unsealed roads and existing rail infrastructure. ■ Contains isolated or scattered foraging or shelter trees. ■ Contains vegetation generally not used frequently for foraging, sheltering and breeding purposes by the species. 	<ul style="list-style-type: none"> ■ Not suitable habitat includes barriers defined in the DCCEE Guidelines (natural or artificial) that prevent the movement of koalas, such as mountain ranges, large water bodies or treeless areas that are greater than 2 km wide.
Presence within the Project Area	<ul style="list-style-type: none"> ■ Eucalypt woodland to open forest; ■ Woodland to open forest associated with stream channels and rivers; and ■ Open regrowth eucalypt woodland vegetation. 	<ul style="list-style-type: none"> ■ Cleared areas with occasional regrowth eucalypt woodlands along drainage lines; and ■ Vine forest/thickets and rainforest. 	<ul style="list-style-type: none"> ■ Potential non-habitat presents in the Project Area as waterways and treeless areas greater than 2km wide.
Total in the Project Area	<ul style="list-style-type: none"> ■ 698.5 ha foraging and breeding habitat 	<ul style="list-style-type: none"> ■ 9,072.6 ha dispersal habitat 	<ul style="list-style-type: none"> ■ 0 ha non-koala habitat
Total in the Disturbance Footprint	<ul style="list-style-type: none"> ■ 0 ha foraging and breeding habitat 	<ul style="list-style-type: none"> ■ Up to 530 ha dispersal habitat 	<ul style="list-style-type: none"> ■ 0 ha non-koala habitat

The impact assessment has determined the proportion of Koala habitat that will be impacted is minor compared to the total area of Koala habitat within the Project Area. This is provided in Table 10-7. Habitat mapping for the Koala is presented in Figure 4-8.

Table 10-7: Koala Habitat and Impact Quantification

Factors	Foraging and breeding habitat	Dispersal habitat
Total in the Project Area	698.5 ha	9,072.6 ha
Total in Disturbance Footprint	0 ha	Up to 530 ha
% Impacted Relative to Total in Project Area	0%	5.8%

It is noted that the wells for the Project will not inhibit Koala dispersal, and that movement opportunities will remain throughout the mapped potential dispersal habitat and potential foraging and breeding habitat. Therefore, the short-term and temporary disturbance to potential koala dispersal habitat will not result in a significant residual impact to the Koala.

It is noted that impacts within Koala dispersal habitat will be minimised using the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] but will, at times, require the unavoidable disturbance of open areas and removal of individual juvenile and non-juvenile trees and seedlings which are located within a predominantly cleared landscape. Application of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] means that individual 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. Senex has committed to not clearing any areas occupied by Koala individuals or areas confirmed as foraging or breeding habitat. Up to 530 ha of Koala dispersal habitat is unavoidable.

In respect of the impacts to dispersal habitat, the disturbance is short term and temporary with permeability remaining, such that Koalas can still access and move across the Project Area. Additionally, the proposed mitigation measures will ensure continued Koala movement is maintained, and therefore does not impede the ability for Koalas to disperse across the broader landscape.

The commitment to no impact to foraging and breeding habitat in the Project Area as well limiting impacts to 5.8% of dispersal habitat available in the Project Area has been considered as part of the comprehensive assessment for the Koala against the SIG 1.1 for an Endangered species under the EPBC Act. This is found in Table 10-8.

Table 10-8: Significant Impact Assessment for the Koala

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of a population	There will be no impact on the total available foraging and breeding habitat in the Project Area. However, there will also be an impact of up to 530 ha, or 5.8% of the total available Koala habitat within the Project Area. Nonetheless, the impact to habitat will be short-term and will ensure Koala movement is not impeded, as the infrastructure will not impact landscape permeability. Climate change has been identified in the Conservation Advice as a threat to the species in the way that increased frequency and intensity of droughts and high temperatures, increasing prevalence of weather	No

Criteria	Description	Criteria Triggered?
<p><i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i></p>		
	<p>conditions to promote bushfires and shrinking climatically suitable areas will impact the Koala (DAWE, 2022c). The Project will not contribute to or exacerbate the impacts of climate change on this species. This is because the activities involved with the Project will not fragment vegetated corridors or inhibit the Koala's ability to move across the landscape in response to potential climate change induced changes to temperatures, rainfall and bushfire patterns. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in in Section 6 and the SSMP) will ensure that impacts are further minimised to the species. Therefore, it is unlikely that the impacts to Koala habitat will lead to a decrease in the size of a koala population.</p>	
<p>Reduce the area of occupancy of the species</p>	<p>The Project will not reduce the Koala foraging and breeding habitat within the Project Area. Therefore, the impact will not lead to a reduced area of occupancy of the species. The area of occupancy for the Koala is 19,428 km² as of mapping and records from 2000 from state governments and CSIRO (DAWE, 2020). Thus, the clearing of a relatively small area of Koala habitat and the nature of the Project infrastructure and activities is unlikely to reduce the area of occupancy for the species.</p>	<p>No</p>
<p>Fragment an existing population into two or more populations</p>	<p>The Project will not fragment existing populations as the Project will not reduce the Koala foraging and breeding habitat within the Project Area and dispersal function will be maintained across the Project Area. No vegetated corridors will be severed and HDD will be used for crossing of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered). Furthermore, given the infrastructure type, the disbursed layout of wells (averaging 500-750m apart), burial of gathering pipes and post-construction rehabilitation of disturbed areas, light traffic movements at limited speeds, etc it is expected that the Koala will still be able to disperse across tracks and small cleared areas once construction has been completed in each area.</p>	<p>No</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p>The foraging and breeding, and dispersal habitat for Koala, has been mapped to occur within the Project Area, and is regarded as habitat critical to the survival of the species.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
	<p>Senex has committed to not clearing any areas confirmed as Koala individuals or areas confirmed as potential habitat for the threatened species, except for Koala dispersal habitat (530 ha) (5.8%). Therefore, the Project will not adversely affect habitat critical to the survival of the species. The vast majority of the Koala foraging and breeding habitat will be retained within the existing riparian corridors and areas of remnant and regrowth open Eucalypt forest and woodlands. Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in in Section 6 and the SSMP).</p>	
<p>Disrupt the breeding cycle of a population</p>	<p>The impacts of the Project will only result in a short-term disturbance 5.8% of the available Koala dispersal habitat in the Project Area. The home range for the Koala is highly variable, however evidence suggest it can range from anywhere between 3 to 500 ha (Wilmott, 2020). Evidence of Koalas being present within the Project Area has been found on few occasions (scratch marks) and suggests a low-density population.</p> <p>The removal of such a small proportion (0.1%) of the local Koala breeding habitat is unlikely to disrupt the breeding cycle of this species. Furthermore indirect impacts are unlikely to disrupt the breeding cycle of a population due to the implementation of mitigation measures including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
<p>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>The Project will only reduce the Koala foraging and breeding habitat within the Project Area by 0.1% and dispersal function will be maintained. Mitigation measures implemented, as part of the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001], will also ensure that the Project will not modify, destroy or decrease the availability or quality of potential habitat to the extent that the species will decline. Such measures include preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in in Section 6 and the SSMP) will ensure that impacts are further minimised to the species. It is also with the implementation of these mitigation measures, that indirect impacts are also unlikely to be significant to the species.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Invasive species such as Wild Dogs (<i>Canis familiaris</i>), Feral Cats and European Red Foxes are common pests encountered in Queensland and Wild Dogs are particularly harmful to Koalas. These invasive species are known to occur in the Project Area. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area. Furthermore, it is unlikely that the Project will result in any increase in Wild Dog abundance.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline</p>	<p>Koala populations are known to be impacted by diseases, specifically koala retrovirus (KoRV) and Chlamydia (<i>Chlamydia pecorum</i>) and myrtle rust which affects koala feed trees and therefore habitat. There is no evidence to suggest the construction and/or operational activities would introduce a disease, such as Chlamydia, that would cause the species to be at risk of illness and subsequent population decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur, as detailed in the Biosecurity Management Plan. This includes following biosecurity measures and ensuring proper personal</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:		
	protection equipment (PPE) is worn by any fauna spotter catcher workers.	
Interfere with the recovery of the species	<p>The interim recovery objectives for the Koala are:</p> <ul style="list-style-type: none"> ■ Protect and conserve the quality and extent of habitat refuges for the persistence of the species during droughts and periods of extreme heat, especially in riparian environments and other areas with reliable soil moisture and fertility; and ■ Maintain the quality, extent and connectivity of large areas of Koala habitat surrounding habitat refuges. <p>The Project will not result in an impact to Koala foraging and breeding habitat and only result in a relatively small impact to Koala dispersal habitat within the Project Area (5.8%).</p> <p>Therefore, the Project will not interfere with the recovery objectives for the species.</p>	No

Significant Impact: Not Significant

Ooline (*Cadellia pentastylis*)

The Project in the Project Area is unlikely to result in a significant impact to Ooline.

Ooline is currently listed as Vulnerable under the EPBC Act, as of 16 July 2000. Habitat for Ooline is made up of 118.7 ha of habitat consisting of relatively narrow remnant and regrowth patches in the far south of the Project Area. During field surveys, Ooline was observed in the adjoining areas (10 km buffer) and in addition, the desktop searches showed four additional records within the Project Area and another six within the 10 km buffer adjoining areas. During the 2023 field surveys, 35 individuals were recorded within the eastern portion of the Hillandale property, adjacent to existing Ooline records. The individuals identified had ranged from juveniles to mature plants from 1 to 18 metres in height, occurring in mostly cleared agricultural land (Attexo, 2023).

Habitat for Ooline which totals 118.7 ha will be avoided by the Project. Additionally, surveys will be undertaken within and immediately surrounding the disturbance footprint to ensure that stands and isolated patches of Ooline (including a 20 m buffer), if present, are avoided. Additionally, as stated, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas as part of the application of the Project's mitigation measures to ensure that if any individual plants are present. A significant impact assessment based on guidance provided in the SIG 1.1 for Vulnerable species, is presented in Table 10-9. Mapping for this species is presented in Figure 4-4.

Table 10-9: Significant Impact Assessment for Ooline

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	Habitat for Ooline which totals 118.7 ha will be avoided by the Project.	No
Reduce the area of occupancy of an important population	Site ecology surveys (undertaken in accordance with the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] will confirm the location of any individuals present within each proposed disturbance location so they can be avoided. Therefore, the Project will not lead to a decrease in the size of, reduce the area of occupancy of, or fragment an important population of Ooline.	No
Fragment an existing important population into two or more populations		No
Adversely affect habitat critical to the survival of a species	Habitat for Ooline which totals 118.7 ha will be avoided by the Project. Senex has committed to avoiding all individual plants (should any be found to occur within or adjacent to the proposed disturbance footprints). Additionally, surveys will be undertaken in all proposed disturbance areas to ensure that individual Ooline plants, if present, are avoided. The initial avoidance of habitat in the design phase, as well as further on the ground detailed surveys to avoid Ooline populations during construction will not result in any adverse impacts to habitat critical to the survival of this species.	No
Disrupt the breeding cycle of an important population	Habitat for Ooline which totals 118.7 ha will be avoided by the Project. Senex has committed to avoiding all individual plants (should any be found to occur within or adjacent to the proposed disturbance footprints).	No
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Pre-clearance ecology surveys (undertaken in accordance with the Atlas Stage 3 Environmental Constraints Protocol for Planning and Field Development [OPS-ATLS-EN-PLN-001] will confirm the location of any individuals present within each proposed disturbance location so they can be avoided. The small amounts of clearing in the larger context of the landscape will not remove/isolate or decrease the quality of habitat that would result in the species decline.	No

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Given the disturbed nature of the Project Area, and from field surveys efforts conducted in 2022 and 2023, weed species are known to occur. Two WoNS species, Common Pest Pear (<i>Opuntia stricta</i>) and Velvety Tree Pear (<i>Opuntia tomentosa</i>), were recorded within the Project Area at moderate densities in Brigalow woodland, and an additional five WoNS species are considered to have a potential to occur within the Project Area. However, vehicle hygiene procedures will be implemented to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to disturbance.	No
Introduce disease that may cause the species to decline	The construction and operation of the infrastructure is unlikely to lead to introduction or spread of a disease relevant to the species.	No
Interfere substantially with the recovery of the species	The construction and operation of the infrastructure is unlikely to substantially interfere with the recovery of the species. Up to 12 months prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of threatened species will be undertaken by a suitably qualified person. Infrastructure will avoid Ooline habitat and individual Ooline plant locations. Ooline will continue to be able to propagate in areas around the infrastructure and therefore the recovery of the species will not be impacted.	No

Significant Impact: Not Significant

White-throated Needletail (*Hirundapus caudacutus*)

The Project in the Project Area is unlikely to result in a significant impact to the White-throated Needletail.

The White-throated Needletail is currently listed as Vulnerable under the EPBC Act, as of 4 July 2019, as well as being listed as Migratory and Marine. This species has been assessed as known to occur within the Project Area. The White-throated Needletail was not observed during field investigations for the current Project, however, was observed within the Project Area during subsequent field surveys for Senex on 24 November 2022 (Cunningham, M pers. comm.). A flock of eight birds were observed flying low near Weldon's Road, there is one record within the Cherwondah State Forest from 2002.

This species is predominantly aerial when on migration in Australia, occasionally stopping to roost in large patches of rainforest, wooded vegetation and open Eucalypt forests (Coventry, 1989; Higgins, 1999), generally associated with elevated areas. While occasional aerial observations occur for this species, the Project Area is unlikely to contain important foraging habitat for the species. Additionally, no threshold area for important habitat for this species can be determined at present and has not been identified (TSSC, 2019). The Project Area contains no rainforests and no elevated open forests with dense foliage that could be used for occasional roosting. While flights over the Project Area may occur from time to time, only elevated areas are regarded as roosting habitat. Thus, potential habitat has not been mapped for this species, and so no impact area has been calculated.

The significant impact guidance for Vulnerable species in SIG 1.1, refers to impacts to ‘important populations’ of a species (DoE, 2013). Important population is defined as a population that is necessary for a species’ long-term survival and recovery. This may include populations identified in recovery plans and/or are:

- Key source populations either for breeding or dispersal;
- Populations that are necessary for maintaining genetic diversity; and/or
- Populations that are near the limit of the species’ range (DoE, 2013).

This species was conservatively concluded to be an important population in the Project Area and the surrounding landscape due to the following reasons. Firstly, there is an absence of detailed population data for the Project Area, and it was recorded within the Project Area in 2022. However, as the White-throated Needletail is a largely aerial species, and the lack of habitat in the Project Area, a significant impact to this species is considered unlikely.

Based on this information, a significant impact assessment in accordance with the SIG 1.1 for a Vulnerable species is presented in Table 10-10.

Table 10-10: Significant Impact Assessment for the White-throated Needletail

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the White-throated Needletail. This is because there is no roosting habitat available, it is likely to be an occasional flyover, and the Project Area is not an important stopover point supporting an ecologically important number of migrating birds.	No
Reduce the area of occupancy of an important population	There will be no impact to White-throated Needletail foraging or roosting habitat within the Project Area. Additionally, this species is almost exclusively aerial when on migration in Australia.	No
Fragment an existing important population into two or more populations	It is unlikely that the Project will lead to a long-term decrease in the size of, reduce the area of occupancy of, or fragment an important population. Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex’s suite of management plans (as detailed in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species.	No

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Adversely affect habitat critical to the survival of a species	<p>There is no evidence that the Project Area supports habitat critical to the survival of these species.</p> <p>There will be no impact to White-throated Needletail foraging or roosting habitat within the Project Area. Additionally, this species exhibits highly aerial behaviours when on migration in Australia, stopping only occasionally to roost in elevated wooded areas, and so is unlikely to settle in the Project Area. It is unlikely that habitat critical to the survival of this species will be adversely affected.</p>	No
Disrupt the breeding cycle of an important population	The White-throated Needletail does not breed in Australia, and therefore the Project will not disrupt the breeding cycle of an important population.	No
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	This species is almost exclusively aerial when on migration in Australia and so is unlikely to settle in the Project Area. This Project is unlikely to modify or decrease the availability or quality of habitat to the extent that it will cause species decline.	No
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Invasive species such as Feral Cats and European Red Foxes are common pests encountered in Queensland and are particularly harmful to native, threatened birds such as the White-throated Needletail. Both of these invasive species are known to occur in the Project Area. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.	No
Introduce disease that may cause the species to decline	There is currently limited evidence of diseases causing detrimental effects on White-throated Needletail populations. There is also no evidence to suggest the Project would introduce or spread a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.	No

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Interfere substantially with the recovery of the species	There is no formal adopted, or made, Recovery Plans for this species. However, small and spread amount of clearing of remnant patches and linear areas, will not affect the recovery of this species. Additionally, the Project Area will remain connected to adjacent State Forests. While this species is predominately aerial, Project activities will still enable habitat to remain connected between the network of State Forests and remnant vegetation in the adjoining areas and the Project Area, ensuring the species will not be substantially interfered with if they were to land and roost within the Project Area.	No

Significant Impact: Not Significant

Listed Threatened Species with Potential to Occur

Australian Painted Snipe (*Rostratula australis*)

The Project in the Project Area is unlikely to result in a significant impact to the Australian Painted Snipe

The Australian Painted Snipe is currently listed as Endangered and Marine under the EPBC Act, effective 15 May 2013. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

The Australian Painted Snipe inhabits shallow, freshwater wetlands (occasionally brackish) and in ephemeral and permanent waterbodies (i.e., lakes, swamps, claypans, grassland / saltmarsh, dams, rice crops, sewage farms and bore drains), particularly for foraging activities (DCCEEW, 2022c). Potential habitat for the species can be found in all states and territories in Australia. Breeding habitat for the Australian Painted Snipe consists of shallow wetlands with bare mud and both upper parts of the understorey (i.e., shrubs and tall grasses) and canopy cover nearby. Majority of nest records have been recorded from or near small islands within freshwater wetlands, however these can also occur in/near swamps (including cane grass swamps), within flooded areas, in ground cover of water-buttions and grasses, at the base of tussocks, and under low saltbush (DSEWPaC, 2013).

The Project Area includes several small patches of suitable foraging habitat for the Australian Painted Snipe within the ephemeral wetlands on drainage lines; however, potential habitat within the far south-eastern corner of the Project Area will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 79 km north of the Project Area, recorded in cleared non-native vegetation near Bellington Hut State Forest. The record does not list the record date.

The Project Area encompasses 69.7 ha of suitable foraging habitat for the Australian Painted Snipe. Senex has committed to not clearing any areas known to be occupied by Australian Painted Snipe individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 10-11.

Table 10-11: Significant Impact Assessment for the Australian Painted Snipe

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of a population	<p>The Project Area is unlikely to support an important population of the Australian Painted Snipe, as the Project is located outside of the known important areas for the species, and as there are currently no known records of the species within the Project Area or within 79 km of the Project Area.</p> <p>Senex has committed to not clearing any areas known to be occupied by Australian Painted Snipe individuals or areas confirmed as potential habitat for the threatened species. It is therefore unlikely that the Project will lead to a long-term decrease in the size of, reduce the area of occupancy of, or fragment a population.</p> <p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (and as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species.</p>	No
Reduce the area of occupancy of the species		No
Fragment an existing population into two or more populations		No
Adversely affect habitat critical to the survival of a species	<p>There is no evidence that the Project Area supports habitat critical to the survival of these species. There will be no disturbance to Australian Painted Snipe foraging habitat.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP).</p> <p>It is therefore unlikely that habitat critical to the survival of this species will be adversely affected.</p>	No
Disrupt the breeding cycle of a population	<p>There is no evidence that the Project Area supports an important population of this species. Additionally, the Project Area does not contain suitable breeding habitat for the species. Therefore, this Project is unlikely to disrupt the breeding cycle of an important population.</p>	No

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline	Senex has committed to not clearing any areas known to be occupied by Australian Painted Snipe individuals or areas confirmed as potential habitat for the threatened species. The habitat within the Project Area will therefore remain connected to larger patches of potential habitat outside of the Project Area. Therefore, the Project is unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline.	No
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Invasive species such as Feral Cats and European Red Fox are common pests encountered Queensland and are particularly harmful to native, threatened birds. This invasive species is known to occur in the Project Area. The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.	No
Introduce disease that may cause the species to decline	There is currently no known evidence suggesting the Australian Painted Snipe is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.	No
Interfere with the recovery of the species	The interim recovery objectives for the Australian Painted Snipe include: <ul style="list-style-type: none"> ■ "Sustain a positive population trend (compared to the 2020 baseline counts) in the number of mature individuals of the Australian Painted Snipe." (DCCEEW, 2022c) Senex has committed to not clearing any areas known to be occupied by Australian Painted Snipe individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering RoW helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area.	No

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
	Therefore, the Project does not interfere with the recovery objectives for the species	

Significant Impact: Not Significant

Belson's Panic (*Homopholis belsonii*)

The Project in the Project Area is unlikely to result in a significant impact to Belson's Panic.

Belson's Panic (*Homopholis belsonii*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this flora species has the potential to occur within the Project Area, as potential habitat is present, and the species has been recorded within the 10 km buffer.

Belson's Panic occurs at elevations ranging from 200 m to 520 m above sea level. It is known to occur in dry woodland habitats on poor soils, such as those derived from basalt. It occurs on rocky hills supporting White Box (*Eucalyptus albens*) and in Wilga (*Geijera parviflora*) woodland; flat to gently undulating alluvial areas supporting Belah (*Casuarina cristata*); and soils and plant communities of Poplar Box (*Eucalyptus populnea*) woodlands.

It may also be associated with shadier areas of Brigalow (*Acacia harpophylla*), Myall (*A. melvillei*), and Weeping Myall (*A. pendula*) communities; in Mountain Coolibah (*Eucalyptus orgadophila*) communities; and on roadsides. It is generally found among fallen timber at the base of trees or shrubs, among branches and leaves of trees hanging to ground level or along the bottom of netting fences. The distribution of this species overlaps with the "Brigalow (*Acacia harpophylla* dominant and co-dominant)" EPBC Act-listed threatened ecological community (DEWHA, 2008b).

The Project Area includes several small patches of potential habitat for Belson's panic in Eucalypt dominated woodlands, particularly *Eucalyptus crebra*, *E. populnea* and *E. melanophloia*, and Acacia woodlands dominated by Brigalow (*Acacia harpophylla*). The flora species has not been previously recorded within the Project Area; however, there is one record of the species within 10 km of the Project Area. This record is located 2 km north of the Project Area and was recorded in Eucalyptus open forests with a shrubby understorey in 2007.

The Project Area contains a total of 366.3 ha of potential habitat for Belson's Panic. Senex has committed to preferentially avoiding any areas confirmed with Belson's Panic individuals or areas confirmed as habitat for the threatened species. Senex has also committed to avoiding, relocating or reinstating any individual Belson's Panic (grass) plants (should any be found to occur within proposed disturbance footprints).

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-12.

Table 10-12: Significant Impact Assessment for Belson's Panic

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	Belson's Panic was not recorded during the 2022 field surveys of the Project Area, and no historical records of the species exists within the Project Area. However, there is one record of the species 2 km north of the Project Area, recorded in 2007.	No
Reduce the area of occupancy of an important population	The Project Area contains 366.3 ha of suitable Belson's Panic habitat, and Senex has committed to preferentially avoiding any areas confirmed with Belson's Panic individuals or areas	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Fragment an existing important population into two or more populations</p>	<p>confirmed as habitat for the threatened species. Additionally, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas. Senex has also committed to avoiding, relocating or reinstating any individual Belson's Panic (grass) plants (should any be found to occur within proposed disturbance footprints).</p> <p>It is therefore unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.</p> <p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species.</p>	<p>No</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p>There are limited areas of potential habitat for this species in the form of isolated patches of Brigalow and Poplar Box open forests and woodlands scattered throughout the Project Area. A large patch located within the far south-eastern corner of the Project Area will be avoided by the Project.</p> <p>Senex has committed to preferentially avoiding any areas confirmed with Belson's Panic individuals or areas confirmed as habitat for the threatened species. Additionally, the species has the ability to recolonise in cleared or highly disturbed areas (Menkins, 1998). Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>A total of 366.3 ha of Belson's Panic potential habitat is scattered throughout the Project Area. Of which, a large patch located within the far south-eastern corner of the Project Area will be avoided by the Project. Additionally, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas to ensure that if any individual plants are present, they can be avoided, relocated or reinstated (should any be found to occur within proposed disturbance footprints).</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Belson's Panic flowers from February to May and November to December, with fruiting typically recorded to occur in February. The species has the ability to recolonise in cleared or highly disturbed areas (Menkins, 1998). The small amounts of clearing in the larger context of the landscape will not</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>remove/isolate or decrease the quality of habitat that would result in the species decline.</p>	
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Given the disturbed nature of the Project Area, and from field surveys efforts conducted in 2022 and 2023, weed species are known to occur. Two WoNS species, Common Pest Pear and Velvety Tree Pear, were recorded within the Project Area at moderate densities in Brigalow woodland, and an additional five WoNS species are considered to have a potential to occur within the Project Area. However, vehicle hygiene procedures will be implemented to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to disturbance.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There are currently no known diseases to impact the Belson's Panic. The construction and operation of the infrastructure is unlikely to lead to introduction of a disease relevant to the species.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no formal adopted, or made, Recovery Plans for this flora species. Senex has committed to not clearing any areas confirmed with Belson's Panic individuals or areas confirmed as habitat for the threatened species.</p> <p>The construction and operation of the infrastructure is unlikely to substantially interfere with the recovery of the species. Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of threatened species will be undertaken by a suitably qualified person. Infrastructure will preferentially avoid threatened species locations.</p>	<p>No</p>

Significant Impact: Not Significant

Brown Treecreeper (*Climacteris picumnus victoriae*)

The Project in the Project Area is unlikely to result in a significant impact to the Brown Treecreeper

Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) is currently listed as vulnerable under the EPBC Act, effective 3 March 2023. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present (in Section 6 and the SSMP).

The Brown Treecreeper (south-eastern) inhabits dry open eucalypt forests and woodlands, predominantly those dominated by stringybarks or other rough-barked eucalypt species. Favourable habitat for the species must be subjected to a form of ongoing disturbance (i.e., historically Indigenous burning practices) to prevent the ground layer from becoming too dense and uniform, leading to unfavourable habitat (DCCEEW, 2023a).

The species breeds and roosts in open dry eucalypt forest and woodlands with hollows, in either live trees, dead standing trees or tree stumps (considered essential for nesting). Brown Treecreeper (south-eastern) forage for invertebrates on-ground and in mature, live and/or dead trees (Bounds, 2019), with suitable foraging habitat for the species consisting of forests and woodlands with an open, grassy understorey, in which areas with fallen timber provide greater foraging opportunities (DCCEEW, 2023a). The Project Area includes several patches of potential habitat for the Brown Treecreeper, however the large portion of potential habitat in the far south-eastern corner of the Project Area will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 195 km west of the Project Area, recorded in Blue grass (*Dichanthium*) and tall bunch grass (*Chrysopogon*) tussock grasslands near Barabanbel State Forest in 1960.

The Project Area encompasses 272.1 ha of potential habitat for the Brown Treecreeper. Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-13.

Table 10-13: Significant Impact Assessment for Brown Treecreeper

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the Brown Treecreeper, as there are currently no known records of the species within the Project Area or within 195 km of the Project Area.	No
Reduce the area of occupancy of an important population	Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species. Therefore, as the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.	No
Fragment an existing important population into two or more populations	Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Habitat critical to the survival of the Brown Treecreeper consists of any known or likely habitat. Therefore, the Project Area does contain habitat critical to the species survival. however, Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species. Therefore, it is unlikely the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>The species roosts and breeds in dry open eucalypt forests that contain hollow in living and/or dead standing trees. The riparian eucalypt open forests and woodlands within the Project Area contain abundant hollows, including the far south-east corner, which will be avoided by the Project. Habitat features including hollows and loose timber will be avoided or relocated using appropriate removal and translocation methods. Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species, and as such, the Project is unlikely to disrupt the breeding cycle of an important population.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species. Therefore, as the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Brown Treecreepers are threatened by invasive species common in Queensland, including Feral Cats, European Red Fox, European Rabbits (<i>Oryctolagus cuniculus</i>) and Noisy Miners (<i>Manorina melanocephala</i>). Although the Noisy Miner are a native species, the introduction of them into Brown Treecreeper habitat may drive the Brown Treecreeper out of the habitats (if utilised).</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Introduce disease that may cause the species to decline, or</p>	<p>There is currently no known evidence suggesting the Brown Treecreeper is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no recovery plan for this species, although a recovery plan is required. Senex has committed to not clearing any areas known to be occupied by Brown Treecreeper individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Collared Delma (*Delma torquata*)

The Project in the Project Area is unlikely to result in a significant impact to the Collared Delma

The Collared Delma (*Delma torquata*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

The Collard Delma occurs in eucalypt dominated woodland and open forest habitats, particularly where suitable micro-habitats (e.g., exposed rocky outcrops) are present (DEWHA, 2008c). The species inhabits ground cover dominated by native grasses (e.g., Kangaroo Grass, Barbed Wire Grass, Wiregrass and Lomandra) (Peck & Hobson, 2007).

The Project Area includes several patches of potential habitat for the Collared Delma, particularly within the far south-eastern corner of the Project Area. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known records of the species are located approximately 113 km north-west of the Project Area, near Bellington Hut State Forest in Eucalyptus open forests with a grassy understorey in 2001 and 2020.

The Project Area encompasses 259.7 ha of potential habitat for the Collared Delma. Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-14.

Table 10-14: Significant Impact Assessment for Collared Delma

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the Collared Delma, as there are currently no known records of the species within the Project Area or within 113 km of the Project Area.	No
Reduce the area of occupancy of an important population	Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species. Therefore, as the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.	No
Fragment an existing important population into two or more populations	Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species.	No
Adversely affect habitat critical to the survival of a species	Surface rocks are considered critical habitat features to the survival of the Collared Delma. Other critical habitat has not been defined for the species. Habitat features including surface rocks will be avoided or relocated using appropriate removal	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>and translocation methods. Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures, including pre-clearance surveys, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP). It is therefore unlikely that habitat critical to the survival of this species will be adversely affected.</p>	
<p>Disrupt the breeding cycle of an important population</p>	<p>There is no evidence to suggest the Project Area contains an important population of the Collared Delma, as the species has not been previously recorded within the area and the closest known record is located 113 km south-west of the Project Area in Bellington Hut State Forest. Therefore, the Project is considered unlikely to disrupt the breeding cycle of an important population.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species. As the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>The main threatening invasive species to the Collared Delma is Dwarf Lantana (<i>Lantana montevidensis</i>), however the weed species was not recorded during the 2022 field surveys. Vehicle hygiene procedures will be implemented to minimise the risk of introducing weed species that may threaten the Collared Delma.</p> <p>Additionally, the Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area. Therefore, through the correct implementation of biosecurity measures, it is considered unlikely that the Project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Introduce disease that may cause the species to decline, or</p>	<p>There is currently no known evidence suggesting the Collared Delma is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no recovery plan for this species, although a recovery plan is required. Senex has committed to not clearing any areas known to be occupied by Collared Delma individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

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

The Project in the Project Area is unlikely to result in a significant impact to the Corben's Long-eared Bat.

Corben's Long-eared Bat (*Nyctophilus corbeni*) is currently listed as Vulnerable under the EPBC Act, effective 4 April 2001. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

Within its distribution, Corben's Long-eared Bat inhabits inland woodlands, including box, ironbark, cypress-pine woodlands (particularly in Queensland), Buloke woodlands, Brigalow woodland, Belah woodlands, smooth-barked apple woodland, river red gum forest, black box woodland, and various types of tree mallee (TSSC, 2015a). The species is most abundant in extensive woodlands, rather than smaller patches and in habitats with distinct tree canopy, dense and cluttered understoreys (Turbill & Ellis, 2006).

Little information is publicly available on the species breeding behaviours and habitats. However, foraging and roosting habitat likely consists of forests and woodlands dominated by *Allocasuarina luehmannii*, *Acacia harpophylla*, *Casuarina cristata*, *Eucalyptus camaldulensis*, and various other types with dead hollow-bearing trees or trees with exfoliating bark. Roosting occurs within dead trees including ironbark, cypress and bull oak, and occasionally under peeling bark. Foraging only habitats consist of remnant and regrowth vegetation and low woodlands.

The Project Area includes several patches of potential habitat for Corben's Long-eared Bat within the southern portion of the Project Area only. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 28 km south-east of the Project Area, recorded in Eucalyptus woodlands with a shrubby understorey in 2002.

The Project Area encompasses 259.6 ha of potential habitat for Corben's Long-eared Bat. Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-15.

Table 10-15: Significant Impact Assessment for Corben's Long-eared Bat

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the Corben's Long-eared Bat, as there are currently no known records of the species within the Project Area or within 28 km of the Project Area.	No
Reduce the area of occupancy of an important population	Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species. Therefore, as the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.	No
Fragment an existing important population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Critical habitat to the survival of the Corben's Long-eared Bat has not been defined in Queensland. The southern populations of the species (in Victoria) appear to rely on old-growth vegetation as a critical component to their distribution, however there is no evidence to suggest this is the case in Queensland.</p> <p>Additionally, Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p> <p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>The Project Area is unlikely to support an important population of the Corben's Long-eared Bat. The species inhabits a wide range of inland woodland vegetation; however, breeding habitats have not been specified for the species. Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. In addition, Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species. It is therefore unlikely that the Project will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Predation of the Corben's Long-eared Bat by invasive species has not been demonstrated previously and the risk is unknown, however is considered a potential threat. It is likely that potential predation (if demonstrated) will be by Feral Cats and European Red Fox, which are known to occur in the Project Area and vicinity, respectively.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area. Therefore, it is considered unlikely that the Project will result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
<p>Introduce disease that may cause the species to decline</p>	<p>There is currently no known evidence suggesting the Corben's Long-eared Bat is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no recovery plan for this species, although a recovery plan is required. Senex has committed to not clearing any areas known to be occupied by Corben's Long-eared Bat individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests. Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Diamond Firetail (*Stagonopleura guttata*)

The Project in the Project Area is unlikely to result in a significant impact to the Diamond Firetail.

Diamond Firetail (*Stagonopleura guttata*) is listed as Vulnerable under the EPBC Act effective 31 March 2023. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

Diamond Firetails prefer habitats with relatively low tree density, minimal large logs and little litter cover. However, these habitats must include high grass cover for foraging, roosting and breeding (Antos et al., 2008).

Foraging habitat for the Diamond Firetail consists of grassy understoreys of open woodlands dominated by *Eucalyptus* spp., *Acacia* spp., and/or *Casuarina* spp., where the species forages exclusively on the ground for ripe grass, herb seeds, green leaves and insects (DCCEEW, 2023b). Diamond Firetail have also been recorded to occur in farmland and grassland with scattered trees (Higgins et al., 2007).

The species roosts in dense shrubs or smaller nests built especially for roosting. Breeding 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.

The Project Area includes several patches of potential habitat for Diamond Firetail throughout the Project Area however the large portion of potential habitat in the far south-eastern corner of the Project Area will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 14 km south-east of the Project Area, in cleared non-native vegetation near Gurulmundi State Forest in 2019.

The Project Area encompasses 1,287.4 ha of potential habitat for Diamond Firetail. Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as potential habitat for the threatened species. The current habitat mapping includes wooded areas that could be used for roosting.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-16.

Table 10-16: Significant Impact Assessment for Diamond Firetail

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	The Project Area is unlikely to support an important population of the Diamond Firetail, as there are currently no known records of the species within the Project Area or within 10 km of the Project Area. The closest record is located in a state forest approximately 14 km south-east of the Project Area.	No
Reduce the area of occupancy of an important population	Diamond Firetails are sedentary birds, only occasionally moving locally, therefore, as no populations have been found within the Project Area or within 10 km of the Project Area, it is considered unlikely that the Project will sustain an important population.	No
Fragment an existing important population into two or more populations	Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>potential habitat for the threatened species. Therefore, as the species has not been recorded within the vicinity and there is no disturbance impact, it is considered unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.</p> <p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, weed washdowns, and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Habitat critical to the survival of the Diamond Firetail consists of eucalypt, acacia or casuarina woodlands, open forests, and lightly timbered habitats, within which, low tree density, few large logs, and little litter cover but high grass cover are critical habitat features.</p> <p>Habitat features including logs will be preferentially avoided or relocated using the appropriate removal and translocation methods. Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as potential habitat for the threatened species. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p> <p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>The Project Area is unlikely to support an important population of the Diamond Firetail. The species inhabits eucalypt, acacia and/or casuarina woodlands and open forests, which are present within the Project Area. Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as potential habitat for the threatened species. Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. It is therefore unlikely that the Project will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Diamond Firetail are threatened by invasive species common in Queensland, including European Rabbits, Pied Currawongs (<i>Strepera graculina</i>) and Noisy Miners.</p> <p>Although the Noisy Miner is a native species, it is considered an aggressive species and may drive the Diamond Firetail out of their habitats (if utilised). However Noisy Miner were not recorded during the field surveys.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline</p>	<p>There is currently no known evidence suggesting the Diamond Firetail is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species</p>	<p>There is no recovery plan for this species, although a recovery plan is required. Senex has committed to not clearing any areas known to be occupied by Diamond Firetail individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Dunmall's Snake (*Furina dunmalli*)

The Project in the Project Area is unlikely to result in a significant impact to the Dunmall's Snake.

Dunmall's Snake (*Furina dunmalli*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

Dunmall's Snake inhabits open forests, dominated by Brigalow (*Acacia harpophylla*), Wattles (*A. burowii*, *A. deanii*, *A. leiocalyx*), native Cypress (*Callitris* spp.) and/or Bulloak (*Allocasuarina luehmannii*), and woodlands on floodplains associated with deep, cracking clays and clay loam soils (Covacevich et al., 1988, Cogger et al., 1993). The species is thought to be nocturnal, seeking fallen timber and in soil cracks for shelter (DoE, 2014a).

The Project Area includes several patches of potential habitat for Dunmall's Snake within the southern portion of the Project Area only. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 14 km south-west of the Project Area, in Brigalow (*Acacia harpophylla*) forests and woodlands near Yuleba State Forest in 2009.

The Project Area encompasses 259.7 ha of potential habitat for Dunmall's Snake. Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-17.

Table 10-17: Significant Impact Assessment for Dunmall's Snake

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	Dunmall's Snake was not recorded within the Project Area during the 2022 field surveys, and the species has not been previously recorded within the area. The closest Dunmall's Snake record is located in Yuleba State Forest, 14 km south-west of the Project Area. Therefore, it is unlikely an important population of the species is present within the Project Area.	No
Reduce the area of occupancy of an important population	Additionally, there is limited habitat within the Project Area with abundant litter, rocks and woody debris, located in the southern portion of the Project Area. This suitable habitat is largely located within the far south-eastern corner which will be avoided by the Project.	No
Fragment an existing important population into two or more populations	Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species. A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of	No

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	occupancy of an important population and fragment an existing important population of Dunmall's Snake.	
Adversely affect habitat critical to the survival of a species	Critical habitat for the species has not been defined in the conservation advice, and there is limited habitat within the Project Area (consisting of rocks, litter and woody debris), of which a large portion in the far south-eastern corner will be avoided by the action. Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species. Additionally, there is abundant available habitat within the surrounding locality, including State Forests. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of the Dunmall's Snake.	No
Disrupt the breeding cycle of an important population	It is unlikely an important population of the species is present within the Project Area. There is limited habitat within the Project Area (consisting of rocks, litter and woody debris), of which a large portion in the far south-eastern corner will be avoided by the action. Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species. A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be conducted to survey potential refuge sites (woody debris) for the species and ensure the species is not harmed by the Project if present. It is considered unlikely the Project will disrupt the breeding cycle of an important population of Dunmall's Snake.	No
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	There is limited habitat within the Project Area, with any suitable habitat for the species located in the southern portion of the Project Area. In which, this suitable habitat is largely located within the far south-eastern corner that will be avoided by the Project. Remaining available habitat is located in the south-western corner and in a central area of the southern Project Area. There is 259.7 ha of suitable habitat for the Dunmall's snake. Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species. Additionally, there is suitable habitat for the species located in the surrounding locality, including state forests. As such, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	No

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Predation and habitat occupation by invasive animals is a potential threat to Dunmall's Snake.</p> <p>Weed invasion is not a known threat to the species. Feral predators may be a threat to the species and are likely present to some degree in the landscape.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	No
Introduce disease that may cause the species to decline, or	<p>There is currently no known evidence suggesting Dunmall's Snake is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.</p>	No
Interfere substantially with the recovery of the species.	<p>There is no recovery plan for this species, and a recovery plan is not required. The approved conservation advice specifies the following priority actions applicable to the Dunmall's Snake (DoE, 2014a):</p> <ul style="list-style-type: none"> ■ Protect and monitor known populations and identify threats; ■ Develop a fire management strategy for known populations and habitat; ■ Minimise adverse impacts from land use including road widening and maintenance; ■ Identify and control threatening weeds in Dunmall's snake habitat. <p>Senex has committed to not clearing any areas known to be occupied by Dunmall's Snake individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p>	No

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	Therefore, the Project will not interfere with the recovery of the species.	
Significant Impact: Not Significant		

Five-clawed Worm-skink (*Anomalopus mackayi*)

The Project in the Project Area is unlikely to result in a significant impact to the Five-clawed Worm-skink.

The Five-clawed Worm-skink (*Anomalopus mackayi*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

The Five-clawed Worm-skink inhabits woodlands generally supported by clay-loam soils (Shea et al., 1987), including grassy White Box woodlands, open woodlands and River Red Gum–Coolibah-Bimble Box woodlands (DEWHA, 2008d). Within these woodlands, the species resides in deep burrows and soil cracks. On the surface, the Five-clawed Worm-skink uses fallen logs and timber as sheltering sites (DEWHA, 2008d).

The Project Area includes several patches of potential habitat for the Five-clawed Worm-skink throughout the Project Area. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 150 km south-east of the Project Area, recorded in cleared non-native vegetation in 2002.

The Project Area encompasses 209.6 ha of potential habitat for the Five-clawed Worm-skink. Senex has committed to not clearing any areas known to be occupied by Five-clawed Worm-skink individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-18.

Table 10-18: Significant Impact Assessment for Five-clawed Worm-skink

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	It is unlikely the Project Area sustains an important population of Five-clawed Worm-skink, as the species has not been recorded onsite and the closest record of the species is located 150 km south-east of the Project Area. Habitat suitable for the Five-clawed Worm-skink is present within the Project Area, albeit limited, with an absence of native grasslands with deep cracking clays. Limited habitats in the form of Brigalow woodlands, featuring coarse woody debris and leaf litter cover are present throughout the Project Area. Ephemeral wetlands and creek lines are also present along with cracking clay soils in some areas. Senex has committed to not clearing any areas known to be occupied by Five-clawed Worm-skink individuals or areas confirmed as potential habitat for the threatened species. A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of	No
Reduce the area of occupancy of an important population		No
Fragment an existing important population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	occupancy of an important population and fragment an existing important population of Five-clawed Worm-skink.	
Adversely affect habitat critical to the survival of a species	<p>Critical habitat for the species has not been defined in the conservation advice, and there is limited habitat within the Project Area, with an absence of native grasslands with deep cracking clays. Habitat where present is in the form of Brigalow woodlands, featuring coarse woody debris, leaf litter cover, as well as ephemeral wetlands, creek lines and cracking clay soils in some areas.</p> <p>Senex has committed to not clearing any areas known to be occupied by Five-clawed Worm-skink individuals or areas confirmed as potential habitat for the threatened species. Additionally, there is abundant available habitat within the surrounding locality, including State Forests. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of the Five-clawed Worm-skink.</p>	No
Disrupt the breeding cycle of an important population	It is unlikely the Project Area sustains an important population of Five-clawed Worm-skink, as the species has not been recorded onsite and the closest record of the species is located 150 km south-east of the Project Area.	No
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	No
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Five-clawed worm-skink are predated on by European Red Foxes and Feral Cats which are known to be present within the Project Area.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p> <p>With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.</p>	No
Introduce disease that may cause the species to decline, or	There are currently no known diseases to impact the Five-clawed Worm-skink and there is no evidence to suggest the Project would introduce a disease that would cause the species to decline.	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further diseases are not introduced into the Project Area.</p>	
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no recovery plan for this species and a recovery plan is not required. Senex has committed to not clearing any areas known to be occupied by Five-clawed Worm-skink individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	<p>No</p>

Significant Impact: Not Significant

Grey Snake (*Hemiaspis damelii*)

The Project in the Project Area is unlikely to result in a significant impact to the Grey Snake.

The Grey Snake (*Hemiaspis damelii*) is listed as Endangered under the EPBC Act, effective 5 October 2022. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

In Queensland, the Grey Snake favours woodlands dominated by Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*), on cracking clay soils, and in association with water bodies, including small gullies and ditches, ephemeral wetlands, and floodplains (DCCEEW, 2022d). Within these habitats, the species typically seeks shelter in floodplain environments beneath logs, rocks and soil cracks when required (DCCEEW, 2022d).

Additional habitat for the Grey Snake includes Bluegrass (*Dichanthium sericeum*) and/or Mitchell grass (*Astrebla spp.*) grassland on alluvial plains with cracking soils (DCCEEW, 2022d). In the Western Downs regions of south-east Queensland, a particular association between Grey Snakes and red sodosol soils with a strong contrast between the A horizon and sodic B horizon can be observed.

The Project Area includes several patches of potential habitat for the Grey snake, scattered throughout the Project Area, although majority is located towards the central and northern portions. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 52 km east of the Project Area, near Barakula State Forest, in Eucalyptus open woodlands with shrubby understorey in 2010.

The Project Area encompasses 431.2 ha of potential habitat for the Grey Snake. Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 10-19.

Table 10-19: Significant Impact Assessment for the Grey Snake

Criteria	Description	Criteria Triggered?
An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of a population,	It is unlikely an important population of Grey Snake is present within the Project Area, as the species has not been previously recorded during field surveys. The closest known record of the Grey Snake is located 52 km east of the Project Area, in Barakula State Forest. The Project Area contains a total 431.2 ha of suitable habitat for the Grey Snake, scattered throughout the Project Area, in the form of Brigalow and Belah woodlands within the northern and far-south-eastern portions of the Project Area. Additionally, ephemeral wetlands and creek lines are present, with cracking clay soils in some areas. Although suitable habitat is present, only one frog species, being the Common Green Tree Frog, was recorded during the 2022 field surveys. Common Green Tree Frog is not a preferential frog species for Grey Snake.	No
Reduce the area of occupancy of the species,		No
Fragment an existing population into two or more populations,		No

Criteria	Description	Criteria Triggered?
<p><i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i></p>		
	<p>Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species. Additionally, a qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Grey Snake.</p>	
<p>Adversely affect habitat critical to the survival of a species,</p>	<p>No habitat critical to the survival has been defined for the Grey Snake, and no important populations are present within the Project Area.</p> <p>Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species. Additionally, there is abundant available habitat within the surrounding locality, including State Forests. Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of the Grey Snake.</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population,</p>	<p>It is unlikely the Project Area sustains an important population of Grey Snake, as the species has not been recorded onsite and the closest record of the species is located 150 km south-east of the Project Area.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline,</p>	<p>The Project Area contains a total 431.2 ha of suitable habitat for the Grey Snake, scattered throughout the Project Area, in the form of Brigalow and Belah woodlands within the northern and far-south-eastern portions of the Project Area. Additionally, ephemeral wetlands and creek lines are present, with cracking clay soils in some areas.</p> <p>Although suitable habitat is present, only one frog species, being the Common Green Tree Frog, was recorded during the 2023 field surveys. Common Green Tree Frog is not a preferential frog species for Grey Snake.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
	<p>Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species. Therefore, it is considered unlikely the Project will modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Grey Snake are vulnerable to Cane Toad (<i>Rhinella marina</i>) toxins when ingested. Cane Toads are known to occur within the Project Area and surrounds, as the invasive species was recorded during the field surveys. Climate change is a threat for the species based on the Conservation Advice in the form that the distribution of the Cane Toad is predicted to encompass the entire geographic range of Grey Snake in Queensland (Kearney et al. 2008). The Project will not contribute to or exacerbate the impacts of climate change. Additionally, the Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area. With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There are currently no known diseases to impact the Grey Snake and there is no evidence to suggest the Project would introduce a disease that would cause the species to decline.</p> <p>Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further diseases are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere with the recovery of the species.</p>	<p>There is no recovery plan for this species and a recovery plan is not required. Senex has committed to not clearing any areas known to be occupied by Grey Snake individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
	Therefore, the Project will not interfere with the recovery of the species.	

Significant Impact: Not Significant

Northern Quoll (*Dasyurus hallucatus*)

The Project in the Project Area is unlikely to result in a significant impact to the Northern Quoll.

The Northern Quoll (*Dasyurus hallucatus*) is currently listed as Endangered under the EPBC Act, effective 12 April 2005. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

Across its distribution, the Northern Quoll occupies a diverse range of habitats particularly for foraging and dispersal activities, ranging from rocky areas to eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert within close proximity to a permanent water source (SPRAT, 2017). Preferable habitats for the species typically encompass some form of rocky areas for denning with nearby access to vegetated habitats for foraging.

Breeding and denning habitat for the Northern Quoll consists of rocky areas for denning, with dens typically in rock crevices, tree hollows or termite mounds, in close proximity to vegetated habitats and a permanent water source.

The Project Area includes few patches of potential habitat for the Northern Quoll within the southern portion of the Project Area only, largely associated with eucalypt and acacia woodlands and will be avoided by the Project. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 153 km north-east of the Project Area, recorded in Eucalyptus woodlands with a tussock grass understorey 1892.

The Project Area encompasses 226.7 ha of potential foraging, breeding and denning habitat for the Northern Quoll. Senex has committed to not clearing any areas known to be occupied by Northern Quoll individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 10-20.

Table 10-20: Significant Impact Assessment for the Northern Quoll

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of a population,	It is unlikely the Project Area sustains an important population of the Northern Quoll, as the species has not been recorded within the Project Area and the closest record of the species is located 153 km north-east of the Project Area.	No
Reduce the area of occupancy of the species,	Habitat suitable for the Northern Quoll is present within the Project Area, albeit limited. Potential habitats within the Project Area are in the form of rocky areas for breeding, denning and foraging, within the in the plateau with eucalypt woodland/open forest habitat types in the far south-eastern corner.	No
Fragment an existing population into two or more populations,	The far south-eastern corner of the Project Area will be avoided by the Project. The Project Area contains a total 226.7 ha of potential habitat for the species. Senex has committed to not clearing any areas known to be occupied by Northern Quoll individuals or areas confirmed as potential habitat for the threatened species. A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large	No

Criteria	Description	Criteria Triggered?
<p>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</p>		
	<p>woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Northern Quoll.</p>	
<p>Adversely affect habitat critical to the survival of a species,</p>	<p>Habitat critical to the survival of the Northern Quoll is defined as any areas where the species is least exposed to threats or least likely to be in the future (Hill & Ward, 2010).</p> <p>Senex has committed to not clearing any areas known to be occupied by Northern Quoll individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP).</p> <p>It is therefore unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of a population,</p>	<p>The breeding season for the Northern Quoll generally occurs during the middle of the year, with young being born in the dry season. The Northern Quoll breeds in rocky areas where dens are made in rock crevices, tree hollows, hollow logs or termite mounds. Habitat features including hollows and large rocks will be avoided or relocated using appropriate removal and translocation methods.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). Therefore, it is considered unlikely that the Project will disrupt the breeding cycle of an important population.</p>	<p>No</p>
<p>Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline,</p>	<p>The Project Area contains suitable rocky habitats for the Northern Quoll for breeding, denning and foraging purposes. These areas, however, are limited to the far south-eastern corner of the Project Area, which will be avoided by the Project.</p> <p>Additionally, small fragments of Northern Quoll habitat containing microhabitat features can be found scattered in two additional areas within the southern portion of the Project Area. Senex has committed to not clearing any areas known to be occupied by Northern Quoll individuals or areas confirmed as potential habitat</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
	for the threatened species. Therefore, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	<p>Northern Quoll are vulnerable to Cane Toad toxins when ingested. Cane Toads are known to occur within the Project Area and surrounds, as the invasive species was recorded during the field surveys.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area. With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.</p>	No
Introduce disease that may cause the species to decline, or	Parasitism is thought to be a threatening factor to the Northern Quoll, particularly the toxoplasmosis disease. However, a later study concluded there is no compelling evidence that the disease is involved in the decline of the species, particularly within the Kakadu National Park (Oakwood & Pritchard, 1999). Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further diseases are not introduced into the Project Area.	No
Interfere with the recovery of the species.	<p>The species recovery plan lists the following objectives (Hill & Ward, 2010):</p> <ul style="list-style-type: none"> ■ Protect the species populations on offshore island from invasion and establishment of cane toads, cats and other potential invasive species; ■ Foster the recovery of Northern Quoll sub-populations in areas where the species has survived alongside cane toads; ■ Halt Northern Quoll declines in areas not yet colonised by Cane Toads; ■ Halt declines in areas recently colonised by Cane Toads; 	No

Criteria	Description	Criteria Triggered?
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An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:

	<ul style="list-style-type: none"> ■ Maintain secure populations and source animals for future reintroductions/introductions if they become appropriate; ■ Reduce the risk of northern quoll populations being impacted by disease; and ■ Reduce the impact of feral predators on Northern Quolls. <p>Impacts to this species from construction and operation of the infrastructure is limited to a potential marginal reduction in suitable habitat. The construction and operation of the infrastructure is unlikely to substantially interfere with the recovery of the species. Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of threatened species will be undertaken by a suitably qualified person. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Infrastructure will preferentially avoid threatened species locations. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	
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Significant Impact: Not Significant

Painted Honeyeater (*Grantiella picta*)

The Project in the Project Area is unlikely to result in a significant impact to the Painted Honeyeater.

The Painted Honeyeater (*Grantiella picta*) is currently listed as Vulnerable under the EPBC Act, effective 8 July 2015. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

The Painted Honeyeater inhabits Mistletoe in eucalypt forests and woodlands, riparian woodlands of Black Box and River Red Gum, box-ironbark-yellow gum woodlands, woodlands dominated by paperbarks, acacia spp., casuarina spp., Callitris spp., and occasionally farmlands and gardens (DoE, 2015a). Woodlands with a higher abundance of mature trees are of higher preference for Painted Honeyeater, as these contain a higher abundance of Mistletoes.

Breeding habitat for the Painted Honeyeater consists of Boree/Weeping Myall (*Acacia pendula*) woodlands, Brigalow (*A. harpophylla*) woodlands, box-gum woodlands and box-ironbark forests on the inland slopes of the Great Dividing Range. Additional breeding habitats include forests and woodlands with high quantities of mistletoe and where parasitism rates are high, preferably remnant vegetation. The species typically nests in mature trees that are abundant with mistletoe, where the species may use the mistletoe as a nesting substrate.

The Painted Honeyeater favours mistletoes of the genus *Amyema*, growing on forests and woodland eucalypts and acacias, for foraging and roosting habitat.

The Project Area includes several patches of potential habitat for the Painted Honeyeater scattered throughout the Project Area, however the large portion of potential habitat in the far south-eastern corner of the Project Area will be avoided by the Project. However, there are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 47 km south-west of the Project Area, recorded in Eucalypt open forest with tussock grass understorey in 1997.

The Project Area encompasses 272.1 ha of potential habitat for the Painted Honeyeater. Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-21.

Table 10-21: Significant Impact Assessment for Painted Honeyeater

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	It is unlikely an important population of Painted Honeyeater is present within the Project Area, as the species has not been previously recorded during field surveys. The closest known record of the Painted Honeyeater is located 47 km south-west of the Project Area.	No
Reduce the area of occupancy of an important population	The Project Area contains a total 272.1 ha of suitable habitat for the Painted Honeyeater, scattered throughout the Project	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
<p>Fragment an existing important population into two or more populations</p>	<p>Area. Areas with a high abundance of mistletoe species in either eucalypt or acacia woodlands provide foraging habitat for this species. 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 within the Project Area.</p> <p>The far south-eastern corner of the Project Area encompasses a large patch of Painted Honeyeater habitat, which will be avoided by the Project. Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Additionally, a qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Painted Honeyeater.</p>	<p>No</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p>There is no indication the Project Area comprises habitat critical to the survival of the species. Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP).</p> <p>It is therefore unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>It is unlikely an important population of Painted Honeyeater is present within the Project Area. The species inhabits mature trees in remnant vegetation with a high abundance of mistletoe, which are present in the eucalypt woodlands across the Project Area, albeit sparingly.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. It is therefore unlikely that the Project will disrupt the breeding cycle of an important population or modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>Painted Honeyeaters and their nests are predated on by Black Rats (<i>Rattus rattus</i>). Although the Noisy Miner is a native species, it is considered an aggressive species and may drive the Painted Honeyeater out of their habitats. However, Black Rats and Noisy Miners were not recorded during the field surveys.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There are currently no known diseases to impact the Painted Honeyeater and there is no evidence to suggest the Project would introduce a disease that would cause the species to decline.</p> <p>Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further diseases are not introduced into the Project Area.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>The interim recovery objectives for the Painted Honeyeater include:</p> <ul style="list-style-type: none"> ■ <i>“Measure and sustain a positive population trend (compared to the 2020 baseline counts) in the number of mature individuals of the Painted Honeyeater; and</i> ■ <i>Maintain or improve the extent, condition, and connectivity of habitat of the Painted Honeyeater”</i> (DAWE, 2021) <p>Senex has committed to not clearing any areas known to be occupied by Painted Honeyeater individuals or areas confirmed as potential habitat for the threatened species.</p> <p>It is noted that the flexibility in spacing of wells and the alignment of the gathering RoW helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
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An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:

	<p>locations rather than being in one contiguous area. Additionally, the Project Area will remain connected to adjacent State Forests.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	
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Significant Impact: Not Significant

Slender Tylophora (*Vincetoxicum forsteri*)

The Project in the Project Area is unlikely to result in a significant impact to the Slender Tylophora.

Slender Tylophora (*Vincetoxicum forsteri*) is currently listed as Endangered under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this flora species has the potential to occur within the Project Area, as potential habitat is present.

- The species grows in dry scrub, open forest and woodland associated with *Melaleuca uncinata*, *Eucalyptus fibrosa*, *E. sideroxylon*, *E. albens*, *Callitris endlicheri*, *C. glaucophylla*, *Allocasuarina luehmannii*, *Acacia hakeoides*, *A. lineata*, *Myoporum* spp., and *Casuarina* spp. This species occurs within the Border Rivers–Gwydir, Central West, Namoi (NSW), and Border Rivers Maranoa–Balonne (Queensland) Natural Resource Management regions (DEWHA, 2008e).

The Project Area includes several small patches of potential habitat for Slender Tylophora, particularly within the far south-eastern corner of the Project Area. There are five scattered small areas of potential habitats towards the centre of the Project Area, and one small area of potential habitat in the north-west of the Project Area. There are currently no known records of the species within the Project Area or within 100 km of the Project Area, where there is one record from May 1960, in Eucalyptus woodlands with a tussock grassy understorey.

The Project Area contains a total of 122.7 ha, of potential habitat for Slender Tylophora. Senex has committed to not clearing any areas confirmed with Slender Tylophora individuals or areas confirmed as potential habitat for the threatened species. Additionally, Senex has also committed to avoiding any individual Slender Tylophora plants (should any be found to occur within proposed disturbance footprints).

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Endangered species, is presented in Table 10-22.

Table 10-22: Significant Impact Assessment for Slender Tylophora

Criteria	Description	Criteria Triggered?
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An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:

Lead to a long-term decrease in the size of a population,	It is unlikely the Project Area sustains an important population of Slender Tylophora as the species was not recorded during the	No
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Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
Reduce the area of occupancy of the species,	2022 field surveys, and no historical records of the species exists within the Project Area or within 100 km of the Project Area.	No
Fragment an existing population into two or more populations,	<p>Limited areas of suitable habitat (dry eucalypt woodland) are present within the Project Area. Suitable habitat for the flora species includes areas of dry eucalypt woodland, with riparian and wetland eucalypt communities considered unsuitable for this species. The Project Area contains 122.7 ha of suitable Slender Tylophora habitat, with majority of this habitat located within the far south-eastern corner of the Project Area, which will be avoided by the Project. Senex has committed to not clearing any areas confirmed with Slender Tylophora individuals or areas confirmed as potential habitat for the threatened species. Additionally, Senex has also committed to avoiding any individual Slender Tylophora plants (should any be found to occur within proposed disturbance footprints).</p> <p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, limited vehicle movements, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species.</p> <p>It is therefore unlikely that the Project will lead to a long-term decrease in the size, reduce the area of occupancy, or fragment an important population.</p>	No
Adversely affect habitat critical to the survival of a species,	<p>There are limited areas of potential habitat for this species in the form of dry eucalypt woodland scattered throughout the Project Area. A large patch located within the far south-eastern corner of the Project Area will be avoided by the Project.</p> <p>Senex has committed to not clearing any areas confirmed with Slender Tylophora individuals or areas confirmed as potential habitat for the threatened species. Additionally, Senex has also committed to avoiding any individual Slender Tylophora plants (should any be found to occur within proposed disturbance footprints). Therefore, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	No
Disrupt the breeding cycle of a population,	A total of 122.7 ha of Slender Tylophora is scattered throughout the Project Area. Of which, a large patch located within the far	No

Criteria	Description	Criteria Triggered?
<p><i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i></p>		
<p>Modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline,</p>	<p>south-eastern corner of the Project Area will be avoided by the Project. Additionally, the Project will preferentially be located within previously cleared areas and pre-clearance surveys will be completed within all proposed disturbance areas to ensure that if any individual plants are present, they can be avoided.</p> <p>Slender Tylophora flowers from May to July. The small amounts of clearing in the larger context of the landscape will not remove/isolate or decrease the quality of habitat that would result in the species decline.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Given the disturbed nature of the Project Area, and from field surveys efforts conducted in 2022 and 2023, weed species are known to occur. Two WoNS species, Common Pest Pear and Velvety Tree Pear, were recorded within the Project Area at moderate densities in Brigalow woodland, and an additional five WoNS species are considered to have a potential to occur within the Project Area. However, vehicle hygiene procedures will be implemented to minimise the risk of introducing weed species, and the risk of the species propagating in potential habitat areas adjacent to disturbance.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There are currently no known diseases to impact the Slender Tylophora. The construction and operation of the infrastructure is unlikely to lead to introduction of a disease relevant to the species.</p>	<p>No</p>
<p>Interfere with the recovery of the species.</p>	<p>There is no formal adopted, or made, Recovery Plans for this flora species. Senex has committed to not clearing any areas confirmed with Slender Tylophora individuals or areas confirmed as potential habitat for the threatened species. Additionally, Senex has also committed to avoiding any individual Slender Tylophora plants (should any be found to occur within proposed disturbance footprints).</p> <p>The construction and operation of the infrastructure is unlikely to substantially interfere with the recovery of the species. Prior to undertaking activities that result in significant disturbance to land, an ecological survey to confirm presence of threatened species will be undertaken by a suitably qualified person. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Infrastructure will preferentially avoid threatened species locations. Additionally, the Project Area will remain connected to adjacent State Forests.</p>	<p>No</p>

Criteria	Description	Criteria Triggered?
<i>An action is likely to have a significant impact on an Endangered species if there is a real chance or possibility that it will:</i>		
	Therefore, the Project will not interfere with the recovery of the species.	

Significant Impact: Not Significant

Southern Squatter Pigeon (*Geophaps scripta scripta*)

The Project in the Project Area is unlikely to result in a significant impact to the Southern Squatter Pigeon.

The Southern Squatter pigeon (*Geophaps scripta scripta*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

Southern Squatter pigeon foraging only habitat is generally defined as open forests to sparse, open woodlands and scrub, and less often, savannas. Habitats are mostly remnant, regrowth or partly modified vegetation communities dominated in the overstorey by Eucalyptus, Corymbia, Acacia or Callitris species. The species is nearly always found within 3 km of a permanent water source including rivers, creeks and waterholes (TSSC, 2015b).

In Queensland, foraging and breeding habitat for the Southern Squatter Pigeon is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills (i.e., RE Land Zone 5) and lateritic (duplex) soils on low 'jump-ups' and escarpments (i.e., RE Land Zone 7) (TSSC, 2015b).

Dispersal habitat for the species typically consists of any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies.

The Project Area includes several small patches of potential habitat for the Southern Squatter Pigeon largely associated with eucalypt and acacia woodlands in the far south-eastern corner of the Project Area, which will be avoided by the Project. The species not been recorded within the Project Area; however, there is one known record of the species located approximately 6 km east of the Project Area, recorded in cleared non-native vegetation in 2016.

The Project Area contains 164.3 ha of breeding and foraging habitat, and 316 ha of dispersal habitat for the Southern Squatter Pigeon. Senex has committed to not clearing any areas known to be breeding or foraging habitat for Southern Squatter Pigeon individuals, however up to 2.1 ha of dispersal habitat (of previously cleared land) will be impacted by the Project. A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-23.

Table 10-23: Significant Impact Assessment for Southern Squatter Pigeon

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	Important populations of the species include those in the Darling Downs of southern Queensland (DCCEEW 2023d). While field surveys of the Project Area did not record the species, there is one record of the species approximately 6 km east of the Project Area. As a result, populations potentially occurring within the Project Area and the broader Wandoan region may be considered to be 'important populations' or important subpopulations as per the EPBC Act definition above. The Project Area contains a total 164.3 ha of breeding and foraging habitat, and 316 ha of dispersal habitat for the Southern Squatter Pigeon, largely within the southern portion	No
Reduce the area of occupancy of an important population		No
Fragment an existing important population into two or more populations		No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>of the Project Area. Areas associated with eucalypt and acacia dominated woodlands provide potential habitat for the species.</p> <p>The far south-eastern corner of the Project Area encompasses a large patch of Southern Squatter Pigeon habitat, which will be avoided by the Project. Senex has committed to not clearing any areas known to be breeding or foraging habitat for Southern Squatter Pigeon individuals, however up to 2.1 ha of dispersal habitat will be impacted by the Project. These disturbances will predominantly be located within previously cleared land, and such minor impacts are not expected to impact an important population.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Southern Squatter Pigeon.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>All Southern Squatter Pigeon habitat within the Project Area is considered habitat critical to the survival of the species. Senex has committed to not clearing any areas known to be breeding or foraging habitat for Southern Squatter Pigeon individuals, however 2.1 ha of dispersal habitat (of previously cleared land) will be impacted by the Project. Clearing of Southern Squatter Pigeon dispersal habitat will be minor (2.1 ha of the available 316 ha) and located within previously cleared areas.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP).</p> <p>It is therefore unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>Important populations of the species include those in the Darling Downs of southern Queensland (DCCEEW 2023d). While field surveys of the Project Area did not record the species, there is one record of the species approximately 6 km east of the Project Area. As a result, populations potentially occurring within the Indicative Footprint and the broader Wandoan region may be considered to be an 'important</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>population' or an important subpopulation as per the EPBC Act definition above. Senex has committed to not clearing any areas known to be breeding or foraging habitat for Southern Squatter Pigeon individuals, however 2.1 ha of dispersal habitat will be impacted by the Project. Clearing of Southern Squatter Pigeon dispersal habitat will be minor (2.1 ha of the available 316 ha) and located within previously cleared areas. Breeding habitat for Southern Squatter Pigeon will not be impacted by the Project.</p> <p>Breeding habitat for the species occurs in stony rises, on sandy soils within 1 km of a permanent water source (Squatter Pigeon Workshop, 2011). There is an overall lack of breeding habitat to the north of the Project Area, as this area is largely cleared with dense pastoral grasses. Potential breeding habitat for the species, in the form of dry woodland habitat remains on and around the plateau in the far south-eastern part of the Project Area, which will be avoided by the Project.</p> <p>Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. It is therefore unlikely that the Project will disrupt the breeding cycle of an important population.</p> <p>Furthermore, indirect impacts are unlikely to disrupt the breeding cycle of a population through the implementation of mitigation measures, including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans.</p>	
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be breeding or foraging habitat for Southern Squatter Pigeon individuals, however 2.1 ha of dispersal habitat will be impacted by the Project. Clearing of Southern Squatter Pigeon dispersal habitat will be minor (2.1 ha of the available 316 ha) and located within previously cleared areas. Additionally, there are large expanses of habitat available for the species in the network of remnant vegetation (including State Forests) outside of the Project Area. It is therefore unlikely that the Project will modify, destroy, remove or isolate or decrease the availability</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
	or quality of habitat to the extent that the species is likely to decline.	
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	<p>Southern Squatter Pigeon are predated on by European Red Foxes and Feral Cats which are known to be present within the Project Area. Additionally, grazing by European Rabbits is a known threat to the Southern Squatter Pigeon.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p> <p>With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.</p>	No
Introduce disease that may cause the species to decline, or	<p>There is currently limited evidence of diseases causing detrimental effects on Southern Squatter Pigeon populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.</p>	No
Interfere substantially with the recovery of the species.	<p>There is no formal adopted, or made, Recovery Plan for this species and a recovery plan is not required. Senex has committed to not clearing any areas known to be breeding or foraging habitat for Southern Squatter Pigeon individuals, however 2.1 ha of dispersal habitat will be impacted by the Project. Clearing of Southern Squatter Pigeon dispersal habitat will be minor (2.1 ha of the available 316 ha) and located within previously cleared areas.</p> <p>Additionally, the Project Area will remain connected to adjacent State Forests, which are known to be habitat for the Southern Squatter Pigeon.</p> <p>Therefore, the Project will not interfere with the recovery of the species.</p>	No

Significant Impact: Not Significant

Southern Whiteface (*Aphelocephala leucopsis*)

The Project in the Project Area is unlikely to result in a significant impact to the Southern Whiteface.

Southern Whiteface (*Aphelocephala leucopsis*) is listed as Vulnerable under the EPBC Act effective 31 March 2023. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

The Southern Whiteface resides in a wide range of open woodlands and shrubland environments dominated by *Acacia* spp. and *Eucalyptus* spp., particularly where understorey of grasses and/or shrubs are present (DCCEEW, 2023c). Along with the general habitat, breeding and roosting habitat for the species further consists of tree hollows, in either live or dead standing trees.

The Project Area contains several patches of potential habitat for the Southern Whiteface, scattered throughout the Project Area. The portion of potential habitat in the far south-eastern corner of the Project Area will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 57 km south-west of the Project Area, in a campground at Rocky Creek near Yuleba State Forest in 2016.

The Project Area encompasses 938.5 ha of potential habitat for the Southern Whiteface. Senex has committed to not clearing any areas known to be occupied by Southern Whiteface individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-24.

Table 10-24: Significant Impact Assessment for Southern Whiteface

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	It is unlikely an important population of Southern Whiteface is present within the Project Area, as the species has not been previously recorded within the Project Area. The closest known record of the Southern Whiteface is located 57 km south-west of the Project Area.	No
Reduce the area of occupancy of an important population	A total of 938.5 ha of potential habitat for the Southern Whiteface is scattered throughout the Project Area. Senex has committed to not clearing any areas known to be occupied by Southern Whiteface individuals or areas confirmed as potential habitat for the threatened species.	No
Fragment an existing important population into two or more populations	As per the approved conservation advice, the species is predicated to have an area of occupancy of 80,000 km ² (DCCEEW, 2023c). Additionally, surveys will be undertaken prior to construction at proposed infrastructure locations. The Project Area is largely cleared however the avoidance of impact ensures that it will remain connected to adjacent, larger remnant forests, like Hinchley State Forest. Climate change has been identified in the Conservation Advice as a threat to this species in the way of increased frequency or length of droughts in south-east Queensland with impacts to food sources (DCCEEW, 2023c). The Project will not contribute to or exacerbate the impacts of climate change, as the Project will not fragment vegetated corridors or constrain the movement of Southern Whiteface across the landscape in response to potential climate change induced changes to rainfall patterns and temperatures.	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Southern Whiteface.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Potential habitat for the Southern Whiteface has been concluded to contain habitat critical to the survival of the species, as the Project Area contains living and dead trees with hollows and crevices that are essential for roosting and nesting. Senex has committed to not clearing any areas known to be occupied by Southern Whiteface individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Mitigation and management measures of any indirect temporary impacts will not result in an adverse impact to habitat critical to the survival of the species.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP).</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>It is unlikely an important population of Southern Whiteface is present within the Project Area. Breeding habitat for the Southern Whiteface consists of open woodlands and shrublands with an understorey of grasses or shrubs and tree hollows, in either live or dead standing trees, which are present within the Project Area. Senex has committed to not clearing any areas known to be occupied by Southern Whiteface individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Furthermore, the design phase will avoid hollow-bearing trees that are necessary for the successful breeding cycle of the species. Habitat features including hollows and loose timber will be avoided or relocated using appropriate removal and translocation methods.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>Furthermore, indirect impacts are unlikely to disrupt the breeding cycle of a population through the implementation of mitigation measures, including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans.</p>	
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Southern Whiteface individuals or areas confirmed as potential habitat for the threatened species. This habitat will therefore remain connected to larger remnant patches outside of the Project Area. Therefore, the Project is unlikely to modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>
<p>Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p>	<p>There is currently limited evidence of invasive species causing detrimental effects on Southern Whiteface populations in Queensland.</p> <p>The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.</p>	<p>No</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p>There is currently limited evidence of diseases causing detrimental effects on Southern Whiteface populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.</p>	<p>No</p>
<p>Interfere substantially with the recovery of the species.</p>	<p>There is no formal adopted, or made, Recovery Plan for this species; however, a recovery plan is required. The small and dispersed nature of clearing of remnant patches and linear areas, will not affect the recovery of this species. Additionally, the Project Area will remain connected to adjacent State Forests, which are known to be habitat for the Southern Whiteface.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
	Therefore, the Project will not interfere with the recovery of the species.	
Significant Impact: Not Significant		

Yakka Skink (*Egernia rugosa*)

The Project in the Project Area is unlikely to result in a significant impact to the Yakka Skink.

The Yakka skink (*Egernia rugosa*) is currently listed as Vulnerable under the EPBC Act, effective 16 July 2000. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

The Yakka Skink predominantly inhabits open dry sclerophyll forests and/or woodlands, refuging in cavities under or around surface microhabitats (i.e., beneath rocks, in dense ground vegetation and hollow logs, and soil-bound root systems of fallen trees) (Wilson and Knowles, 1988; Cogger, 2000). Yakka Skink may also occur in cleared habitats, where shelter sites (i.e., tunnel erosion, rabbit warrens and log piles) occur (DoE, 2014b). The species rarely travels far from its shelter site, with presence typically recorded by scat piles near the entrance, as the species use communal defecation sites (Eddie 2012; Wilson 2012). The Yakka Skink further occupy vegetation types including Poplar Box (*E. populnea*), Ironbark (*E. sideroxylon*), Brigalow (*A. harpophylla*), Mulga (*A. aneura*), Bendee (*A. catenulata*), White Cypress Pine (*C. columellaris*) and Lancewood (*A. shirleyi*) woodlands and open forests (DoE, 2014b).

The Project Area contains few scattered small potential habitats without the southern portion, and one large patch of potential Yakka Skink habitat in the far south-eastern corner, which will be avoided by the Project. There are no publicly available records of the species within 10 km of the Project Area. The closest historical known record of the species is located approximately 28 km south-east of the Project Area, recorded in other shrublands in 1998.

The Project Area encompasses 228 ha of potential habitat for the Yakka Skink. Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-25.

Table 10-25: Significant Impact Assessment for Yakka Skink

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Lead to a long-term decrease in the size of an important population of a species	Yakka Skink was not recorded within the Project Area during the 2022 field surveys, and the species has not been previously recorded within the area. The closest species record is located approximately 28 km south-east of the Project Area.	No
Reduce the area of occupancy of an important population	An important population of Yakka Skink is defined where “ <i>any contiguous patch of suitable habitat, particularly remnant vegetation, where a colony is known or identified or any microhabitat where colonies are likely to be found</i> ” (DSEWPac, 2011). As the species was not recorded during field surveys or previously within the Project Area, or within 28 km of the Project Area, it is considered unlikely that an important population of the species is present within the Project Area.	No
Fragment an existing important population into two or more populations	Within the Project Area, suitable habitat with abundant litter, rocks and woody debris occurs in large remnant areas of forest and woodland associated with the escarpment and plateau in the far south-eastern corner. The species is unlikely to occur in	No

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>the northern or central parts of the Project Area, where woodland fragments are small, narrow and disturbed, with few suitable habitats features for this species.</p> <p>Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). It is considered unlikely the Project will lead to a long-term decrease in the size of an important population of a species, reduce the area of occupancy of an important population and fragment an existing important population of Yakka Skink.</p>	
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Habitat critical to the survival for Yakka skink has not been defined in the species conservation advice. Known important habitat of Yakka Skink is defined where any contiguous patch of suitable habitat, particularly remnant vegetation, where a colony is known or identified or any microhabitat where colonies are likely to be found" (DSEWPaC, 2011). The Project Area contains abundant litter, rocks and woody debris in large remnant areas of forests and woodlands associated with the escarpment and plateau in the far south-eastern corner. This area of habitat will be avoided by the Project.</p> <p>Additionally, small fragments of Yakka Skink habitat containing microhabitat features can be found scattered in two additional areas within the southern portion of the Project Area. However, Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as habitat for the threatened species, as thus, it is considered unlikely that the Project will adversely affect habitat critical to the survival of a species.</p>	<p>No</p>
<p>Disrupt the breeding cycle of an important population</p>	<p>The breeding season for the Yakka Skink is currently unknown.</p> <p>Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species.</p> <p>A qualified fauna spotter catcher will be present during vegetation clearing within remnant habitat. Pre-clearing surveys will be carried out to check potential refuge sites for the species (large woody debris) and ensure no harm to any individuals (should the species be present). Therefore, it is considered unlikely that the Project will disrupt the breeding cycle of an important population.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i>		
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The Project Area contains abundant litter, rocks and woody debris in large remnant areas of forests and woodlands associated with the escarpment and plateau in the far south-eastern corner. This area of habitat will be avoided by the Project. Additionally, small fragments of Yakka Skink habitat containing microhabitat features can be found scattered in two additional areas within the southern portion of the Project Area. Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species, as thus, it is considered unlikely that the Project will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	No
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Yakka Skink are threatened by invasive species common in Queensland, including European Red Fox and Feral Cats, which are known to occur in the project Area. The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area.	No
Introduce disease that may cause the species to decline, or	There is currently no known evidence suggesting the Yakka Skink is threatened by diseases in Queensland. There is also no evidence to suggest the Project would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. Project activities during construction and operation will adopt and follow Biosecurity measures, including adherence to the Queensland Operations Biosecurity Management Plan [SENEX-QLDS-EN-PLN-001] and Senex Queensland Weed Hygiene Procedure [SENEX-QLD-EN-PRC-023] (which includes requirements for weed washdowns, certification and record keeping for all vehicles and machinery), that will ensure that further invasive species are not introduced into the Project Area.	No
Interfere substantially with the recovery of the species.	There is no recovery plan for this species and a recovery plan is not required. Senex has committed to not clearing any areas known to be occupied by Yakka Skink individuals or areas confirmed as potential habitat for the threatened species. It is noted that the flexibility in spacing of wells and the alignment of the gathering rights-of-way helps ensure that unavoidable clearing of vegetation/habitat is limited to smaller isolated locations rather than being in one contiguous area. Infrastructure will preferentially avoid threatened species locations. Additionally, the Project Area will remain connected to adjacent State Forests.	No

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
	Therefore, the Project will not interfere with the recovery of the species.	
Significant Impact: Not Significant		

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

The Project in the Project Area is unlikely to result in a significant impact to the Yellow-bellied Glider (south-eastern).

The Yellow-bellied Glider (south-eastern) (*Petaurus australis australis*) is currently listed as Vulnerable under the EPBC Act, effective 2 March 2022. The likelihood of occurrence has concluded this species has the potential to occur within the Project Area, as potential habitat is present.

Yellow-bellied Glider (south-eastern) typically resides in eucalypt-dominated woodlands and forests, including both wet and dry sclerophyll forests (DAWE, 2022d). Within their favourable habitats, Yellow-bellied glider (south-eastern) show a preference for large patches of mature old growth forests (typically 100 years in age) as these provide suitable trees for foraging and shelter.

More specifically, breeding and denning habitat for Yellow-bellied Glider (south-eastern) consists of Eucalypt dominated woodlands and forests with hollow-bearing trees, primarily in living, smooth-barked eucalypts. Stags, being standing dead trees, are also used for denning purposes, however these only account for two percent of den trees in certain forest types.

The Project Area includes few patches of potential habitat for the Yellow-bellied Glider (south-eastern) within the southern portion of the Project Area only, including a large patch within the far south-eastern corner that will be avoided by the Project. The species has not previously been recorded within the Project Area, however there are three known records within 10 km of the Project Area. These records are all located within Eucalyptus open forests with a grassy understorey of Cherwondah State Forest and were recorded in 2009.

The Project Area encompasses 145.8 ha of potential habitat for the Yellow-bellied Glider (south-eastern). Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species.

A significant impact assessment based on guidance provided in the SIG 1.1 for a listed Vulnerable species, is presented in Table 10-26.

Table 10-26: Significant Impact Assessment for Yellow-bellied Glider (south-eastern)

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Lead to a long-term decrease in the size of an important population of a species	There are no known important populations of the Yellow-bellied Glider (south-eastern) located within the vicinity of the Project Area. The species was not recorded during field surveys of the Project Area and there are no known historical records within	No

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>the Project Area. However, there are three records of the species within a 10 km buffer of the Project Area and were all recorded within Cherwondah State Forest in 2009. The Project Area contains 145.8 ha of potential habitat for the Yellow-bellied Glider (south-eastern), of which is largely located in the far south-eastern corner of the Project Area. This area will be avoided by the Project. Additional potential habitat, in the form of eucalypt dominated woodlands with the presence of hollow-bearing trees, is also located in the south-western corner of the Project Area.</p> <p>Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species. Additionally, surveys will be undertaken prior to construction at proposed infrastructure locations, further avoiding any hollow-bearing trees. The Project Area is largely cleared however the avoidance of impact ensures that it will remain connected to adjacent, larger remnant forests, like Hinchley State Forest. Climate change has been identified in the Conservation Advice as a threat to this species in the way that high temperatures and low rainfall affect the species (DAWE, 2022d). The Project will not contribute to or exacerbate the impacts of climate change, as the Project will not fragment vegetated corridors or constrain the movement of Yellow-bellied Glider (south-eastern) across the landscape in response to potential climate change induced changes to rainfall patterns and temperatures.</p> <p>Mitigation measures such as preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP) will ensure that both direct and indirect impacts are further minimised to the species. Therefore, the Project is unlikely to lead to a long-term decrease in the size of the population.</p>	
<p>Reduce the area of occupancy of an important population</p>	<p>There are no known important populations of the Yellow-bellied Glider (south-eastern) within the Project Area.</p> <p>As per the approved conservation advice, the species is predicated to have an area of occupancy of 12,724 km² (DAWE, 2022d). Senex has committed to not clearing any</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</p>		
	<p>areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Additionally, indirect impacts will be avoided through the application of environmental management measures such as the designation of 'no go' areas and implementation of weed and pest procedures. Therefore, the Project is considered unlikely to reduce the area of occupancy of the species.</p>	
<p>Fragment an existing important population into two or more populations</p>	<p>There are no known records of the species within the Project Area, and the species was not recorded during field surveys. A total of 145.8 ha of potential habitat for the Yellow-bellied Glider (south-eastern) is located within the Project Area. Of which, the vast majority of potential habitat is located within the far south-eastern corner of the Project Area and will be avoided by the Project. Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species and the Project will not fragment existing populations (if any).</p> <p>No vegetated corridors will be severed and HDD will be used for crossing of Woleebee Creek in PL 1037 (and as required elsewhere).</p> <p>Furthermore, given the infrastructure type, the disbursed layout of wells (averaging 500-750 m apart), burial of gathering pipes and post-construction rehabilitation of disturbed areas, light traffic movements at limited speeds, etc. will ensure that Yellow-bellied Glider (south-eastern) habitat remains connected, both within and outside of the Project Area.</p>	<p>No</p>
<p>Adversely affect habitat critical to the survival of a species</p>	<p>Potential habitat for the Yellow-bellied Glider (south-eastern) has been concluded to be habitat critical to the survival of the species, as the Project Area contains large contiguous areas of floristically diverse eucalypt forest, mature living hollow-bearing trees. However, a large portion of this potential habitat is located within the far south-eastern corner of the Project Area and will be avoided by the Project. Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species.</p> <p>Mitigation and management measures of any indirect temporary impacts will not result in an adverse impact to habitat critical to the survival of the species.</p> <p>Indirect impacts are also unlikely to result in a significant impact to the species due to the implementation of mitigation measures which will include pre-clearance surveys, HDD of</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
<p><i>An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:</i></p>		
	<p>crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans (as detailed in Section 6 and the SSMP).</p>	
<p>Disrupt the breeding cycle of an important population</p>	<p>Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species. Furthermore, the design phase as well as micro siting will avoid hollow-bearing trees that are necessary for the successful breeding cycle of the species. Yellow-bellied Glider (south-eastern) has an exclusive home range of 50-65 ha (DAWE, 2022d). However, through the design phase and micro siting efforts, the Project will not reduce the home ranges for the species. Therefore, if the species is present within the area, they will be able to successfully breed.</p> <p>Furthermore, indirect impacts are unlikely to disrupt the breeding cycle of a population through the implementation of mitigation measures, including preferential use of previously cleared areas, pre-clearance surveys, HDD of crossings of Woleebee Creek in PL 1037 (as required at other similar crossings if encountered), burial of gathering pipes, RoW rehabilitation, use of spotter-catchers, relocation of key habitat features, vehicle speed limits and limited vehicle movements, at least daily inspections of open trenches and measures to prevent entrapment and facilitate escape from open trenches, weed washdowns, certification and recordkeeping and the implementation of Senex's suite of management plans.</p>	<p>No</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Senex has committed to not clearing any areas known to be occupied by Yellow-bellied Glider (south-eastern) individuals or areas confirmed as potential habitat for the threatened species. This habitat will therefore remain connected to larger remnant patches outside of the Project Area. Therefore, the Project is unlikely to modify, destroy, remove, or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>	<p>No</p>

Criteria	Discussion	Criteria Triggered?
An action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:		
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Yellow-bellied Gliders (south-eastern) are predated on by European Red Foxes, feral deer (family Cervidae) and Feral Cats which are known to be present within the Project Area. The Project activities during construction and operation will adopt and follow biosecurity measures that ensure that further invasive species are not introduced into the Project Area. With the appropriate management measures in place, it is unlikely the Project will result in invasive species becoming established within the vulnerable species habitat.	No
Introduce disease that may cause the species to decline, or	There is currently limited evidence of diseases causing detrimental effects on Yellow-bellied Glider (south-eastern) populations in Queensland. There is also no evidence to suggest the proposed disturbance would introduce a disease that would cause the species to decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur. This includes following biosecurity measures and ensuring proper personal protection equipment (PPE) is worn by any fauna spotter catcher workers.	No
Interfere substantially with the recovery of the species.	There is no formal adopted, or made, Recovery Plan for this species. Additionally, the Project Area will remain connected to adjacent State Forests, which are known to be habitat for Yellow-bellied Gliders (south-eastern). This will enable the species to be able to continually traverse the landscape, ensuring genetic viability of the population. Therefore, the Project will not interfere with the recovery of the species.	No

Significant Impact: Not Significant

Listed Migratory Species Known or Likely to Occur

White-throated Needletail (*Hirundapus caudacutus*) and Fork-tailed Swift (*Apus pacificus*)

The Project in the Project Area is unlikely to lead to a significant impact to the White-throated Needletail and Fork-tailed Swift.

The White-throated Needletail is a largely aerial species when on migration through Australia, only occasionally stopping to roost in Eucalypt forests (Higgins, 1999). A flock of eight birds were observed flying low through the Project Area but were not observed to land or roost. As a result, it is considered unlikely there will be a significant impact. It should be noted that this species is also listed as Vulnerable under the EPBC Act, however due to its aerial nature, it is also unlikely to be significantly impacted by Project activities.

The Fork-tailed Swift is almost exclusively aerial and occur mostly over inland plains and sometimes above foothills and coastal areas (Higgins, 1999). The Fork-tailed Swift was not observed during field surveys, and potential foraging habitat was assessed to occur over dry open habitats, where it would fly aerially over. Therefore, no habitat mapping was mapped on the ground.

The SIG 1.1 state that actions likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

Important habitat for migratory species is explained as:

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

An ecologically significant proportion of the population can be characterised by species population status, genetic distinctiveness and species-specific behavioural patterns.

The White-throated Needletail does not breed in Australia and exhibits highly aerial behaviour during its migration. Its migratory flightpath, which traverses the coastal extent of the Australia's eastern coast, does not occur over the Project Area. Additionally, this species occurs over a large range, throughout eastern and south-eastern Australia. According to the draft referral guideline for 14 birds listed as migratory species (DoE, 2015a), a nationally ecologically significant population of the White-throated Needletail population is defined as 10 individuals (0.1% of total population; DoE, 2015a). A single observation of eight individuals in a flock recorded during ecology surveys undertaken within the Project Area was below the threshold for a nationally important population. The draft referral guideline recognises that different types of development (e.g., tall buildings, powerlines and wind turbines) have the potential to have different impacts that are hard to predict, however suggests more targeted surveys may only be required when project including wind turbines, tall buildings, airport developments etc. are proposed within the White-throated needletail's range and or near its important habitats. The Project infrastructure is not conducive to causing annual mortality rates or affecting breeding cycles of White-throated Needletail meeting or exceeding the threshold for a nationally important population (10 individuals). Additionally, given the paucity of important habitats, and that the Project is committed to avoiding any habitats for MNES species, the Project is regarded as unlikely to cause a significant impact on the species.

The Fork-tailed Swift occurs across a large array of inland plains and foothills and is almost exclusively aerial in Australia. A nationally ecologically significant proportion of the Fork-tailed Swift population is defined as 100 individuals (0.1%; DoE, 2015a). For this reason, the Project Area is not regarded as important habitat for this species and is unlikely to contain an ecologically significant proportion of the population. Additionally, as it is almost exclusively aerial, Project activities are not predicted to cause any impacts to the species.

As both migratory species have been concluded not be an important population, and/or ecologically significant proportion of a populations, an assessment against the SIG 1.1 criteria for Migratory species has not been undertaken. Overall, the Project in the Project Area is unlikely to lead to a significant impact to either of the migratory species.

Listed Migratory Species with Potential to Occur

The following bird species are all listed as Migratory and/or Marine under the EPBC Act and have the potential to occur within the Project Area:

- Satin Flycatcher (*Myiagra cyanoleuca*);
- Rufous Fantail (*Rhipidura rufifrons*);
- Common Sandpiper (*Actitis hypoleucos*);
- Sharp-tailed Sandpiper (*Calidris acuminata*);
- Latham's Snipe (*Gallinago hardwickii*); and
- Oriental Cuckoo (*Cuculus optatus*) – Migratory only.

Ecologically significant proportions of the populations of each of these species are listed in Table 10-27. As the Project Area is not expected to provide habitat for ecologically significant proportions of a population for any of these species, an assessment against the SIG 1.1 criteria for Migratory species has not been undertaken. Overall, the Project in the Project Area is unlikely to lead to a significant impact to any of these migratory species.

Table 10-27: Ecologically Significant Proportions of Populations for Migratory Species with a Potential to Occur

Species	Ecologically Significant Proportion of a Population (0.1%)*
Satin Flycatcher	1,700
Rufous Fantail	4,800
Common Sandpiper	190
Sharp-tailed Sandpiper	85
Latham's Snipe	30
Oriental Cuckoo	1,000

*As defined for each species in the DoE (2015a) and Hansen et al. (2016).

APPENDIX G MSES SIGNIFICANT RESIDUAL IMPACT ASSESSMENTS

Species Name	NC Act Status	Lead to long term decrease *	Extent of occurrence*	Fragmentation*	Habitat isolation*	Invasive species	Disease	Species recovery	Disruption*	Comment
Dulacca Woodland Snail (<i>Adclarkia dulacca</i>)	VU	x	x	x	x	x	x	x	x	<ul style="list-style-type: none"> ■ This species was listed as likely to occur within the Project Area due to records existing in the 10 km buffer (adjoining areas). No species were recorded in field surveys from 2022. ■ Habitat was mapped for this species in the Project Area and included Acacia woodlands dominated by Brigalow (<i>Acacia harpophylla</i>) and Eucalypt dominated woodlands mainly with <i>E. crebra</i> and <i>E. populnea</i>. ■ A total of 666.3 ha of habitat is mapped in the Project Area. Senex has committed to not clearing any areas confirmed as habitat for Dulacca Woodland Snail. As such, all direct impacts will be avoided. This is unlikely to result in a SRI for this species.
Greater Glider (southern and central) (<i>Petauroides volans</i>)	EN	x	x	x	x	x	x	x	x	<ul style="list-style-type: none"> ■ This species was confirmed to be present based on being recorded in the Project Area in field surveys in 2022. ■ Habitat was mapped for this species and included all remnant vegetation of most broad terrestrial broad habitat types particularly those dominated by Eucalypt species wherever large trees with hollows occur in woodland connected with these corridors and also in the extensively wooded in the south of the Project Area. ■ A total of 528 ha of habitat is mapped in the Project Area. Senex has committed to not clearing any areas confirmed as habitat for Greater Glider. As such, all direct impacts will be avoided. This is unlikely to result in a SRI for this species.

Species Name	NC Act Status	Lead to long term decrease *	Extent of occurrence*	Fragmentation*	Habitat isolation*	Invasive species	Disease	Species recovery	Disruption*	Comment
Koala (<i>Phascolarctos cinereus</i>)	EN	x	x	x	x	x	x	x	x	<ul style="list-style-type: none"> ■ The Koala was concluded as likely to occur based on evidence of the species (scratch marks) identified in suitable habitat in the Project Area. ■ Habitat was mapped for the koala in terms of foraging and breeding habitat and dispersal habitat. Foraging and breeding habitat included all Eucalypt dominated woodlands and open forests, including riparian vegetation. Dispersal habitat included any cleared areas and Acacia dominated woodlands. ■ A total of 698.5 ha of foraging and breeding habitat and 9,072.6 ha of dispersal habitat is mapped in the Project Area, of which up to 530 ha of dispersal habitat will be cleared (5.8% of total dispersal habitat disturbed). No foraging or breeding habitat will be cleared for the project. This is unlikely to result in a SRI for this species.
Ooline (<i>Cadellia pentastylis</i>)	VU	x	x	x	x	x	x	x	x	<ul style="list-style-type: none"> ■ This species was confirmed to occur within the Project Area based on being found in surveys conducted in 2022. ■ A total of 118.7 ha of habitat is mapped in the Project Area, of which none will be impacted. All proposed disturbance areas will be surveyed (in accordance with the Constraints Protocol) to confirm the location of any individuals present within the proposed disturbance location so that, where present, individual Ooline plants will be avoided. This is unlikely to result in a SRI for this species.

Species Name	NC Act Status	Lead to long term decrease *	Extent of occurrence*	Fragmentation*	Habitat isolation*	Invasive species	Disease	Species recovery	Disruption*	Comment
Pale Imperial Hairstreak (<i>Jalmenus eubulus</i>)	VU	x	x	x	x	x	x	x	x	<ul style="list-style-type: none"> ■ The Pale Imperial Hairstreak was concluded as likely to occur within the Project Area based on the presence of suitable habitat, in the absence of any records in the Project Area or greater adjoining areas. ■ A total of 180.2 ha of habitat has been mapped in the Project Area. ■ A total of 180.2 ha of habitat is mapped in the Project Area, all of which will be avoided. This is unlikely to result in a SRI for this species.
Short-beaked Echidna	SLC	x	x	x	x	x	x	x	x	<ul style="list-style-type: none"> ■ Recent records present within the Study Area from 2014, and there are various recent records within the 10 km buffer for this species. ■ The species is a generalist and occurs across a variety of habitats throughout the Project Area, which includes open woodland, semi-arid and arid areas (Aplin <i>et al.</i>, 2016). ■ This species is likely to occur at low densities. The Project Area contains 9,814 ha of potential general habitat (and up to 530 ha or 5.4% will be potentially disturbed as a result of the Project).
South-eastern Glossy Black-cockatoo (<i>Calyptorhynchus lathami lathami</i>)	VU	x	x	x	x	x	x	x	x	<ul style="list-style-type: none"> ■ This species was listed as likely to occur within the Project Area due to records existing in the 10 km buffer (adjoining areas). No species were recorded in field surveys from 2022. ■ Habitat was mapped for this species in the Project Area and included all remnant and regrowth vegetation of most broad terrestrial broad habitat types particularly those dominated by Eucalypt species with large hollow bearing trees, along with

Species Name	NC Act Status	Lead to long term decrease *	Extent of occurrence*	Fragmentation*	Habitat isolation*	Invasive species	Disease	Species recovery	Disruption*	Comment
										<p>remnant and regrowth RE with potential feed trees (<i>Casuarinaceae</i> spp.).</p> <ul style="list-style-type: none"> ■ A total of 1,003 ha of habitat is mapped in the Project Area, all of which will be avoided. This is unlikely to result in a SRI for this species.
White-throated Needletail (<i>Hirundapus caudacutus</i>)	VU	x	x	x	x	x	x	x	x	<ul style="list-style-type: none"> ■ This species was confirmed to be present based on being recorded in the Project Area in field surveys in 2022. ■ Species likely only to fly aurally over the Project Area (through September to April on its migration), which contains no rainforest vegetation. The Project Area does not contain habitat in the form of elevated Eucalypt forests or wooded ridges to act as foraging and roosting habitat for the species. ■ Habitat mapping has therefore not been undertaken for this species as it is only likely to fly aurally over the Project Area. ■ The Project is unlikely to impact the species based on no indirect or direct impacts to habitat.

NC Act listing status: EN = Endangered, VU= Vulnerable, NT = Near Threatened, SLC = Special Least Concern.

x Indicates it is unlikely that a significant residual impact will occur.

✓ Indicates there is potential for a significant residual impact

APPENDIX H THREATENED SPECIES RECORDS

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
Threatened Ecological Communities							
<i>Acacia harpophylla</i> (Brigalow, dominant and codominant)	E	-	PMST	Field surveys of the Project Area recorded the <i>Acacia harpophylla</i> TEC to occur in several locations across the Project Area, particularly within the far south-eastern corner and the north-western area.	The following REs associated with this TEC that were identified in the project Area include 11.3.1, 11.9.5 and 11.9.5a. A total of 17 patches of the TEC were found within the Project Area. An additional 14 patches did not meet the TEC condition criteria.	Known	Project Habitat Descriptions Table
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	E	-	PMST	REs associated with this TEC were not recorded within the Project Area during field surveys.	-	Unlikely	-
Poplar Box Grassy Woodland on Alluvial Plains	E	-	PMST	Field surveys of the Project Area recorded the Poplar Box Grassy Woodland on Alluvial Plains TEC to occur in multiple locations within the northern area and one location in the central area.	Only RE 11.3.2 was identified within the Project Area, covering a total of 33.2 ha. A total of 10 patches were recorded within the Project Area. An additional 14 patches did not meet the TEC condition criteria.	Known	Project Habitat Descriptions Table
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	E	-	PMST	REs associated with this TEC were not recorded within the Project Area during field surveys.	-	Unlikely	-

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
Weeping Myall Woodlands	E	-	PMST	REs associated with this TEC were not recorded within the Project Area during field surveys.		Unlikely	-
Birds							
<i>Actitis hypoleucos</i> (Common Sandpiper)	Mi	-	PMST Atlas of Living Australia (ALA)	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 789110 Date: Not supplied Location: 84 km south-east of the Project Area.	Closest known record was recorded in cleared land adjacent to Baking Board Creek in Chinchilla.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Aphelocephala leucopsis</i> (Southern Whiteface)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 5982850 Date: 26/08/2016 Location: 56 km south-west of the Project Area.	Closest known record was recorded at campground at Rocky Creek in Yuleba.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Apus pacificus</i> (Fork-tailed Swift)	Mi	-	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 4362130	Closest known record was recorded in eucalypt open forest in Cherwondah State Forest.	Likely	ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				Date: 06/02/2002 Location: 12.5 km west of the Project Area.			
<i>Calidris acuminata</i> (Sharp-tailed Sandpiper)	Mi	-	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 2981363 Date: Not supplied Location: 61 km south-east of the Project Area.	Closest known record was recorded in cleared land 1 km east of Leichardt Highway and 2 km west of Condamine River.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Calidris ferruginea</i> (Curlew Sandpiper)	CE, Ma and Mi	CE	PMST ALA	Occurrence ID: 5994146 Date: 02/02/2014 Location: 9 km south of the Project Area.	This record was recorded in eucalypt woodlands in with a tussock grass understorey.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Calidris melanotos</i> (Pectoral Sandpiper)	Mi, Ma	-	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 2976881 Date: 14/11/1996 Location: 108.9 km south-west of the Project Area	This record was recorded in cleared, non-native vegetation near Roma.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Calyptorhynchus lathamii lathamii</i>	V	V	Survey PMST	Field surveys undertaken for other Senex projects identified a record	Recorded outside of Project Area near sparse woodlands.	Likely	Survey

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
(South-eastern Glossy Black-cockatoo)			ALA	of this species with 0.7 km south of the Project Area near Wolderns Road near Jackson Wandoan Road. Date: 19/11/2020			Date: 19/11/2020
				Occurrence ID: 5753267 Date: 29/08/2009 Location: 0.1 km south of the Project Area	This record was recorded in eucalypt open forest in with grassy understorey.		ALA Occurrence Records (Accessed 17/07/2023)
				Occurrence ID: 5753209 Date: 28/0/2009 Location: 7.1 km South of the Project Area	An individual was recorded in Brigalow (<i>Acacia harpophylla</i>) forest and woodlands.		ALA Occurrence Records (Accessed 17/07/2023)
<i>Charadrius leschenaultii</i> (Greater Sand Plover)	V, Mi, Ma	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: OBS832588780 Date: 28/11/2019 Location: 237.3 km south-east of the Project Area	Closest known record was recorded in cleared, native vegetation near Toowoomba.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Climacteris picumnus victoriae</i> (Brown Treecreeper (south-eastern))	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area.	Closest known record was recorded in Bluegrass and Tall Bunch Grass tussock grasslands.	Potential	ALA Occurrence Records

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				<p><u>Closest record:</u> Record Number: 04086072 Date: 27/06/1990 Location: 251 km south of the Project Area.</p>			(Accessed 17/07/2023)
<i>Cuculus optatus</i> (Oriental Cuckoo)	Mi	-	PMST ALA	<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest record:</u> Occurrence ID: 387031 Date: Not supplied Location: 84.3 km south-east of the Project Area</p>	Closest known record was recorded in cleared, non-native vegetation in Chinchilla.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Erythrotriorchis radiatus</i> (Red Goshawk)	E	E	PMST ALA	<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest record:</u> Occurrence ID: 2981334 Date: Not supplied Location: 62.6 km south-east of the Project Area.</p>	Closest known record was recorded in cleared, native vegetation.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Falco hypoleucos</i> (Grey Falcon)	V	V	PMST ALA	<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest record:</u></p>	Closest known record was recorded in eucalyptus woodlands with a shrubby understorey.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				Occurrence ID: 11170 Date: Not supplied Location: 63.8 km south-east of the Project Area.			
<i>Gallinago hardwickii</i> (Latham's Snipe)	Mi	-	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 1560945 Date: Not supplied Location: 34 km south-east of the Project Area.	Closest known record was recorded in eucalypt open forest with grassy understorey.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Grantiella picta</i> (Painted Honeyeater)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: OBS231628830 Date: 02/10/1997 Location: 47 km south-east of the Project Area.	Closest known record was recorded in eucalypt open forest with tussock grass understorey.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Hirundapus caudacutus</i> (White-throated Needletail)	V, Mi	V	Survey PMST ALA	Field surveys undertaken for other Senex projects identified a record of this species within the Project Area near Wolderns Road. Eight individuals recorded. Date: 24/11/2022	Recorded inside the Project Area. Eight individuals recorded flying low out of and over adjacent vegetation (RE11.5.1) on overcast morning.	Known	Survey Date: 24/11/2022

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				<p>Field surveys undertaken for other Senex projects identified a record of this species approximately 0.5 km south of the Project Area near Wolderns Road near Jackson Wandoan Road. Date: 23/11/2022</p>	<p>Recorded to the south of the Project Area near sparse woodlands. Flying over at height on cloudy day. Single individual seen. Direct flight.</p>		<p>Survey Date: 23/11/2022</p>
				<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest public record:</u> Occurrence ID: 4362129 Date: 06/02/2002 Location: 10.7 km west of the Project Area.</p>	<p>Closest known record was recorded in eucalypt open forest with a grassy understorey.</p>		<p>ALA Occurrence Records (Accessed 17/07/2023)</p>
<i>Motacilla flava</i> (Yellow Wagtail)	Mi, Ma	-	PMST ALA	<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest record:</u> Occurrence ID: 2461052 Date: 01/01/1905 Location: 275.2 km north of the Project Area</p>	<p>Closest known record was recorded in cleared, non-native vegetation near Duinga.</p>	Unlikely	<p>ALA Occurrence Records (Accessed 17/07/2023)</p>
<i>Myiagra cyanoleuca</i> (Satin Flycatcher)	Mi	-	PMST ALA	<p>There are no publicly available records within 10 km of the Project Area.</p>	<p>Closest known record was recorded in eucalypt woodlands with shrubby understorey.</p>	Potential	<p>ALA Occurrence Records</p>

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				<p><u>Closest record:</u> Occurrence ID: Date: Location: 78 km south-east of the Project Area.</p>			(Accessed 17/07/2023)
<i>Rhipidura rufifrons</i> (Rufous Fantail)	Mi	-	PMST ALA	<p>Species recorded as part of other surveys completed in 2020. Recorded outside of Project Area near Sundown Road. Approx 1 km southeast of the Project Area. Date: 19/11/2020</p>	Recorded in sparse vegetation near a drainage line.	Potential	Survey Date: 19/11/2020
				<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest record:</u> Occurrence ID: 3000646 Date: 01/10/1997 Location: 28.4 km south-east of the Project Area.</p>	Closest known record was recorded in eucalypt woodlands with shrubby understorey.		ALA Occurrence Records (Accessed 17/07/2023)
<i>Rostratula australis</i> (Australian Painted Snipe)	E	E	PMST ALA	<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest record:</u> Occurrence ID: Date: Not specified</p>	Closest known record was recorded in eucalypt woodlands with a tussock grass understorey.	Potential	ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				Location: 166 km south-west of the Project Area.			
<i>Stagonopleura guttata</i> (Diamond Firetail)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: Date: 21/04/2019 Location: 14 km south-west of the Project Area.	Closest known record was recorded in eucalypt woodlands with shrubby understorey.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
Fish							
<i>Maccullochella peelii</i> (Murray Cod)	V	-	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 89513-PRG1001-20150526-ELB-152-MACPEE Date: 26/05/2015 Location: 59.5 km south-east of the Project Area	Closest known record was recorded in the Condamine River.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
Flora							
<i>Acacia curranii</i> (Curly-bark Wattle)	V	V	PMST ALA	Occurrence ID: AQ0406606 Date: 29/08/1982 Location: 9.99 km south-east of the Project Area	This record was recorded in eucalyptus woodlands with a tussock grass understorey.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
<i>Acacia wardellii</i> (Thomby Range Wattle)	-	NT	PMST ALA WO	Occurrence ID: 0857077 Date: 01/01/2018 Location: 8 km South of the Project Area	Closest known record was recorded in eucalypt woodlands with shrubby understorey in Gurulmundi State Forest.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Arythroxon hispidus</i> (Hairy Joint Grass)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: BRI AQ0582978 Date: 23/05/1995 Location: 80.75 km north-east of the Project Area	Closest record was recorded in cleared, non-native vegetation near Dawson River.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Cadellia pentastylis</i> (Ooline)	V	V	PMST ALA	Various records as part of surveys completed for the Project.	35 individuals recorded in the south-eastern corner of the Project Area.	Known	Survey records ALA Occurrence Records (Accessed 17/07/2023)
				Occurrence ID: 61599270 Date: 01/10/2020 Location: 4 km south of the Project Area	This record was recorded in eucalypt open forest with grassy understorey.		
				Occurrence ID: 50507474 Date: 17/10/2012 Location: 4 km south of the Project Area	This record was recorded in eucalypt open forest with grassy understorey.		
				Occurrence ID: BRI AQ0911861 Date: 01/10/2012 Location: 4 km south of the Project Area	This record was recorded in cleared, non-native vegetation.		

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				Occurrence ID: BRI AQ0911861 Date: 01/10/2012 Location: 4 km south of the Project Area	This record was recorded in cleared, non-native vegetation.		
				Occurrence ID: 5686535 Date: 08/05/2009 Location: 6 km south of the Project Area	This record was recorded in eucalypt open forests with a grassy understorey.		
				Occurrence ID: BRI AQ0912536 Date: 19/04/2013 Location: 7.5 km south of the Project Area	This record was recorded in cleared, non-native vegetation.		
				Occurrence ID: BRI AQ0872058 Date: 28/08/2009 Location: 7.5 km south of the Project Area	This record was recorded in Brigalow (<i>Acacia harpophylla</i>) forests and woodlands.		
				Occurrence ID: 6004372 Date: 19/03/2014 Location: 8.7 km south of the Project Area	This record was recorded in eucalypt open forests with a tussock gras understorey.		
				Occurrence ID: 5686535 Date: 08/05/2009 Location: 6.3 km south of the Project Area	This record was recorded in eucalypt open forests with a grassy understorey.		
				Occurrence ID: 4400248 Date: 09/10/2001	This record was recorded in Brigalow (<i>Acacia harpophylla</i>) forests and woodlands.		

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				Location: 6.4 km south of the Project Area			
				Occurrence ID: BRI AQ0601998 Date: 21/09/1995 Location: 6.6 km south of the Project Area	This record was recorded in Brigalow (<i>Acacia harpophylla</i>) forests and woodlands.		
<i>Calytrix gurulumundensis</i>	V	V	PMST ALA	Occurrence ID: 117393034 Date: 18/09/2021 Location: 5.45 km south-east of the Project Area	This record was recorded in eucalyptus open forests with a grassy understorey.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
				Occurrence ID: BRI AQ0951130 Date: 17/08/2015 Location: 8.43 km south of the Project Area	This record was recorded in eucalyptus open forests with a tussock grass understorey.		
				Occurrence ID: BRI AQ0857067 Date: 16/07/2014 Location: 8.2 km south of the Project Area	This record was recorded in eucalyptus open forests with a tussock grass understorey.		
				Occurrence ID: CBG 8803230.1 Date: 20/09/1988 Location: 8.5 km south of the Project Area	This record was recorded in eucalyptus open forests with a tussock grass understorey.		
				Occurrence ID: MEL 0688591A Date: 12/07/1981 Location: 9.15 km south-east of the Project Area	This record was recorded in eucalyptus open forests with a grassy understorey.		

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				<p>Occurrence ID: BRI AQ0094856 Date: 10/06/1961 Location: 9.35 km south-east of the Project Area</p>	This record was recorded in eucalyptus open forests with a tussock grass understorey.		
				<p>Occurrence ID: BRI AQ0825589 Date: 16/10/2011 Location: 9.41 km south-east of the Project Area</p>	This record was recorded in eucalyptus open forests with a tussock grass understorey.		
				<p>Occurrence ID: BGQLD.0799-trial-occ Date: 16/10/2011 Location: 9.73 km south-east of the Project Area</p>	This record was recorded in eucalyptus open forests with a tussock grass understorey.		
				<p>Occurrence ID: BRI AQ0380357 Date: 12/07/1981 Location: 9.62 km south-east of the Project Area</p>	This record was recorded in eucalyptus open forests with a tussock grass understorey.		
				<p>Occurrence ID: 96056256 Date: 24/09/2021 Location: 9.38 km south-east of the Project Area</p>	This record was recorded in eucalyptus open forests with a tussock grass understorey.		
				<p>Occurrence ID: 6004306 Date: 19/03/2014 Location: 9.83 km south-east of the Project Area</p>	This record was recorded in eucalyptus open forests with a tussock grass understorey.		

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				Occurrence ID: MEL 0688591A Date: 12/07/1981 Location: 9.11 km south-east of the Project Area	This record was recorded in eucalyptus open forests with a grassy understorey.		
<i>Dichanthium setosum</i> (Bluegrass)	V	-	PMST ALA	Occurrence ID: 6596489 Date: 16/11/2017 Location: 1.38 km north of the Project Area	This record was recorded in cleared, non-native vegetation.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
				Occurrence ID: BRI AQ0283140 Date: 01/01/1971 Location: 9.67 km north-east of the Project Area	This record was recorded in cleared, non-native vegetation.		
<i>Eucalyptus cutisii</i> (Plunkett Mallee)	-	NT	PMST ALA	Occurrence ID: NSW307233 Date: 06/1966 Location: 9.38 km north-east of the Project Area	This record was recorded in cleared, non-native vegetation.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Homopholis belsonii</i> (Belson's Panic)	V	E	PMST ALA	Occurrence ID: BRI AQ0785062 Date: 15/10/2007 Location: 2 km north of the Project Area	This record was recorded in eucalyptus open forests with a shrubby understorey.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Lepidium monoplacoides</i> (Winged Pepper- cress)	E	-	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: AD 257951	Closest record was recorded in eucalyptus woodlands with a tussock grass understorey in Yelarbon.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				Date: 17/01/2011 Location: 263.9 km south-east of the Project Area			
<i>Micromyrtus carinata</i> (Gurulmundi Heath-myrtle)	-	E	PMST ALA	Occurrence ID: MEL 1590917A Date: 19/04/1980 Location: 9.94 km east of the Project Area	This record was recorded in cleared, non-native vegetation.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
				Occurrence ID: AQ0857073 Date: 17/07/2014 Location: 9 km south of the Project Area	This record was recorded in eucalyptus woodlands with a tussock grass understorey.		
				Occurrence ID: AQ0951132 Date: 17/08/2015 Location: 9 km south of the Project Area	This record was recorded in eucalyptus woodlands with a tussock grass understorey.		
				Occurrence ID: NSW531941 Date: 03/11/1993 Location: 8.63 km south-east of the Project Area	This record was recorded in eucalyptus woodlands with a tussock grass understorey.		
				Occurrence ID: BRI AQ0404154 Date: 01/03/1997 Location: 9.55 km south-east of the Project Area	This record was recorded in eucalyptus woodlands with a tussock grass understorey.		
				Occurrence ID: BRI AQ0584693 Date: 03/11/1993 Location: 8.55 km south-east of the Project Area	This record was recorded in eucalyptus woodlands with a grassy understorey.		

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				<p>Occurrence ID: BRI AQ0383427 Date: 19/05/1960 Location: 9.80 km south-east of the Project Area</p> <p>Occurrence ID: 6004313 Date: 19/03/2014 Location: 9.88 km south-east of the Project Area</p> <p>Occurrence ID: BRI AQ0601999 Date: 21/09/1995 Location: 10 km south-east of the Project Area</p> <p>Occurrence ID: NSW458381 Date: 21/09/1995 Location: 9.78 km south-east of the Project Area</p> <p>Occurrence ID: NSW282364 Date: 12/07/1981 Location: 8.99 km south-east of the Project Area</p>	<p>This record was recorded in eucalyptus woodlands with a tussock grass understorey.</p> <p>This record was recorded in eucalyptus woodlands with a tussock grass understorey.</p> <p>This record was recorded in eucalyptus woodlands with a grassy understorey.</p> <p>This record was recorded in eucalyptus woodlands with a grassy understorey.</p> <p>This record was recorded in eucalyptus woodlands with a grassy understorey.</p>		
<i>Solanum stenopterum</i> (Winged Nightshade)	-	E	PMST ALA WO	<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest record:</u> Occurrence ID: Date: 28/03/2017</p>	This record was recorded in cleared, non-native vegetation.	Potential	ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				Location: 15 km south-west of the Project Area.			
<i>Thesium australe</i> (Austral Toadflax)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: MEL 0002740A Date: 22/12/1846 Location: 82.15 km south-east of the Project Area	The closest record was recorded in cleared, non-native vegetation.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Vincetoxicum forsteri</i> (Slender Tylophora)	E	E	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: BRI AQ0420081 Date: 17/05/1960 Location: 99.2 km south-west of the Project Area.	The closest record was recorded in eucalyptus woodlands with a tussock grassy understorey.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Xerothamnella herbacea</i>	E	E	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: BRI AQ0440550 Date: 04/02/1984	The closest record was recorded in cleared, non-native vegetation.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				Location: 90.7 km south-east of the Project Area			
Invertebrates							
<i>Adclarkia cameroni</i> (Brigalow Woodland Snail)	E	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 6002856 Date: 19/03/2014 Location: 14.81 km south of the Project Area *However, this record is incorrect, refer to Appendix I.	This record was recorded in other shrublands in Gurulmundi State Forest. *However, this record is incorrect, refer to Appendix I.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
				<u>Next closest record:</u> Occurrence ID: Date: 03/2011 Location: 52.12 km south-east of the Project Area			
<i>Adclarkia dulacca</i> (Dulacca Woodland Snail)	E	E	PMST ALA	Occurrence ID: MO79215 Date: 28/08/2009 Location: 4 km south-west of the Project Area.	This record was recorded in eucalyptus open forest with a grassy understorey.	Likely	ALA Occurrence Records (Accessed 17/07/2023)
				Occurrence ID: MO79214 Date: 25/08/2009 Location: 8.7 km south of the Project Area.	This record was recorded in Brigalow (<i>Acacia harpophylla</i>) forests and woodlands.		

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Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
<i>Jalmenus eubulus</i> (Pale Imperial Hairstreak (Butterfly))	-	V	PMST ALA WO	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 5784146 Date: 08/12/2008 Location: 21.5 km south-east of the Project Area.	This record was recorded in eucalyptus open woodlands with a tussock grass understorey in Gurulmundi State Forest.	Likely	ALA Occurrence Records (Accessed 17/07/2023)
Mammals							
<i>Chalinolobus dweyeri</i> (Large-eared Pied Bat)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 4367054 Date: 21/01/2003 Location: 102.17 km north-west of the Project Area	The closest record was recorded in eucalyptus open forests with a grassy understorey.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Dasyurus hallucatus</i> (Northern Quoll)	E	-	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: J13700 Date: 20/06/1966 Location: 142 km north-east of the Project Area.	This record was recorded in eucalyptus woodlands with a tussock grass understorey.	Potential	ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
<i>Macroderma gigas</i> (Ghost Bat)	V	E	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 1565299 Date: 25/06/1997 Location: 223.48 km north-west of the Project Area	The closest record was recorded in cleared, non-native vegetation.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Nyctophilus corbeni</i> (Corben's Long-eared Bat)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 6077375 Date: 24/02/2013 Location: 40 km south-east of the Project Area.	This record was recorded in cleared, non-native vegetation.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Petauroides volans</i> (Greater Glider (central and southern))	E	E	PMST ALA	Species recorded in the Project Area during Project surveys in 2022.	Species recorded in the Project Area. Includes observed species and trees with hollows.	Known	Surveys
				Occurrence ID: JM6912 Date: 22/03/1989 Location: 1.83 km west of the Project Area.	This record was recorded in cleared, non-native vegetation.		ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
<i>Petaurus australis australis</i> (Yellow-bellied Glider (south-eastern))	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 5784338 Date: 17/09/2009 Location: 11.1 km east of the Project Area.	This record was recorded in eucalyptus open forests with a grassy understorey.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Phascolarctos cinereus</i> (Koala)	E	-	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 2652002 Date: 01/01/1984 Location: 10.42 km west of the Project Area.	This record was recorded in cleared, non-native vegetation.	Likely	ALA Occurrence Records (Accessed 17/07/2023)
<i>Tachyglossus aculeatus</i> (Short-beaked Echidna)	-	SLC	ALA WO	Occurrence ID: ae878f79-a92a-4cfa-823a-061fed16771e Date: 29/12/2020 Location: 8.7 km east of the Project Area	This record was recorded in cleared, non-native vegetation.	Likely	ALA Occurrence Records (Accessed 17/07/2023)
				Occurrence ID: 88666791 Date: 26/07/2021 Location: 0.1 km west of the Project Area	This record was recorded in cleared, non-native vegetation.		

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
				<p>Occurrence ID: 5753278 Date: 29/08/2009 Location: 0.1 km south of the Project Area</p>	This record was recorded in eucalyptus open forests with a grassy understorey.		
				<p>Occurrence ID: 164937146 Date: 04/04/2023 Location: 6 km south-east of the Project Area</p>	This record was recorded in eucalyptus open forests with a grassy understorey.		
Reptiles							
<i>Acanthophis antarcticus</i> (Common Death Adder)	-	V	ALA WO	<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest record:</u> Occurrence ID: J30594 Date: Not supplied Location: 34.7 km south-west of the Project Area.</p>	This record was recorded in cleared, non-native vegetation.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Anomalopus mackayi</i> (Five-clawed worm-skink)	V	E	PMST ALA	<p>There are no publicly available records within 10 km of the Project Area.</p> <p><u>Closest record:</u> Occurrence ID: 3839563 Date: 23/09/2023 Location: 149.4 km south-east of the Project Area.</p>	This record was recorded in cleared, non-native vegetation.	Potential	ALA Occurrence Records (Accessed 17/07/2023)

Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
<i>Delma torquata</i> (Collared Delma)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 116384011 Date: 13/10/2020 Location: 111.3 km north-west of the Project Area.	This record was recorded in eucalyptus woodlands with a tussock grass understorey.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Egernia rugosa</i> (Yakka Skink)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: J80162 Date: 01/02/1998 Location: 29.2 km south-east of the Project Area.	This record was recorded in other shrublands.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Eseya albagula</i> (White-throated Snapping Turtle)	CE	CE	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 3769872 Date: 01/01/1998 Location: 60.31 km north-east of the Project Area	The closest record was recorded in eucalyptus open forests with a shrubby understorey, adjacent to Dawson River.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)

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Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
<i>Furina dunmalli</i> (Dunmall's Snake)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 5638285 Date: 25/01/2009 Location: 38.8 km south-west of the Project Area.	This record was recorded in Brigalow (<i>Acacia harpophylla</i>) forests and woodlands.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Hemiaspis damelii</i> (Grey Snake)	E	E	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: 5778093 Date: 20/04/2010 Location: 51.4 km east of the Project Area.	This record was recorded in eucalyptus open woodlands with shrubby understorey in Barakula State Forest.	Potential	ALA Occurrence Records (Accessed 17/07/2023)
<i>Rheodytes leukops</i> (Fitzroy River Turtle)	V	V	PMST ALA	There are no publicly available records within 10 km of the Project Area. <u>Closest record:</u> Occurrence ID: J89000 Date: 17/10/2009 Location: 174.45 km north of the Project Area	The closest known record was recorded in cleared, non-native vegetation.	Unlikely	ALA Occurrence Records (Accessed 17/07/2023)

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Species Name	EPBC Act Status	NC Act Status	Source	Records	Habitat Description of Specific Records	Likelihood of Occurrence as per Appendix B	References
<i>Strophurus taenicauda</i> (Golden-tailed Gecko)	-	NT	ALA WO	Occurrence ID: 5994146 Date: 02/02/2014 Location: 9 km south of the Project Area	This record was recorded in eucalyptus woodlands with a tussock grass understorey.	Likely	ALA Occurrence Records (Accessed 17/07/2023)

Key: E – Endangered, V – Vulnerable, Mig – Migratory, SLC – Special Least Concern, LC – Least Concern, NT – Near Threatened

PMST – Protected Matters Search Tool, WO – Wildlife Online, ALA – Atlas of Living Australia, RE – Regional Ecosystem, DES – Department of Environment and Science, DEE – Department of Environment and Energy, NRA – Natural Resources Assessment

APPENDIX I SUBJECT MATTER EXPERT STATEMENT



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Supplementary Report

Additional information relating to Dulacca Woodland Snail (*Adclarkia dulacca*) and Brigalow Woodland Snail (*A. cameroni*) within the Atlas 3 Project Area, Queensland.

Compiled by BOOBOOK for Senex

Revision	Date	Description	Author	Verifier	Approved
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Abbreviations

CSG	coal seam gas
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
km	kilometre (s)
m	metre (s)
NC Act	<i>Nature Conservation Act 1992</i>
QM	Queensland Museum
RE	Regional Ecosystem (s)
SEVT	Semi-evergreen vine thicket
TSSC	Threatened Species Scientific Committee

Conclusions drawn in this report are based on available information at the time of writing. Any additional information may alter such conclusions and the author reserves the right to do so if such information becomes available. This report has been made as at the date of the report and is not to be used after six (6) months and not if there are any material changes meanwhile. In either event it should be referred back for review. To the extent permitted by law BOOBOOK does not accept liability for any loss or damage which any person may suffer arising from any negligence or breach of contract on its part. This report was prepared for the benefit of the party to whom it is directed only and for the purpose identified within. BOOBOOK does not accept responsibility to any other person for the contents of the report.

1. Introduction

The purpose of this report is to provide additional information for the Senex Atlas 3 Gasfield Project (the Project) relating to two species of threatened land snail. These species are:

- ✎ Dulacca Woodland Snail (*Adclarkia dulacca*) listed as Endangered under both the Commonwealth *Environment Protection and Biodiversity Conservation Act* (EPBC Act) and Queensland *Nature Conservation Act 1992* (NC Act).
- ✎ Brigalow Woodland Snail (*A. cameroni*) listed as Endangered under the EPBC Act and as Vulnerable under the NC Act.

The study area referred to herein includes the entirety or parts of the following Senex-operated tenements: ATP 2059, PL 445, PL 1037 and PL 209 (the Project Area).

The information presented within this report expands on likelihood of occurrence assessments provided for both species within a previously submitted terrestrial ecology report (Boobook 2022) as well as providing additional information for both species relevant to the Project Area. As described within Boobook (2022) it should be noted that no detailed surveys for either species were undertaken within the Project Area, hence information provided herein is based on available desktop information (Appendix A) as well as expert opinion. Boobook's Principal Ecologist, Craig Eddie, is a recognised expert on the land snails of the Brigalow Belt and has undertaken multiple surveys for both species, as well as other land snails, over the past three decades (Appendix B).

2. Dulacca Woodland Snail

2.1 Taxonomy

The Dulacca Woodland Snail (*Adclarkia dulacca*) belongs to the family Camaenidae. It is one of three species within the genus *Adclarkia*. Although first discovered in the 1990's (Stanisic 1998), *A. dulacca* was only formally described in 2010 (Stanisic *et al.* 2010).

2.2 Distribution

Publicly accessible records of Dulacca Woodland Snail (ALA 2022, QM 2022) show that it is found in a small area of southern inland Queensland between Yuleba and Miles in the west and east respectively, and between Wandoan and Meandarra in the north and south respectively (Appendix A). Most records are centred on the Dulacca area (ALA 2022) which contains the type locality for the species.

The entire distribution of the species is within the Brigalow Belt South bioregion. Most records lie within Subregion 28 (Dulacca Downs) with outliers in Subregion 26 (Southern Downs) and Subregion 31 (Eastern Darling Downs). All of these subregions have extensive areas of fertile clay plains (Sattler and Williams 1999) that are substantially cleared of native vegetation. Most notably, Subregion 28 (Dulacca Downs) which contains the bulk of the known distribution of Dulacca Woodland Snail in Queensland, has less than 15% remnant vegetation cover. Consequently, the current distribution of Dulacca Woodland Snail is highly fragmented (ALA 2022) being largely restricted to patches or strips of habitat retained on roadsides, shade lines and ridges.

2.3 Ecology

There are no published studies of the ecology of Dulacca Woodland Snail. The species is known to live in a variety of forest and woodland types where it shelters under logs, rocks, and other ground debris (Stanisic *et al.* 2010, TSSC 2016a). Like other camaenid land snails the species is active at night after rain (C. Eddie pers. obs.). During periods of inactivity the Dulacca Woodland Snail will aestivate (i.e. enter a period of dormancy) at its chosen shelter site. In order to conserve moisture, live snails attach to the underside of a log, rock, leaves or the ground surface and seal any gaps in the shell opening with mucus. Burrowing into shallow soil has been observed in captivity (C. Eddie pers. obs.).

2.4 Habitat

At the time of the species description Stanistic *et al.* (2010) described the habitat of the Dulacca Woodland Snail as “vine thicket/woodland on rocky outcrop”. This description refers primarily to the habitat at the type locality which is a ridgeline to the east of Dulacca. At this location snails were found under rocks in “degraded thicket/*Brachychiton*” (Stanistic *et al.* 2010).

Other than vine thicket, the species is known to occur in Brigalow (*Acacia harpophylla*) woodland/open forest, ironbark (*Eucalyptus* spp.) woodland, Lancewood (*Acacia shirleyi*) woodland and Gum-topped Box (*E. woollsiana*) woodland (TSSC 2016a).

Although habitat preferences are not completely known, most records of the species are from regrowth or remnant vegetation communities dominated by Brigalow (*Acacia harpophylla*) and/or Belah (*Casuarina cristata*) (Queensland Museum 2022, Boobook unpublished data). Although the species was first described from specimens collected within vine thicket, field surveys by C. Eddie over the past decade (Boobook unpublished data) indicate that Brigalow/Belah woodlands and open forests provide the most important habitat for the species, in particular regional ecosystems (RE) 11.4.3 and 11.9.5. Dulacca Woodland Snail will occur in other vegetation types e.g. vegetation dominated by Lancewood, Narrow-leaved Ironbark (*E. crebra*) and Gum-topped Box but this is usually where these habitats currently or formerly adjoined Brigalow/Belah communities (C. Eddie pers. obs.).

The Dulacca Woodland Snail shelters beneath logs, under rocks, among leaf litter, fallen bark slabs and in loose bark at the base of trees (Stanistic *et al.* 2010, C. Eddie pers. obs.). The species can occur in non-remnant habitats (e.g. regrowth) providing that there are suitable shelter sites (Eddie in TSSC 2016a) such as a dense scattering of logs.

The species can persist in small (<0.5 ha) and fragmented patches, as well as narrow linear strips (<10 m wide) providing suitable shelter sites are present (Boobook unpublished data).

2.5 Movement Patterns

Nothing is known of the movements of Dulacca Woodland Snail; however, the species is considered to be of low mobility (Stanistic in TSSC 2016a). Movement between suitable microhabitat sites (e.g. log piles) may be possible (Stanistic in TSSC 2016a). Movement patterns of Australian land snails are poorly studied. Ridgeway *et al.* (2014) studied the behavioural ecology, including movement patterns, of several species of camaenid land snails in the Sydney region of New South Wales (NSW). These species were *Pommerhelix duralensis*, *Meridolum corneovirens* and *M. middense* which are comparable in size or a little larger (15-30mm in diameter) than Dulacca Woodland Snail. The study of Ridgeway *et al.* (2014) found that these snails moved only short distances during any one observation (often <1m) and that the longest recorded movement was 3.5 m out of 50 survey-animal nights. Ridgeway *et al.* (2014) also concluded that the very low dispersal rates recorded for two of the species suggested that they are highly susceptible to habitat fragmentation. Although not confirmed by field studies, it is probable that Dulacca Woodland Snails also only moves very short distances and that they are equally as susceptible to habitat fragmentation through the creation of isolated populations.

2.6 Summary Information Relating to the Project Area

Boobook (2022) assessed the Dulacca Woodland Snail as ‘Likely to be present’ within the Atlas 3 Project Area. This assessment was based on the presence of potentially suitable habitat (i.e. RE 11.9.4, 11.9.5, 11.9.5a, 11.9.10 and 11.10.7) and specimen-backed records within close proximity to the Project Area (Appendix A). As no targeted surveys were undertaken within the Project Area, a conservative approach was undertaken with regard to predictive habitat mapping i.e. Dulacca Woodland Snail was assumed to be present throughout the Project Area where potentially suitable RE were ground-truthed to be present.

Based on available specimen-backed records, Dulacca Woodland Snail is most likely to occur within the southern end of the Project Area, where mapped potential habitat is closest to confirmed records of the species. Presence of Dulacca Woodland Snail within the northern end of the Project Area has not been established, however no detailed surveys have been undertaken to confirm this. It is possible that mapped habitat in the north of the Project Area is not occupied by the species but this can only be confirmed following targeted survey by suitable qualified personnel.

Should the species be present in the Project Area it is most likely to be confined to remnant and regrowth of the nominated RE where these contain suitable microhabitat (i.e. shelter sites such as logs, rocks, bark piles and dense leaf litter). These include very small patches and narrow strips.

Dulacca Woodland Snail is unlikely to move far (i.e. no more than metres) from shelter sites and it is therefore highly unlikely to disperse across highly modified areas such as cleared paddocks which have few or no shelter sites.

No population estimates can be made as the number of individuals present within a patch varies according to the availability/abundance of shelter sites and a range of other factors. Population estimates which are non-microhabitat destructive require surveys at night after rain.

3. Brigalow Woodland Snail

3.1 Taxonomy

Although first collected in the mid-1980s (Queensland Museum 2022), Brigalow Woodland Snail (*Adclarkia cameroni*) was only formally described in 2010 (Stanisic *et al.* 2010). The holotype for the species was collected by C. Eddie south of Dalby in 1994. Brigalow Woodland Snail differs from Dulacca Woodland Snail by having a more elevated spire (*A. dulacca* has a flat shell) and a more flared last whorl (*A. dulacca* has more concentric coiling) (Stanisic *et al.* 2010). The shell of Brigalow Woodland Snail is usually much thinner (i.e. more fragile) than Dulacca Woodland Snail (C. Eddie pers. obs.).

3.2 Distribution

Publicly accessible records of Brigalow Woodland Snail (ALA 2022) show that it is found in a small area of southern inland Queensland between Bowenville in the east and Miles in the west. Most records are broadly associated with the Condamine/Balonne River floodplain (ALA 2022).

The known distribution of the species is entirely within the Brigalow Belt bioregion. The majority of records lie within Subregion 31 (Eastern Darling Downs) with other occurrences in Subregion 26 (Southern Downs) and Subregion 32 (Inglewood Sandstones). Subregions 26 and 31 have extensive areas of fertile clay plains (Sattler and Williams 1999) that are substantially cleared of native vegetation. Consequently, the current distribution of Brigalow Woodland Snail is highly fragmented (ALA 2022) and largely restricted to retained patches and strips of habitat along riparian corridors (TSSC 2016b).

Recent targeted surveys for the species by C. Eddie have expanded the known range of the species to well east of Dalby and westwards along the Balonne River almost to Surat (Boobook unpublished data). There have been no recent changes to knowledge of the northern extent of its range.

3.3 Ecology

Like the Dulacca Woodland Snail, there are no studies of the ecology of Brigalow Woodland Snail. The species is known to live in a variety of woodland types where it shelters under logs, rocks, and other ground debris (Stanisic *et al.* 2010, TSSC 2016). The species is active at night after rain and during periods of inactivity will aestivate under logs, flood wash piles, rocks, leaves, loose bark piles at the base of trees and other ground debris (C. Eddie pers. obs.). Burrowing into shallow soil has been observed in captivity (C. Eddie pers. obs.).

3.4 Habitat

At the time of the species description Stanisic *et al.* (2010) described the habitat of the Brigalow Woodland Snail as “Brigalow/eucalypt woodland”. Stanisic (in TSSC 2016b) describes the Brigalow Woodland Snail as occurring in “remnant and scattered *Acacia harpophylla* (Brigalow) and woodland patches (such as road verges and riparian corridors) on the Condamine River floodplain, especially in the area around Dalby and Chinchilla”. Virtually no other habitat information has been published since the species description and subsequent Commonwealth listing (TSSC 2016b). There are currently no documented RE associations or vegetation structural/floristic data available for known sites. The species can occur in non-remnant habitats (e.g. regrowth and grassland) providing there are suitable shelter sites (TSSC 2016b).

3.5 Movement Patterns

As per Dulacca Woodland Snail nothing is known of the movements of Brigalow Woodland Snail. As described in section 2.5, the Brigalow Woodland Snail is assumed to move over distances of no more than several metres and is susceptible to habitat fragmentation though it can occur in very small patches and strips of vegetation containing suitable microhabitat.

3.6 Summary Information Relating to the Study Area

The Brigalow Woodland Snail was assessed as being 'Unlikely to be present' within the Atlas 3 Project Area by Boobook (2022). This assessment was based on the Project Area being outside of the known distribution of the species (by greater than 50 km to the southeast) with the nearest specimen-backed records being from near the township of Miles.

The importance of specimen-backed records to determine likelihood of occurrence for this species cannot be overstated. Within the range of Brigalow Woodland Snail there are many undescribed species of Camaenidae that closely resemble Brigalow Woodland Snail based on macro-shell features. Positive identification of *Adclarkia* spp. requires examination of shell microsculpture. When viewed under a microscope, species of *Adclarkia* have distinctive microsculpture i.e. raised ridges on the teleoconch of the shell, whereas the undescribed species have pustules or otherwise different microsculpture. The shells of the undescribed species may be of identical size and shape to that of Brigalow Woodland Snail. Identifications by experts and voucher specimens deposited in formal institutions are therefore critical to verify the distribution of this species.

A publicly available record (ALA 2022) of Brigalow Woodland Snail from Stones Country Resource Reserve (near Gurulmundi) was rejected within Boobook (2022). This record is not specimen-backed and as such its identity cannot be verified. Comprehensive surveys for land snails in Stones Country Resource Reserve conducted by C. Eddie since 1995 have not detected Brigalow Woodland Snail. However, Dulacca Woodland Snail has been recorded from Gurulmundi State Forest where it immediately adjoins Stones Country Resource Reserve (Queensland Museum 2022). This ALA record likely represents another record of Dulacca Woodland Snail or a more common species (e.g. *Pallidelix lambkinae*) but not Brigalow Woodland Snail. Discussions with the source of this record have confirmed that this record is a misidentification (R. Hobson pers. comm.).

Brigalow Woodland Snail is closely associated with the Condamine and Balonne Rivers and its major tributaries. These drainages are all within the Murray Darling Basin. Virtually all of the Atlas 3 Project Area is within the Fitzroy Basin. To date the Brigalow Woodland Snail has not been found within any drainages of the Fitzroy Basin.

On the basis that Brigalow Woodland Snail is well outside its known range and not within the appropriate river catchment, it is concluded that this species is unlikely to occur within the Project Area as originally determined by Boobook (2022).

4. References

ALA (2022). *Atlas of Living Australia*. <http://www.ala.org.au/>

Queensland Museum (2022). *Zoology Specimen Database Records*.

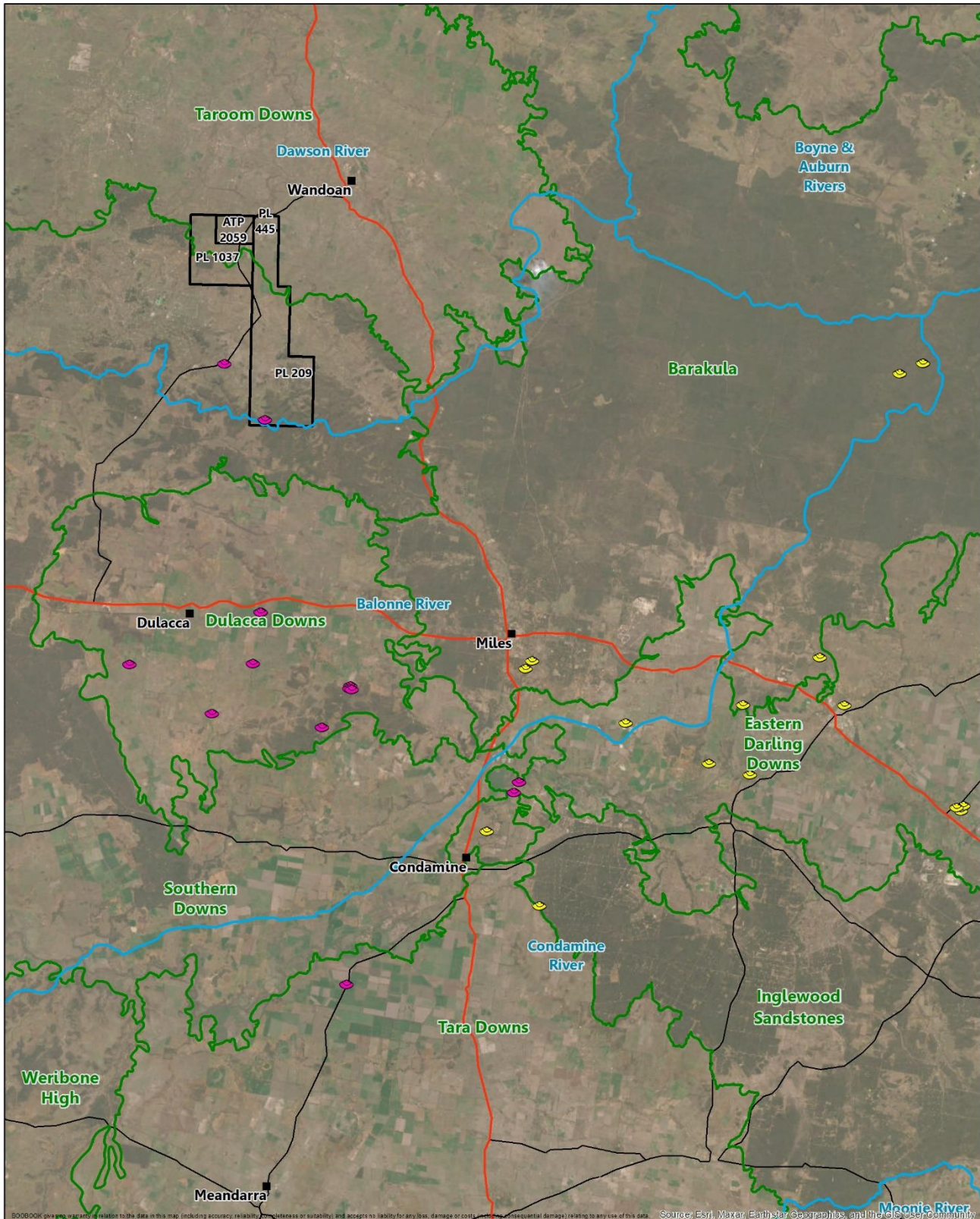
Ridgeway, P.A., Lindsay, K., Pou, D. and Visintin, A. (2014). Indications of diverse behavioural ecologies in the morphologically conservative Australian land snails *Pommerhelix* and *Meridolum* (Stylommatophora: Camaenidae). *Molluscan Research* **34**(1): 25-39.

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

Threatened Species Scientific Committee (TSSC) (2016a). Approved Conservation Advice for *Adclarkia dulacca* (*Dulacca woodland snail*). Department of the Environment and Energy, Canberra. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/83885-conservation-advice-07122016.pdf>

Threatened Species Scientific Committee (TSSC) (2016b). Approved Conservation Advice for *Adclarkia cameroni* (*Brigalow Woodland Snail*). Department of the Environment and Energy, Canberra. <https://www.environment.gov.au/biodiversity/threatened/species/pubs/83886-conservation-advice-07122016.pdf>

Appendix A. Location of the Study Area and publicly available records for *Adclarkia dulacca* and *A. cameroni*.



Appendix1: Publicly available records for *Adclarkia* species.

Adclarkia species		■ Town		
Brigalow Woodland Snail (<i>Adclarkia cameroni</i>)	Dulacca Woodland Snail (<i>Adclarkia dulacca</i>)	— Main road		
Petroleum lease	Exploration permits for petroleum	— Highway		
		Sub-basin drainage areas	Project: Atlas Stage3 Desktop Snail Records Map No: PC946_Map Date: 21/07/2023 Drawn: L. Hardwick Approved: C. Eddie Scale: 1: 450,000 @ A3 Datum: GDA94	
		Biogeographic Subregions		

Appendix B. Capability Profile for Craig Eddie.

CRAIG EDDIE

Principal Ecologist

CAREER SUMMARY

2000 – Present	Principal Ecologist, BOOBOOK Ecological Consulting
1995 – 2006	Natural Resource Ranger, Qld. Parks & Wildlife Service (Roma)
1994 - 1995	Technician, Qld. Department of Primary Industries (Dalby)
1993 - 1994	Technician, Qld. Museum (Brisbane)

EDUCATION

1993: Bachelor of Applied Science – Natural Systems & Wildlife Management, University of Queensland (Gatton Campus) Hons 1

PROFESSIONAL EXPERIENCE & SKILLS

General Ecology Expertise

Ecological surveys (including threatened flora/fauna surveys searches) of >500 infrastructure projects in southern inland Queensland including coal seam gas wells, flow lines, gas plants, roads, access tracks, quarries, camps, major pipelines, seismic lines, fibre optic cables, communication towers, powerline easements and evaporation ponds

11 years of fauna and flora surveys conducted in national parks and other reserves within Roma QPWS management district (Carnarvon, Expedition, Culgoa Floodplain, Alton, Palmgrove, Isla Gorge, Lonesome, Precipice, Thrushton and Narkoola National Parks)

Weed identification, mapping, surveys and management advice

Preparation of fire and pest management plans

Technical reviews for Environmental Impact Statements and ecological assessments

Biodiversity assessment of landholder properties for conservation planning and reserve acquisitions

Preparation and review of numerous ecological reports resulting from field surveys

Preparation of *EPBC Act 1999* referrals associated with threatened species and ecosystems

Regional ecosystem mapping and applications for changes and PMAVs

Assessment of projects for compliance with relevant parts of environmental legislation

Third party technical reviews relating to terrestrial ecology matters.

Land Snail Expertise

1987 – current: land snail collecting throughout Australia and curation of a large private reference collection (>40,000 lots)

1993 – 1994: Technical Assistant within Malacology Section of Queensland Museum: curation and identification of Qld and NSW land snails

1995 – current: land snail surveys of the Brigalow Belt South bioregion in Qld

Donation of >5,000 land snail specimens to Qld Museum

Selected Recent Land Snail Survey Experience

2019. Targeted survey and habitat mapping for Dulacca Woodland Snail within the Dulacca Wind Farm project area.

2022. Targeted survey for Dulacca and Brigalow Woodland Snail within the proposed Bogandilla Wind Farm project area.

2022-2023. Targeted survey for Dulacca and Brigalow Woodland Snail within the proposed QGC Tight sands seismic exploration project area.

2023. Targeted survey for Dulacca and Brigalow Woodland Snail within the proposed Bungaban Wind Farm project area.

2023. Targeted survey for Dulacca Woodland Snail on private property near Wandoan.

Relevant Publications

- Eddie, C. (1992) Land snails and slugs of Booloumba Creek State Forest Park, Conondale Ranges, Southeast Queensland. *The Moreton Bay Radula* **10**(1): 6-7.
- Eddie, C. (1993) Survey of land snails restricted to dry vineforests in the Lockyer Valley, Queensland. Unpublished report to University of Queensland.
- Eddie, C. (1993) Land snails of the karst limestones of the Kempsey Region, NSW. Unpublished report.
- Eddie, C. (1997) A record of *Cochlicella barbara* (Linnaeus, 1758) from Queensland. *Australian Shell News* **97**: 4
- Eddie, C. (2000) A new locality for the land snail genus *Elsothera* in Queensland. *Australasian Shell News* **108**: 4-5.
- Stanisic, J., Eddie, C., Hill, A. & Potter, D. (1994) A preliminary report on the distribution of land snails occurring within the Wet Tropics area. Unpublished report.

APPENDIX J MNES TERRESTRIAL SPECIES SURVEY RECORDS

DataLayer (Corresponds with .shp and .kmz)	Latitude	Longitude	Map Datum	Date of Record	Species Name (Scientific Name)	Common Name	Unique Number (OBJECT ID)	Comment (any comments)
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.172559	149.836297	GCS_GDA94	23/03/2022	Phascolarctos cinereus	Koala	112	Scratches on Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.3357	149.891197	GCS_GDA94	30/04/2022	Phascolarctos cinereus	Koala	139	Scratches on Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.340356	149.878755	GCS_GDA94	1/05/2022	Phascolarctos cinereus	Koala	161	Scratches on Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.179639	149.810575	GCS_GDA94	15/03/2022	Phascolarctos cinereus	Koala	318	Scratches on Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.17215	149.820294	GCS_GDA94	16/03/2022	Phascolarctos cinereus	Koala	319	Scratches on Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.172025	149.820583	GCS_GDA94	16/03/2022	Phascolarctos cinereus	Koala	320	Scratches on Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.16969	149.823559	GCS_GDA94	27/06/2022	Phascolarctos cinereus	Koala	469	Characteristic scratches on Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.16941	149.82387	GCS_GDA94	27/06/2022	Phascolarctos cinereus	Koala	470	Large Eucalyptus tereticornis with Koala scratches
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.169451	149.823982	GCS_GDA94	27/06/2022	Phascolarctos cinereus	Koala	472	Large Eucalyptus tereticornis with hollows and Koala scratches
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.16947	149.823761	GCS_GDA94	27/06/2022	Phascolarctos cinereus	Koala	474	Large Eucalyptus tereticornis with hollows and Koala scratches
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.228461	149.844482	GCS_GDA94	27/06/2022	Phascolarctos cinereus	Koala	477	Fur on barbed-wire fence on large Eucalyptus melanophloia
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.21317	149.833431	GCS_GDA94	10/07/2018	Phascolarctos cinereus	Koala	495	scratches on tree
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.208318	149.821946	GCS_GDA94	10/07/2018	Phascolarctos cinereus	Koala	496	scratches on tree
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.234048	149.844413	GCS_GDA94	20/08/2022	Phascolarctos cinereus	Koala	497	scratches on large Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.254478	149.85278	GCS_GDA94	21/08/2022	Phascolarctos cinereus	Koala	498	scratches on Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.259357	149.872012	GCS_GDA94	21/08/2022	Phascolarctos cinereus	Koala	499	numerous scratches on tree
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.255946	149.855503	GCS_GDA94	22/08/2022	Phascolarctos cinereus	Koala	500	numerous scratches on Eucalyptus tereticornis
Tree_With_Scratches_that_May_be_Caused_by_Koala	-26.270515	149.881294	GCS_GDA94	22/08/2022	Phascolarctos cinereus	Koala	501	numerous scratches on Eucalyptus tereticornis
Ooline_records	-26.334162	149.889274	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	89	Cadellia pentastylis co-dominant 25 trees within 50x20m plot
Ooline_records	-26.335684	149.891193	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	102	
Ooline_records	-26.342464	149.898966	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	111	
Ooline_records	-26.341163	149.887757	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	117	
Ooline_records	-26.365379	149.883914	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline	130	To ca 25 m tall; GPS7 wpt. 120
Ooline_records	-26.365064	149.883327	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline	131	To ca 25m tall
Ooline_records	-26.372461	149.876392	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline	132	
Ooline_records	-26.384311	149.878352	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline	142	
Ooline_records	-26.384717	149.874968	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline	143	
Ooline_records	-26.40177	149.84723	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	154	
Ooline_records	-26.399037	149.840044	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	161	
Ooline_records	-26.383841	149.856855	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	167	
Ooline_records	-26.384372	149.88522	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline	181	
Ooline_records	-26.389506	149.885807	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline	183	
Ooline_records	-26.387198	149.896729	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline	198	
Ooline_records	-26.397736	149.896315	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline	210	
Ooline_records	-26.365443	149.874775	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline	269	
Ooline_records	-26.370035	149.842752	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline	291	
Ooline_records	-26.388612	149.880761	GCS_GDA94	11/06/2022	Cadellia pentastylis	Ooline	305	Very large trees to 40 m, evenly spaced 40 m apart throughout patch
Ooline_records	-26.315467	149.883068	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline	367	
Ooline_records	-26.318971	149.882092	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline	383	
Ooline_records	-26.33256	149.892243	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	719	
Ooline_records	-26.334579	149.898416	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	720	
Ooline_records	-26.332703	149.901787	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	721	
Ooline_records	-26.377369	149.877489	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline	722	
Ooline_records	-26.38003	149.876797	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline	723	
Ooline_records	-26.399991	149.854373	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	724	
Ooline_records	-26.396652	149.854064	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	725	
Ooline_records	-26.382627	149.887212	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline	726	
Ooline_records	-26.383252	149.891976	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline	727	
Ooline_records	-26.394124	149.901084	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline	728	
Ooline_records	-26.363812	149.87035	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline	729	
Ooline_records	-26.360426	149.871314	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline	730	
Ooline_records	-26.36391	149.844015	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline	731	
Ooline_records	-26.367402	149.844723	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline	732	
Ooline_records	-26.310983	149.881042	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline	733	
Ooline_records	-26.333888	149.891634	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	735	
Ooline_records	-26.379717	149.906291	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline	736	
Ooline_records	-26.341868	149.887022	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	737	
Ooline_records	-26.388257	149.885543	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline	738	
Ooline_records	-26.389821	149.882506	GCS_GDA94	11/06/2022	Cadellia pentastylis	Ooline	739	SEVT
Ooline_records	-26.334582	149.873549	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline	740	
Ooline_records_2	-26.310974	787834.3065	GCS_GDA94		Cadellia pentastylis	Ooline		Some die back of branches, 1 dead individual
Ooline_records_2	-26.317064	787896.651	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.319042	787882.0921	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy

Ooline_records_2	-26.316785	786923.8178	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.319048	787092.6925	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.319064	787268.9161	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.321788	787020.1028	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.324031	786936.8974	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.323948	786937.5306	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.324859	787002.623	GCS_GDA94		Cadellia pentastylis	Ooline		
Ooline_records_2	-26.324533	787198.7956	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.324409	787200.5014	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.322669	787282.5726	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.321902	787293.7271	GCS_GDA94		Cadellia pentastylis	Ooline		Some die back
Ooline_records_2	-26.321737	787204.896	GCS_GDA94		Cadellia pentastylis	Ooline		Healthy
Ooline_records_2	-26.311337	787887.7693	GCS_GDA94		Cadellia pentastylis	Ooline		Most leaves diseased with black scale on underside
Ooline_records_2	-26.312664	787868.8188	GCS_GDA94		Cadellia pentastylis	Ooline		Predominantly healthy
Ooline_records_2	-26.313244	787842.2343	GCS_GDA94		Cadellia pentastylis	Ooline		Predominantly healthy
Ooline_records_2	-26.316211	786904.1453	GCS_GDA94		Cadellia pentastylis	Ooline		Leaves predominantly unhealthy on lower branches
Ooline_records_2	-26.320001	787449.2216	GCS_GDA94		Cadellia pentastylis	Ooline		
Ooline_Field_Observations	-26.334162	149.889274	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		1 Cadellia pentastylis co-dominant 25 trees within 50x20m plot
Ooline_Field_Observations	-26.335684	149.891193	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		2
Ooline_Field_Observations	-26.342464	149.898966	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		3
Ooline_Field_Observations	-26.341163	149.887757	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		4
Ooline_Field_Observations	-26.365379	149.883914	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline		5 To ca 25 m tall, several other clumps nearby
Ooline_Field_Observations	-26.365064	149.883327	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline		6 To ca 25 m tall, several other clumps nearby
Ooline_Field_Observations	-26.372461	149.876392	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline		7
Ooline_Field_Observations	-26.384311	149.878352	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline		8
Ooline_Field_Observations	-26.384717	149.874968	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline		9 Tall Cadellia pentastylis with Brachychiton australis and B. rupestris over SEVT
Ooline_Field_Observations	-26.40177	149.84723	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline		10
Ooline_Field_Observations	-26.399037	149.840044	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline		11 Large patch of Cadellia pentastylis forest
Ooline_Field_Observations	-26.383841	149.856855	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline		12 Scattered Cadellia pentastylis to the west
Ooline_Field_Observations	-26.384372	149.88522	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline		13
Ooline_Field_Observations	-26.389506	149.885807	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline		14
Ooline_Field_Observations	-26.387198	149.896729	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline		15
Ooline_Field_Observations	-26.397736	149.896315	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline		16
Ooline_Field_Observations	-26.365443	149.874775	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline		17
Ooline_Field_Observations	-26.370035	149.842752	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline		18
Ooline_Field_Observations	-26.388612	149.880761	GCS_GDA94	11/06/2022	Cadellia pentastylis	Ooline		19 Very large trees to 40 m, evenly spaced 40 m apart throughout patch
Ooline_Field_Observations	-26.315467	149.883068	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline		20
Ooline_Field_Observations	-26.318971	149.882092	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline		21
Ooline_Field_Observations	-26.33256	149.892243	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		22
Ooline_Field_Observations	-26.334579	149.898416	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		23 Cadellia pentastylis patch
Ooline_Field_Observations	-26.332703	149.901787	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		24 Patch of Cadellia pentastylis with Casuarina cristata
Ooline_Field_Observations	-26.377369	149.877489	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline		25
Ooline_Field_Observations	-26.38003	149.876797	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline		26
Ooline_Field_Observations	-26.399991	149.854373	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline		27
Ooline_Field_Observations	-26.396652	149.854064	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline		28 Single large Cadellia pentastylis in Acacia harpophylla and Casuarina cristata woodland
Ooline_Field_Observations	-26.382627	149.887212	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline		29 Patch of Cadellia pentastylis and Acacia harpophylla regrowth
Ooline_Field_Observations	-26.383252	149.891976	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline		30 Patch of Cadellia pentastylis and Acacia harpophylla
Ooline_Field_Observations	-26.394124	149.901084	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline		31 Acacia harpophylla with Eucalyptus crebra and Cadellia pentastylis
Ooline_Field_Observations	-26.363812	149.87035	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline		32 Tall Cadellia pentastylis woodland with Acacia harpophylla and Casuarina cristata
Ooline_Field_Observations	-26.360426	149.871314	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline		33 Patch of Cadellia pentastylis and Acacia harpophylla
Ooline_Field_Observations	-26.36391	149.844015	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline		34 Cadellia pentastylis patch with scattered Eucalyptus populnea
Ooline_Field_Observations	-26.367402	149.844723	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline		35 Patch of Cadellia pentastylis and Acacia harpophylla
Ooline_Field_Observations	-26.310983	149.881042	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline		36 Single Cadellia pentastylis in paddock
Ooline_Field_Observations	-26.333888	149.891634	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		37
Ooline_Field_Observations	-26.379717	149.906291	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline		38
Ooline_Field_Observations	-26.341868	149.887022	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		39 Patch of Cadellia pentastylis, Acacia harpophylla and Eucalyptus woollsiana
Ooline_Field_Observations	-26.388257	149.885543	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline		40 Patch of Cadellia pentastylis and Acacia harpophylla
Ooline_Field_Observations	-26.389821	149.882506	GCS_GDA94	11/06/2022	Cadellia pentastylis	Ooline		41 Tall Cadellia pentastylis over SEVT
Ooline_Field_Observations	-26.334582	149.873549	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline		42 Casuarina cristata woodland with Cadellia pentastylis
Ooline_Field_Observations	-26.332265	149.889872	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		43 Patch of Cadellia pentastylis, Acacia harpophylla and Casuarina cristata woodland
Ooline_Field_Observations	-26.331768	149.8907	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		44 Cadellia pentastylis occurs east from this point
Ooline_Field_Observations	-26.400809	149.855858	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline		45 Patch of Cadellia pentastylis
Ooline_Field_Observations	-26.33204	149.868681	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline		46 Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.330305	149.876829	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline		47 Cadellia pentastylis trees observed from a distance

Ooline_Field_Observations	-26.330933	149.881876	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	48	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.332003	149.885992	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	49	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.322867	149.879332	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline	50	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.328797	149.869146	GCS_GDA94	13/06/2022	Cadellia pentastylis	Ooline	51	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.337892	149.884112	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	52	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.338726	149.893927	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	53	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.338405	149.888999	GCS_GDA94	30/04/2022	Cadellia pentastylis	Ooline	54	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.363633	149.854212	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline	55	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.361696	149.853639	GCS_GDA94	10/06/2022	Cadellia pentastylis	Ooline	56	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.379646	149.846229	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	57	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.372087	149.856159	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	58	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.376538	149.854791	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	59	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.374086	149.85597	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	60	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.382678	149.851862	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	61	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.385993	149.852356	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	62	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.38596	149.854582	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	63	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.402792	149.844665	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	64	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.399874	149.852084	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	65	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.403705	149.851303	GCS_GDA94	2/05/2022	Cadellia pentastylis	Ooline	66	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.374475	149.877731	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline	67	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.378168	149.878813	GCS_GDA94	1/05/2022	Cadellia pentastylis	Ooline	68	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.390068	149.891545	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline	69	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.386606	149.895003	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline	70	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.398307	149.907237	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline	71	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.393127	149.902162	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline	72	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.398354	149.903294	GCS_GDA94	4/05/2022	Cadellia pentastylis	Ooline	73	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.384332	149.905012	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline	74	Cadellia pentastylis trees observed from a distance
Ooline_Field_Observations	-26.38036	149.90412	GCS_GDA94	3/05/2022	Cadellia pentastylis	Ooline	75	Cadellia pentastylis trees observed from a distance
Greater_Glider	-26.182491	149.793155	GCS_GDA94	16/03/2022	Petauroides armillatus	Central Greater Glider	322	Spotlight; 12 m up in Eucalyptus populnea
Greater_Glider	-26.183893	149.796205	GCS_GDA94	16/03/2022	Petauroides armillatus	Central Greater Glider	329	Spotlight; 18 m up in large Eucalyptus populnea
Greater_Glider	-26.227217	149.835801	GCS_GDA94	23/03/2022	Petauroides armillatus	Central Greater Glider	338	Spotlight; in Eucalyptus tereticornis
Greater_Glider	-26.226354	149.836897	GCS_GDA94	23/03/2022	Petauroides armillatus	Central Greater Glider	340	Spotlight; in Eremophila mitchellii
Greater_Glider	-26.16941	149.82387	GCS_GDA94	27/06/2022	Petauroides volans	Greater Glider	471	Large Eucalyptus tereticornis with hollows
Greater_Glider	-26.169451	149.823982	GCS_GDA94	27/06/2022	Petauroides volans	Greater Glider	473	Large Eucalyptus tereticornis with hollows and Koala scratches
Greater_Glider	-26.16947	149.823761	GCS_GDA94	27/06/2022	Petauroides volans	Greater Glider	475	Large Eucalyptus tereticornis with hollows and Koala scratches
Greater_Glider	-26.1702	149.82343	GCS_GDA94	27/06/2022	Petauroides volans	Greater Glider	476	
GlossyBlack-Cockatoo	-26.204558	149.811424	GCS_GDA94	19/11/2020	Calyptorhynchus lathami lathami	Glossy Black-Cockatoo	486	
WhiteThroatedNeedletail1	-26.202196	149.80706	GCS_GDA94	23/11/2022	Hirundapus caudacutus	White-throated Needletail	1440	Flying over at height on cloudy day. Single individual seen. Direct flight
WhiteThroatedNeedletail2	-26.191769	149.8148865	GCS_GDA94	24/11/2022	Hirundapus caudacutus	White-throated Needletail	1454	Flying low out of and over adjacent vegetation (11.5.1) on overcast morning.

APPENDIX K KEY PERSONNEL CVS

Dr David Dique

Partner

David is a Brisbane based Partner that has held state government and private consultancy roles throughout his 25 year career. David has extensive experience in Queensland's resources sector, having provided approvals leadership and technical support for a number of Tier 1 and 2 mining and oil and gas clients. David's resource sector experience includes leading EPBC Act, EIS and EA amendment approvals and delivering operational support aligned with EA and EPBC Act condition requirements. David is currently a DAWE approved Principal Ecologist.

From an academic and research background, David has a detailed understanding of principles that underpin biodiversity research, survey and assessment, management, monitoring, rehabilitation and offsetting. This, coupled with experience in biodiversity conservation planning and policy development from state government, has enabled David to provide high-level strategic approvals advice for major projects in the resources sector. David has recently provided technical oversight for projects being undertaken against IFC Principles in south-east Asia and PNG. This has included baseline surveys and impact assessments, referral preparation, MNES reporting, World Bank Guidelines and IFC PS6 assessments and regulator and financier liaison for geothermal and other resource projects.

Experience: 25 years' experience, including providing compliance and approvals advice to the Oil and Gas Sector

Email: David.Dique@erm.com

Education

- 2004 – Doctor of Philosophy: University of Queensland, Brisbane Qld
- 1994 – Bachelor of Natural Resources (Hons 1): UNE, Armidale NSW
- EIANZ Certified Environmental Practitioner (Ecology Specialist)
- Department of Agriculture, Water and the Environment (DAWE) Suitably qualified ecologist

Languages

- English, native speaker

Fields of Competence

- Contract Management
- Major project delivery
- State and Federal strategic approvals
- Environmental due diligence
- EA compliance and auditing
- Ecological survey design and assessment
- Biodiversity impact assessment/EIA
- Biodiversity policy and legislation
- Rehabilitation Management
- Threatened Species habitat mapping
- Biodiversity Offsets
- EPBC Act referral and MNES reporting
- IFC and World Bank Biodiversity assessments

Key Industry Sectors

- Oil & Gas
- Mining
- Government
- Infrastructure
- Renewables

Key Projects

Oil and Gas

- Project Director for Western Surat Gas Project EA amendment application and Public Environment Report, supporting State and Commonwealth approvals, Senex Energy, Surat Basin
- Project Director for ecological assessment for Project Atlas supporting development of approvals documentation, Senex Energy, Surat Basin
- Project Director for ecological assessments for Reid's Dome Project, State Gas, Surat Basin
- Project Director Receiving Environment Monitoring Plan 2019 Review APLNG facility, ConocoPhillips, Gladstone
- Project Director Weed and rehabilitation monitoring on Curtis Island, APLNG facility, ConocoPhillips, Gladstone
- Project Director Shorebird Monitoring 2018-2021, APLNG facility, ConocoPhillips, Gladstone
- Project Director for North Surat EA amendment and EPBC Act Referral for expansion of gasfields and associated infrastructure, Shell (QGC), Surat Basin
- Project Director for confidential gas field expansion, EA amendment and Commonwealth approvals documentation, Confidential Client
- Project Director for ATP 852 gas field, EA amendment and supporting EPBC Act referral and MNES report, QCLNG Project
- Independent Peer Reviewer for Rehabilitation Management Plan Audit for Surat Basin Acreage, QCLNG, Surat Basin
- Project Director for pre-clearance surveys and threatened species surveys for 420km gas pipeline, Santos GLNG, Roma to Gladstone
- Project Director for Rehabilitation Management Plan and analogue site assessment for 420km gas pipeline, Santos GLNG, Roma to Gladstone
- Project Director for the Western High Pressure Gas Network (WHPGN) ex. Combabula Spur Pipeline Construction Audit, Origin, APLNG, Surat Basin
- Project Director for a Third Party Environmental Compliance Audit (EA conditions, pipeline construction) for Origin, APLNG, Surat Basin
- Project Director for two Third Party Environmental Compliance Audits pipeline construction for Santos, GLNG, Surat Basin
- Project Director for analogue site identification, assessment for gas fields and pipeline for QGC, QCLNG, Roma
- Project Director for the development of the QCLNG Project offset plan under State and Federal statutory approvals, QGC Surat Basin
- Project Director for MNES reporting and Referral preparation for expansion of operations in Spring Gully, APLNG, Surat Basin
- Project Director for pre-clearance surveys and ecological investigations associated with gas field expansion and related infrastructure for Origin, APLNG, Roma
- Project Director for a Third Party Environmental Compliance Audit (MCU, CISDA, GSD) for Origin, APLNG, Surat Basin
- Project Director for EPBC Act Compliance Audit for QGC, QCLNG, Surat Basin
- Project Director for a variety of Tier 2 approvals and permits (e.g. water way barrier works, vegetation clearing permits) for Origin and QGC, APLNG and QCLNG, Surat Basin
- Project Director for water mouse surveys (over 12 month period) and preparation of water mouse management plan at the Narrows for QGC, GCLNG, Gladstone
- Project Director for ecological investigations for Spring Gully gas field expansion to support EA amendment for Origin, APLNG, Surat Basin
- Project Director for Wildlife Management Plan, pipeline construction team, QGC, QCLNG, Roma
- Project Director for *Nature Conservation Act* 1992 Vegetation Clearing permits and approvals, Santos, GLNG, Roma

Other Relevant Projects

- Project Director for EPBC Act referral preparation, provision of strategic approvals advice and ecological assessment for 250km pipeline from Moranbah to Alpha, Sunwater
- Project Director for Ecology Impact Assessment and MNES reporting for Bruce Highway Upgrade (Cooroy to Curra Stage D), DTMR, Gympie
- Technical Biodiversity Lead for Confidential Rail assessment in South-east Qld for DFRC project, Port of Brisbane
- Technical lead for Alpha Rail EIS, ecology, for a 500km proposed rail alignment, strategic approvals advice for the Alpha mine and rail component of the project through federal approvals process, Hancock/GVK
- Technical lead for Carmichael Coal mine, ecology and threatened species management and strategic approvals advice for mine and rail for Carmichael Coal Mine, Adani, Galilee Basin

Matt Davis

Principal Ecologist

Matt has experience advising clients from a variety of sectors and markets. He has considerable expertise in the transport sector, having managed biodiversity and environmental approvals for major road, rail and port projects for government and private clients. This includes leading multidisciplinary teams of ecology specialists from a variety of technical backgrounds, including zoologists, botanists, aquatic and marine ecologists whilst working with planners, engineers, project managers and designers.

Matt has also worked in renewables projects across Australia, including onshore and offshore wind projects in NSW, Victoria, South Australia and Western Australia. pumped hydro storage approvals and feasibility. energy



Experience: 14 years' experience

LinkedIn: <https://www.linkedin.com/in/matt-davis-84545854/>

Email: matt.davis@erm.com

Education

- BSc – Ecology (Griffith University, 2007)
- MEnvMan – Conservation Biology (UQ, 2017)

Professional Affiliations and Registrations

- Biodiversity Assessment Method Accredited Assessor (BAAS18090) – delivered BDARs for road, ferry terminal, wind farm and energy from waste major projects
- Certified Environmental Practitioner (CEnvP 582)
- Suitably Qualified Person under Queensland Flora Survey Guidelines
- Member Environment Institute of Australia and New Zealand)

Languages

- English, native speaker

Fields of Competence

- Biodiversity and infrastructure
- Biodiversity impact assessment
- State legislation and approvals strategies
- EPBC Act approvals, reporting and strategies
- Biodiversity offsets
- Vegetation management
- Botany and threatened flora
- Ecological restoration
- Threatened species habitat assessment and mapping
- GIS applications for ecological information
- Due diligence assessments for biodiversity

Key Industry Sectors

- Government
- Renewables
- Infrastructure
- Water
- Property development

Key Projects

Dawsonvale Offsets Review

Matt led a field team undertaking biocondition assessments and review of requirements for a potential offset site against the EPBC Act Offsets Policy.

RMA 1 Ecology Assessment

Matt is leading ecological field assessment and reporting to support EPBC Act approval variation for a residual management area for aluminium refinery.

Wambo Wind Farm

Matt is currently providing technical review and oversight finalising the EPBC Act preliminary documentation and bird and bat management plan to support Commonwealth and State approvals

HyEnergy Project

Matt is the biodiversity lead, currently scoping and implementing fieldwork to contribute to Western Australia and EPBC Act approvals, as well as to inform design layouts.

Australis Offshore Wind Farms

Matt was the biodiversity lead, providing ecological input into State and EPBC Act referrals for sites in Western Australia, South Australia and Victoria.

Hills of Gold Wind Farm

Matt was the biodiversity lead for 420MW wind farm project completing the EPBC Act referral and EIS for the State Significant Development. He coordinated fieldwork, reviewed and authored reports

Cultana Pumped Hydro Storage

Matt was the ecology lead for the project and provided ecology to the project Ecological Assessment Report and Terrestrial Study Report, including assessment of impacts to all environmental values on site as well as EPBC Act referral

Darlington Point Solar Farm

Matt provided technical reviews for the biodiversity assessments of this 275MW solar farm. He prepared

the EIS chapter for biodiversity and managed the field team completing surveys and assessment.

Western Sydney Energy and Resource Recovery Centre

Matt was the biodiversity lead for the State Significant Development EIS coordinating terrestrial and aquatic components. He reviewed and authored the technical reports and EIS chapter.

Newcastle GasDock

Matt provided early marine and terrestrial biodiversity assessments to inform siting decisions. This included fieldwork for threatened frogs and review of marine and benthic habitats, including sections within Commonwealth waters.

Kamay Ferry Terminals

Matt was the biodiversity lead for this State Significant Infrastructure project, coordinating teams of terrestrial and marine ecologists. He reviewed the reporting, including EIS technical reports, as well as NSW and EPBC Act offset strategies.

Beerburrum to Nambour Rail Upgrade

Matt provide technical reviews for fieldwork and reporting to support Qld approvals and an EPBC Act referral. Design advice was also provided for fauna structures to be included in the reference design.

ARTC Inland Rail Environmental Assessment and Technical Advisor

Matt was the Arup ecological lead for the Inland Rail Phase 1 environmental assessment for the G2C project. Matt continued to work with ARTC as an ecology subject matter expert, providing technical advice to ARTC during the delivery of the project

Canberra Light Rail, Stage 2a and 2b

Matt led technical reviews and coordination for ecology components of the project, which included field surveys and preparation of Preliminary Documentation under the EPBC Act

Amelia James

Ecologist

Amelia is an Ecologist at ERM, based in Brisbane, Queensland. Amelia holds a Bachelor of Science, majoring in Ecology, from the University of Queensland (2016) and Graduate Certificate in Environmental Management from the University of Queensland (2019). Amelia joined ERM in November 2019.

Amelia has experience which includes biodiversity assessments (flora and fauna surveys), vegetation community mapping and environmental due diligence assessments. Amelia statistically analyses and interprets field data to prepare a variety of technical reports and deliverables in the areas of ecology, contaminated land, environmental monitoring and environmental licensing.



Experience: 3 years' experience in Environmental Consulting

LinkedIn: www.linkedin.com/in/ameliajames11019996

Email: amelia.james@erm.com

Education

- Graduate Certificate of Environmental Management, University of Queensland, Australia, 2019
- Bachelor of Science (majoring in Ecology), University of Queensland, Australia, 2016

Professional Affiliations and Registrations

- Environmental Institute of Australia and New Zealand (EIANZ) member of the Professional Development, Student and Early Career Professionals and SEQ Committees

Languages

- English, native speaker

Fields of Competence

- Flora and Fauna Surveys (targeted and ad hoc)
- Threatened Matters Desktop Reviews
- Environmental Impact Assessments
- Ecological Reporting
- Federal, state and local biodiversity legislation and policies
- Due Diligence Assessments (Ecological)
- Client and Stakeholder Engagement
- Natural Heritage Assessments

Key Industry Sectors

- Renewable Energy
- Resources
- Community and Stakeholder Engagement

Key Projects

ARTC Inland Rail Management Plans and Impact Assessments (QLD and NSW), 2022

Preparation of impact assessments and management plans for a suite of documentation relating to the Inland Rail Program.

Multiple EPBC Act Referral Preparations (QLD and NSW) (2020-2022)

Amelia has assisted in the preparation of over 10 EPBC Act referral submissions, including those which are now in the approvals stages. This includes renewable energy projects and linear infrastructure.

Wambo Windfarm Preliminary Documentation (2021)

Amelia assisted in the preparation of the Wambo Wind Farm PD preparation and approvals process. This included the development of an Offsets Strategy for impacted MNES.

Bushfire Management Plan Preparation, Hayman Island InterContinental Resort (QLD), 2021

Involved fieldwork to identify flora species, slope and potential dangers present in order to determine the bushfire rating of the proposed development.

Shorebird monitoring and report preparation, ConocoPhillips, Gladstone (QLD), 2021

Involved shorebird surveys from a vessel and data analysis to identify trends and relationships with shorebird frequency and density over time. This also involved the development of recommendations to ensure species management and protection in the future.

Ecological Surveys, Windfarms across NSW and Qld

Involved bird utilisation surveys and harp trapping for birds and bats in a potential windfarm site in western Queensland, as well as detailed ecological surveys (including targeted flora surveys) in locations across NSW and QLD.

EPBC Referral Preparation, ARTC K2ARB Inland Rail and Wambo Wind Farm (QLD), 2020

Involved the preparation of the EPBC referral documentation, including MNES significant impact assessments, from information reported in the Ecological Baseline Assessments.

EPBC Referral Preparation, ARTC K2ARB Inland Rail and Wambo Wind Farm (QLD), 2020

Involved the preparation of the EPBC referral documentation, including MNES significant impact assessments, from information reported in the Ecological Baseline Assessments.

ARTC K2ARB Inland Rail EIS Document Preparation (QLD), 2020

Involved in a specialised team to write specific technical reports for the K2ARB Project. This involved extracting and condensing information from technical reports and then undertaking impact assessments with this information. EIS Chapters prepared included Flora and Fauna, Noise and Vibration, Cultural Heritage, Cumulative Impacts, Biosecurity, MNES and Hazard and Risk.

ARTC K2ARB Inland Rail Ecological Assessment and Report (QLD), 2020

Undertook a two day ecological survey, involving habitat assessments, spotlighting and targeted frog calls, to identify ecological values. This information was used in compilation with other reports on the area, to determine the ecological values and constraints for the K2ARB Project section of the Inland Rail Program.

Wambo Wind Farm: Noise and Visual Landscape Assessments (QLD), 2020

ARTC Environmental Constraints Management Options Review (QLD), 2020

Involved the compilation of management/design options that best mitigate environmental constraints/risks identified during the baseline reporting phase.



Dr Timothy Howell

Aquatic Ecologist

PhD (Research), Aquatic Science,
Griffith University, 2008

Bachelor of Science (Aquatic Science) (Hons),
Deakin University, 1999

Tim is a career aquatic ecologist with 20 years’ professional experience. He holds a degree with honours in Aquatic Science and a PhD (research) in fish ecology and river rehabilitation. Tim has worked on a broad range of projects for the industry, government agencies, universities, and in collaboration with multiple organisations. Clients include industries such as mining, energy, water supply, aviation, transport, state government, city and regional councils, as well as local business.

Tim is knowledgeable at designing, leading and completing scientific investigations for a range of purposes, such as environmental impact assessment, compliance monitoring, receiving environment monitoring programs (REMP), biological impact monitoring, targeted species monitoring programs, baseline surveys, management plans (species specific, general aquatic values and water quality), research and development and desktop/literature reviews.

Professional career history

2014 – Present	Principal Aquatic Ecologist	Freshwater Ecology Consulting
2012 – 2014	Aquatic Ecology Coordinator	AMEC Environment & Infrastructure Pty Ltd
2011 – 2012	Senior Aquatic Ecologist	Ecosure Pty Ltd
2009 – 2011	Senior Environmental Scientist	Aquateco Pty Ltd
2008 – 2009	Research Assistant	Australian Rivers Institute, Griffith University
2003 – 2006	Research Assistant	NSW DPI Fisheries
2003 – 2008	PhD Candidate	Australian Rivers Institute, Griffith University
2002 – 2003	English Teacher	Various companies (Japan)
1999 – 2000	Supervisor / Manager	Gulf Pearls (Sudan)

About Freshwater Ecology Consulting

Freshwater Ecology is a specialist consultancy that:

- Provides highly respected and experienced aquatic scientists
- Offers practical and scientifically defensible solutions
- Delivers projects within agreed timeframes and budgets
- Guarantees high quality outputs delivered cost-competitively

Selected Project Experience

Environmental Impact Assessment - EIA / EIS / ESIA

Mining & Gas

- **Atlas Gas Project - aquatic ecology baseline assessment (2022-ongoing)**, central Queensland. ERM / Senex.
Role: Project manager, Field operator, Data analysis, Author.
- **Eva Copper Project - aquatic ecology baseline assessment (2021-ongoing)**, Gulf Country Queensland. EMM / Copper Mountain Mining Corporation.
Role: Project manager, Field operator, Data analysis, Author.
- **Reid's Dome Project - aquatic ecology baseline assessment (2021-ongoing)**, central Queensland. ERM / State Gas.
Role: Project manager, Field operator, Data analysis, Author.
- **Commodore Coal - aquatic ecology baseline assessment (2020-2022)**, Darling Downs, Queensland. E2M / SLR.
Role: Project manager, Field operator, Data analysis, Author.
- **Jericho Project - preliminary aquatic ecology baseline assessment (2019)**, Gulf Country, Queensland. Golder Associates / Oz Minerals.
Role: Project manager, Technical reviewer.
- **Bauxite Hills Project (2014-2016)**, Cape York, Queensland. MetroCoal / AMEC.
Role: Project manager, Field operator, Data analysis, Author.
- **Bowen Gas Project - Supplementary EIS (2015)**, central Queensland. Environment and Heritage Partners/ Arrow Energy.
Role: Field operator.
- **Comet Ridge Coal Project EIS (2014)**, central Queensland. Tecsol.
Role: Project manager, Field operator, Data analysis, Author.
- **Surat Gas Project - Supplementary EIS (2012-2013)**, south Queensland. Coffey Environments/ Arrow Energy.
Role: Project manager, Field operator, Data analysis, Primary co-author.
- **Byerwen Coal Project - Supporting REMP desktop assessments for supplementary aquatic ecology EIS (2013-2014)**, central Queensland. QCoal.
Role: Project Manager, Author.
- **Byerwen Coal Project EIS (2013)**, central Queensland. QCoal.
Role: Project manager, Field operator, Data analysis, Co-author.
- **Bowen Gas Project EIS (2010-2012)**, central Queensland. Arrow Energy.
Role: Project manager, Field operator, Data analysis, Primary co-author.
- **Ravenswood Mine (2011-2012)**, north Queensland. Resolute Mining Limited / Coffey Environments.
Role: Project manager, Field operator, Data analysis, Primary co-author.
- **Wilton Coal Project (2012)**, central Queensland. Northern Resource Consultants.
Role: Field operator.
- **Belvedere Coal Project (2010-2011)**, central Queensland. Ecological Survey and Management.
Role: Field operator, Data analysis, Co-author.
- **New Ensham Coal Project (2010)**, central Queensland. MatrixPlus.
Role: Project manager, Field operator, Data analysis, Co-author.
- **Surat Gas Project (2009-2010)**, south Queensland. Coffey Environments/ Arrow Energy.
Role: Field operator, Data analysis, Co-author.
- **Sarum Mine (2009-2010)**, north Queensland. Xstrata Coal.
Role: Field operator, Data analysis, Co-author.

- **Millennium Mine Expansion (2009-2010)**, central Queensland. Peabody Energy.
Role: Data analysis, Co-author.

Infrastructure

- **Mt Rawdon Pumped Hydro Project (2021-ongoing)**, central Queensland. 3D Environmental, ERIAS Group.
Role: Project manager, Field operator, Data analysis, Author.
- **Inland Rail. Gowrie to Helidon, Helidon to Calvert, Calvert to Kagaru sections (2020-ongoing)**, south-east Queensland. EMM / ARTC.
Role: Project manager, Field operator, Data analysis, Author.
- **Urannah Dam (2020)**, north Queensland. GHD / Bowen River Utilities.
Role: Field operator.
- **Toowoomba Dam upgrades (2020)**, south-east Queensland. GHD / Toowoomba Regional Council.
Role: Field operator.
- **Tiaro Flood Immunity Upgrade, Bruce Highway (2020)**, south-east Queensland. Red Ash / Jacobs / TMR.
Role: Project manager, Field operator, Data analysis, Author.
- **Cammura to Moree Inland Rail Upgrade (2020)**, NSW. Golder Associates / ARTC.
Role: Project manager, Author.
- **Mt Lindsey Highway Jimboomba Creek crossing upgrade (2018)**, south-east Queensland. E2M / Jacobs / TMR.
Role: Project manager, Author.
- **Woolgoolga to Ballina Pacific Highway Upgrade Threatened Fish Management Plan (2014 – 2015)**, NSW. AMEC Foster Wheeler / NSW Roads and Maritime Services.
Role: Final Technical Review.
- **Sunshine Coast Airport Expansion (2012-2014)**, south-east Queensland. The Longview Group/ Sunshine Coast Council.
Role: Project manager, Field operator, Data analysis, Co-author.
- **Noosa Sewage Plant Upgrade (2012)**, south-east Queensland. ARUP / Unity Water.
Role: Project manager, Field operator, Data analysis.
- **Caloundra South Urban Development (2010-2011)**, south-east Queensland. ARUP / Stocklands.
Role: Project manager, Field operator, Data analysis, Author.
- **Sydney Airport Runway Extension (2009)**, NSW. Sydney Airport.
Role: Data analysis, Co-author.
- **APLNG western high pressure gas network - Aquatic values survey report and environmental management (2012)**, south-east Queensland. Origin Energy.
Role: Technical review.
- **Sarina Rail Upgrade (2010)**, central Queensland. Boyds Bay Environmental Services / Aurizon (formerly QR National).
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Wembley Road Upgrade (2010)**, south-east Queensland. Dept. Transport and Main Roads.
Role: Field operator, Data analysis, Co-author.
- **Sydney Airport Runway Extension (2009)**, NSW. Sydney Airport.
Role: Data analysis, Co-author.
- **Jabiru Island Road Upgrade (2009)**, south-east Queensland. Dept. Transport and Main Roads.
Role: Data analysis, Co-author.

Receiving Environment Monitoring Program - REMP (Water Quality and Biological)

- **Mt Garnet Dalcouth REMP (2022-ongoing)**, north Queensland. MGT Minerals.
Role: Project Manager, Primary Author.
- **Cook Colliery – REMP design and sampling (2021-ongoing)**, central Queensland. QCoal.
Role: Project Manager, Primary Author.
- **QCoal Northern Hub Mines (Sonoma, Cows, Jax and Drake Mines) – REMP design and sampling (2015-ongoing)**, central Queensland. QCoal.
Role: Project Manager, Field operator, Data analysis, Author.
- **Byerwen Coal Project – REMP design and sampling (2015-ongoing)**, central Queensland. QCoal.
Role: Project Manager, Author.
- **Macarthur River Mine REMP Independent Monitor (2021-ongoing)**, Northern Territory. Advisian.
Role: Project Manager, Author.
- **Nathan River Mine (2021-ongoing)**, Northern Territory. Nathan River Resources.
Role: Project Manager, Data analysis, Author.
- **Lady Annie Mine (2020-ongoing)**, north Queensland. SGM Environmental / CST Mining.
Role: Project Manager, Field Operator.
- **Foxleigh Coal Mine (2021)**, central Queensland. Nitro Solutions.
Role: Field operator, Data analysis, Co-author.
- **Eagle Downs REMP (2015-2018)**, central Queensland. MetroCoal / AMEC.
Role: Project manager, Field operator, Data analysis, Author.
- **Stanwell Power Station REMP Monitoring & Reporting (2014-2019)**, central Queensland.
Role: Field Operator, Technical Review.
- **Bundaberg regional Council sewage REMP (2019)**, central Queensland. Blue Earth Environmental / GHD / Bundaberg Regional Council.
Role: Field Operator.
- **Bauxite Hills Project REMP (2017-2018)**, Cape York, Queensland. MetroCoal/ AMEC.
Role: Project manager, Field operator, Data analysis, Author.
- **Curragh Coal Mine (2014)**, central Queensland. AECOM/ Wesfarmers Resources
Role: Data Analysis.
- **Ravenswood Mine (2011-2012)**, north Queensland. Resolute Mining Limited / Coffey Environments.
Role: Project manager, Field operator, Data analysis, Primary co-author.
- **Fosterville Gold Mine (2011-2012)**, central Victoria. Crocodile Gold (formerly AuRico Gold).
Role: Field Operator, Data Analysis, Co-author.

Compliance Monitoring (Water Quality and Biological)

- **Tweed Sands Plant fish and aquatic macroinvertebrate assessment (2020)**, northern NSW. Hanson Pty Ltd.
Role: Project manager, Field operator, Data analysis, Author.
- **Tumbulgum Quarry aquatic ecology assessment (2020)**, northern NSW. Golder Associates.
Role: Project manager, Field operator, Data analysis, Author.
- **Condamine River gas seeps measurements (2016 - 2020)**, south-east Queensland. Origin Energy.
Role: Field operator.
- **APLNG pipeline waterway crossing assessment (2015)**, south-east Queensland / central Queensland. Origin Energy / E2M.

Role: Project manager, Field operator, Data analysis, Author.

- **Defence base water quality monitoring program (2012)**, south-east Queensland / Northern NSW. Department of Defence / Spotless.
Role: Field operator, Technical reviewer.
- **Monslatt surface and groundwater baseline monitoring (2010-2012)**, central Queensland. Blue Energy.
Role: Project manager, Field operator, Data analysis, Co-author.
- **Forsythe surface and groundwater baseline monitoring (2012)**, north Queensland. Altius Mining.
Role: Technical review.
- **Townsville Airport water quality monitoring program (2012)**, central Queensland. Townsville Airport.
Role: Field Operator.
- **Cobaki Broadwater – ecosystem health and habitat monitoring (2009-2010)**, south-east Queensland. Gold Coast Airport.
Role: Data analysis, Co-author.

Groundwater Dependant Ecosystem / Stygofauna Survey

- **Atlas Gas Project (2022-ongoing)**, central Queensland. ERM / Senex.
Role: Project manager, Field operator, Data analysis, Author.
- **Eva Copper Project (2022-ongoing)**, Gulf Country Queensland. EMM / Copper Mountain Mining Corporation.
Role: Project manager, Field operator, Data analysis, Author.
- **Urannah Project (2022)**, central Queensland. Bowen River Utilities.
Role: Project manager, Field operator, Technical Reviewer.
- **Blackwater Coal Mine (2020-2021)**, central Queensland. BMA.
Role: Project manager, Field operator, Technical Reviewer.
- **Newlands Girrah Project (2019)**, central Queensland. Newlands Coal.
Role: Project manager, Technical Reviewer.
- **Western Surat Gas Project (2017)**, central Queensland. ERM / Senex.
Role: Project manager, Co-author.
- **Drake Coal Project (2015)**, central Queensland. QCoal.
Role: Project manager, Field operator, Data analysis, Co-author.
- **Byerwen Coal Project (2013)**, central Queensland. QCoal.
Role: Project manager, Field operator, Data analysis, Co-author.
- **Ravenswood Mine (2011-2012)**, north Queensland. Resolute Mining Limited / Coffey Environments.
Role: Project manager, Field operator, Data analysis, Co-author.

Ecotoxicology

- **Ross River PFAS investigations (2018)**, north-east Queensland. Department of Defence.
Role: Project manager, Data analysis, Field operator, Author.
- **Stanwell Power Station – potential impacts of copper and zinc in water and sediments (2017)**, central Queensland. AECOM / Stanwell Corporation Ltd.
Role: Project manager, Data analysis, Author.
- **Cobaki Broadwater – oyster bioaccumulation study (2009-2010)**, south-east Queensland. Gold Coast Airport.
Role: Data analysis, Co-author.

- **Sydney Airport runway extension – oyster bioaccumulation study (2009)**, NSW. Sydney Airport.
Role: Data analysis, Co-author.
- **Co Dinh chromite mine - aquatic resources scoping and ecotoxicology preliminary assessment (2010)**, Vietnam. Archipelago Resources.
Role: Project manager, Field operator, Data analysis, Author.

Biodiversity Surveys

- **Local Waterway Health Assessment (2016-ongoing)**, south-east Queensland. Queensland Urban Utilities / Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Freshwater fish biodiversity assessment of the Mandingalby-Yidinji country (2014-ongoing)**, Queensland wet tropics, Australia. 3D Environmental.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Scrubby Creek catchment fish assemblage assessment (2021)**, south-east Queensland. Redfin AquaSciences / Logan City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Slacks Creek catchment fish assemblage assessment (2021)**, south-east Queensland. Redfin AquaSciences / Logan City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Sherwood Arboretum Park Lake aquatic macroinvertebrate and macrophyte assessment (2021)**, south-east Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Forest Lake aquatic ecology assessment (2019-2020)**, south-east Queensland. Queensland Urban Utilities / Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Biami Yumba Lake aquatic macrophyte and fauna assessment (2020)**, south-east Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Edenbrooke Park Lake aquatic macrophyte assessment (2020)**, south-east Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Aquatic fauna assessment of 7th Brigade Park (2019-2020)**, south-east Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Freshwater fish and aquatic macrophytes of Drewvale Dam (2019)**, south-east Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Freshwater fish and aquatic macrophytes of Einbunpin Lagoon (2019)**, south-east Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Aquatic ecology assessment of Cannery Creek (2018)**, south-east Queensland. Queensland Urban Utilities.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Aquatic ecology baseline assessment for Caloundra development (2018)**, south-east Queensland. Blue Earth Environmental/ NGH Environmental / Sunshine Coast Council.
Role: Field Operator.
- **Freshwater fish and aquatic macrophytes of Dan Stiller Reserve (2018)**, South-East Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.

- **Freshwater fish of Moggill Creek (2017)**, south-east Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Freshwater fish of Enoggera Creek (2017)**, central Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Freshwater fish of Ithaca Creek (2017)**, central Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Freshwater fish of Spring Creek (2016)**, central Queensland. Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Townsville Airport biodiversity assessment (2012)**, central Queensland. Townsville Airport.
Role: Field operator.
- **Robina Lakes - Aquatic ecology audit and macrophyte harvesting program assessment (2010)**, south-east Queensland. Gold Coast City Council.
Role: Data analysis, co-author.
- **Cobourg Peninsular biodiversity assessment (2010)**, Northern Territory. AECOM / Department of Sustainability, Environment, Water, Population and Communities.
Role: Macroinvertebrate data analysis and interpretation.
- **Assessment of fish communities of the Hunter, Manning, Karuah and Macquarie Tuggerah catchments (2003-2004)**, Hunter and Central Rivers Catchment Management Authority.
Role: Project manager, Field operator, Data analysis, Author.

Targeted Species Investigations

- **England Creek Riverbank Stabilisation Project Fernvale threatened fish and platypus assessment (2019)**, south-east Queensland. SEQ Water.
Role: Project manager, Field Operator, Data Analysis, Author.
- **Targeted EVNT species (Oxleyan Pygmy Perch and Honey blue-eye) (2019)**, South-east Queensland. Blue Earth Environmental / NGH Environmental / Sunshine Coast Council.
Role: Field Operator.
- **Oxleyan Pygmy Perch surveys (2014-ongoing)**, south-east Queensland. Volunteer collaboration.
Role: Project manager, Field Operator, Data Analysis, Author.
- **Macquarie Perch population monitoring in the Yarra River (1994 - ongoing)**, Victoria.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Oxleyan Pygmy Perch management plan, Woolgoolga to Ballina (2015-2016)**, south-east Queensland. AMEC Foster Wheeler / NSW Roads and Maritime Services.
Role: Author of the final version of the Management Plan.
- **Cotter Dam upgrade - Potential impacts of a dam enlargement on a nationally threatened fish species (2010)**, Australian Capital Territory. Hydronumerics / ACTEW.
Role: Project manager, Expert review.
- **Potential impacts of dredge spoil on barramundi spawning grounds (2010)**, Darwin, Northern Territory. INPEX.
Role: Desktop review, Gap analysis, Author.
- **Effects of suspended sediment exposure on early life stages of barramundi (2010)**, Darwin, Northern Territory. INPEX.
Role: Expert advice.
- **Macquarie Perch coastal population assessment (2006)**, central coast NSW. Sydney Catchment Management Authority, central NSW.
Role: Field operator.
- **Age and growth of Estuary Perch in the Hopkins River (1998)**, south-west Victoria. Deakin University.
Role: Project manager, Field operator, Data analysis, Author.

Expert advice / witness

- **Nucrush Quarry (2022-ongoing)**, south-east Queensland. Connor O'Meara Solicitors.
Role: Expert witness.
- **Moorabool Quarry aquatic ecology assessment (2020)**, south-east Queensland. Edith Pastoral Company.
Role: Project manager, Field operator, Data analysis, Author.
- **Eastern Golf Course Relocation Project – Hazard identification and gap analysis (2010-2011)**, Victoria. Robert Luxmore Project Management.
Role: Gap analysis, expert witness advice.

Risk Assessment

- **Insurance Risk Assessment – Significant sewage facility failure (2022)**, south-east Queensland. Queensland Urban Utilities.
Role: Development and costing of a hypothetical monitoring program.
- **Beaconsfield Mine Tailings Recovery Project – Hazard identification and gap analysis (2012)**, Tasmania. Beaconsfield Mining.
Role: Gap analysis, expert review.

Fishway Assessment

- **Willawong Fish Passage Assessment (2021)**, south-east Queensland. Queensland Urban Utilities / Brisbane City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Scrubby Creek Queens Road culvert fish passage assessment (2021)**, south-east Queensland. Redfin AquaSciences / Logan City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Slacks Creek assessment of fish barriers (2021)**, south-east Queensland. Redfin AquaSciences / Logan City Council.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Gregory River Wide Bay Pipeline upgrade (2021)**, south-east Queensland. Blue Earth Environmental.
Role: Field Operator.
- **Aurizon Network culvert upgrades (2020)**, central Queensland. AECOM / Aurizon.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Waterway assessment and expert advice on waterway barrier and fish passage for a new dam development (2018 - 2020)**, north Queensland. Mulgowie Farming Company.
Role: Project Manager, Field Operator, Data Analysis, Author.
- **Sideling Creek Dam Spillway Fishway Monitoring Plan (2019)**, south-east Queensland, Australia. SEQ Water.
Role: Project manager, Author.
- **Cedar Grove fish passage assessment (2014, 2019)**, south-east Queensland, Australia. SEQ Water.
Role: Field operator.
- **Wiggins Island Rail Loop - fish passage and geomorphological condition monitoring (2013)**, central Queensland. Aurizon.
Role: Project manager, Field operator, Technical reviewer.
- **Fish passage assessments of various fishways including Warren, Gunningbah, Duck Creek, Crooked Creek, Manilla (2005)**, NSW. NSW Fisheries.
Role: Field operator.

- **Fish passage assessments of a rock ramp fishway on the Merri River (1998)**, south-west Victoria. Deakin University.
Role: Field operator.

Catchment / Waterway Health Monitoring

- **Moggill Creek Health Monitoring Program (2011-2016)**, south-east Queensland, Moggill Creek Catchment Group.
Role: Project manager, Experimental design, Design of sampling protocol, Community training, Field operator, Data analysis, Author.
- **Hydro-Ecological Relationships and Thresholds to Inform Environmental Flow Management and River Restoration (2008-2009)**, south-east Queensland, Griffith University.
Role: Scientific advisor, Field operator, Backpack Electrofishing trainer.
- **Sustainable Rivers Audit – Fish theme (2004)**, central NSW, Murray-Darling Basin Commission.
Role: Field operator.

Training Courses

- **Fishing with Electricity: Theory, Principles and Application (Short Course) (2010)**, Brisbane.
Role: Project manager (organisation of national/ international experts and course content), Field trainer.

Training / Certification

- Senior Backpack Electrofisher Operator
- Senior Boat Electrofisher Operator
- Commercial Boat License (enclosed waters)
- AUSRIVAS accredited in NSW and QLD
- QLD Generic Coal Induction (Standard 11)
- Defensive Driver Training and Education
- 4WD Training (nationally accredited)
- Senior First Aid (incl. CPR)

Memberships

- Australian Freshwater Sciences Society
- Australian Society for Fish Biology
- Australia New Guinea Fish Association (Qld, National)

Publications

During his professional working career Tim has authored and co-authored a range of books and papers in international scientific journals. Further details can be provided on request.

With over 20 years' experience in ecological research, Michael's expertise includes:

- **Bioregional scale surveys of aquatic and terrestrial vertebrates using quantitative and qualitative approaches (trapping, transects, audio, spotlighting, electrofishing)**
- **Desktop analysis and prioritization of survey effort to address bioregional gaps in inventory knowledge**
- **Identification and safe handling of vertebrate species**
- **Technical analysis of ecological data including distributional modeling, population viability and habitat suitability**
- **Science writing and communication including research grants, papers, technical reports and public presentations**



CAREER SUMMARY

2019 – Present:	Senior Ecologist, Boobook Ecological Consulting, Roma, Qld
2012 – 2019	Senior Lecturer, Population Genetics, University of Pretoria, South Africa
2004 – 2010	Senior Lecturer, Zoology, University of the Free State, South Africa
2002 – 2004	Post-Doctoral Fellowship, Molecular Ecological Research, University of Pretoria, South Africa
1997 – 2000	Senior Research Assistant, Systematics & Ecology, University of Stellenbosch, South Africa
1991 – 1996	Tutor in Ecology and Population Genetics, University of Queensland

QUALIFICATIONS

PhD (2002, UQld) – Ecology & Systematics

BSc Hons I (1993, UQld) – Population & Ecological Genetics

BSc (1991, UNE) – Zoology, Botany, Ecology

OTHER TRAINING

Snake Handling (ASI, South Africa)

Aquatic Vertebrate Survey techniques (SAIAB, South Africa)

Occupational health and safety - Construction Induction – Queensland

4WD Driver Training

HLTAID0013 – Provide First Aid & CPR

AFFILIATIONS

Melbourne Museum (Research Associate)

South African Institute for Aquatic Biodiversity (SAIAB) (Research Associate)

Molecular Ecology and Evolution Programme, University of Pretoria (Research Associate)

Birdlife Southern Queensland

Weed Society of Queensland

Queensland Naturalists Society

SELECTED PROFESSIONAL EXPERIENCE

Coal Seam Gas Industry

- Delivery and reporting of ecological assessments within the Surat and lower Bowen Basins
- Targeted surveys for threatened flora/fauna species, weed surveys, pre-clearance surveys and regional ecosystem/TEC mapping
- Property level surveys of MNES/MSES features including mapping of remnant and regrowth vegetation communities (GTRE)
- Vegetation and habitat quality analysis using Queensland government BioCondition and Offsets assessment methodology

Ecological Research

- Author of over 50 scientific research papers, book chapters technical reports and natural history notes
- Research and reports on threatened rainforest reptile and amphibian fauna from North-East, Central and South-East Queensland

Faunal surveys, threatened and invasive species assessments and management reports

- IUCN conservation status assessments of various Australian frogs, and frog and reptile species of Southern Africa
- Surveys and recovery plan for the Critically Endangered Kroombit Tinker Frog, Qld
- Vertebrate surveys of Mt Binnie and Crater Mt Reserve, PNG
- Sanctuary sites and transplantation of the Critically Endangered Maloti Minnow, Lesotho
- Conservation status of reptiles and amphibians of the Cape Fold Mountains and Maloti-Drakensberg Bioregion, South Africa
- Herpetofaunal surveys of threatened species in montane areas of southern Africa including Mulanje Mountain, Malawi and Chimanimani Mountains, Zimbabwe
- Biotic assessment and recovery of frogs in the Rondegat River, South Africa, through piscicide based removal of alien fishes

Teaching and Supervision

- 20 years tertiary teaching experience (AQF levels 6-8)
- Designed, coordinated and delivered courses in General Biology, Vertebrate Ecology, Field Techniques, Conservation, Evolution and Population Genetics, Ornithology, Herpetology, Biostatistics
- Contributions to professional workshops in distributional modelling, phylogeography and conservation of herpetofauna in regional biodiversity hotspots
- Supervisor of 2 PhD, 8 MSc and 12 BSc Hons research students

John Herron

Partner

John Herron has substantial experience in environmental approvals, impact assessment, and environmental management across a variety of infrastructure, energy, and resource projects. This experience has been acquired through working on some of the most environmentally, socially, and culturally sensitive projects throughout Australia.

Coming from a background in Applied Environmental Sciences and Environmental Management, John specialises in reducing project risks in the context of the legal frameworks that projects must be planned, assessed, developed, and operated. The outcome of his contribution is greater confidence in project schedule, costs, regulatory compliance, and knowing there will be a sustained pursuit of getting projects done the right way



Experience: 18 years' experience in environmental approvals and impact assessment

LinkedIn:

<https://www.linkedin.com/in/herronenvironmental/>

Email: John.Herron@erm.com

Education

- Master of Environmental Management (Sustainable Development), University of Queensland 2010
- Bachelor of Applied Science (Biology, Business Management), Queensland University of Technology 2000
- Commonwealth Department of Environment Suitably Qualified Ecologist

Professional Affiliations and Registrations

- EIANZ

Languages

- English, native speaker

Fields of Competence

- Environmental Planning Approvals
- Ecology
- Strategic Approvals Advice
- Environmental Impact Assessments
- Community Engagement
- Sustainability
- Aboriginal Cultural Heritage
- GIS

Key Industry Sectors

- Energy (Generation, Renewables, Electricity)
- Oil and Gas (Onshore, Offshore)
- Government (Strategic Land Use)
- Transport (Road, Rail) Infrastructure
- Mining

Honours and Awards

- UQ Deans Commendation for Academic Excellence

Key Projects

Elecseed - Kumbarilla Renewable Energy Park (K-REP) Approvals. The K-REP project is a proposed 200 MW PV facility adjacent to the QGC Ruby Jo substation and compressor station. Part of the future potential strategy for the K-REP project is for hydrogen production and blending into the onshore CSG infrastructure for export from Curtis Island LNG facilities. John has been the project director for this package of work which has been completed across various project phases. The scope of support has been comprehensive for the project, including local development approvals, Commonwealth approvals, and Aboriginal Cultural Heritage engagement. John has also acted on behalf of Elecseed with regulator engagement at State and Commonwealth levels.

North Queensland Bulk Ports Corporation - Port of Mackay Western and Central Districts Environmental Values Ground Truthing

Assessment: John was Project director and lead client interface for NQBP to undertake this work. NQBP has approximately 708 hectares of onshore land at the Port of Mackay. A significant proportion of this land is currently undeveloped and has varying levels of State and Commonwealth environmental interests mapped across it. This mapping may not be correct, and NQBP requires a suitably qualified consultant to undertake ground-truthing of the site and to provide approvals advice in relation to its developability. John also provided strategic advisory on approvals matters for the Ports corporation along with the potential implication for future development in accordance with the EPBC Act.

Confidential Client - Queensland Strategic Approvals. John developed a unique project methodology to provide strategic approvals advice for a State-significant Queensland renewable energy concept scope. Acting as Project Director, John successfully delivered the project involved aggregating a set of spatial data to determine constraints and opportunities for the concept, provided a regulatory risk review, approvals matrix, and scheduling advice, and articulated the analysis in a succinct report and presentations to lay the foundations for the primary approvals of the regional-scale renewable energy generation, transmission, hydrogen and hydrogen carrier production and transmission and export project.

Confidential Client – Lithium Battery Research and Development Site Selection Study. John was project director and key client interface for a renewable energy battery storage proponent to find an appropriate location for an expansion of research and development and prequalification pilot place centred on cathode powder technology. The project delivered site optioneering, planning and approvals advisory services and overall site suitability outcomes for the client.

Shell QGC - GDE Vegetation and BioCondition Survey 2022: John was project manager for the Groundwater Dependent Ecosystems (GDE) vegetation and BioCondition surveys for select catchment areas within Shell QGCs Surat North Project (SNP) area for the second of the 2022 vegetation survey events occurring at the end of the dry season. John was client liaison, HSE coordinator and managed three subconsultants to deliver the scope for Shell on time, on budget and with no safety incidents.

Confidential Client - Western Australia Strategic Approvals. John developed the project methodology and delivery to provide strategic advice for a 90,000ha in southern Western Australia renewable energy concept that included wind, solar, bulk electricity transmission, hydrogen pipelines, port, and offshore brine disposal. John acted in the role as Project Director and undertook technical review and quality assurance on the project deliverables.

Confidential Client - Western Australia Strategic Approvals. John developed the project methodology and delivery to provide strategic advice for a large hydrogen synthesis project located within a strategic industrial area on the west coast of Western Australia. John acted in the role as Project Director and undertook technical review and quality assurance on the project deliverables.

Aurizon - Avifauna Pest Management Strategy: John partnered with specialist avian ecologists to develop and pest management strategy for Aurizon to manage large populations of welcome swallows and fairy martens at the Aurizon Jilalan Rail Maintenance Facility.

Confidential Client - Queensland High Voltage Direct Current Transmission Powerline Route Selection Study. John developed the project methodology including spatial analysis and MCA to determine appropriate corridor options and then to provide strategic approvals advice regarding the appropriate route for an HVDC transmission powerline between an area in northwest Queensland to the NEM transmission infrastructure near the east coast of Queensland.

Confidential Client – Northern Territory: John acted as project delivery manager to undertake a review and presentation of multiple approvals options for a proposed green hydrogen hub. The role included undertaking an independent review of the Northern Territory Government strategic environmental assessment for the MASDP and determine compliance of the project and its principles with various international and EU standards.

Townsville City Council - Lansdown Eco Industrial Precinct (LEIP): John was Project Director for the Lansdown Eco Industrial Precinct Environmental Approvals for LEIP enabling infrastructure (roads, water, electricity). Working with TCC and Calibre (Design Engineer), the Project sought to avoid and minimise potential impact prior to lodgement of necessary approvals applications. The LEIP is a proposed industrial development which to create a sustainable industrial park that integrates economic development with environmental sustainability, social responsibility, and community engagement. It includes a range of industries such as renewable energy, advanced manufacturing, and research and development facilities.

Chip Tyre - Waste-to-Energy Plant Environmental Approvals and Compliance, Ipswich: John was the Project Director of environmental studies and assessment documentation for a waste-to-energy plant. The project involved a detailed planning assessment against state government and Ipswich City Council scheme requirements. In addition, the project included an environmental authority application to undertake environmentally relevant activities and a range of technical supporting assessments including for traffic, stormwater, hazard and risk, air, noise and geotechnical.

APA - Western Slopes EIS Peer Review: John was project director and participant in the 3rd party peer review of the GHD Western Slopes EIS on behalf of APA. The Peer Review was undertaken in accordance with the DPIE guideline, and focuses on the subject matter of Biodiversity, Impact Assessment, Social Impact assessment and Soils and Geology.

Confidential Client – Gladstone Green Hydrogen and Ammonia Project: John developed a site selection MCA to select an appropriate location for a ~100ha footprint green hydrogen facility within the GSDA. John also developed a proposed corridor with the client for the purposes of transmission and export of products. John provided strategic approvals advice and developed an approach to address State and Commonwealth primary approvals for this complex multi-stage project with potential infrastructure sharing elements.

Bowen Rail Company - Rail Maintenance Facility Approvals, Environmental Support and Compliance, Abbot Point, Queensland: John acted as Project Manager in providing approvals and environmental support related to a rail maintenance facility at the Port of Abbot Point in Queensland. Obtaining development approvals for a rail maintenance facility for the Bowen Rail Company within the Abbot Point State Development Area. CDM Smith was engaged by the Bowen Rail Company to deliver the development approvals for a proposed rail maintenance facility on the Abbot Point branch of the Newlands System at Abbot Point. The project involved undertaking a range of scientific and technical studies to support the applications for this 30ha project site. CDM Smith also supported the Bowen Rail Company in terms of land access and land acquisition processes and negotiated fair approval conditions for effective project delivery with minimal environmental and social impacts.

Wiley and Co - Bindaree Beef Abattoir, Preliminary Hazard Analysis, Wagga, NSW: John was the project manager and client interface for the Development Application technical assessment of preliminary hazard pursuant to HIPAP 5 for a proposed expansion of the Teys Bindaree Abattoir in Wagga. The Project required accurate ammonia refrigerant dispersion modelling and risk assessment for the purposes of gaining development approval from the NSW government.

Australia Pacific LNG ConocoPhillips LNG Facility Curtis Island, Lighting Rationalisation Study, Gladstone: John developed a methodology to assess the potential impacts resulting from the phase-out of high-pressure sodium luminaires with the gradual replacement with LED luminaires at the LNG facility on Curtis Island. The study required the collaboration between marine and terrestrial ecologists and lighting engineering specialists to determine the most appropriate spectral curve for specification to LED lighting suppliers for use at the LNG facility. The aim of the study was to provide recommendations, post-audit of luminaires at the facility, for suppliers to provide products that would uphold the health and safety of workers on the facility but not impact the navigation or breeding of proximal marine fauna.

One Rail Australia, Confidential Project: John was the project manager and participant in an advisory panel to conduct an assessment of site options for a rail maintenance facility for ORA. John participated in the advisory workshop and was the author of the outcome report to advise on the lowest impact location for the proposal.

Brisbane City Council, Moreton Island Ecology Survey and Construction Environmental Management: John was Project Director and client liaison for a project to undertake marine flora and fauna survey on the western coast of Moreton Island prior to beach reforming works being undertaken. The work was to ensure no environmental impact and no specific permitting would be required. The work also required supervision while the construction work was underway.

Department of State Development, Infrastructure, Local Government and Planning, Cairns South State Development Area, Investigation and Master Planning: as part of this John oversaw investigations and master planning for a State Development Area south of Cairns. Works overseen included site analysis and a multi-criteria assessment related to the environment, social, and cultural heritage matters.

Brisbane City Council, Review of Bushfire Risk Mitigation Decision Support Tools: John was the project director for this project to undertake a study to understand fire behaviour in Australian landscapes and the impacts of fires on key assets to develop decision support systems and tools in bushfire risk management. The Project identified and reviewed bushfire risk mitigation decision support tools

(BRMDST) that are available to help the Council make informed decisions regarding the effectiveness of and priorities for fire preparedness activities. These included SPARK, REDEYE, and TEN RIVERS.

Edify Energy - Fatal Flaws Analysis Mount Murchison Solar PV Station: John developed a fatal flaws assessment for a potential Solar PV facility at Mount Murchison. The assessment conducted environmental and planning due diligence of the prospective site to determine the most suitable local and commonwealth environmental approvals outcomes for the proposal.

ARTC Inland Rail, G2H, H2C, C2K Projects (PPP), Environment Manager – ARTC: John implemented the primary approvals strategy for five inland rail projects within the Queensland State Government and Commonwealth Government jurisdictions. He worked with project managers and engineers, schedulers, commercial and legal experts, external consultancy firms and State and Commonwealth government agencies. In his role as environment manager for the Gowrie to Helidon, Helidon to Calvert and Calvert to Kagaru Projects, John helped the Community Engagement Team by undertaking presentations and participating in Q&A sessions regarding the projects and their approvals processes to interested stakeholders at public forums throughout the project areas. He also acted as a liaison between Inland Rail and peak bodies and other community groups. John performed technical reviews of environmental and planning deliverables by consultancy firms and developed and reviewed tender documentation and assessed responses for future program phases. He also assisted the Cultural Heritage Advisor to consult Aboriginal parties throughout the Queensland program area negotiating the terms of cultural heritage management plans.

Arrow Energy - Upstream Gas Projects, Regulatory Approvals Specialist: Engaged in-house as a subject matter expert to provide approval and permitting advisory services to support the effective execution of the Surat, and Moranbah Gas Project developments for Arrow Energy, John worked closely with the Arrow Energy ecology team to ensure all matters of disturbance and relinquishment was undertaken in accordance with legislation and approvals.

ATEC - Surat Basin Railway Environmental Impact Statement (EIS) and EPBC Referral, Surat Basin Rail Joint Venture: John undertook technical field surveys and authored ecology chapters for the EIS and authored the EPBC referral for the Project. John also undertook the spatial analysis, developed the methodology for the multi-criteria analysis for rail route selection, and assisted the Project director in a range of tasks for environmental deliverables over the course of the environmental planning approvals of the Project.

Department of Transport and Main Roads, Southern Freight Rail Corridor Study: John was a member of the technical staff within the study team involved with stakeholder and agency engagement and overseeing the Community Infrastructure Designation process. Tasks for this project included assistance and review in developing the land use and planning technical paper, legislative framework chapter, and assistance with the social and economic impact assessments.

Australia Pacific LNG Pipelines Project, Environmental Consultant: John was Australia Pacific LNG's environmental representative in a collaborative effort between Australia Pacific LNG, Queensland Curtis LNG (QGC), and McConnell Dowell Constructors (Aust.) Pty Ltd and Consolidated Contracting Company Australia Joint Venture to secure and implement the conditions of development approval for the high-pressure gas transmission pipelines crossing The Narrows to the LNG Facilities on Curtis Island. John was involved with this project from the design stage through to the final rehabilitation of the project. John acquired project approvals, was present during construction to manage compliance, and ensured temporary infrastructure decommissioning and project rehabilitation was done in accordance with regulations.

ENERGEX - Middle Ridge to Abermain 110kV Powerline Approvals: John supported Energex in the initial environmental studies and approvals planning for the proposed Middle Ridge to Abermain 110kV powerline project. The project was eventually resolved by infrastructure sharing between Energex and Powerlink whereby Energy could use a redundant circuit on Powerlink infrastructure to address anticipated demand.

ENERGEX - Sustainability Assessment Framework:

John developed the Sustainability Assessment Framework in a collaborative project with Energex. The framework was designed to underpin site and route selection studies for ENERGEX in an increasingly challenging region where land availability for electricity sub-transmission and distribution assets is limited.

Queensland Rail - Environmental Planning Study, Briaba Deviation: John assisted in the preparation of an Environmental Planning Study for the proposed Briaba deviation on the Newlands coal rail network in accordance with the QR Environmental and Planning Processes Manual. The proposed deviation comprised approximately 12km of new track through an area of State Forest near Collinsville in central Queensland and involved consideration of land tenure issues in conjunction with ecological and Aboriginal cultural heritage risks.

Australia Pacific LNG Pipelines Project - Ruby Spur Pipeline, Environmental Consultant: John managed the acquisition of Commonwealth approvals for the Australia Pacific LNG Ruby Spur Pipeline. This involved the development of scopes and deployment of field surveys for numerous ecologists to operate in accordance with approval conditions.

Australia Pacific LNG Pipelines Project - Western High-Pressure Gas Network, Environmental Approvals Manager: John was also the environmental manager for the APLNG Western High-Pressure Gas Network approvals, a network of 120km of gas transmission pipelines in the Combabula, Eurombah, Fairview, and Spring Gully areas. John also undertook an ecology survey for condition assessment for road corridor works for Western Downs Regional Council to ensure disturbance relating to the project activities was undertaken lawfully.

Windlab Systems - Transmission Powerline Route Selection, Hughenden 330kV: John played a key role in researching and developing reporting and route selection studies for transmission corridor options between a proposed wind farm and the proposed Copperstring transmission powerline in central Queensland. This study sought to achieve a balance between economic, social, and ecological considerations in the selection of a transmission alignment.

Queensland Curtis LNG Project - Surat Basin Gas Field Development: John conducted ecology pre-clearing surveys to establish the presence and distribution of conservation significant flora and fauna species across the Surat Basin gas field development areas for the QGC gas project.

Australia Pacific LNG Project - Vegetation and Biodiversity Offset Strategy: John undertook co-authorship and spatial data analysis to compile the vegetation and biodiversity strategy for the APLNG Project.

Australia Pacific LNG Project: Species Management Plans –John researched and compiled species management plans as per Commonwealth project approval conditions for the APLNG gas field and pipeline project.

Department of Transport and Main Roads - Review of Environmental Factors and Bushfire Management Plan, Petrie-Kippa Ring Multimodal Transport Corridor (MMTC): John undertook a spatial analysis of the proposed development site to identify key environmental values and representative survey sites, undertook field ecological fauna survey, developed reporting of environmental factors, and compiled a bushfire management plan for the MMTC Project.

ENERGEX - Marine Plants Permits, Hays Inlet 110kV Overhead Powerline: John acted as project manager and site liaison for access to conduct marine plants surveys, and prepared necessary applications for permits required for the Hays Inlet 110kV overhead powerline in Southeast Queensland.

ENERGEX - Caboolture-Toorbul 110kV Overhead Powerline Corridor Selection Report: John developed the spatial assessment methodology, an MCA analysis and was the author and project manager for this project.

ENERGEX - GIS Baseline Studies and Approvals Advisory, Caboolture to Toorbul 33kV overhead powerline: John acted as project manager for the acquisition of data from the council and State government stakeholders for the development and management of spatial data for a route selection study in an environmentally sensitive area. John also acted as project manager for initial community engagement and ecology studies along the proposed powerline corridor.

Brisbane City Council, Brisbane City Council Climate Change and Energy Taskforce and Report: John worked with the BCC Climate Change and Energy Taskforce and was a co-contributor to the compilation of the report which has been adopted by the Council to tackle the potential risks of climate change to the City of Brisbane.

Powerlink - Site and Route Selection and Community Infrastructure Designation – Upper Kedron: Corridor Selection and Community Infrastructure Designation, Powerlink sought Ministerial Community Infrastructure Designation for a proposed 275kV/110kV substation west of Brisbane. As a lead researcher and author, John developed a site selection study and report, along with an incoming transmission powerline route selection report and project managed the land designation process.

ENERGEX - Fauna Habitat Assessment & Bushfire Management Plan, Whiteside Substation Development: A negotiated development approval granted to ENERGEX for the development of a zone substation at Whiteside imposed concurrent conditions of koala habitat retention, rehabilitation, and bushfire immunity. John undertook field surveys and reporting in collaboration with a small team of scientists to deliver the appropriate results for ENERGEX's project.

Department of Infrastructure and Transport (SA) - Northern Expressway, Environmental Consultant: John undertook research and reporting to provide a greenhouse gas assessment and abatement plan for the Northern Expressway in South Australia.

Queensland Rail - Winchester to Peak Downs Track Duplication, Environmental Consultant: John was part of the project team that undertook the environmental planning study for the Winchester to Peak Downs railway duplication - part of a system-wide upgrade to meet increased capacity at the Dalrymple Bay and Hay Point coal terminals. The purpose of the study was to assess the environmental and planning aspects of the project and make recommendations in the context of sustainability.

ENERGEX - GIS Baseline Studies, Gympie-Toolara Forest high-performance 33kV overhead powerline:

John acted as project manager for the acquisition of data from the council and State government stakeholders for the development and management of spatial data for an area selection study in an environmentally sensitive area. This allowed for the route selection of the powerline within a corridor to avoid or reduce the impact upon key environmental values.

Department of Transport and Main Roads - Meridan Way Overpass, Ecology Studies:

John undertook detailed flora and fauna survey for the proposed site to produce a review of environmental factors to inform detailed design and implementation of construction and operational environmental management measures for the proposed roadway overpass located in an environmentally sensitive area containing Wallum and rare and threatened flora and fauna species.

Eastern Star Gas - Review of Environmental Factors Pilots and Gas Gathering System, Bohena Gas Gathering System:

John developed the review of environmental factors for the Eastern Star Gas project in the Gunnedah basin, undertaking research and reporting into a project constrained by high ecological and community sensitivity.

Queensland Rail - Dingo to Walton Track

Duplication: John undertook field studies and was the lead author for a comprehensive study of the environmental and planning constraints for the Dingo to Walton track duplication project which was a single component of the long-term strategic upgrade of the Blackwater system.

Brisbane City Council - Tilley Road Upgrade Project, Stage 1B:

John undertook ecological assessments for the Tilley Road upgrade project Stage 1B, undertaking a field survey and reporting for approvals under the Brisbane City Council *Natural Assets Local Law 2003* for clearing required for the development of a new roadway through parklands.

ENERGEX - Aboriginal Cultural Heritage due diligence assessment, Wulkuraka substation:

John undertook a due diligence assessment as required under the *Aboriginal Cultural Heritage Act 2003* for the purposes of development approval for the Wulkuraka zone substation.

ENERGEX - Bushfire Management Plan, Russell Island

John undertook a spatial analysis and desktop study to determine the most appropriate environmental solution from a range of technical options to satisfy anticipated demand requirements on the water network in the Sunshine Regional Council LGA.

ENERGEX - Kalbar-Boonah 33kV Overhead Powerline:

John undertook field assessments and provided an EPBC self-assessment on behalf of ENERGEX in relation to potential impacts on significant areas of *Melaleuca irbyana* forest.

ENERGEX - Beenleigh to Cades County 110kV Community Infrastructure Designation:

John was Project Manager for the Beenleigh to Cades County 110kV CID Project.

Brisbane Airport Corporation - Brisbane Domestic Airport Expansion

John undertook ecological assessments and reported on a proposed expansion of the Brisbane Domestic Airport.

ENERGEX - Loganlea Jimboomba 110kV overhead powerline GIS Baseline Studies:

John was Project Manager and client interface for this spatial analysis study for the proposed Loganlea to Jimboomba 110kV sub-transmission powerline.

ENERGEX - Murarrie – Tingalpa 110kV overhead powerline GIS Baseline Studies and Corridor Selection Report:

John was Project Manager and client interface for this spatial analysis study for the proposed Loganlea to Jimboomba 110kV sub-transmission powerline.

Department of Transport and Main Roads - Ipswich Motorway Upgrade Ecology Surveys -

John undertook comprehensive faunal ecology surveys of the impacted locations and their periphery to determine the absence or presence of an abundance of fauna species.

Spotless, Australian Defence Force - Multiple Ecological Assessments:

John undertook several ecology studies on behalf of the Australian Defence Force at Enoggera and Amberley bases to establish the presence or absence of listed threatened species and develop appropriate management and mitigation measures to minimise or prevent impact upon them. Studies included the development of a Weed and Pest Management Plan for the Amberley Air Base, a Koala

Habitat Assessment for Amberley Air Base, a Fauna Management Plan for the introduction of the FA-18 Super Hornets, and several frog surveys throughout Enoggera Barracks.

Department of Transport and Main Roads - Environmental Design Report – Bruce Highway Upgrade, Albert Park Bowls to Pine Street – John was a key contributor to the environmental assessment and reporting on this project.

Sunshine Coast Regional Council - Maleny Rising Main - John undertook a spatial analysis and desktop study to determine the most appropriate environmental solution from a range of technical options to satisfy anticipated demand requirements on the water network in the Sunshine Regional Council LGA.

Brisbane City Council – Multi-Criteria Analysis – pre-planning and feasibility studies for sewerage systems – Using and social and environmental constraints mapping methodology, John compiled an MCA to inform the most appropriate environmental option for an upgrade to the inner-city sewerage system of Brisbane.

Department of Transport and Main Roads - Robina to Varsity Lakes (Stage 1) and Varsity to Tugun (Stewart Road) (Stage 2) Review of Environmental Factors - John undertook the field ecology and noise monitoring surveys on the Project and wrote relevant technical chapters.

ENERGEX - Stapylton Depot development: John undertook detailed desktop and field surveys to compile an ecological assessment report in support of a development application to Gold Coast City Council for the development of a pole depot for ENERGEX.

HUB alliance - Inner Northern Busway and King George Square Cycling Facility: John undertook a study to assess and recommend materials for the construction of the INB and KGS cycling facility based on the principles of sustainability. Materials chosen and recommended included the maximisation of recycled materials and future recyclability, supply-chain ethics, and economic costs.

Wilson Architects + Donovan Hill - Translational Research Institute: John developed the Pest Management Plan in accordance with Development Approval application requirements for the Translational Research Institute with reference to State Pest management requirements.

Queensland Motorways - Logan Motorway and Gateway Motorway Extension: John authored an environmental scoping study for the proposed duplication of the Logan Motorway.

ENERGEX - Multiple Ecological Assessments and Construction Environmental Management Plans: John undertook 204 small-scale ecology assessments and developed detailed construction environmental management plans for ENERGEX throughout Southeast Queensland between 2006 and 2011. These reports detailed the key environmental, social, and cultural values potentially impacted by each ENERGEX project, and provided recommendations for pre-construction, peri and post-construction activities to avoid, minimise or mitigate impacts. ENERGEX undertook these studies to demonstrate their general environmental duty under the Environmental Protection Act 1994, and to identify and resolved any potential matters in relation to the *Queensland Aboriginal Cultural Heritage Act 2003*, *Queensland Heritage Act 1992*, *Nature Conservation Act 1994*, *Vegetation Management Act 1999*, and *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

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