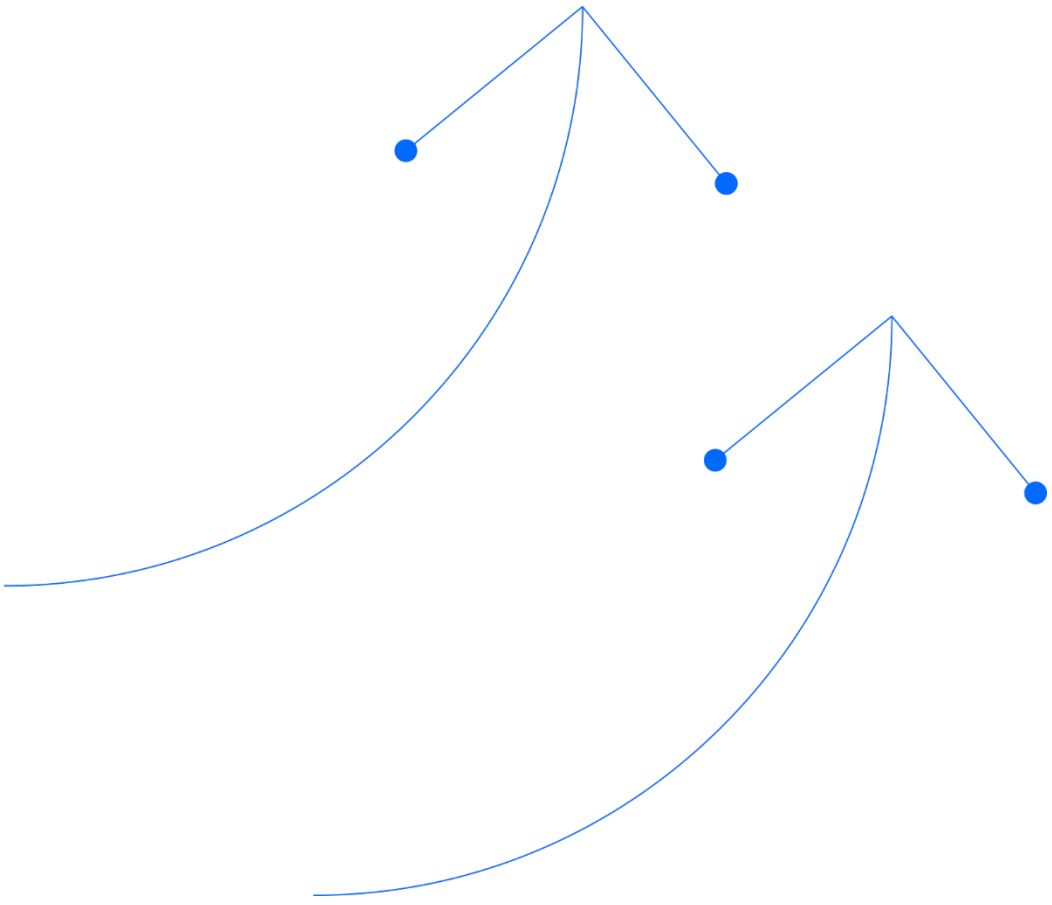
Santos

APPENDIX J: ENVIRONMENTAL ASSESSMENT

April 2026



Prepared for
Santos QNT Pty Ltd
ABN: 33 083 077 196

AECOM

Environmental Assessment Report

Beetaloo Basin Appraisal Activity

05-Mar-2026
The Beetaloo Appraisal EMP

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Environmental Assessment Report

Beetaloo Basin Appraisal Activity

Client: Santos QNT Pty Ltd

ABN: 33 083 077 196

Prepared by

AECOM Australia Pty Ltd
Larrakia Country, Level 1 C308, 19C Kitchener Drive, Darwin NT 0800, GPO Box 3175, Darwin NT 0801, Australia
T +61 1800 868 654 www.aecom.com
ABN 20 093 846 925

In association with

David van den Hoek

05-Mar-2026

Job No.: 60742376

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Quality Information

Document	Environmental Assessment Report
Ref	60742376
Date	05-Mar-2026
Originator	Brea Johnson
Checker	Kate Brodie, William Riddell and Chris Todd
Verifier	Andrew Larwood

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
0	14-April-2025	Draft for Review	Julie Carpenter Project Manager	
1	11-Jun-2025	Report updated with client comments	Julie Carpenter Project Manager	
2	03-Jul-2025	Report updated with client comments	Julie Carpenter Project Manager	
3	17-Oct-2025	Report updated with client comments and latest footprint	Julie Carpenter Project Manager	
4	13-Nov-2025	Report updated with client comments	Julie Carpenter Project Manager	
5	05-Mar-2026	Minor updates from client comments	Julie Carpenter Project Manager	

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Table of Acronyms

Acronym	Meaning
BOM	Bureau of Meteorology
BVG	Broad vegetation group
CLA	Cambrian Limestone Aquifer
cm	Centimetre
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEPWS	Department of Environment, Parks and Water Security (NT)
MP	Management Plan
EMP	Environmental Management Plan
EPBC Act	Environmental Protection and Biodiversity Conservation Act
EP161	Exploration Permit 161
GDE	Groundwater dependent ecosystem
GPS	Global Positioning Device
ha	hectare
IBA	Important Bird Area
IBRA	The Interim Biogeographic Regionalisation of Australia
km	Kilometre
km^2	Square kilometres
LCA	Land Condition Assessment
L/s	Litres per second
m	metre
ML/year	Megalitre per year
MNES	Matters of National Environmental Significance
mm	millimetre
NAFI	North Australian Fire Information
NR Maps	Natural Resource Maps
NT	Northern Territory
PMST	Protected matters search tool
PPL	Perpetual Pastoral Lease
SREBA	Strategic Regional Environmental and Baseline Assessment
sp.	Unspecified species of the genus (e.g. *Corymbia* sp. indicating an unspecified species of the Corymbia genus)
spp.	Multiple unspecified species of the genus (e.g. *Corymbia* spp. indicating more than one unspecified species of the Corymbia genus), or all species in the genus (e.g. all species within the Corymbia genus).
TPWC Act	Territory Parks and Wildlife Conservation Act
WoNS	Weed of National Significance

Executive Summary

AECOM Australia Pty Ltd (AECOM) completed an ecological and land assessment survey for Santos QNT Pty Ltd (Santos) to evaluate the environmental impacts of exploration activities associated with Exploration Permit 161 (EP161) in the Beetaloo Sub-basin, Northern Territory (NT). Santos are proposing to undertake exploration and the appraisal at two onshore shale petroleum well pads located at Jibera South and Newcastle South ('the Project'). The assessment focused on documenting the site conditions of two proposed well pads. The direct impact area required for this Project is referred to within this report as the Disturbance Footprint, with the broader area termed the Project Area.

Environmental values were described using a combination of desktop information and field survey results. The Project consists of nine vegetation communities and non-remnant habitat. None of the vegetation communities identified during the field survey comprise a *sensitive* or *significant* vegetation type, as defined in the NT Pastoral Land Clearing Guidelines (Pastoral Land Board, 2025).

Field surveys recorded 42 flora and 44 fauna species, including one migratory species (fork-tailed swift) listed under the *Environment Protection and Biodiversity Act 1999* (EPBC Act). No threatened fauna or flora listed under the EPBC Act or *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act) were observed during field surveys. The likelihood of occurrence assessment identified one listed species (Gouldian finch) as likely to occur, and seven fauna as possible to occur in the Project Area.

One invasive flora species was observed, and several are likely to occur nearby across different local management areas. No invasive fauna species were recorded during field surveys, although several were expected to occur within the Project Area.

Potential direct and indirect impacts to ecological values may occur as a result of the Project. However, the Project design has applied the principle of avoidance, mitigation and management to reduce environmental impacts. A fauna spotter-catcher will be present during clearing.

An impact assessment was conducted for threatened and migratory species that are listed under the EPBC Act and TPWC Act and considered known, likely or possible to occur within the Project Area. Based on the findings of Section 5.0, significant impact assessments were undertaken in accordance with the EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance (Department of the Environment, 2013) for the following EPBC Act and TPWC Act listed species:

- Northern blue-tongue skink
- Gouldian finch
- Red goshawk
- Grey falcon
- Northern shrike-tit
- Plains death adder
- Yellow-spotted monitor
- Fork-tailed swift
- Oriental cuckoo.

With the implementation of mitigation measures detailed in Section 7.0, and design updates to avoid and minimise impacts to hollow-bearing trees and hollow logs, findings of the assessments determined the Project is unlikely to result in a significant impact to values listed under the EPBC Act or TPWC Act.

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) completed an ecological and land assessment survey for Santos QNT Pty Ltd (Santos) examining the environmental values in the proposed exploration areas located within Exploration Permit 161 (EP161) in the Beetaloo Sub-basin, Northern Territory (NT). Santos are proposing to undertake exploration and the appraisal at two onshore shale petroleum well pads located at Jibera South and Newcastle South ('the Project'). The Project is located on the Tanumbirini Perpetual Pastoral Lease (PPL).

1.1 Purpose of this report

The primary purpose of this report is to support the risk assessment of the proposed Regulated Activities (see Section 1.3) for the Project. To support the risk assessment, site condition was documented via desktop and field verification at two proposed pads within Jibera South and Newcastle South locations (Figure 1). This includes identifying Matters of National Environmental Significance (MNES) values and assessing impacts in accordance with *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (Department of the Environment, 2013), for values considered known or likely to occur that are listed under EPBC Act and *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act).

1.2 Project description

The Project occurs in two distinct locations within EP161:

- Jibera South, located north of the Carpentaria Highway, 4 km north-west of Tanumbirini
- Newcastle South, located south of the Carpentaria Highway, 25 km south-east of Tanumbirini.

The Project is described using the following terms; the Disturbance Footprint, the Project Area and the Study Area. These are provided in Figure 1.

The Disturbance Footprint indicates the likely location and maximum extent of direct impacts for Project activities. The final location of this Disturbance footprint will be informed by micro-siting activities to avoid, minimise and mitigate impacts to Matters of National Environmental Significance (MNES) and other environmental values including matters of Territory significance where possible. The Disturbance Footprint includes three impact types as described in Table 1 and presented in Figure 2.

The Project Area, also termed the Construction Disturbance Zone, has been defined to allow flexibility for final well and borrow pit placement and linear infrastructure alignments. As the design of Jibera South and Newcastle South development progresses, the Disturbance Footprint may shift within the Project Area to avoid cultural heritage, environmental and engineering constraints. Project activities will not be conducted outside the Project Area.

A Study Area was examined to determine environmental values at the landscape-scale and was the focus for the desktop assessment.

Table 1 Impact types within the Disturbance Footprint

Impact type	Construction feature
Clearing. Clearing of native vegetation required	Well pads, borrow pits, new access tracks
Clearing – rehabilitation. Area previously disturbed, minor clearing of native vegetation required	Existing access tracks or temporary access tracks that require widening and maintenance for use during construction. Track will be rehabilitated following construction.
Maintenance only. Area previously disturbed, clearing of native vegetation not required.	Existing access tracks or airstrip that require maintenance only, including grading, raising and improving drainage for flood mitigation.

1.3 Proposed activities

Santos proposes to undertake additional exploration and appraisal (E&A) activities throughout 2026, 2027 and beyond. The regulated activities proposed under this action include:

- **Clearing and earthworks for 2 new Well Pad locations** – Jibera South and Newcastle South: The clearing and construction for the creation of two new well pads and ancillary infrastructure (as listed below). Each new well paid will cover and areas of 15 ha.
- **Drilling and Completion** – Up to 12 Appraisal wells (both vertical and horizontal) distributed across the Jibera South and Newcastle South well pads (horizontal wells will extend approximately 3,500 m).
- **HFS and well testing** – Each of the 12 new wells will include an average of 60 stages of HFS for horizontal wells and 4 stages for verticals.
- **Maintenance and Decommissioning** – of up to 12 installed wells distributed across Jibera South and Newcastle South well pads once activities no longer required.
- **Construction, operation, decommissioning, dismantling and removal of infrastructure** – each well pad will include evaporation tanks, storage tanks, drilling sumps, cutting pits and any transfer infrastructure within the well pad. This also includes transportation onsite and disposal of these wastes both offsite and onsite where authorised in the project EMP (e.g. burial of cuttings).
- **Flaring** – will occur during the well testing phase.
- **Ancillary Infrastructure and Activities** – Infrastructure and activities required to support the Regulated Activity includes:
    - Groundwater monitoring bores – impact and control bores
    - Water extraction bores – up to 10 bores installed at each well pad
    - Clean water storage – onsite tanks or dams
    - Access tracks
    - Upgrade to intersection of Newcastle South access track with the Carpentaria Highway
    - Dangerous goods and hazardous materials storage and handling
    - Borrow pits
    - Airstrip operations
    - Office, workshop and laydowns
    - Bulk material transport and storage
    - Installation and operation of camps at each the Jibera South and Newcastle South well pads.

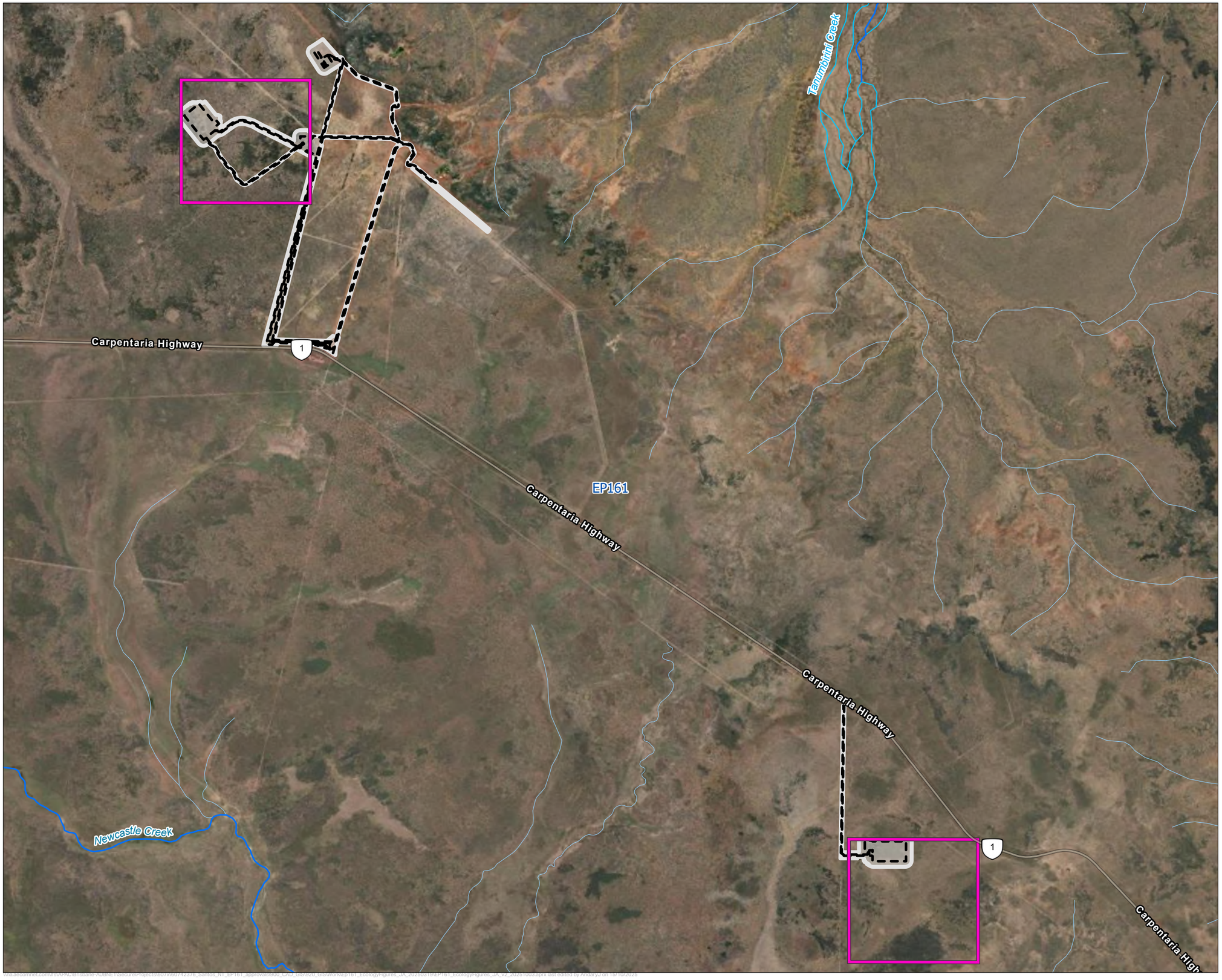
1.4 Scope of works

This report describes the assessment methodology, physical environment and results of field surveys. The scope of work for this report includes:

- A review of historical data and reports prepared during the previous Beetaloo onshore oil and gas exploration programs.
- Database searches of the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters database at 10 km and 50 km buffer (October 2025). The 50 km buffer offers more context for a robust assessment of potential MNES values utilising the Project Area, particularly flora and fauna values in an understudied location of Australia.
- Database searches of the NT Department of Environment, Parks and Water Security (DEPWS) Natural Resource Maps Database (flora and fauna Atlas database) (9/12/2024) and the more

recently published Strategic Regional Environmental and Baseline Assessment for the Beetaloo Sub-basin (SREBA) data set.

- Ecology surveys of the EP161 Disturbance Footprint (16 -20 December 2024).
- Consideration of NT Pastoral Land Clearing Guidelines (Pastoral Land Board, 2025).
- Significant impact assessment against *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (Department of the Environment, 2013), for species listed under EPBC Act and TPWC Act.



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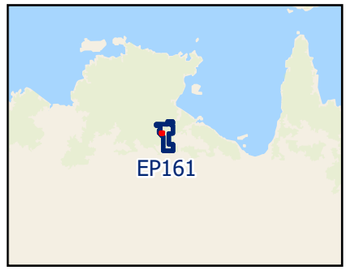
N

0 1 2 km

Legend

- Project Area
- Disturbance Footprint
- Study Area
- EP161
- Major Drainage
- Minor Drainage
- Streams



Environmental Assessment Report EP161 – McArthur Appraisal

Figure 1: The Project

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AECOM

N

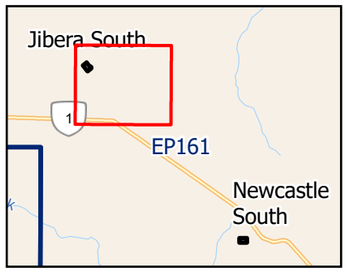
0 350 700 m

Legend

- Disturbance Footprint
- Project Area
- EP161

Disturbance Footprint by Impact

- Maintenance only
- Clearing
- Clearing - rehabilitation



Environmental Assessment Report EP161 – McArthur Appraisal

Figure 2a: Impact Type

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AECOM

N

0 250 500 m

Legend

- Disturbance Footprint
- Project Area
- EP161

Disturbance Footprint by Impact

- Maintenance only
- Clearing
- Clearing - rehabilitation

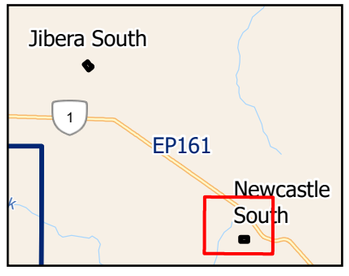

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Figure 2b: Impact Type

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2.0 Regulatory framework

2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and establishes a process for environmental assessment and approval of proposed actions that have, will have or are likely to have a significant impact on MNES or on Commonwealth land.

The EPBC Act covers nine MNES, which comprise:

- world heritage areas
- national heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- listed migratory species (protected under international agreements)
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- water resources (that relate to coal seam gas development and large coal mining development).

The EPBC Act also regulates Commonwealth actions and actions that have, will have or are likely to have a significant impact on the environment of Commonwealth land. The proposed action will not affect Commonwealth land and will not involve a Commonwealth action and no further assessment for these aspects has been undertaken.

Under the EPBC Act, a referral to DCCEEW is required if a project or action has the potential to cause a 'significant impact' on MNES. The determination is made with reference to the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (Department of the Environment, 2013) and other EPBC Act policy statements, including significant impact guidelines for selected threatened species, groups of species and threatened ecological communities.

A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment, which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

2.2 *Petroleum (Environment) Regulations 2016* (NT)

The *Petroleum Act 1984* (NT) regulates the onshore gas industry in the Northern Territory. It is supported by the *Petroleum (Environment) Regulations 2016* (PER). The PER seeks to promote ecologically sustainable development by requiring approvals from the Minister for Environment for all activities that will have an environmental impact. An environmental impact is defined in the PER as any adverse change, or potential adverse change, to the environment that results wholly or partly from a regulated activity.

The PER require that an environment management plan (EMP) is submitted by the proponent (Santos) to the Minister for Lands, Planning and the Environment. The EMP must specify *any legislative requirements applicable to the regulated activity described in the plan that are relevant to the protection of the environment and demonstrate how those requirements will be met*.

An EMP is provided to the Northern Territory Environment Protection Authority (NT EPA) for consideration under the PER. The NT EPA review an EMP under the PER and makes a recommendation to the minister. The minister must consider the NT EPA's recommendation before deciding whether to approve an EMP.

This Environmental Assessment report will inform and be a component of Santos' EMP that will be required for NT Government approval prior to exploration activities being undertaken.

2.3 Environmental Protection Act 2019 (NT)

Under the Environment Protection Act 2019 (EP Act), a proposed action that has the potential to have a significant impact on the environment must be referred to the Northern Territory Environment Protection Authority (NT EPA) for assessment, A proposed action or strategic proposal that undergoes environmental impact assessment by the NT EPA must have an environmental approval granted by the Minister for Environment before it can proceed in the NT.

Key environmental factors are considered during the environmental impact assessment (EIA) process to determine the potential impacts of a proposed action on the environment. Factors addressed in this report include:

- Terrestrial Ecosystems: the assessment of vegetation, fauna, and habitat quality
- Aquatic Ecosystems: the health and quality of freshwater and marine ecosystems
- Landforms and Soils: the assessment of soil stability, erosion, and landform changes.

The NT EPA provides a framework for environmental impact assessment (EIA) in the NT. The NT EPA guidelines help determine if a proposal has potential to significantly impact the environmental triggers that would then require the Project to be referred to the NT EPA for further assessment such as a Supplementary Environmental Report (SER) or and Environmental Impact Statement (EIS).

2.4 *Territory Parks and Wildlife Conservation Act 1976* (NT)

The Territory Parks and Wildlife Conservation Act (TPWC Act) provides the framework for classification, protection and conservation of wildlife, flora and fauna in the Northern Territory. Species are classified as extinct, extinct in the wild, critically endangered, endangered, vulnerable, near threatened and least concern. The TPWC Act prohibits impacts to protected places, impacts to threatened flora and fauna and interference with protected wildlife.

2.5 Weeds Management Act 2001 (NT)

There are four classes of weeds under the NT *Weeds Management Act*, which was amended in May 2022. The classes are described as:

A - it is necessary to eradicate the plant.
B - it is necessary to prevent the growing and spreading of the plant.
C - it is necessary to prevent the introduction of the plant into the Territory or a part of the Territory.
D - it is necessary to prevent the plant being spread by the actions of persons.

2.6 Pastoral Land Clearing Guidelines (NT)

The NT Pastoral Land Clearing Guidelines (Pastoral Land Board, 2025) provide guidance for good land development practice in the Northern Territory by establishing standards for the management (i.e. clearing and retention) of native vegetation. This includes definitions of sensitive and significant vegetation types that should be excluded from proposed clearing footprints, and recommended buffers to be implemented around such vegetation.

Clearing of native vegetation on pastoral land requires a permit under the *Pastoral Land Act 1992*, and the Pastoral land Board is the consent authority for clearing applications. The Pastoral Land Board can determine that specific activities are exempt from requiring a clearing permit, under Section 91D of the Act. This may include clearing that is required under an approved EMP under the *Petroleum (Environment) Regulations 2016*.

Land clearing is defined as a Regulated activity under the PER, and as such land clearing for the project is to be addressed in an EMP under the PER.

3.0 Assessment method

3.1 Desktop review

The desktop assessment incorporated a review of relevant government databases, mapping layers, publicly available ecological data and previous ecological assessments undertaken within and surrounding the Project Area, pertaining to the following:

- Vegetation types and flora and fauna species within the region that potentially occur within the Disturbance Footprint using previous reports and aerial / satellite imagery.
- EPBC Act and TPWC Act listed threatened species or communities that potentially occur within the Disturbance Footprint.
- MNES or other matters protected by the EPBC Act that potentially occur within the Disturbance Footprint.
- Atlas of Living Australia (ALA) database to retrieve historical records of conservation significant flora and fauna species that potentially occur within the Disturbance Footprint.
- eBird Australia database to retrieve information on bird distribution, abundance and seasonal trends of conservation significant species that potentially occur within the Disturbance Footprint.
- Weeds or feral animals listed under the EPBC Act or *Weeds Management Act 2001* that potentially occur within the Disturbance Footprint.
- The National Groundwater Dependent Ecosystems (GDE) Atlas to determine the presence or absence of GDEs within the Disturbance Footprint.
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) EPBC Act Protected Matters Report database (Department of Climate Change, Energy, the Environment and Water, 2025)
- Department of Environment, Parks and Water Security (DEPWS) Natural Resource (NR) maps (DEPWS, 2025).
- Previous AECOM and Santos data and reporting in the region.

Table 2 provides a list of reports (2004 - 2024), previously compiled in relation to environmental approvals and management support for petroleum exploration activities in the Beetaloo Sub-basin. The extent of work undertaken since 2004 has enabled a good understanding of the natural environment, which has been used in assessing the land condition of the Project Area.

Table 2 Summary of existing environmental assessments and reports for the Beetaloo Basin (2004-2024)

Date	Report
Sweetpea Petroleum	
Jul- Aug 2004	Baseline land condition assessment (LCA)
	Site database established
Jul 2005	Exploration EMP finalised and approved
Nov 2019 to Feb 2020	LCA for EP136 (Seismic and Drilling Exploration Program)
Petrohunter Australia (Partner to Sweetpea)	
Dec 2006	Baseline vegetation assessment
Apr 2007	Drill site assessments
Apr 2007	Annual report
Jun 2007	Update of the existing EMP to include the new Exploration Permit areas
Jul 2007	Drill site maps
Jul 2007	Supplemental Environmental Management Plan, Drilling Program 2007, Beetaloo Basin, NT
Jul 2007	Soil erosion assessment
Jul 2007	Groundwater quality
Falcon Oil and Gas	
Dec 2010	Drill site condition assessments
Jan 2011	Archaeological survey
Mar 2011	Site-specific drilling EMP
2011	Falcon Shenandoah 1 Stimulation and Testing Groundwater Monitoring
2011 to 2012	Shenandoah 1 Re-Entry Environment Plan (EP)
July 2012	EP99 Archaeological Survey, Beetaloo Basin
2013	EP99 Seismic Exploration Environmental Management Plan
Tamboran B2 Pty Ltd	
2015 and 2016	Beetaloo Basin Environmental and Heritage Assessment and preparation of Approval documentation
Oct 2018	LCA and Heritage Assessment of proposed lease area (Velkerri 76 S1-1, Velkerri 76 S2-1, Velkerri 117 E1-1, Velkerri 98 N1-2, Kyalla 117 N2-1 and Kyalla 117 W1-2, Kyalla 98 W1-1)
July 2019	Weed Survey of Kyalla 117 N2-1 and access tracks, including Kalala S1 and Amungee NW-1H
Dec 2019	LCA and Heritage Assessment of EP76, EP117 and EP98
Jun 2020	Beetaloo Exploration Program Annual Weed Survey Report 2020
Sep 2021	Land Condition Assessment and weed surveys for Velkerri 76 N1, Amungee NW and Beetaloo W
September 2021	Environmental Management Plan: McArthur Basin Hydraulic Fracturing Program (NT Exploration Permit (EP) 161
May 2022	Additional Land Condition Assessment field survey of this specific proposed exploration program
December 2022	Land Condition Assessment field survey in Tamboran B2 Pty Ltd permit area
March - April 2023	Land Condition Assessment specific to the revised Amungee NW-3, Amungee NW-4, Shenandoah South and Shenandoah North lease pad and seismic areas.
July 2024	Land Condition Assessment for Shenandoah South seismic survey program.
August 2024	Environmental Management Plan: 161 2D Seismic and Ground Gravity Survey Program (STO7-4) NT Exploration Permit 161

3.2 Strategic Regional Environmental and Baseline Assessment for the Beetaloo Sub-basin data set

AECOM have undertaken a review of the recently published SREBA data and reports which were prepared by the NT Government (NTG) specifically for the Beetaloo Sub-basin. The aim of the SREBA is to provide the information necessary for decisions to be made about the development of any onshore shale gas industry in the region.

To prepare this report, AECOM have used these outputs to supplement the data obtained during the field survey. The terrestrial ecosystem baseline data reviewed includes:

- regional vegetation mapping
- description of regional biogeographic patterns for terrestrial biodiversity
- spatial distribution models for significant species and communities
- identification and mapping of areas of high conservation value
- evaluation of the sensitivity of significant species to development.

3.3 Field assessment

A field survey was conducted to document on ground environmental values with the disturbance footprint of the proposed EP161 lease pads prior to development and inform Santos of potential constraints that will require specific environmental mitigations. The survey was conducted generally in accordance with the NT Guidelines for Assessment of Impacts on Terrestrial Biodiversity (NTEPA, 2011).

The ecology and land assessment field surveys assessed a total of 18 sites across the Study Area during December 2024. The assessment undertaken at each site is as follows:

- Flora assessment
    - Description of vegetation communities (based on dominant species within each canopy strata).
    - Vegetation transects recording canopy cover along 4 x 50 m transects from centre point in northerly, easterly, southerly and westerly directions.
    - Targeted flora searches in accordance with the NT Guideline for Targeted Surveys of Threatened and Significant Plant Species (Cuff et al., 2020).
    - The presence and abundance of weeds.
- Fauna assessment
    - 10 – 15-minute bird survey, including call-playback for threatened northern shrike-tit (*Falcunculus whitei*).
    - Active searches for fauna or signs of fauna.
    - Fauna habitat features, such as hollows, logs, and burrows (the fauna habitat quality for each mapped vegetation community type would be assessed).
    - The presence and abundance of feral animals (*i.e.* indication of scats, tracks, wallows etc.).

Incidental observations of fauna and flora were also taken. Control sites were surveyed to confirm nearby vegetation communities. These surveys were an abbreviated version of the flora assessments to confirm the same vegetation structure and community was present in the adjacent Project Area.

The field locations assessed for the Project are presented in Table 3 and Figure 3. Field assessments were undertaken at a total of 18 sites across the Study Area. Sites were selected based on preliminary vegetation mapping.

Table 3 Site names and locations for 2024 field survey

Assessment sites	Latitude	Longitude
VS1	-16.449132	134.615322
VS2	-16.449363	134.612864
VS3	-16.447987	134.617881
VS4	-16.452273	134.618865
VS5	-16.452708	134.627966
VS6	-16.451357	134.630146
VS7	-16.555725	134.714392
VS8	-16.557542	134.715741
VS9	-16.559101	134.714057
VS11	-16.557883	134.711051
VS12	-16.454588	134.613835
VS13	-16.558046	137.719372
VS14	-16.439846	134.631922
VS15	-16.438909	134.631703
VS18	-16.565181	134.725456

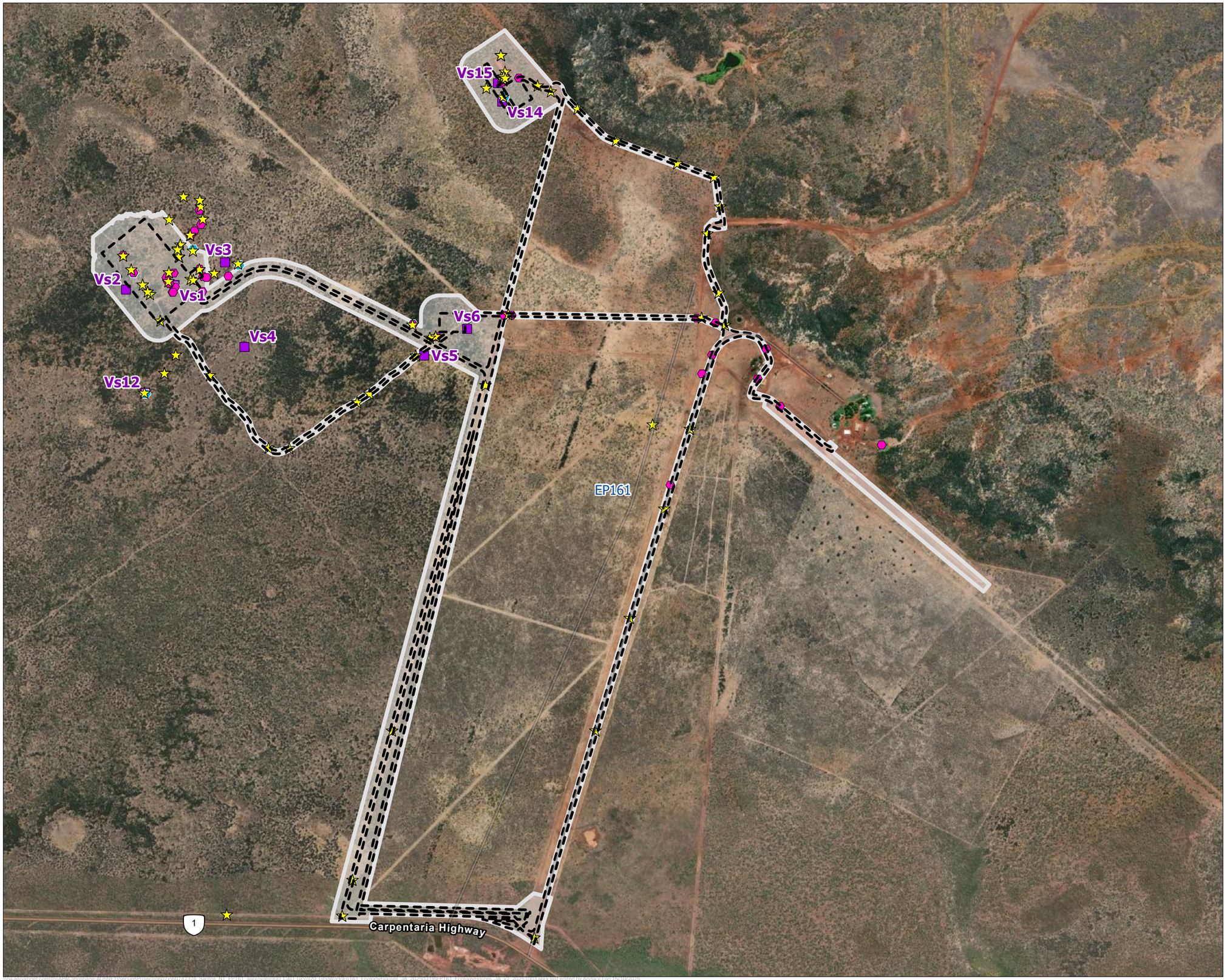
3.4 Likelihood of occurrence assessment

Prior to field surveys a likelihood of occurrence assessment was conducted using information available during the desktop assessment (see Section 3.1). Following the ecological field surveys, the likelihood of occurrence assessment was revised based on ground-truthed vegetation communities, habitat condition, microhabitat features and expert opinion. This process serves as a guide and is not a definitive statement on the presence or absence of a species, other than where species were observed during field surveys.

Each species has been assessed against the categories defined below:

- **Known**: Species was positively identified and recorded in the Disturbance Footprint during the field surveys; or previous, reliable records occur within the Disturbance Footprint.
- **Likely**: Species was not recorded during the field surveys or previously, however there are reliable records within the nearby surrounding area and suitable habitat exists in the Disturbance Footprint.
- **Possible**: Species was not recorded during the field surveys or previously, however reliable records occur in the surrounding area and/or habitat in the Disturbance Footprint is marginal or degraded.
- **Unlikely**: Habitat in the Disturbance Footprint may be marginally suitable; however, species was not recorded during the field surveys, and no known records of the species exist within the surrounding area.

The full likelihood of occurrence assessment is presented in Appendix A. For each species, the assessment outlines the relevant listing under the EPBC Act and TPWC Act, as well as the preferred habitat and distribution.



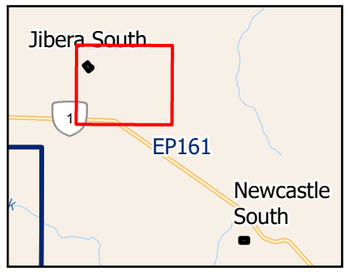
AECOM

N

0 350 700 m

Legend

- Disturbance Footprint
- Project Area
- EP161
- Bird Survey
- Fauna sightings
- Flora Survey
- General observation



Environmental Assessment Report EP161 – McArthur Appraisal

Figure 3a: Survey Sites

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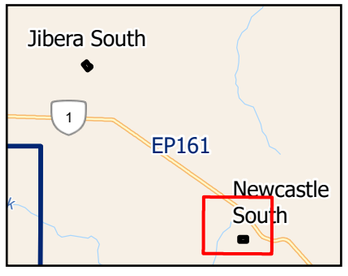
AECOM

N

0 250 500 m

Legend

- Disturbance Footprint
- Project Area
- EP161
- Bird Survey
- Fauna sightings
- Flora Survey
- General observation



Environmental Assessment Report EP161 – McArthur Appraisal

Figure 3b: Survey Sites

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3.5 Significant impact assessment

The *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (Department of the Environment, 2013) provides the framework for the assessment of potential impacts upon MNES as well as a process for determining the level of significance of impacts.

Significant impact assessments were undertaken for all MNES values considered present, including species considered known, likely or possible to occur as a result of the likelihood of occurrence assessment. In lieu of specific Northern Territory Government impact assessment, a significant impact assessment was also conducted for any TPWC Act listed threatened species considered known, likely or possible to occur.

In accordance with the guidelines, impacts on values are to be assessed using the broadest scope of the Project, with consideration to both direct and indirect impacts and proposed measures that may avoid and reduce impacts. Significance is tested through a set criterion stipulated in the guideline, which is tailored to each MNES and for some values, the conservation status of the MNES. For the impact assessments, it has been assumed that the Disturbance Footprint is the maximum direct impact required for the Project. The significant impact assessment is presented in Appendix B, results are summarised in Section 8.0.

3.6 Limitations

Field assessments are subject to limitations in the detection success of species. These limitations may result in false-absence records where a species is not present but not detected. The species directly observed during this survey are opportunistic sightings only and not considered exhaustive. Habitat assessment has been undertaken to identify the potential species within the proposed disturbance footprint, specifically threatened species. The likelihood of occurrence assessment method also mitigates this limitation.

The seasonal conditions during the field survey may have influenced the quantum of flora and fauna detected. It is recognised that a single field study cannot always account for 100% of diversity present across a survey location. The survey was sufficient in characterising vegetation communities and habitat values within the Project Area.

The limitations discussed above are not considered to fundamentally alter the outcomes of this assessment or hinder achieving the overarching scope of this report.

4.0 Physical environment

4.1 Climate

The climate of the Beetaloo area can be described as arid to semi-arid, with rainfall decreasing in frequency and quantity from north to south. The climate is monsoon influenced and has a distinctive wet and dry season. The wet season occurs in summer, between October and March and is characterised by hot and wet conditions. The dry season occurs during the winter months between May and August and is characterised by mild days and cool nights. September and April are transitional months, with occasional rainfall. Approximately 90% of the rainfall occurs during the wet season, and annual totals show moderate variability from year to year.

There is a pronounced north-south rainfall gradient through the region, with mean annual rainfall of ~1200 mm in the north and ~500 mm in the south (DEPWS, 2022). The maximum rainfall for the Project Area occurs in January and February, coinciding with the northern Australian annual monsoon event and average monthly rainfall is very low in the dry season (between May and October) (BOM, 2025; DEPWS, 2022).

Daly Waters airstrip is on a similar latitude with the northern end of the EP161, and recorded the highest average rainfall in the region at this time, with 167 mm falling in January and 188 mm in February. The May to September period is generally very dry, with average monthly rainfall ranging from 0.3 – 6.2 mm (BOM, 2025). The annual rainfall pattern within the area is highly variable. Drought conditions are known to occur in the region once every 10 years (Bertram & Holt, 1980).

Average maximum and minimum temperatures are also high in the wet season and lower in the dry season, with slightly greater extremes of temperature in the southern part of the region. At Daly Waters, annual monthly maximum temperatures range between 29.0 °C (June) and 38.2 °C (November), and minimums between 11.9 °C (July) and 24.2 °C (December) (DEPWS, 2022).

The average annual rainfall experienced in the region (which includes the BOM data from Daly Waters Airstrip, statin number 14626) is shown in Table 4. The year of the survey (2024), Daly Waters Airstrip recorded its highest total annual rain on record (1353.6 mm).

Table 4 Annual rainfall 2016 – 2024

Year	Annual rainfall (mm)	Months during which rain was recorded
2016	608	12
2017	866	7
2018	752	7
2019	277	8
2020	951	9
2021	679	7
2022	561	10
2023	762	8
2024	1354	9

4.2 Topography, surface water and drainage

The Disturbance Footprint occurs within a topographic zone classified as laterite plains that predominantly slope in a south and south westerly direction (DIPE, 2003).

The SREBA Beetaloo Georgina Basin Water Management Area mapping reveal that the Disturbance Footprint occurs on the edge of the Limmen Bight basin (Figure 4). Limmen Bight basin is part of the Limen River Catchment, and terminates on the Gulf, in Limmen National Park.

Across the Disturbance Footprint there are no creeks that will be directly impacted by Project activities. There are some minor streams nearby the Disturbance Footprint, in which there may be indirect

impacts due to changes in water volume, direction and speed. Nearby waterways are described in Table 5 below.

Flooding of the Disturbance Footprint is unlikely, due to the slope of the landscape as well as the distance from nearby creeks.

Table 5 Waterways near the Disturbance Footprint

Catchment	Waterway type	Distance to the well pad (km)	
		Jibera South	Newcastle South
Limmen Bight basin	Intermittent stream (stream order 1)	6 km	4.5 km

4.3 Hydrogeology

The primary hydrostratigraphic unit associated with the Project is the Cambrian Limestone Aquifer (CLA), which serves as the main water supply source. The CLA is a multi-layered system extending from approximately 20 to 400 metres below the surface and is subdivided into the upper and lower CLA. The upper CLA includes the Anthony Lagoon Formation, composed of siltstone interbedded with karstic limestone and dolomite, while the lower CLA comprises the Gum Ridge Formation, which is the principal water-bearing unit in the study area. The Gum Ridge Formation, located within the Georgina Basin, is a karstic limestone unit that plays a critical role in regional hydrogeology due to its fractured and partially dolomitised nature. It exhibits highly variable permeability, with hydraulic conductivity ranging from 0.359 to 62.5 m/day and transmissivity between 52 and 10,000 m²/day. Groundwater yields from bores vary from 0.2 to 15 L/s, influenced by dissolution processes that create random interconnectivity between fractures and voids. The formation holds substantial groundwater reserves, estimated between 1,766,000 and 3,532,000 GL, and supports two regional groundwater flow systems that originate in the southern Georgina Basin and discharge north-west towards the Roper River. Groundwater quality in the Gum Ridge Formation is characterised by low total dissolved solids (approximately 500 mg/L), with a Na-Ca-Mg cationic and HCO_3-SO_4 anionic signature, typical of limestone and dolomite systems (AECOM, 2025).

Overlying and underlying the CLA are the Moroak Sandstone and Bessie Creek Sandstone formations, both part of the Roper Group. The Moroak Sandstone is a medium to fine quartz sandstone deposited in a high-energy, tide-dominated environment. It demonstrates good porosity and permeability near structural features, although these properties are more variable off-structure due to diagenetic processes. The Bessie Creek Sandstone, also deposited in a high-energy setting, primarily acts as an aquitard but can form local fractured rock aquifers, particularly near regional structures. However, groundwater in both formations tends to be highly saline, limiting their utility compared to the fresher water found in the CLA. Due to their depth and limited permeability, these formations are considered local scale fractured and weathered aquifers within the Beetaloo Sub-basin (AECOM, 2025).

Dissolution processes in the CLA, driven by rainfall infiltration into carbonate-rich formations, lead to the formation of sinkholes throughout the Beetaloo Sub-basin, although none are mapped in areas overlain by Cretaceous deposits. Additional aquifers in the region include perched aquifers in Cretaceous sediments and fractured rock aquifers below the CLA, though these are localised and not regionally significant. Groundwater monitoring at the Santos Tanumbirini site has identified the presence of Naturally Occurring Radioactive Materials (NORM), with gross alpha and beta concentrations exceeding Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) thresholds but remaining below Western Australia's limits. These levels do not necessitate management as radioactive material. The Velkerri Formation acts as a regional aquitard, providing a competent seal to the underlying Bessie Creek Sandstone and limiting vertical connectivity. Faults in the region generally do not extend to shallow formations, reducing the risk of fluid migration. The potential for aquifer connectivity, particularly between the CLA and the Roper Group, is an important consideration for water resource management within the Beetaloo Sub-basin (AECOM, 2025).

The CLA is characterised by its dissolution process, which occur as rainfall infiltrates the carbonate-dominant formations at or near the surface.

The depth to the water table across the Santos operational area ranges from approximately 60 to 120 mbgl (AECOM, 2025).

AECOM

N

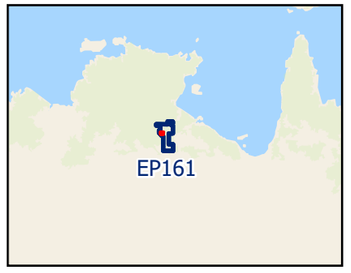
0 1 2 km

Legend

- Disturbance Footprint
- EP161
- Major Drainage
- Minor Drainage
- Streams

River Basins

- Limmen Bight River
- Roper River
- Wiso



Environmental Assessment Report EP161 – McArthur Appraisal

Figure 4: Water Basins and Watercourses

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4.4 Groundwater Receptors and Environmental Values

4.4.1 Groundwater users

A total of 33 bores registered with the Northern Territory Government are located within the Study Area. Of the 33 identified:

- twenty are recorded to target the Gum Ridge Formation with screen intervals ranging from 74 to 185 mbgl
- two are recorded to target Anthony Lagoon Formation
- two are recorded to target Gum Ridge Formation or Anthony Lagoon Formation
- four have no recorded geology
- two are recorded to intersect limestone
- three petroleum supply or monitoring bores are recorded to have open hole completions across sandstone below limestone.

The review of registered bores indicates the lower CLA Gum Ridge Formation is the primary utilised aquifer within the Study areas.

Bores identified within the Study areas had a reported purpose of monitoring (7), petroleum water bore (5), production (15), and unknown (6) (AECOM, 2025). It is noted that registered bores in proximity to the Newcastle South well pad have been decommissioned.

4.4.2 Groundwater Dependant Ecosystems

A search of the NT SREBA dataset was undertaken for GDEs mapped within the Study areas. The GDE search radius was extended to 5 km radius around the well pads and Santos' licenced extraction bores (RN038580, RN040930 and RN040931).

Based on the SREBA Beetaloo GDE Mapping, three groundwater dependent vegetation communities within the Newcastle South Study area have been identified, including:

- 'melaleuca forests (springs, river channels)', a high-confidence permanent GDE,
- 'riparian woodland (ephemeral streams)', a low to moderate confidence seasonal GDE, and
- '*Corymbia bella* woodland on alluvial plains', a moderate confidence seasonal GDE.

Three GDE are mapped within Jibera South Study area, which includes the extraction bores, including:

- 'melaleuca forests (springs, river channels)', a high-confidence permanent GDE,
- 'riparian woodland (ephemeral streams)', a low to moderate confidence seasonal GDE, and
- '*Corymbia bella* woodland on alluvial plains', a moderate confidence seasonal GDE.

These GDEs are likely to be accessing a shallow perched groundwater system given the inferred depth of the CLA in the Study area (AECOM, 2025).

4.4.3 Springs and source hydrostratigraphic units

A spring is a hydrogeological feature which occurs due to natural groundwater discharge at surface or near surface and may be classed as having a permanent or non-permanent (ephemeral) saturation regime. GDEs may in be associated with the expression of surface water in a spring. Nineteen springs were identified within EP161. No springs were identified within the Study areas.

The closest mapped spring, Stone Spring, is located approximately 45 km to the north of Jibera South well pad. Stone Spring is situated within 'Hot Springs Valley' within Tanumbirini Station, associated with the Beetaloo Sub-basin faults. The 'Hot Springs Valley' is a series of springs associated with outcropping of Roper Group Mesoproterozoic sandstone formations. Lagoon Creek Spring within 'Hot Springs Valley' is interpreted to be likely sourced from the Bessie Creek Sandstone (AECOM, 2025).

The assessment of the Gum Ridge Formation identified that the groundwater discharge from the Gum Ridge Formation is associated with GDEs of Bitter Springs and Rainbow Springs. These discharge springs are in the Elsey National Park on the Roper Creek, approximately 230 km to the northwest, a marked distance from the Project. Groundwater extraction, which could potentially influence

groundwater pressure, was assessed during the previous water licence (proposed extraction volume of 193.5 ML/year). The water licence assessment, conducted by the regulator using the Integrated Daly Roper Groundwater and Surface Water Model, indicated no impacts to groundwater discharge (or spring flows) at Bitter Springs and Rainbow springs was predicted. The Gum Ridge Formation limestone aquifer, has significant groundwater storage and regular recharge, which reduces the risk of groundwater extraction impacts. The estimated total extraction over the five year project life is 2,260 ML, which is significantly less than the estimated water available in the Gum Ridge Formation, such that the proposed extraction would result in no change to notable GDEs.

The Gum Ridge Formation groundwater discharge supports GDEs at Bitter Springs and Rainbow Springs in Elsey National Park, located approximately 230 km northwest of the Project area. The Hot Spring Valley, situated along the OT Downs fault zone in the eastern Beetaloo Sub-basin, features bubbling springs linked to reactivated strike-slip faults and fluid pathways dating back 1645-1640 million years. These springs originate from older sources compared to the Roper River discharge springs, highlighting distinct hydrological systems. No direct or indirect impacts on the Roper Group sandstone source units due to hydraulic fracture simulation (HFS) is envisaged based on the project controls to be implemented by Santos (AECOM, 2025).

4.5 Aquatic ecosystems

Mapping of SREBA Beetaloo aquatic ecosystems undertaken by the NT Government indicates that the Disturbance Footprint can be classified as terrestrial aquatic ecosystems. Within the Beetaloo sub-basin, the mapping identified 1,061,555 ha of surface water ecosystems, covering approximately 12% of the study area. Most were floodplain systems, followed by palustrine, riverine, and lacustrine systems. Additionally, 22 spring locations were identified (Young et al., 2022).

Santos has undertaken flood modelling for the Project Area to inform design. There were no surface aquatic ecosystems recorded within the Disturbance Footprint. There are several stream order 1 watercourses near the well pads (Table 5). The nearest aquatic ecosystem is Newcastle Creek and associated waterholes, located 8.5 to 10 km south-west of the Newcastle South well pad (DEPWS, 2023).

4.6 Land systems

Land systems are defined because of their distinct differences from the surrounding areas and by the recurring pattern of geology, topography, soils and vegetation. Land system mapping for the Disturbance Footprint is derived from the following two data sets:

- Land Systems of the Southern Part of the NT; and
- Land Systems of the Northern Part of the NT (DLRM, 2013).

Most of the Disturbance Footprint occurs within the Beetaloo Land System, which is classified as lateritic plains and rises. This land system is characterised by plains and rises associated with deeply weathered Land Systems. These are summarised below in Table 6.

Table 6 Land system details (DLRM, 2013)

Land system	Landform description	Soil description	Vegetation description
Beetaloo	Plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products; sandy and earth soils.	Not available	Not available
Creswell	Erosionally stable, gently undulating plains and rises on ferrugunised Lower Cretaceous sediments (laterite).	Leptic Rudosols, Leptic Tenosols, Red and Yellow Kandosols.	Mid-high open woodland of *Corymbia dichromophloia, C. bleeseri, Eucalyptus tetrodonta, Erythrophleum chlorostachys* with isolated stands of *Acacia shirleyi* on

Land system	Landform description	Soil description	Vegetation description
			crests over *Chrysopogon fallax, Plectrachne pungens, Sorghum plumosum.*
Inacumba	Gently undulating rises and undulating plains to low hills on ferruginised Lower Cretaceous sediments (laterite) and weathered sandstones.	Leptic Rudosols and shallow Ferric Brown Kandosols.	Mid-high open woodland of *Corymbia dichromophloia*, *Eucalyptus miniata*, *E. tetrodonta, C. ferruginea, E. leucophloia* with isolated stands of *Acacia shirleyi* on steeper slopes over *Eriachne* spp.*, Chrysopogon fallax, Plectrachne pungens.*

4.7 Soil erosion

The Australian Soil Classification map was used to determine soil types within the Disturbance Area (Searle, 2021). Most of the area for both Jibera South and Newcastle South was mapped as containing Kandosols, with Vertosol scattered around access tracks. Kandolsols are typically red to brown in colour, have a sandy to loamy texture and are well drained and permeable. This soil type is widespread across the Top End, Sturt plateau, Tennant Creen and Central Australia (DLRM, 2023).

Soil erosion susceptibility varies throughout the Project Area, dependent upon soil types, slope and extent of ground disturbance. Apart from the erosive impact of climatic conditions, soil erosion is influenced mainly by the inherent properties of the soils and the processes which occurred during the formation of the landscapes (Aldrick & Wilson, 1990).

Erosion will occur within the Disturbance Footprint if the land is used beyond its capacity, as is seen if land is overstocked or vehicle movements not controlled. Erosion risk rating based on rainfall is described below in Table 7.

Table 7 Erosion risk rating based on average monthly rainfall at Daly Water Airstrip

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	166.0	188.1	110.0	21.0	6.1	2.8	2.7	0.3	2.3	21.3	53.9	115.6
Erosion Risk	H	H	H	VL	VL	VL	VL	VL	VL	VL	M	H

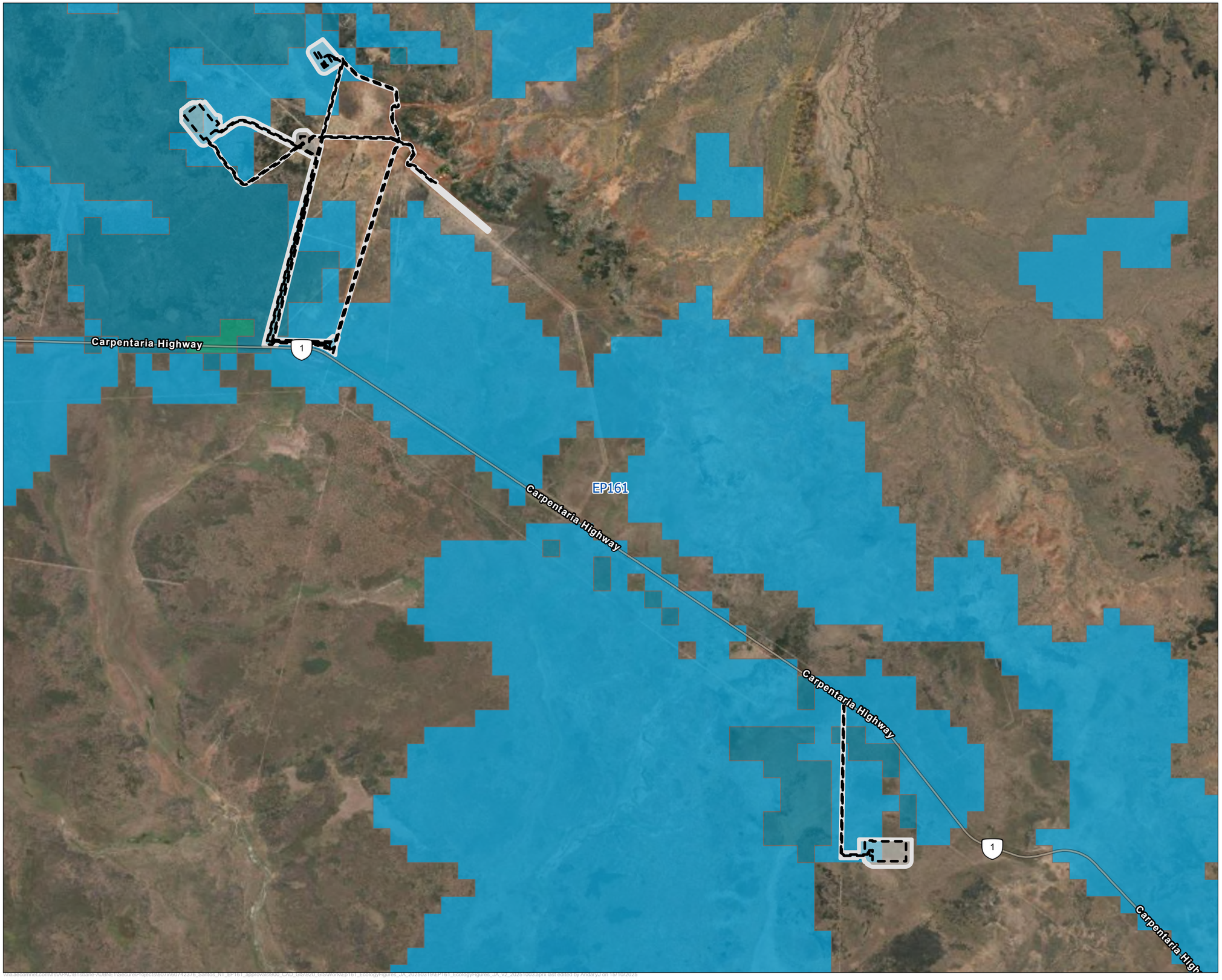
H = High (100+ to 225 mm); M = Moderate (45+ to 100 mm); L = Low (30+ to 45 mm); VL = Very Low (0 to 30 mm). Data sourced from Bureau of Meteorology, Climate Averages for Station 014626 Daly Waters Aerodrome recorded from 1939-2024.

4.8 Bushfire

Fire is a natural occurrence in most Australian ecosystems and plays an important ecological role. Fire is generally excluded from Mitchell grasslands by pastoral management to maintain forage throughout the dry season (HLA-Envirosciences, 2005). Fire is more frequent in the Eucalypt and Acacia woodlands situated within the Sturt Plateau bioregion.

Historical fire data was acquired from the North Australian Fire Information (NAFI) site and queried for the Disturbance Footprint. Ten-year fire data (2014 to 2023) shows that the Study Area of Jibera South has been burnt one to four times in the last 10 years. Newcastle South Study Area has remained mostly unburnt in the last 10 years.

Generally, high intensity fires in the area are most likely to occur during the dry season (June to September) while wet season fires (October to May) are likely to be patchy and lower intensity, depending on the state of curing of the fuel load. The impacts of hot fires can impact flora and fauna species and reduce habitat quality. Research suggests that hot fires may impact fauna diversity and in particular diurnal reptiles (Legge, S. et al., 2008).



AECOM

N

0 1 2 km

Legend

- Project Area
- Disturbance Footprint
- EP161

Years Burnt 2015-2024

- 3
- 2
- 1

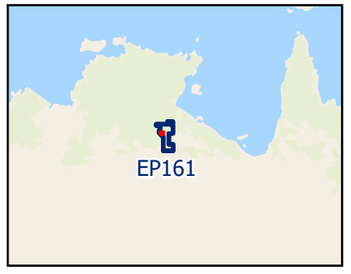


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Figure 5: NAFI Data - Last 10 years Fire Frequency NT Central

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4.9 Air quality

SREBA Beetaloo environmental health interim baseline report on air quality reveals that the dust rate at nearby monitoring stations of the Disturbance Footprint such as Bullwaddy and Daly Waters is within the adopted objective level (4 g/me/month) (GHD, 2022). Concentrations of nitrous oxide (NO_2), sulphur dioxide (SO_2) and hydrogen sulphide (H_2S) were also well below the annual criterion at two monitoring stations as is described in Table 8.

Table 8 Summary of air quality data from the SREBA environmental health interim baseline report (GHD, 2022)

Pollutant	Annual criterion	Bullwaddy	Daly Waters
NO_2 (October to November 2022)	31 (µg/m^3)	2	2
SO_2 (October to November 2022)	57(µg/m^3)	0.6-1	0.3-2
H_2S (October to November 2022)	0.5 µg/sample	Below the detectable limit	
Volatile Organic Compounds (VOC) (October to November 2022)	Below the detectable limit for various organic compounds		
Dust (October 2022)	4 g/m^2/month	1.00	0.40

4.10 Land use and sensitive receptors

Approximate separation distances from the Disturbance Footprint Jibera South and Newcastle South to the nearest environmental and community receptors is summarised in Table 9.

Table 9 Disturbance Footprint environmental and community receptors

Receptor	Distance from Disturbance Footprint	
	Jibera South	Newcastle South
Nearest bore*	3.2 km (North west – Bore number: RN038179)	3.9 km (South – Bore number: RN31244)
Nearest homestead - Tanumbirini	3.7 km (200 m north from nearest access track)	13 km north-west
Nearest community - Daly Waters	133 km west	144 km west
Stuart Highway	133 km west	144 km west
Carpentaria Highway	3.3 km south	0.8 km north
Lake Woods	187 km south-west	187 km south-west
Nearest watercourse	6 km north Unnamed watercourse	4.5 km south-east Unnamed watercourse
Nearest major watercourse	8 km north east Tanumbirini creek	10 km south-west Newcastle creek
Bullwaddy Conservation Reserve	37.5 km west	44 km west
Aquatic ecosystems refugia	18 km south Newcastle creek waterhole	9 km south-west Newcastle creek waterhole

AECOM

N

0 3 6 km

Legend

- Project Area
- Disturbance Footprint
- Sensitive Receptors
- Carpentaria Highway (Sensitive Receptor)
- Major Drainage
- Minor Drainage
- Streams

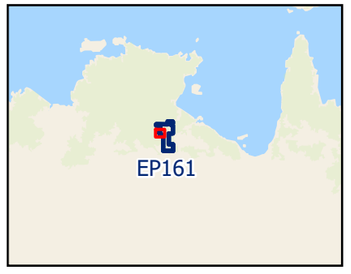

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Figure 6: Sensitive Receptors

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5.0 Natural environment

5.1 Bioregions

The Interim Biogeographic Regionalisation of Australia (IBRA) classifies the Disturbance Footprint mostly occurring within the Sturt Plateau Bioregion, and a smaller part of the Disturbance Footprint occurring within the Gulf Fall and Uplands Bioregion.

The Sturt Plateau Bioregion comprises undulating plains on sandstone, with predominantly neutral sandy red and yellow earth soils. Dominant vegetation is eucalypt woodland (dominated by variable-barked bloodwood *Eucalyptus dichromophloia*) with spinifex understorey, as well as extensive areas of Lancewood (*Acacia shirleyi*), Bullwaddy (*Macropteranthes kekwickii*) vegetation association and associated fauna, including the spectacled hare-wallaby (*Lagorchestes conspicillatus*). Land condition in the bioregion is moderate to good but threatened by impacts from weeds, feral animals, pastoralism and changed fire regimes (Baker et al., 2005).

The Gulf Fall and Uplands bioregion comprises undulating terrain with scattered low, steep hills on Proterozoic and Palaeozoic sedimentary rocks, often overlain by lateralised Tertiary material. Soils are mostly skeletal or shallow sands. Two types of woodland predominate vegetation: Darwin stringybark (*Eucalyptus tetrodonta*) and variable-barked bloodwood (*Corymbia dichromophloia*) with spinifex understorey and northern box (*Eucalyptus tectifica*) with tussock grass understorey (Baker et al., 2005).

5.2 Vegetation communities

Nine vegetation communities were identified within the Project Area, eight of which occur within the Disturbance Footprint. A total of 15 vegetation sites and two check sites were surveyed, identifying five vegetation communities within Jibera South and six communities within Newcastle South.

Prior to the field survey vegetation community boundaries were delineated into visually distinct patches, based on recent satellite imagery at a 1:25,000 scale in the QGIS mapping program. Survey sites were selected within vegetation patch boundaries to form the basis for the field survey. At each vegetation survey site, the following metrics were recorded within a 20 x 20 m quadrat:

- Height and cover of the three dominant species within each of the three dominant strata (NVIS level V)
- Observations on soil and landform
- Photos of vegetation and soil surface.

The results of the survey informed mapping and vegetation community descriptions as outlined in the *Northern Territory Guidelines and Field Methodology for Vegetation Survey and Mapping* (Brocklehurst et al., 2007).

Vegetation communities are reported below in Table 10 and a map of vegetation community boundaries within the Disturbance Footprint is shown in Figure 7.The area of each vegetation community within the Disturbance Footprint are detailed in Table 11. Detailed vegetation community description are provided in Appendix C, Table 38 to Table 47.

None of the vegetation communities identified during the field survey comprise a *sensitive* or *significant* vegetation type, as defined in the NT Pastoral Land Clearing Guidelines (Pastoral Land Board, 2025). No Threatened Ecological Communities were recorded within the Project Area.

Table 10 Vegetation community descriptions

Vegetation community	Description	Survey sites	Photo
1a	*Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys*, mid high open woodland	VS8, VS14	
1b	*Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys,* mid high open woodland, over *Acacia calligera,* low shrubland	VS1, VS7	
1d	*Corymbia dichromophloia, Erythrophleum chlorostachys, Eucalyptus tectifica,* mid high open woodland	VS13	
2a	*Acacia shirleyi, Corymbia dichromophloia,* ± *Corymbia terminalis*, mid high woodland over *Macropteranthes kekwickii* mid high open shrubland	VS11	
2b	*Eucalyptus leucophloia, Macropteranthes kekwickii* ± *Acacia shirleyi,* mid high woodland	VS2, VS6	

Vegetation community	Description	Survey sites	Photo
3	*Eucalyptus chlorophylla*, mid high open woodland	VS5	
4a	*Eucalyptus leucophloia, Corymbia terminalis, Acacia shirleyi*, mid high open woodland, over *Macropteranthes kekwickii, Melaleuca viridiflora, Melaleuca citrolens,* mid high open shrubland	VS4	
4b	*Melaleuca citrolens, Macropteranthes kekwickii, Eucalyptus tectifica*, mid high open woodland, over *Melaleuca citrolens, Terminalia volucris, Melaleuca viridiflora*, mid high open shrubland	VS2, VS12	
5	*Eucalyptus microtheca, Eucalyptus pruinosa,* mid high open woodland, over *Melaleuca viridiflora, Melaleuca citrolens, Vachellia ditricha*, mid high open shrubland	VS9	
6	Historically cleared resprout (Gravel Pit outside study area) - *Erythrophleum chlorostachys*, low open woodland	Gravel Pit - VS15	

Table 11 Ground-truthed vegetation communities mapped within the Disturbance Footprint and the Project Area

Vegetation community		Disturbance Footprint (ha)		Project Area (ha)	
		Jibera South	Newcastle South	Jibera South	Newcastle South
1a	*Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys*, mid high open woodland	2.72	2.38	12.68	9.37
1b	*Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys,* mid high open woodland, over *Acacia calligera,* low shrubland	5.59	16.86	10.36	23.08
1d	*Corymbia dichromophloia, Erythrophleum chlorostachys, Eucalyptus tectifica,* mid high open woodland	0	0	0	0.13
2a	*Acacia shirleyi, Corymbia dichromophloia, ± C. terminalis*, mid high woodland over *Macropteranthes kekwickii* mid high open shrubland	0	0.5	0	2.68
2b	*Eucalyptus leucophloia, Macropteranthes kekwickii ± Acacia shirleyi,* mid high woodland	14.92	0	34.30	0
3	*Eucalyptus chlorophylla*, mid high open woodland	1.55	0	5.46	0
4a	*Eucalyptus leucophloia, Corymbia terminalis, Acacia shirleyi*, mid high open woodland, over *Macropteranthes kekwickii, Melaleuca viridiflora, M. citrolens,* mid high open shrubland	0.70	0	1.61	0
4b	*Melaleuca citrolens, Macropteranthes kekwickii, Eucalyptus tectifica*, mid high open woodland, over *Melaleuca citrolens, Terminalia volucris, Melaleuca viridiflora*, mid high open shrubland	1.50	0	9.07	0
5	*Eucalyptus microtheca, E. pruinosa,* mid high open woodland, over *Melaleuca viridiflora, M. citrolens, Vachellia ditricha*, mid high open shrubland	0	0.16	0	1.90
6	Historically cleared, non-remnant, or modified	37.02	3.15	75.10	3.14
No data	No data collected	0.28	0.01	12.26	3.45
	Sub Total	**64.28**	**23.06**	**160.84**	**43.75**
	Total		**87.34**		**204.59**

AECOM

N

0 350 700 m

Legend

- Disturbance Footprint
- Project Area
- EP161

Vegetation Type

- 1a
- 1b
- 2b
- 3
- 4a
- 4b
- 6
- Gravel pit

EP161

Carpentaria Highway

1

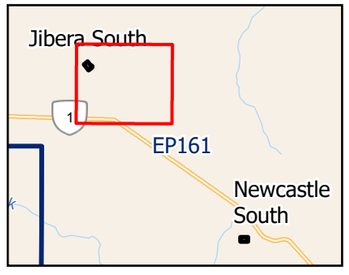

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Figure 7a: Vegetation Communities

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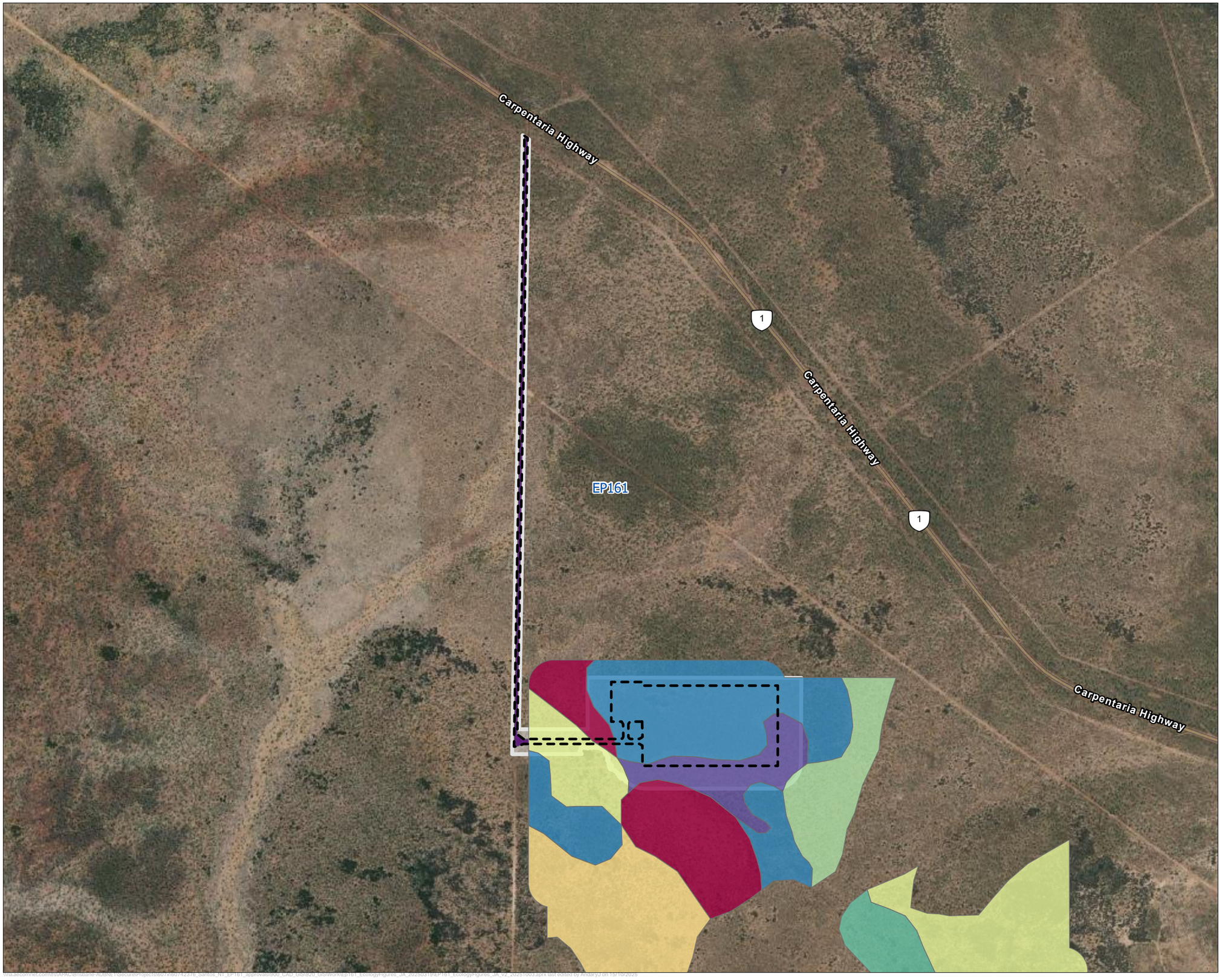

AECOM

N

0 250 500 m

Legend

- Disturbance Footprint
- Project Area
- EP161

Vegetation Type

- 1a
- 1b
- 1c
- 1d
- 2a
- 2c
- 5
- 6

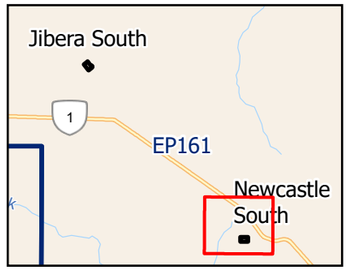

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Figure 7b: Vegetation Communities

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5.3 Flora

5.3.1 Flora species diversity

The field survey undertaken during December 2024 recorded 42 individual flora species. The survey focused on recording dominant species to describe vegetation communities rather than a comprehensive floristic assessment, based on *Northern Territory guidelines and field methodology for vegetation survey and mapping* (Brocklehurst et al., 2007). A full list flora species recorded in the desktop review and field survey is provided in Appendix F, Table 54.

Most flora identification was undertaken in the field. Samples were collected for unidentified species for later identification at the Northern Territory Herbarium. Due to the survey timing, many of the grass species could not be identified as no fertile material was available for identification.

5.3.2 Threatened flora

A desktop analysis of flora in the region was conducted using the DCCEEW PMST and DEPWS Natural Resource maps. This search indicated that no threatened flora species listed under the EPBC Act or the TPWC Act potentially occur in the Project Area.

Additional research was conducted to confirm this outcome, including searching the NT Flora Atlas and SREBA surveys undertaken by the NT Government. As a result, three potential flora species were included in the likelihood of occurrence assessment (Appendix A), all of which were deemed unlikely to occur.

The results of the field survey recorded no threatened flora species.

5.3.3 Weeds

Overall, the presence of weeds was generally rare with low abundance, with a single weed species recorded within the Project Area during field surveys; *Mesosphaerum suaveolens*, commonly known as hyptis). Locations of hyptis are displayed in Figure 8. Hyptis is a Declared weed Class B under the NT *Weed Management Act*, and it is necessary to prevent the spread and growth.

Previous surveys of EP161 have recorded hyptis and rubber bush (*Calotropis procera*) (Santos, 2018). In addition, a range of grassy weeds are known to occur along road corridors throughout the region. This includes buffel grass and Gamba grass, which can alter fire regimes and impact biodiversity.

The *Katherine Regional Weeds Strategy 2021-2026* provides strategic approach to reduce the adverse impact of weeds in the Katherine Region (DEPWS, 2021a). The plan includes a list of weed species that require priority management attention. The nine priority weed species are listed in Table 12. If located, the program EMP requires the Weed Management Branch to be contacted for identification and disposal.

Table 12 Priority weed species identified for the Katherine Region (DEPWS, 2021a)

Scientific name	Common name	Declaration
Vachellia nilotica	Prickly acacia	Class A
Prosopis spp.	Mesquite	Class A
Parthenium hysterophorus	Parthenium	Class A, WoNS
Mimosa pigra	Mimosa	Class A
Cryptostegia grandiflora	Rubber vine	Class A, WoNS
Salvinia molesta	Salvinia	Class B
Cylindropuntia spp.	Rope cactus	Class A
Hyparrhenia rufa	Thatch grass	Class A
Sporobolus spp.	Giant rats tail grass	Not Declared

The *Tennant Creek Regional Weeds Strategy* and *Katherine Regional Weeds Strategy* also identifies three alert weed species that potentially occur (Table 13). Alert weeds have been identified as the principal threatening weeds to specific regions of the NT.

Table 13 Alert weed species in the Katherine and Tennant Creek regions (DEPWS, 2021b, 2021a)

Scientific name	Common name	Declaration
Themeda quadrivalvis	Grader grass	Class B and C
Parthenium hysterophorus	Parthenium	Class A and C, WoNS
Chromolaena odorata	Siam weed	Class C

5.4 Fauna and habitat

5.4.1 Fauna species diversity

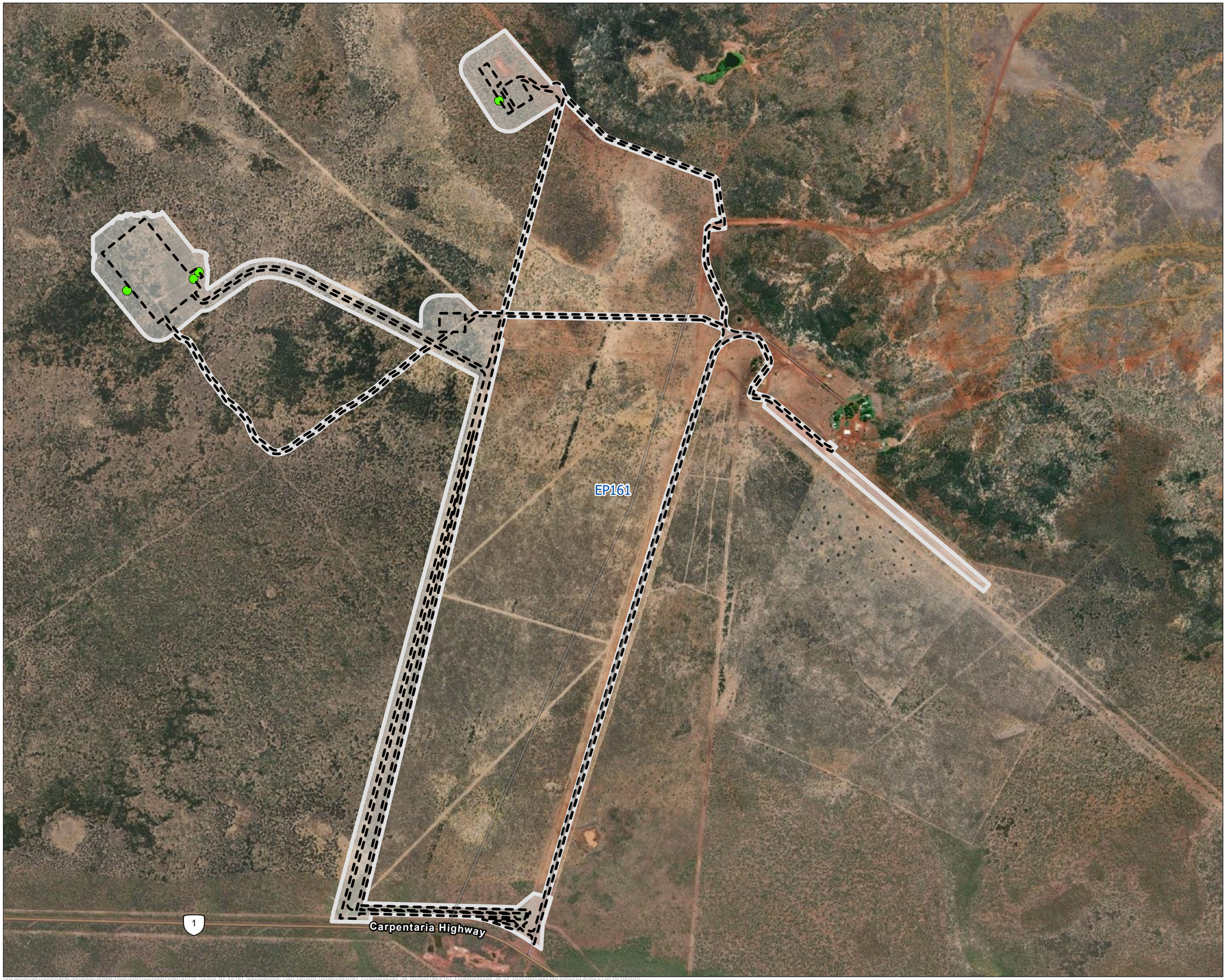
A search of the DEPWS Natural Resource Maps database reveal that a total of 62 fauna species have been recorded within 5 km of the Project Area comprising 38 birds, 12 reptiles, six mammals and six amphibians. SREBA surveys undertaken by the NT Government identified 354 vertebrate species within the region consisting of 202 birds, 99 reptiles, 39 mammals and 14 amphibians (Young et al., 2022).

Overall, 44 fauna species were recorded during the December 2024 field survey, including one species (fork-tailed swift) listed as Migratory under the EPBC Act. A full list of recorded fauna is provided in Table 55, Appendix F.

5.4.2 Fauna habitat

The Project Area primarily comprises open woodland consisting of mixed *Eucalyptus / Corymbia* species with a mixed tussock grass understorey. Often, scattered stands of Lancewood/ Bullwaddy communities occur across the proposed sites and individuals of both species are dispersed throughout. In the wider landscape, including proposed access tracks, additional habitat types include those associated with drainage lines, grasslands/ floodplains and *Acacia sp.* shrublands.

Eucalyptus / *Corymbia* species woodland provides habitat for a range of species. The Project Area contained shrubs and native grasses, which included numerous species suitable for granivorous birds (seed eaters). Some locations had dense leaf litter and numerous logs, which provide suitable refuge and foraging sites for fauna such as reptiles. Most of the fauna species generally found in this vegetation type are widespread in the tropical savannas of the NT. Some locations were found to contain a high density of hollow-bearing trees that provide important habitat for many fauna species, however these hollows were generally small to medium sized and may not support larger arboreal mammals.



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Legend

- Disturbance Footprint
- Project Area
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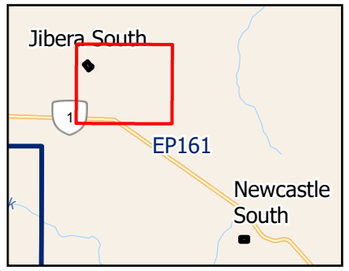

Environmental Assessment Report EP161 – McArthur Appraisal

Figure 8a: Weeds Within Project Area

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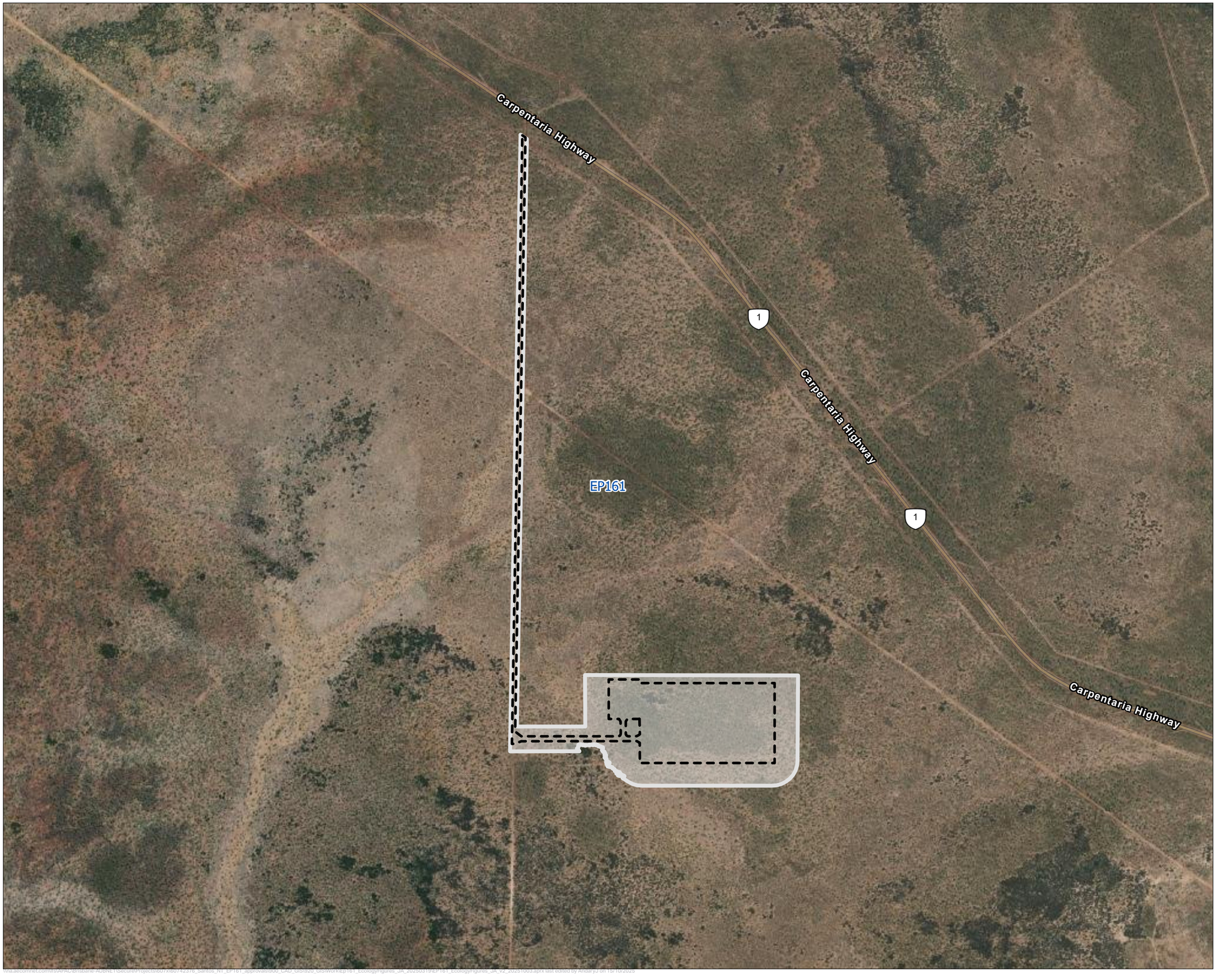

AECOM

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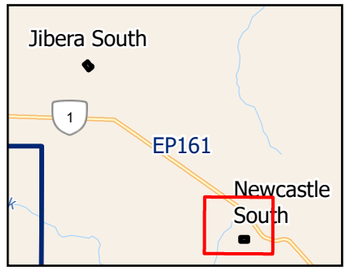
Legend

- Disturbance Footprint
- Project Area
- EP161



Environmental Assessment Report EP161 – McArthur Appraisal

Figure 8b: Weeds Within Project Area

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5.4.3 Threatened fauna

A desktop analysis of fauna in the region was conducted using the DCCEEW PMST, DEPWS Natural Resource maps and records from the NT Government Fauna Atlas database. The search results indicate the potential presence of 24 fauna species listed as threatened under the EPBC Act and/or the TPWC Act. These included 11 birds, six mammals, six reptiles and one shark.

A likelihood of occurrence assessment was performed, based on an understanding of habitat within the Project Area, records in the vicinity and distributional data. Results of the likelihood of occurrence assessment are presented in Table 14, with the complete assessment presented in Appendix A. Six species were identified as possible to occur within the Project Area, and the Gouldian finch is considered likely to occur.

Table 14 Threatened fauna species likelihood of occurrence assessment summary

Species name	Common name	EPBC Act; TPWC Act	Likelihood of occurrence assessment outcome
Chloebia gouldiae	Gouldian finch	EN; VU	Likely
Erythrotriorchis radiatus	Red goshawk	EN; VU	Possible
Falco hypoleucos	Grey falcon	VU; VU	Possible
Falcunculus whitei	Northern shrike-tit	VU; NT	Possible
Acanthophis hawkei	Plains death adder	VU; VU	Possible
Tiliqua scincoides intermedia	Northern blue-tongue skink	CE; -	Possible
Varanus panoptes	Yellow-spotted monitor	-; VU	Possible

The SREBA study for significant terrestrial fauna included the development of species distribution models using covariates for climate, topography, fire soil, vegetation and hydrology (Young et al., 2022). These models have been used to aide assessment of the likelihood of some threatened species (northern shrike-tit, greater bilby, Gouldian finch and yellow-spotted monitor) occurring within the Project Area.

The following provides a summary of each threatened species that possibly occurs within the Project Area.

5.4.3.1 Northern blue-tongue skink

The northern blue-tongue skink occurs in a wide variety of vegetation communities, eucalypt woodland and savanna, sparse and dense shrubland, and spinifex and tussock grassland. Areas of dense vegetation that provide cool and moist conditions within hot, dry, and flammable landscapes are critical habitat for the survival of the species, as such habitat provides the northern blue-tongue skink with food, water and protection from environmental exposure and predation. Examples of such habitat includes rainforest and vine thicket, riparian forests, well-vegetated creeks and drainage lines, well-vegetated swamps and springs, and dense thickets within floodplains, grasslands, shrublands, savannas and woodlands (DCCEEW, 2023b).

Several recent (2020-2022) records occur close to the Carpentaria Highway, and suitable habitat occurs within the Project Area.

5.4.3.2 Gouldian finch

This species is considered likely to occur within the Project Area due to the presence of marginally suitable and non-preferred habitat for breeding and foraging. The species was not observed during field surveys; however, the species distribution is highly variable and linked to rainfall, food and nesting availability and fire regimes, meaning that the area may be used during the wet season when resources change.

The SREBA species distribution model for Gouldian finch indicates a low probability of the species occurring throughout most of the Project Area, as displayed in Figure 9. Publicly available distribution models for Gouldian finch map the Study Area as low to medium probability of presence, with the SPRAT page distribution identifying the “species may occur”.

The recovery plan describes known breeding habitat for Gouldian finch in the Northern Territory as being characterised by rocky hills with hollow-bearing smooth-barked gums (*Eucalyptus tintinnans* or *E. brevifolia*), within 2-4 km of small waterholes or springs that persist throughout the dry season (O’Malley, 2006). In the dry season, foraging habitat is dominated by annual spear grasses or native sorghum (*Sarga* spp.), and in the wet season foraging habitat is dominated by cockatoo grass (*Alloteropsis semialata*), golden beard grass (*Chrysopogon fallax*) or spinifex-dominated communities (*Triodia* spp.). Other important wet season grasses include giant spear grass (*Heteropogon triticeus*), white grass (*Sehima nervosum*), ricegrass (*Xerochloa laniflora*) and kangaroo grass (*Themeda triandra*) (O’Malley, 2006). During the wet season, Gouldian finches move from breeding habitat on hillsides with suitable trees down to lower lying areas where they forage on these preferred wet season perennial grasses (Palmer et al., 2012b). Gouldian Finches feed exclusively on seed from a restricted range of grass species, and do not supplement their diet with seed from forbs, shrubs or insects.

The recovery plan notes that the Gouldian finch’s preferred wet season grasses are selectively grazed by cattle and horses leading to reduced species diversity and vegetative cover of foraging grasses (O’Malley, 2006). Whilst some of the perennial foraging grasses were recorded during recent surveys, they were observed at low density and species diversity. Cattle disturbance is common within the Disturbance Footprint, which has likely impacted ground species diversity. Some vegetation communities also have a structure with minimal grass cover due to a shrubby understorey, or large bare patches of earth.

The Disturbance Footprint is not considered to contain breeding habitat that would be critical to the survival of the Gouldian finch. The preferred nesting trees are not present, with potential nesting trees rare to occasional (*Corymbia dichromophloia* and *Eucalyptus leucophloia*). Suitable permanent water sources are not present within a sufficient distance of the Disturbance Footprint to support breeding habitat. The Disturbance Footprint is not considered to contain foraging habitat that would meet the above definition. The species is unlikely to utilise the floodplain habitat within the Disturbance Footprint in the dry season, preferencing the rocky hills near breeding habitat during this time. The Disturbance Footprint contains a low diversity and cover of preferred wet season foraging grasses (four species observed within the 200 ha survey area), which will be insufficient to support the species for a duration.

In summary, nesting trees are occasional, not of the preferred species, and not combined with the required landscape position, foraging or water resources to be considered breeding or foraging habitat critical to the survival of the species. The foraging opportunities within the Disturbance Footprint are restricted in species diversity and ground cover, likely due to grazing pressure which is a known threat to the species, as well as some areas with a shrubby vegetation composition in the understorey.

The Gouldian finch was not observed during the bird surveys, however the species is considered likely to occur based on general habitat suitability (eucalypt woodland) and recent records within 10 km. Eucalyptus trees that are potentially suitable for nesting have been observed within the Disturbance Footprint. The Disturbance Footprint does not contain habitat critical to the survival of the species, however it may contain marginal habitat utilised during opportunistic wet season foraging or dispersal. Potential nesting trees *Corymbia dichromophloia* and *Eucalyptus leucophloia* were observed sparsely distributed throughout the Disturbance Footprint, but were more common within the wider landscape in areas preferentially avoided through design. Preferred nesting tree species were not observed. The landscape is predominantly flat floodplain, and does not consist of the preferred hillsides with suitable trees for dry season habitat. Habitat within the Disturbance Footprint was only moderately suitable for wet season foraging of Gouldian finch, due to the low density and diversity of preferred foraging grasses.

Existing threats relevant to the Gouldian finch include moderate to high grazing pressure within the Disturbance Footprint, with pugging commonly observed, particularly where soils were seasonally waterlogged. Grazing has likely impacted ground species diversity, with the recovery plan noting that the Gouldian finch’s preferred wet season grasses are selectively grazed by cattle and horses leading to reduced species diversity and vegetative cover of foraging grasses (O’Malley, 2006).

Overall, the project proposes to disturb 46.9 ha of potential breeding, foraging and dispersal habitat for Gouldian finch. Areas with dense hollow bearing trees were preferentially avoided and minimised through the iterative design process.

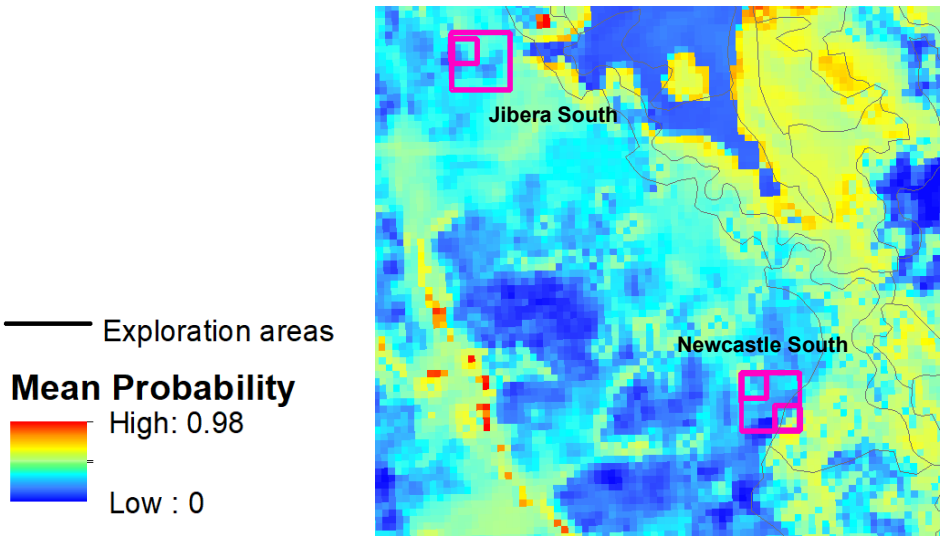

Figure 9 Mean probability of presence of Gouldian finch within the exploration areas (Young et al., 2022).

5.4.3.3 Red goshawk

The red goshawk has a large home range of up to 200 km^2 (Aumann & Baker-Gabb, 1991), and recent satellite tracking of individuals has shown them to travel distances of over 1,500 km outside of the breeding season (MacColl et al., 2023).

The closest known breeding records of the species occur near Mataranka and along the Roper River, more than 200 km north-west of the Project Area. The species is unlikely to breed more than 50 km south of Mataranka due to a lack of suitable habitat, including a lack of suitably sized nest trees.

Based on the habitat definition from the conservation advice (DCCEEW, 2023a; presented in Appendix B), and the Project being located in the species “may occur” distribution, the Disturbance Footprint is not considered to consist of habitat critical to the species survival. The Disturbance Footprint does not contain breeding habitat, with a lack of suitable water sources or tall trees. The woodlands cannot be classified as tall, while the creeks within the region are mostly ephemeral and are lightly wooded at best. It is not situated in the preferred coastal or sub-coastal rugged and elevated terrain. The Disturbance Footprint is a predominantly flat floodplain with a short and open canopy that does not contain the preferred nesting tree height or species, with a lack of tall paperbarks (*Melaleuca* sp.) or Darwin stringybark trees.

The Disturbance Footprint does not contain the preferred foraging habitat types, rather it contains open woodland and shrublands that are low to mid high with some overland water flow and drainage features, however an absence of creeks or rivers. Further to this, the Disturbance Footprint occurs within the “species may occur” distribution, and the definition for habitat critical to the survival highlights being located in the known or likely habitat distribution. The habitat can be described as marginally suitable for red goshawk dispersing from its home breeding territory, or a dispersing juvenile, however it is more likely this species would utilise existing connectivity pathways closer to the coastline to the far north and north-east of the Project Area.

Red goshawk were not observed in the Disturbance Footprint during the field surveys. However, this species is considered possible to occur within the Disturbance Footprint due to the presence of marginally suitable foraging or dispersal habitat, which is located within the “species or species habitat may occur” distribution on SPRAT. The nearest records to the Disturbance Footprint are over >150 km away and are temporally and spatially uncertain. Suitable breeding habitat in the form of tall trees near a watercourse does not occur within the Disturbance Footprint. As red goshawk have very large ranges (over 200 km^2), the species may use the Disturbance Footprint transiently for foraging or dispersal,

however is more likely to disperse along the north to north-east corridor where more suitable habitat occurs along large watercourses. The Project is not considered to adversely impact habitat critical to the survival of the red goshawk.

5.4.3.4 Grey falcon

Grey falcons (*Falco hypoleucos*) are a widespread species that was assessed as possible to occur in the Project Area. The species occurs in low densities throughout arid and semi-arid areas of Australia. The species is known to nest in the tallest trees along watercourses, such as red river gums (*Eucalyptus camaldulensis*), as well as on repeater towers (TSSC, 2020). It commonly steals the nests of other raptors or corvids. Grey falcon may forage within the Project Area but no suitable breeding habitat was found to occur, as suitable tall nesting trees were not present.

5.4.3.5 Northern shrike-tit

The northern shrike-tit lives in dry Eucalypt forests and woodlands where it feeds on insects from the canopy and under bark. It has been recorded in wet Melaleuca open woodlands and woodlands dominated by Nutwood (*Terminalia arostrata*) and Bloodwoods with flaky bark and ironwood (Ward, 2009). In the NT, nesting has been recorded from September through to January and nests are built in terminal branches at the top of trees (Ward, 2009). The stronghold of this species is north of the Project Area, with NR Maps showing only four records south of -16.25° latitude. Targeted surveys by the NT Government in the Beetaloo Basin failed to detect the species south of -16.0° latitude despite significant survey effort (>30 call playback surveys). Additionally, the SREBA distribution model suggests that the project has a low likelihood of the species occurring (Young et al., 2022).

5.4.3.6 Plains death adder

Suitable habitat for the plains death adder consists of flat, treeless, cracking-soil riverine floodplains (Cogger, 2014). A population of the species occur in the Barkly Tableland from the Northern Territory to central-western Queensland. In the Beetaloo Basin records of the species occur close to Lake Woods, Lake Sylvester and Lake Tarrabool. The Project Area is in between mapped known and potential habitat of plains death adder, and the presence of suitable clay soils, high density of woody debris and leaf litter means that there is potential habitat for the plains death adder within the Project Area (DSEWPC, 2012). The species may occur within the Project Area, particularly following heavy wet season rainfall.

5.4.3.7 Yellow-spotted monitor

The yellow-spotted monitor (*Varanus panoptes*) occurs across northern Australia where it occupies a variety of habitats, including grasslands and woodlands (Ward et al., 2012). Most records of this species are from the Top End, though it has been recorded in the Barkly Tablelands. The species likely occurs close to wetlands and riparian habitats within the surrounding landscape; however, such habitat is not proposed to be impacted by the Project.

The SREBA species distribution for yellow-spotted monitor (Figure 10) indicates a high probability for the species across most of the Project Area (Young et al., 2022). This is due to the species being highly mobile and moving across the landscape to suitable habitat.

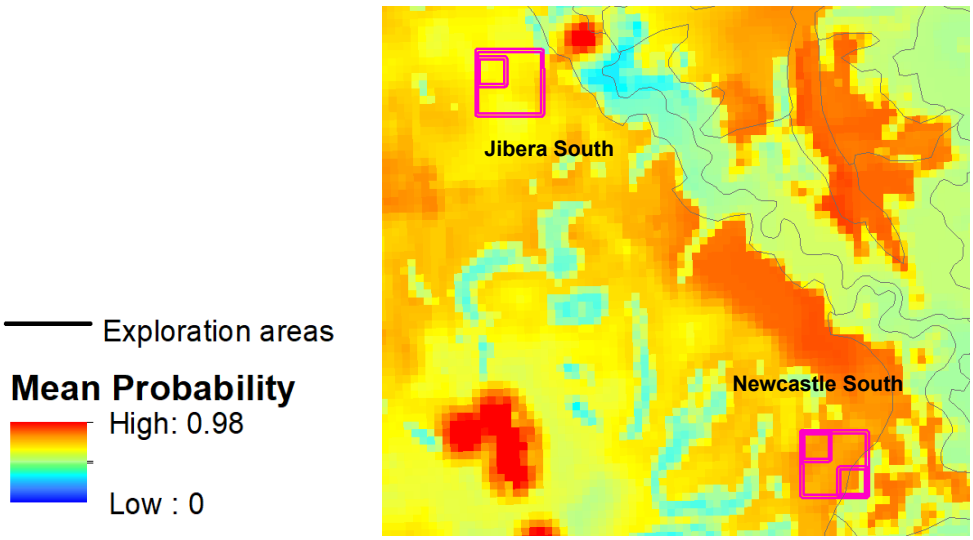

Figure 10 Mean probability of presence of yellow-spotted monitor (Young et al., 2022).

5.4.4 Migratory fauna

The EPBC Protected Matters database (Appendix E) indicated the potential presence of 12 migratory species and 17 marine species within 50 km of the Project Area. Results of the likelihood of occurrence assessment are presented in Table 15, with the complete assessment presented in Appendix A. One migratory species, the fork-tailed swift, was observed during field surveys. Approximately 20 individuals of fork-tailed swifts were sighted flying high over the Project Area, likely foraging aerially.

The oriental cuckoo was considered possible to occur within the Project Area. The Project Area does not contain wetland or coastal marine habitat areas which would support migratory wetland birds or shorebirds. The Project Area does not contain critical habitat for any Migratory or Marine listed species.

Table 15 Migratory species likelihood of occurrence assessment summary

Scientific name	Common name	EPBC Act; TWPC Act	Likelihood of occurrence
Apus pacificus	Fork-tailed swift	Migratory, Marine; not listed	Known
Cuculus optatus	Oriental cuckoo	Migratory; not listed	Possible

5.4.5 Feral animals

Feral animals known to occur within the region are listed in Table 16 below.

Table 16 Feral animals known to occur in the Beetaloo region

Scientific name	Common name
Sus scrofa	Pig
Canis lupus familiaris	Wild dog
Felis catus	Feral cat
Rhinella marina	Cane toad
Equus caballus	Horse
Equus asinus	Donkey
Bubalus bubalis	Water buffalo
Camelus dromedarius	Camel
Rattus rattus	Black rat
Bos Taurus	Domestic cattle

During the December 2024 field survey, evidence of current cattle grazing or grazing within the last one to two years was recorded at most assessed sites.

Cane toads are known to be present in the Project Area and the Commonwealth DCCEEW recognises this species as a 'key threatening process' related to their impacts on biodiversity through predation, competition, land degradation and poisoning. In the NT, cane toads have been implicated in the decline of several reptile species such as the plains death adder (*Acanthophis hawkei*), mulga snake (*Pseudechis australis*), monitors and northern blue-tongue skinks (Catling et al., 1999; Pearson et al., 2013; Price-Rees et al., 2010).

Pest predators such as cats likely occur within the Project Area, though their abundance is difficult to assess due to their cryptic nature. Introduced predators such as cats can impact many vertebrates (Dickman, 2009). One of the primary concerns of introduced predators are the impacts on reptiles and ground-dwelling birds.

There is potential for pest species to be attracted to the Project Area due to increased site activities. Inappropriate dumping of rubbish or artificial water sources on site can attract feral animals.

5.5 Conservation areas

There are no national or world heritage places, Commonwealth land, heritage places, reserves or critical habitat areas listed under the EPBC Act located within or adjacent to the Project Area.

The Bullwaddy Conservation Reserve occurs approximately 30 km west of Jilbera South and approximately 40 to 45 km west of Newcastle South. The Reserve was declared in 2000 under the TPWC Act and is approximately 11,500 ha in area. It represents the only declared conservation area within the Sturt Plateau region to protect Lancewood/ Bullwaddy vegetation communities. Less than 3% of this vegetation community is reserved nationally (Parks and Wildlife Commission, 2005). The most significant values of the reserve are the flora and the associated fauna for which it provides habitat. This includes the spectacled hare-wallaby (*Lagorchestes conspicillatus*), northern nailtail wallaby (*Onychogalea unguifera*) and the giant frog (*Cyclorana australis*). It is also a valuable area for research on the ecology of Bullwaddy (*Macropteranthes kekwickii*), particularly the effects of fire (Parks and Wildlife Commission, 2005).

Limmen National Park is situated approximately 80 to 95 km east of Jilbera South and Newcastle South.

Lake Woods occurs approximately 187 km south of Jibera South and Newcastle South. This large ephemeral wetland is situated on the western edge of the Barkly Tableland, about 220 km north of Tennant Creek. Lake Wood spans approximately 350 km² and includes the lower reaches of Newcastle Creek. It is primarily fed by surface inflow by Newcastle Creek from a large catchment to the northeast.

During major flooding events, the lake can expand to between 850 km² and 1000 km² (Harrison et al., 2009). During the period of inundation, Lake Woods supports over 100,000 waterbirds including internationally significant numbers of plumed whistling-duck (*Dendrocygna eytoni*). Numerous bird species nest and feed in the diverse wetland habitat, and the conservation group 'Birdlife International' nominated Lake Woods as an 'Important Bird Area' (IBA). The lake also includes the largest area of lignum swamp in the NT and in tropical Australia (Harrison et al., 2009).

5.6 Stygofauna

Stygofauna surveys using eDNA have been undertaken in the Beetaloo Basin in August and October of 2019 (Rees et al., 2020), and during May 2021 and October 2022 (Humphreys et al., 2022). These surveys involved sampling across several bores in the region, including four bores within 50 km of the Project Area. The results of stygofauna surveys at these bores are summarised in Table 17.

Stygofauna baseline sampling results recorded no stygofauna within the Disturbance Footprint. The nearest records are from RN006329, located approximately 17 km south east of Newcastle South. Given the absence of detections and the spatial separation from known occurrences, it is considered unlikely that stygofauna are present within the Project Area.

This conclusion is further supported by the hydrogeological context of the area. Stygofauna are typically associated with specific aquifer conditions, such as stable water chemistry, low disturbance, and suitable pore spaces (Edgar, 2024). If the Project Area lacks these characteristics—due to geology, hydrology, or historical land use—it may not provide suitable habitat for stygofauna.

Table 17 Stygofauna survey results (Humphreys et al., 2022; Rees et al., 2020)

Bore	Distance from Project Area	Results
RN006329	17 km south east of Newcastle South	Taxon recorded: • *Parisia unguis*
RN029025	Less than 1 km from Jibera South	No stygofauna detected
RN041141	44 km west of Jibera South	Taxon recorded: • *Parisia unguis*
RN042218	42 km south east of Newcastle South	No stygofauna detected

5.7 Summary of Matters of National Environmental Significance

Actions such as the proposed Project may require approval by the Commonwealth Minister for the Environment, under the EPBC Act. Approval is only required if the action is likely to result in significant impacts on MNES or if the action will have or is likely to have a significant impact on the environment.

An EPBC Protected Matters Search was generated on the 11 April 2025 (refer to Appendix E) to identify whether MNES or other matters protected by the EPBC Act are likely to occur on or in the near vicinity of the Project Area. A summary of MNES values present in the Project Area are provided in Table 18.

Table 18 Summary of MNES within Project Area

MNES Value	Value present in Project Area	Comments
World Heritage Properties	**No**	There are no World Heritage properties within proximity to the Disturbance Footprint. The nearest World Heritage Property is Kakadu National Park approximately 350 km to the north.
National Heritage Places	**No**	There are no national heritage places within proximity to the Disturbance Footprint. The nearest national heritage place is the Bradshaw Defence Area approximately 400 km to the northwest.
Wetlands of International importance (listed under the Ramsar convention)	**No**	There are no wetlands of international importance within the Disturbance Footprint. Ramsar wetlands are sufficiently distant from the Disturbance Footprint, with the nearest Ramsar site, Kakadu National Park, occurring approximately 350 km to the north.
Listed Threatened Species and Ecological Communities	**Yes**	The likelihood of occurrence assessment identified the following EPBC Act listed fauna species, flora species and TECs identified as known, likely or with potential to occur in the Project Area: **Fauna** • Gouldian finch (likely) • Red goshawk (possible) • Grey falcon (possible) • Northern shrike-tit (possible)

MNES Value	Value present in Project Area	Comments
		• Northern blue-tongued skink (possible) • Plains death adder (possible). **Plants** • None. **TECs** • None.
Migratory species	**Yes**	The likelihood of occurrence assessment identified two EPBC Act listed migratory species as known, likely or with potential to occur within the Project Area: **Birds** • Fork-tailed swift (known) • Oriental cuckoo (possible).
Commonwealth Marine Areas	**No**	Commonwealth Marine Areas occur outside of the Disturbance Footprint. The Disturbance Footprint is situated approximately 280 km inland of the coastline.
Great Barrier Reef Marine Park	**No**	The Great Barrier Reef Marine Park does not occur near the Disturbance Footprint.
Nuclear Actions	**No**	The Project is not and does not involve a nuclear action.
A water resource, in relation to coal seam gas development and large coal mining development	This MNES value is not assessed within this report.	

5.8 Summary of Northern Territory values

A summary of Northern Territory environment factor for Terrestrial ecosystems and other environmental values are presented throughout this report, with selected details summarised in Table 19.

Table 19 Summary of NT environmental values within the Project Area

NT Value	Value present in Project Area	Comments
Sensitive or significant vegetation, as defined in the NT Pastoral Land Clearing Guidelines (PLC, 2025)	**No**	There are no sensitive or significant vegetation communities within the Project Area.
Listed Threatened Species and their habitat	**Yes**	The likelihood of occurrence assessment identified the following TPWC Act listed fauna species and flora species identified as known, likely or with potential to occur in the Project Area: **Fauna** • Gouldian finch (likely) • Red goshawk (possible) • Grey falcon (possible) • Northern shrike-tit (possible) • Plains death adder (possible)

NT Value	Value present in Project Area	Comments
		• Yellow-spotted monitor (possible). **Plants** • None.
Listed migratory species and their habitat	**Yes**	The likelihood of occurrence assessment identified two listed migratory species as known, likely or with potential to occur within the Project Area: • Fork-tailed swift (known) • Oriental cuckoo (possible).
Locally endemic species or species with restricted habitat.	**No**	There are no locally endemic species or species with restricted habitat within the Project Area. Species and habitat within the Project Area occur widely across the regional tropical savanna landscape.

6.0 Project impacts

6.1 Construction phase

6.1.1 Direct impacts

Impact types within the Disturbance Footprint are summarised in Table 20 and presented in Figure 2. Project activities range from clearing to maintenance only, with 46.90 ha of clearing in native vegetation, and 40.44 ha occurring in previously cleared areas within the Disturbance Footprint.

Table 20 Impact types within the Disturbance Footprint

Impact type	Construction feature	Vegetation condition	Area (ha) within Disturbance Footprint		
			Jibera South	Newcastle South	Total area
Clearing. Clearing of native vegetation required	Well pads, borrow pits, new access tracks	Remnant	22.14	19.91	42.05
		Disturbed	11.42	0.13	11.55
Clearing – rehabilitation. Area previously disturbed, minor clearing of native vegetation required	Existing access tracks or temporary access tracks that require widening and maintenance for use during construction. Track will be rehabilitated following construction.	Remnant	4.07	-	4.07
Total clearing (remnant vegetation)			**26.21**	**19.91**	**46.12**
Total clearing (disturbed vegetation)			**11.42**	**0.13**	**11.55**
Maintenance only. Area previously disturbed, clearing of native vegetation not required.	Existing access tracks or airstrip that require maintenance only, including grading, raising and improving drainage for flood mitigation.	Remnant	0.78	0	0.78
		Disturbed	25.87	3.02	28.89
Total maintenance			**26.65**	**3.02**	**29.67**
Total area (remnant vegetation)			**26.99**	**19.91**	**46.90**
Total area (disturbed vegetation)			**37.29**	**3.15**	**40.44**
Grand total			**64.28**	**23.06**	**87.34**

6.1.1.1 Vegetation and habitat loss

Vegetation clearing is a direct impact that can result in the loss of vegetation and habitat values, with the severity of impacts more pronounced in habitats that provide values for conservation significant species and communities. Potential impacts resulting from clearing native vegetation can include:

- reduced patch size of vegetation communities potentially compromising the viability of the community and associated habitat

- loss of, or disturbance to microhabitat features, shelter and sources of material for nesting, protection and breeding, such as tree hollows, leaf litter, ground timber, dense shrubs and hollows
- loss of direct sources of food (i.e., for herbivorous, granivorous, nectivorous, or fructivorous species)
- loss of indirect sources of food (i.e., for insectivorous species or species that feed on primary producers (herbivores))
- fragmentation of habitats resulting in reduced dispersal opportunities for fauna
- localised or regional loss of populations of species or of genotypes (depending on the rarity of the species).
- loss of abiotic habitat features such as tree hollows, trunk fissures, flaking bark, leaf litter, fallen timber, rocks, ground cracks, which could result in:
    - loss of shelter for species resulting in increased predation or mortality due to exposure
    - loss of optimal nesting and breeding opportunities leading to decreased breeding or decreased breeding success or increased juvenile mortality
    - loss of landscape features that trap flora seeds, fine debris and topsoil and provide a suitable micro-environment for seed germination and survival
    - loss of landscape features that reduce wind and water erosion and movement of resources such as seeds, nutrients, and water to other areas
    - loss of landscape features that enable water collection and infiltration with increased direct UV exposure potentially leading to increased hydrophobicity and decreased landscape function.

6.1.1.2 Habitat fragmentation

The removal of vegetation and habitat for the Project has the potential to result in habitat fragmentation. Habitat fragmentation is the process through which larger, contiguous patches of habitat are physically separated thereby creating smaller patches. Habitat fragmentation can occur as a result of removal of broad swathes of vegetation as well as through the removal of relatively narrow strips of vegetation for linear infrastructure. The key feature of habitat fragmentation is a physical change in the characteristic features of an environment resulting in a change in the ecological function (species types, vegetation stratum dominance, species maturity, species diversity, solar gain, exposure to elements, exposure to erosion, soil protection etc.).

Connectivity across the Disturbance Footprint is already compromised, as cleared tracks and disturbed habitat occur within patches of remnant vegetation. However, further fragmentation of these patches, or fragmentation of the infrequent larger intact patches may occur via vegetation clearing. Fragmentation may result in:

- impacts on the success of seed dispersal, species recruitment and ultimately the long-term viability and persistence of a vegetation communities within the landscape
- creating isolated patches and barriers for fauna movement which can impact on species recruitment, genetic flow and ultimately the long-term viability and persistence of fauna populations within the landscape.
- increased edge effects (changes in ecological communities along the edge of the community due to increased influence from factors beyond the community, such as increased light and increased number of weed seeds blowing in etc.) and
- reducing gene flow between populations of species, if the species is not able to effectively move across the barrier between patches, resulting in decreased resilience to environmental change and potentially leading to decreased reproductive fitness and evolutionary capacity.

6.1.1.3 Mortality or injury of conservation significant species

Project activities may result in direct mortality of fauna species through:

- strike from moving vehicles/ machinery – key issue for ground dwelling species, particularly those with poor mobility
- entrapment in habitat during removal – key issue during tree felling for species that use tree hollows, trunk fissures, bark or hollow logs for roosting and denning
- entrapment in trenches/ holes – key issue for ground dwelling species, particularly those that are active at night and cannot detect trenches to avoid.
- compaction of soil or microhabitat – key issue for ground dwelling species (i.e., snails, reptiles, and small mammals and burrowing species).

6.1.2 Indirect impacts

Along with the direct impacts from Project activities, the activities may potentially result in indirect or secondary impacts to the associated fauna and floristic values. These potential indirect impacts are described in the following sections.

6.1.2.1 Noise, light and vibration

The use of heavy vehicles, equipment and machinery within the Disturbance Footprint will result in an increase in noise and vibration. The noise and vibration may impact on fauna species within adjacent habitat areas by:

- reducing foraging ability for auditory and visual predators due to increased background noise or light masking signals from potential prey species
- increased risk of predation for species that rely on auditory or visual signals to detect predators when background noise or light is masking signals and
- disturbing foraging or breeding behaviours, along with the presence of humans, causing fauna species to seek shelter.

Current research indicates that there are no government policies or other widely-accepted guidelines in respect to the noise levels which may be acceptable to wildlife. The levels or character of noise that may “startle” or otherwise affect the feeding or breeding pattern of birds or other wild animals are also not firmly established in the technical literature.

Sudden loud, impulsive or impact noises may cause birds and other fauna to become startled (i.e., tree falling, metal on rock impact noise etc.), which if occurring over the longer term, may affect feeding and breeding behaviour in some species. It is anticipated that sudden, loud, impulsive or impact noises are expected to occur periodically and are likely to cause a startle response from some species in the area surrounding the noise generation location.

It is expected that noise and vibration associated with the Project will potentially cause disturbance to all groups of fauna, especially birds and hollow-dwelling fauna. While this may result in the temporary avoidance of the area for the duration of these activities, noise and vibration is expected to be localised, temporary and generally limited to daytime hours during construction.

6.1.2.2 Dust

The use of vehicles, equipment and machinery at a higher intensity than would be typical in the Disturbance Footprint, particularly during clearing activities (e.g. grub-dozing) is likely to result in the generation of dust. Dust generation can impact flora growth if dust generation is ongoing and dust coats the leaves of vegetation semi-permanently, noting that this is unlikely to occur with the staged nature of the Project. Dust may also temporarily obscure visual indicators for fauna species and could temporarily increase predation risks for some species.

6.1.2.3 Weed and pest incursion

Project activities have the potential to introduce or change the distribution and presence of weed and pest species within the Disturbance Footprint. Weed proliferation can degrade vegetation communities by increasing fuel loads (with the potential to alter fire regimes), reduce floristic diversity, alter vegetation structure, cause vegetation dieback, and alter habitat for native fauna species. Increased pest animal populations may result in increased competition for food, the introduction of diseases that can affect native fauna species, increase predation of native species by pest species, increase mortality

of native carnivorous species through ingestion of toxic pest animal species (i.e., cane toad *Rhinella marina*).

Activities that have the potential to increase the risk of establishment of new weed infestations, proliferation of existing weeds or introduction of pest animal species include the following:

- Soil disturbance through vegetation clearing and line preparation activities provides an opportunity for weed species to germinate and out-compete more specialised and slower growing native species.
- Increased vehicular traffic through the area during line preparation may bring weed seeds in from other areas leading to establishment of new weed populations.
- Increased anthropogenic activity and associated food waste generation may increase prevalence of pest animal species taking advantage of these resources.
- Creation of artificial breeding places – i.e., stored sources of open water may create breeding places for cane toads.
- Importation of materials to the site which may harbour seeds and introduced species.

6.1.2.4 Increased risk of erosion, sedimentation and contamination

The Project activities may involve exposure and / or disturbance of the soil surface. This may result in an increased risk of erosion due to wind or rainfall, and an associated increased risk of sedimentation of water bodies, reducing water quality and degrading aquatic habitats. These activities may alter surface water flow, creating localised ponding or increased stormwater runoff, as well as removing the topmost soil layer containing native seed stock and nutrients necessary for plant survival. There is also an increased risk of contamination associated with activities such as refuelling or storage of chemicals.

6.1.2.5 Groundwater and surface water extraction

Extraction of water from bores and farm dams leading to temporary changes in water levels/ habitat extent and potentially water quality. Increased activity at these locations resulting in avoidance by some fauna species and potentially altered foraging and breeding behaviour.

Santos may extract groundwater and surface water from within the Disturbance Footprint for construction purposes, where lawful. Sufficient water supplies are available, and an agreement is in place with the landholder. The precise timing and volume of water extracted would vary depending on the work program and prevailing weather conditions. During the dry season, water levels and the extent of fringing aquatic habitat for migratory wetland bird species will naturally be fluctuating. However, given the absence of migratory birds in Australia during the dry season period, any potential indirect impact associated with water extraction (noise disturbance and minor alterations in hydrology, habitat extent and water quality) will be negligible. Any potential indirect impacts during this time are considered temporary and are unlikely to persist into the wet season when migratory species could return. During the wet season when these migratory species may be present, a larger extent of potential habitat is available. This larger extent of habitat allows any the opportunity for any individuals present to avoid localised disturbances that may arise from water extraction activities. Therefore, the potential for impact during this time is reduced.

6.2 Operation phase

Potential impacts on MNES associated with the operation phase of the Project are considered to be very low as activities will be limited to periodic maintenance. Traversing maintenance vehicles may inadvertently introduce weeds and potentially collide with ground dwelling fauna resulting in injury or mortality. Gas testing and flaring may impact airspace during the operational phase of the Project, which may deter birds, bats and insects from using the area.

6.3 Decommissioning and rehabilitation phase

Similar to the operational phase of the Project, decommissioning and rehabilitation activities are also considered to have only minor and temporary impacts on MNES values as they will be completed progressively. Temporary and localised increases in noise and potentially dust may occur but will be

managed using the same methods used during construction. Traversing vehicles required to complete decommissioning or rehabilitation activities may inadvertently introduce weeds and potentially collide with ground dwelling MNES resulting in injury or mortality.

6.4 Cumulative impacts

The cumulative environmental impacts associated with gas development in the Beetaloo Basin encompass a range of interrelated ecological, hydrological, and socio-environmental factors. While individual gas projects may appear to pose limited environmental risk when assessed in isolation, the aggregated impacts across spatial and temporal scales warrant evaluation to determine the potential for landscape-scale environmental degradation. Primary concerns include the deterioration of surface water and groundwater quality, as well as regional-scale habitat fragmentation and biodiversity loss resulting from vegetation clearance, linear infrastructure development, and increased vehicular activity.

To address these cumulative effects, Santos proposes the implementation of a suite of mitigation and environmental management measures informed by similar Projects in New South Wales and Queensland. These include, but are not limited to, the presence of a fauna spotter-catcher during land clearing activities, an approach that exceeds current regulatory obligations within the Northern Territory. Additional impact minimisation is achieved through the strategic co-location of project infrastructure within previously disturbed areas, thereby reducing the extent of new environmental disturbance. Post-construction, progressive rehabilitation and facilitation of natural regeneration across parts of the Development Footprint are intended to support ecological recovery.

Through the integration of these best-practice measures, the Project may establish a regional precedent for improved environmental management for onshore gas developments in the Northern Territory. In doing so, the Project aligns with broader objectives for ecologically sustainable development by exceeding baseline regulatory standards and adopting a precautionary approach to environmental stewardship.

7.0 Mitigation measures

7.1 Overview

Mitigation and management measures have been proposed for the Project which consider the nature of Project activities, and the potential direct, indirect and cumulative impacts as a result of Project activities.

Santos have implemented the following hierarchy of management principles in the planning for and development of new petroleum activities that have the potential to disturb land. These principles and the order in which they have been applied are as follows:

1. **Avoid** project activities where impacts to sensitive values (that is, conservation significant species and communities) may occur.
2. **Minimise** direct and indirect impacts where they cannot be completely avoided.
3. **Mitigate** by implementing mitigation and management measures to reduce direct, indirect and cumulative impacts.
4. **Remediate and rehabilitate**: actively remediate and rehabilitate impacted areas to promote long-term recovery.
5. **Offset (where necessary)**: provide suitable offsets for activities that result in significant residual impacts to ecological values even with the implementation of the above principles.

Santos will implement a series of management plans for the Project based on the above hierarchy. These are:

- Environmental Management Plan (EMP) – this document details how the proposed action will be carried out during the construction, operation, decommissioning and rehabilitation phases and mitigation measures to be applied during these phases. The EMP also details the management plans (MP) and performance indicators for key environmental values;
- Rehabilitation Monitoring Plan – this document outlines final rehabilitation completion criteria and monitoring requirements.

7.2 Avoid

During all Project phases, efforts will be made to avoid impacts to ecological values. Avoidance of impacts is primarily demonstrated through Project planning and design, and is also applied prior to and during construction. Avoidance measures include:

- Wells have been placed to avoid alluvial vegetation communities and areas field-validated as containing a higher abundance of hollow-bearing trees.
- Avoidance Zones will avoid vegetation and habitat disturbance by relocating, co-locating or excluding disturbances wherever practicable. This includes:
  - Linear infrastructure such as roads will be co-located to avoid sensitive values.
  - Disturbance will be preferentially located in previously disturbed areas.
- Micro-siting of infrastructure and access tracks will be applied where possible to avoid impacts to important habitat features such as hollow-bearing trees and hollow logs.
- A fauna spotter-catcher will be present during clearing activities to avoid fauna mortality or injury in accordance with the EMP.

If avoidance of sensitive values cannot be undertaken, then minimisation will be considered, as outlined below.

7.3 Minimise

Minimisation of impacts to sensitive values will be demonstrated as follows:

- Existing access tracks and existing areas of disturbance have been used as a first preference during Project planning and design.
- Avoid impact to animal breeding places – i.e., avoiding hollow trees and potential Gouldian finch nesting trees (such as *Corymbia dichromophloia*).
- Ecological values have been identified to inform areas where impacts should be minimised, which includes all potential threatened species habitat.

If minimisation of impacts to sensitive values cannot be undertaken, then mitigation will be implemented, as outlined below.

7.4 Mitigate and manage

Mitigation measures have been designed considering the nature of proposed Project activities and have been incorporated into the design process and within the management plans for the Project. Mitigation measures within each MP are summarised below for the EMP (Table 21). Other general mitigation and management measures proposed to be implemented for the Project are summarised in Table 22.

7.4.1 Environmental Management Plan

The EMP identifies the following key environmental objectives relating to biodiversity and rehabilitation for the project:

- Avoid or minimise impacts on terrestrial and aquatic ecosystems and associated flora, fauna and habitat of national and state significance.
- Avoid or minimise habitat loss and fauna mortality.
- Prevent introduction and control spread of weed and pest plant and animal species.
- Rehabilitate land significantly disturbed by project activities to a condition that is stable, non-polluting and safe to humans and wildlife as soon as practical.
- Rehabilitate significant disturbances within remnant vegetation areas to a condition that allows return of pre-disturbance biodiversity values.
- Rehabilitate significant disturbances within non-remnant areas to match the surrounding agricultural land-use (or other use as determined by the landholder).

Table 21 Management Plans (MP) within the EMP

MP	Key content
1. Erosion Sediment Control Plan	• Management measures to minimise the risk of degrading soil resources during construction works. Includes consideration of erosion and sediment control, contaminated land and acid sulfate soils and separation of soil profiles. • An Erosion and Sediment Control Management Plan will be implemented • Topsoil will be stockpiled and managed to prevent wind and water erosion.
2. Water resource management	• Management measures, such as a Wastewater Management Plan, has been developed to minimise the risk of degrading the quantity and quality of water (surface water and groundwater) resources during construction works. • A Well Operations Management Plan (WOMP) will be developed and implemented in accordance with the Code of Practice: Well Integrity and supplied and approved by the regulator.

MP	Key content
3. Flora and fauna management	• Measures to reduce the risk to sensitive fauna and flora, including: - Presence of a fauna spotter-catcher during clearing - Fauna relocation and wildlife care protocols. - Fauna ladders will be installed in drilling pit (sumps) - Routine monitoring of drill pads and any pits or trenches for fauna entrapment - Use of camera for remote monitoring of pits - Site fenced to minimise stock interaction. - Decommissioning sumps to occur as soon as reasonably possible after project.
4. Weed management	• Appropriate measures to prevent the increase of pest animals on site (in particular cane toads and feral cats), including waste management and reducing unnatural water pooling or retention. • Weed hygiene procedure to be implemented to minimise weed seed introduction and movement. • Irrigation completed by use of sprinklers or dispersion hoses to prevent pooling and runoff/attractants to fauna • Implementation of a site-specific Weed Management Plan aligned with the requirements of the NT Weed Management Planning Guide.
5. Bushfire management	• The implementation of a site-specific Bush Fire Management Plan, which includes preparation and planning information, action and mitigation measures, and stakeholder and emergency contact information in case of a fire. This will mitigate the potential for inappropriate fire regimes to impact threatened species.
6. Cultural heritage management	• Prior to commencing work, workers must understand the unexpected finds protocol and activity specific cultural heritage management procedures. • Application of Santos new find protocol for any uncovered unexpected heritage finds. • All activities to be undertaken in accordance with the EMP's Cultural Heritage Assessment • Workers must not move or remove cultural heritage items.
7. Environmental emergency preparedness and response	• Measures to minimise the impacts of the three environmental emergencies that could reasonably be expected to occur at the site at some time: major chemical spill (fuel), dangerous weather events (heavy rainfall/flooding/cyclone) and bushfire. • A Spill Management Plan will be implemented.

Table 22 General mitigation and management measures

Environmental aspects	General mitigation and management measures
Air quality, light, and noise and vibration	• In Vehicle Monitoring System in all Santos project vehicles • A 60km/hr speed limit on unsealed roads and project access tracks will be implemented. • Dust suppression measures will be implemented in the Disturbance Footprint during periods of high traffic and high dust. • Maintain access tracks during Santos activities.
Liquid and solid waste management	• Application of the waste hierarchy system (avoids, reduce, reuse, recycle, treat, dispose). • Waste streams are segregated on site where appropriate to maximise opportunities for waste recovery, reuse and recycling.

Environmental aspects	General mitigation and management measures
	• Covered bins are provided for the collection and storage of wastes. Rubbish loads are covered during transport to a licensed waste facility. • Good housekeeping standards maintained.
Hazardous substances use and management	• Measures for hazardous substance storage, handling, use and disposal to minimise the risks of environmental contamination.

7.5 Rehabilitate and decommission

Where a direct or indirect impact has occurred to habitat, Santos will apply rehabilitation measures as appropriate to minimise cumulative impacts throughout the life of the Project. In accordance with the Rehabilitation Management Plan, Santos will undertake three forms of rehabilitation:

1. Stabilisation of exposed construction disturbances – this occurs during the construction phase and is designed to minimise the area of disturbance exposed, thereby minimising the potential for soil loss, erosion and sedimentation of the surrounding areas. This may involve some revegetation but is predominantly about contouring and stabilisation.
2. Reduction of the Disturbance Footprint – at the cessation of construction, there may be scope for a portion of the construction footprint to be reduced to an operational footprint. This can either involve further stabilisation as described above, designed to prevent adverse impacts such as erosion and to protect the asset or in some cases may be the commencement of rehabilitation of vegetation with the view to reach final rehabilitation objectives (i.e. progressive rehabilitation)
3. Final rehabilitation – this most commonly occurs at the end of life of an operational asset and coincides with the activities undertaken as part of decommissioning and well sealing/abandonment. Final rehabilitation will be completed in accordance with the conditions of the EMP with the view of achieving pre-determined and agreed rehabilitation objectives and standards with the landholder. This may include the landholder taking ownership of certain infrastructure for ongoing private use. Rehabilitation undertaken within or in proximity to MNES will utilise local provenance native species to achieve rehabilitation targets.

Similar to final rehabilitation, decommissioning and abandonment is asset and site-specific. Consequently, development of decommissioning and abandonment plans will commence during planning for any one asset's operational lifetime. This will ensure that the planning is fit-for-purpose in terms of agreed rehabilitation outcomes and that the decommissioning and abandonment proposal and process is in line with the regulatory standards and legislation of the day. Decommissioning and abandonment activities will be completed within the pre-existing disturbed footprint where the footprint and nature of the activity allows.

8.0 Significant impact assessment

8.1 Species for significant impact assessment

The findings of this report resulted in species listed under EPBC Act and TPWC Act being subjected to or discounted from significant impact assessment, as summarised in Table 23.

Table 23 EPBC Act listed and TWPC Act listed species subjected to or discounted from Project impact considerations

MNES	EPBC Act status[1]	TPWC Act status[2]	Likelihood of occurrence
CONSIDERED IN IMPACT ASSESSMENT PROCESS			
Northern blue-tongue skink	CE	-	Possible
Gouldian finch	EN	VU	Likely
Red goshawk	EN	VU	Possible
Grey falcon	VU	VU	Possible
Northern shrike-tit	VU	NT	Possible
Plains death adder	VU	VU	Possible
Yellow-spotted monitor	-	VU	Possible
Fork-tailed swift	Mi, Ma	-	Known
Oriental cuckoo	Mi	-	Possible
NOT FURTHER CONSIDERED (assessed as unlikely to occur in the Disturbance Footprint)			
Ipomoea agrillicola	-	NT	Unlikely
Carex fascicularis	-	VU	Unlikely
Eleocharis retroflexa	V	DD	Unlikely
Sharp-tailed sandpiper	VU, Mi	-	Unlikely
Curlew sandpiper	CE, Mi, Ma	VU	Unlikely
Painted honeyeater	VU	VU	Unlikely
Night parrot	EN	EN	Unlikely
Princess parrot	VU	VU	Unlikely
Australian painted snipe	EN	VU	Unlikely
Masked owl (northern)	VU	VU	Unlikely
Northern quoll	En	EN	Unlikely
Ghost bat	VU	NT	Unlikely
Greater bilby	VU	VU	Unlikely
Bare-rumped sheath-tailed bat	VU	DD	Unlikely
Northern brushtail possum	VU	-	Unlikely
Pale field rat	-	VU	Unlikely
Gulf snapping turtle	EN	-	Unlikely
Mertens' water monitor	EN	VU	Unlikely
Mitchell's water monitor	CE	VU	Unlikely

MNES	EPBC Act status[1]	TPWC Act status[2]	Likelihood of occurrence
Largetooth sawfish	VU, Mi	VU	Unlikely
Red-rumped swallow	Mi, Ma	-	Unlikely
Barn swallow	Mi, Ma	-	Unlikely
Grey wagtail	Mi, Ma	-	Unlikely
Yellow wagtail	Mi, Ma	-	Unlikely
Common sandpiper	Mi, Ma	-	Unlikely
Pectoral sandpiper	Mi, Ma	-	Unlikely
Oriental plover	Mi, Ma	-	Unlikely
Oriental pratincole	Mi. Ma	-	Unlikely
Osprey	Mi, Ma	-	Unlikely
Saltwater crocodile	Mi, Ma	-	Unlikely

[1]Conservation status under the EPBC Act: CE=Critically Endangered, EN=Endangered, VU=Vulnerable, Mi=Migratory, Ma=Marine.

[2] Conservation status under the TPWC Act: EN = Endangered, VU = Vulnerable, NT = Near Threatened, DD = Data Deficient.

8.2 Significant impact assessment outcome

The significant impact assessments are provided in Appendix B. The outcome for each species is summarised in Table 24. The impact assessment process determined the Project is unlikely to result in a significant impact to MNES values including species listed under EPBC Act, or species listed under the TPWC Act. This is due to the following factors:

- The Disturbance Footprint was found to lack habitat considered critical for the survival of the species, or comprise important habitat for the species OR
- The Disturbance Footprint was found to be unable to support an important population or ecologically significant proportion of a population OR
- The Project design and proposed mitigation measures were considered appropriate to manage impacts to the species.

Table 24 Outcome of the significant impact assessment

MNES	EPBC Act status[1]	TPWC Act status[2]	Outcome
Northern blue-tongue skink	CE	-	The Project is unlikely to result in a significant impact to the northern blue-tongue skink. The Disturbance Footprint does not contain habitat critical to the survival of this species. Habitat to be cleared consists of potentially suitable foraging habitat for the species during the wet season when water is available. Extensive habitat for this species occurs in the landscape. The Project EMP will manage pests including cane toads, which are the primary threat to this species. A fauna spotter-catcher will mitigate direct impacts to individuals and locate potential burrows or hollow logs.
Gouldian finch	EN	VU	The Project is unlikely to result in a significant impact to the Gouldian finch, due to marginal habitat condition with non-preferred habitat features, and a low potential for a population to utilise this habitat for a duration. Habitat critical to the survival of this species does not occur, however the Disturbance Footprint may provide marginally suitable wet season foraging or dispersal habitat. Potential breeding habitat including areas with higher density hollows in snappy gums have been avoided

MNES	EPBC Act status[1]	TPWC Act status[2]	Outcome
			through the design phase, however this habitat does not have the preferred hilly landscape position or water resources to be preferred breeding habitat. A fauna spotter-catcher will mitigate direct impacts to individuals and search for nests. Clearing activities are likely to occur outside breeding season (wet season) as the landscape is too waterlogged for machinery during this time.
Red goshawk	EN	VU	The Project is unlikely to result in a significant impact to the red goshawk. The Disturbance Footprint does not contain habitat critical to the survival of this species. Habitat to be cleared consists of potentially suitable foraging habitat for the species, but does not contain breeding habitat. Extensive habitat for this species occurs in the landscape, and the nearest records are more than 150 km away. The Project will not create barriers to movement for this highly mobile species. A fauna spotter-catcher will mitigate direct impacts to individuals and search for nests.
Grey falcon	VU	VU	The Project is unlikely to result in a significant impact to the grey falcon. Habitat to be cleared consists of potentially suitable foraging habitat for the species, but does not contain breeding habitat. Extensive habitat for this species occurs in the landscape. The Project will not create barriers to movement for this highly mobile species. A fauna spotter-catcher will mitigate direct impacts to individuals and search for nests.
Northern shrike-tit	VU	NT	The Project is unlikely to result in a significant impact to the northern shrike-tit. The Disturbance Footprint does not contain habitat critical to the survival of this species. Habitat to be cleared consists of potentially suitable breeding and foraging habitat for the species. Extensive habitat for this species occurs in the landscape. A fauna spotter-catcher will mitigate direct impacts to individuals.
Plains death adder	VU	VU	The Project is unlikely to result in a significant impact to the plains death adder. The Disturbance Footprint does not contain habitat critical to the survival of this species, and an important population is unlikely to occur. Habitat to be cleared consists of potentially suitable habitat for the species during the wet season when water is available. Extensive habitat for this species occurs in the landscape. The Project EMP will manage pests including cane toads, which are the primary threat to this species. A fauna spotter-catcher will mitigate direct impacts to individuals.
Yellow-spotted monitor	-	VU	The Project is unlikely to result in a significant impact to the yellow-spotted monitor. The Disturbance Footprint does not contain habitat critical to the survival of this species, and an important population is unlikely to occur. Habitat to be cleared consists of potentially suitable habitat for the species to transiently utilise, however it prefers to live and hunt near water and drainage lines. Extensive habitat for this species occurs in the landscape. The Project EMP will manage pests including cane toads, which are the primary threat to this species. A fauna spotter-catcher will mitigate direct impacts to individuals.
Fork-tailed swift	Mi, Ma	-	The Project is unlikely to result in a significant impact to the fork-tailed swift. Potential habitat within the Disturbance Footprint is considered important habitat for the species, along with the entirety of Australia. However, it is unlikely to support an ecologically significant proportion of the population, and will impact less than 6% of the proxy area threshold. Given the species is predominantly aerial and is widespread in Australia, clearing impacts are unlikely to affect the persistence of the species, or reduce the availability of aerial foraging habitat. Flaring from gas testing is unlikely to impact the species, as the species was observed flying higher

MNES	EPBC Act status[1]	TPWC Act status[2]	Outcome
			than 20 metres above the canopy, but flaring may cause temporary avoidance of the area.
Oriental cuckoo	Mi	-	The Project is unlikely to result in a significant impact to the oriental cuckoo. Potential habitat within the Disturbance Footprint is unlikely to be important habitat for the species and is unlikely to support a significant proportion of the population. The Project EMP includes a weed and pest management plan, and is not expected to increase the abundance or distribution of feral cats or cane toads that are known threats to the species.

[1]Conservation status under the EPBC Act: CE=Critically Endangered, EN=Endangered, VU=Vulnerable, Mi=Migratory, Ma=Marine.

[2] Conservation status under the TPWC Act: EN = Endangered, VU = Vulnerable, NT = Near Threatened, DD = Data Deficient.

8.3 Currency of assessment

This report, including the significant impact assessment (self-assessment) should be reviewed and if necessary updated if:

- the action or action area varies substantially from that described in Section 1.0 and presented on Figure 1, and if activities differ to what is presented in Figure 2
- there is more than 18 months between the date of this assessment and the commencement of the action
- additional MNES are listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) or the description, significance or listing of an existing matter is amended prior to the commencement of the action.

9.0 Land condition assessment

AECOM undertook a land condition assessment of the proposed Project Area. The aim of the assessment was to provide a baseline assessment of ecological conditions to support Santos' application to the NT Government Department of Lands, Planning and Environment to continue exploration activities. Information obtained during this assessment will assist in determining the effectiveness of site rehabilitation once exploration activities have ceased.

Vegetation communities within the Disturbance Footprint and Project Area are summarised in Table 25. Land condition tables are presented in Table 48 to Table 53 in Appendix D.

Table 25 Vegetation communities and associated landforms within the Disturbance Footprint and the Project Area

Vegetation community descriptions		Disturbance Footprint (ha)	Project Area (ha)
Level plains of residual plateau surface			
1a	*Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys*, mid high open woodland.	5.10	22.05
1b	*Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys,* mid high open woodland, over *Acacia calligera,* low shrubland.	22.45	33.44
2a	*Acacia shirleyi, Corymbia dichromophloia, ± Corymbia terminalis*, mid high woodland over *Macropteranthes kekwickii* mid high open shrubland	0.50	2.68
2b	*Eucalyptus leucophloia, Macropteranthes kekwickii ± Acacia shirleyi,* mid high woodland	14.92	34.30
Level, imperfectly drained and run off areas			
1d	*Corymbia dichromophloia, Erythrophleum chlorostachys, Eucalyptus tectifica,* mid high open woodland.	0	0.13
Broad, imperfectly drained lower-lying areas on level plains			
3	*Eucalyptus chlorophylla*, mid high open woodland	1.55	5.46
4a	*Eucalyptus leucophloia, Corymbia terminalis, Acacia shirleyi*, mid high open woodland, over *Macropteranthes kekwickii, Melaleuca viridiflora, Melaleuca citrolens,* mid high open shrubland	0.70	1.61
4b	*Melaleuca citrolens, Macropteranthes kekwickii, Eucalyptus tectifica*, mid high open woodland, over *Melaleuca citrolens, Terminalia volucris, Melaleuca viridiflora*, mid high open shrubland	1.50	9.07
5	*Eucalyptus microtheca, Eucalyptus pruinosa,* mid high open woodland, over *Melaleuca viridiflora, Melaleuca citrolens, Vachellia ditricha*, mid high open shrubland	0.16	1.90
Historically cleared, level plains of residual plateau surface			
6	*Erythrophleum chlorostachys*, low open woodland, or gravel pit	40.16	78.24
No data	Areas within the Project Area lacking vegetation data mainly fall adjacent to tracks planned for maintenance.	0.29	15.71
	Total area	**87.33**	**204.59**

During the survey, the Project Area was assessed to be in generally moderate to good condition with no current evidence of weeds, some minor erosion was present, and some disturbance from cattle grazing has occurred. Most of the area calculated as "no data" refers to vegetation adjacent to access tracks that may be maintained by the project.

EPBC Act and TPWC Act listed threatened species that are considered possible to occur within the Project Area include:

- Gouldian finch *Chloebia gouldiae* (Endangered EPBC Act, Vulnerable TPWC Act)
- Red goshawk *Erythrotriorchis radiatus* (Endangered EPBC Act, Vulnerable TPWC Act)
- Grey falcon *Falco hypoleucos* (Vulnerable EPBC Act and TPWC Act)
- Northern shrike-tit *Falcunculus whitei* (Vulnerable EPBC Act)
- Plains death adder *Acanthophis hawkei* (Vulnerable EPBC ACT and TPWC Act)
- Northern blue-tongue skink *Tiliqua scincoides intermedia* (Critically Endangered EPBC Act)
- Yellow-spotted monitor *Varanus panoptes* (Vulnerable TPWC Act).

Mitigation measures are presented in Section 7.0, which aim to reduce and manage the impacts related to Project activities on the natural environment and threatened species that may occur within the Disturbance Footprint.

10.0 Conclusion

AECOM completed an ecological and land assessment surveys for Santos to describe environmental values being impacted by exploration activities associated with Exploration Permit 161 (EP161) in the Beetaloo Sub-basin, Northern Territory (NT). Santos propose to undertake exploration and the appraisal of two onshore shale petroleum well pads located within EP161 – McArthur Appraisals (the Project). The primary aim of this assessment is to identify and document site condition of two proposed well pads located at Jibera South and Newcastle South Study Area. Collectively these areas are referred to within this report as the Disturbance Footprint, and the wider area is referred to as the Project Area.

Environmental values were described using a combination of desktop information and field survey results. The Project consists of nine vegetation communities and non-remnant habitat. None of the vegetation communities identified during the field survey comprise a *sensitive* or *significant* vegetation type, as defined in the NT Pastoral Land Clearing Guidelines (Pastoral Land Board, 2025).

Field surveys recorded 42 flora and 44 fauna species, including one migratory species (fork-tailed swift) listed under the EPBC Act. No threatened fauna or flora listed under the EPBC Act or *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act) were observed during field surveys. The likelihood of occurrence assessment identified one listed species (Gouldian finch) as likely to occur, and seven fauna as possible to occur in the Project Area.

One invasive flora species was observed, and several are likely to occur nearby across different local management areas. No invasive fauna species were recorded during field surveys, although several were expected to occur within the Project Area.

Potential direct and indirect impacts to ecological values may occur as a result of the Project. However, the Project design has applied the principle of avoidance, mitigation and management to reduce environmental impacts. A fauna spotter-catcher will be present during clearing activities.

An impact assessment was conducted for threatened and migratory species that are listed under the EPBC Act and TPWC Act and considered known, likely or possible to occur within the Project Area. Based on the findings of Section 5.0, significant impact assessments were undertaken in accordance with the EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance (Department of the Environment, 2013) for the following EPBC Act and TPWC Act listed species:

- Northern blue-tongue skink
- Gouldian finch
- Red goshawk
- Grey falcon
- Northern shrike-tit
- Plains death adder
- Yellow-spotted monitor
- Fork-tailed swift
- Oriental cuckoo.

With the implementation of mitigation measures detailed in Section 7.0, and design updates to avoid and minimise impacts to hollow-bearing trees and hollow logs, findings of the assessments determined the Project is unlikely to result in a significant impact to values listed under the EPBC Act or TPWC Act.

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Appendix A

Likelihood of occurrence assessment

Appendix A Likelihood of occurrence assessment

Table 26 Likelihood of occurrence assessment for species listed under EPBC Act and TPWC Act within the Disturbance Footprint

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
Flora					
Ipomoea argillicola	-	NT	The NT Flora Atlas identified two records of *Ipomoea argillicola*, occurring within the Bullwaddy Conservation Reserve approximately 33 km from Jibera South and 45 km from Newcastle South.	*Ipomoea argillicola* is known to occur in Astrebla grasslands on grey cracking clays.	**Unlikely** Suitable habitat does not occur within the Disturbance Footprint, with records more than 30 km away.
Carex fascicularis	-	VU	SREBA surveys undertaken by the NT Government identified this species as occurring in the Beetaloo region. The species was recorded approximately 145 km southwest of the Project Area.	*Carex fascicularis* is a perennial sedge that grows in the margins of streams and swamps, and was detected in a *Fimbristylis* herbland within an *Astrebla* spp. mixed tussock grassland on cracking clay soils, near a flowing creek, at site HAY18 on Hayfield Station (Young et al., 2022).	**Unlikely** Suitable stream or swamp habitat does not occur within the Disturbance Footprint, with records more than 100 km away.
Eleocharis retroflexa	V	DD	SREBA surveys undertaken by the NT Government identified this species as occurring in the Beetaloo region. The species was recorded in a low open *Melaleuca viridiflora* wetland near Mataranka, approximately 267 km northwest of the Project Area (Young et al., 2022).	*Eleocharis retroflexa* is a small, annual sedge that grows on the margins of seasonal swamps on laterite and clay loam substrates.	**Unlikely** Suitable wetland habitat does not occur within the Disturbance Footprint, with records more than 200 km away.
Birds					
Sharp-tailed sandpiper	VU, Mi, Ma	-	Most of the sharp-tailed sandpiper population migrates to Australia in the non-breeding season, with	In Australia the sharp-tailed sandpiper prefers muddy	**Unlikely**

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
Calidris acuminata			widespread records occurring both inland and in coastal locations. In the NT the species mostly occurs in the north coastal regions. Widely scattered inland records occur south to northern Tanami Desert, and in southern NT (Higgins & Davies, 1996).	edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (Higgins & Davies, 1996).	Suitable wetland habitat does not occur within the Disturbance Footprint.
Curlew sandpiper *Calidris ferruginea*	CE, Mi, Ma	VU	In the NT this species occurs around Darwin, north to Melville Island and Cobourg Peninsula, and east and south-east to Gove. It has been recorded inland from Victoria River Downs and around Alice Springs (Higgins & Davies, 1996).	Coastal habitats, inland it has been found around lakes, dams and ephemeral / permanent waterholes.	**Unlikely** Suitable wetland habitat does not occur within the Disturbance Footprint.
Gouldian finch *Chloebia gouldiae*	EN	VU	Formerly widespread across northern Australia. In the NT they are found in the Top End south past Daly Waters (Palmer et al., 2012a). The nearest and most recent sighting of Gouldian finch is 8 km east of Newcastle South, recorded in 2023.	Gouldian finches occupy different habitat types in the breeding and non-breeding season. Breeding habitat consists of hillsides with suitable nesting trees. Outside of the breeding season they are found in lowland drainages to feed on suitable perennial grasses (Dostine et al., 2001).	**Likely** Recent (2023) records occur within 10 km of the Disturbance Footprint. Suitable foraging habitat is present.
Red goshawk *Erythrotriorchis radiatus*	EN	VU	Found across most of Northern Australia, in the NT most records are from the Top End but there are records from central Australia (Pizzey & Knight, 2012). The Disturbance Footprint occurs within the “may occur” distribution on SPRAT. The nearest records to the Disturbance Footprint are over >150 km away and are temporally and spatially uncertain.	Red goshawks occupy a range of habitats, often at ecotones, including coastal and sub-coastal tall open forest, tropical savannahs crossed by wooded or forested watercourses. In the NT, it inhabits tall open forest/woodland as well as tall	**Possible** No records within 150 km and no suitable breeding habitat occurs within the Disturbance Footprint. The species may use the area transiently for foraging or dispersal, however is more likely to disperse along the north to north-east corridor where more suitable habitat occurs.

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
				riparian woodland (Aumann & Baker-Gabb, 1991).	
Grey falcon *Falco hypoleucos*	VU	VU	This species has a widespread distribution, and records occur throughout the NT. However, most records are from arid and semi-arid regions (Pizzey & Knight, 2012). The nearest record is 20 km east of Newcastle South, near Limmen Bight River. This record was created in 1999 and is spatially uncertain. There are more recent records closer to the Carpentaria Highway (1999 - 2020), approximately 140 km from the Disturbance Footprint.	Grey falcon is typically found on inland drainage systems in lightly treed lowland plains, pastoral lands, timbered watercourses and, occasionally, the driest deserts (Department of the Environment and Energy, 2019).	**Possible** Recent records occur along the Carpentaria highway. The species may forage within the Disturbance Footprint but is unlikely to breed.
Northern shrike-tit *Falcunculus whitei*	VU	NT	This species has been recorded from widely scattered localities from near Timber Creek to the east Gulf Country, north to Kakadu National Park and in north-eastern Arnhem Land (DEPWS, 2021d). The nearest and most recent record to the Disturbance Footprint is 140 km west, along the Carpentaria Highway recorded in 2021.	Occupies wet and semi-arid melaleuca and eucalypt open woodlands. May be associated with bloodwoods with flaky bark and ironwood (Ward, 2008).	**Possible** No recent records occur in the vicinity of the Disturbance Footprint. Sub-optimal habitat is present.
Painted honeyeater *Grantiella picta*	VU	VU	This species is migratory based on seasonal variation in occurrence. They breed on the inland slopes of the Great Dividing Range. After the breeding season they sometimes occur in the north-eastern NT, south of the Roper River (S. T. Garnett & Baker, 2021).	Painted honeyeater inhabits woodlands dominated by Acacia and/or Eucalyptus species and open forests but prefers habitats with abundant mature trees that host mistletoes. The species specialises on the fruit of mistletoes and also forages	**Unlikely** No recent records occur close to the Disturbance Footprint; and marginally suitable habitat is present, however the vegetation lacks density of mistletoe.

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
				on nectar and insects (S. Garnett et al., 2011).	
Night parrot *Pezoporus occidentalis*	EN	EN	Night parrot was once widespread across arid and semi-arid regions. Recent confirmed records of the species come from widely separated locations in western Queensland and Western Australia (DEPWS, 2021i).	This species occupies spinifex grasslands in stony or sandy areas, in ephemeral herb lands, samphire and chenopod shrublands on floodplains (DEPWS, 2021i).	**Unlikely** No recent records occur within the area. Suitable habitat does not occur within the Disturbance Footprint.
Princess parrot, Alexandra's parrot *Polytelis alexandrae*	VU	VU	This species irregularly occurs across the arid zone from near Oodnadatta in South Australia, west to near Coolgardie and the east Murchison River in Western Australia, and north to near the Fitzroy River in Western Australia and to Howell Ponds in the Northern Territory (Higgins, 1999).	Princess parrot is usually recorded from shrubland in swales between sand dunes, with occupied sites typically having a variety of shrubs (including Grevillea, Hakea, Cassia and Eremophila species) among scattered emergent trees, with a ground-cover of spinifex Triodia species. The species occurs less often in woodland. The princess parrot forages on the ground and in flowering shrubs and trees (Higgins, 1999).	**Unlikely** No recent records occur close to the Disturbance Footprint.
Australian painted snipe *Rostratula australis*	EN	VU	Records of the species occur across the NT. More recent records come from McMinns Lagoon near Darwin, Yellow Waters in Kakadu, the Sturt Plateau, the Barkly and the Tanami (DEPWS, 2021c).	Australian painted snipe prefers a habitat of recently flooded temporary vegetated wetlands during the non-breeding period and brackish temporary freshwater wetlands with minimum vegetation during breeding periods. Birds usually forage	**Unlikely** Suitable wetland habitat does not occur within the Disturbance Footprint.

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
				in thick, low vegetated areas during the day (Curtis et al., 2012).	
Masked owl (northern) *Tyto novaehollandiae kimberli*	VU	VU	The subspecies occurs in northern Australia, although its distribution is not well known. In the NT, occurs from Cobourg south to Katherine and the VRD and east to the McArthur River (Threatened Species Scientific Committee, 2015b).	This species inhabits tall open eucalypt forest in the NT, especially those associated with *Eucalyptus miniata* and *E. tetrodonta*. Also found in riparian and monsoonal forest and rainforest.	**Unlikely** No recent records occur close to the Disturbance Footprint and suitable habitat is not present.
Mammals					
Northern quoll *Dasyurus hallucatus*	EN	EN	The species once occurred throughout most of Northern Australia although it is has declined across much of its range. In the NT it is found in the Top End as far southeast as Borroloola (DEPWS, 2021j).	Northern quolls do not have highly specific habitat requirements although the most suitable appear to be rocky habitats. They occur in a variety of habitats across their range, including open forest and woodland. Daytime den sites provide important shelter. Shelter sites include rocky outcrops, tree hollows, hollow logs, termite mounds, goanna burrows and human dwellings (DEPWS, 2021j).	**Unlikely** No recent records occur in the vicinity of the Disturbance Footprint and habitat is sub-optimal.
Ghost bat *Macroderma gigas*	VU	NT	The species' range in northern Australia is from relatively arid conditions in the Pilbara region of Western Australia to humid rainforests of northern Queensland. A large colony occurs in a series of gold mine workings at Pine Creek, NT. This species has also been recorded throughout the mainland Top End north	The distribution of ghost bats is influenced by the availability of suitable caves and mines for roost sites. The species often roosts in a deep crack or cave during the day (Pettigrew	**Unlikely** No recent records occur close to the Disturbance Footprint. Suitable roosting habitat does not occur within the Disturbance Footprint, therefore it is

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
			of approximately 17° latitude (DEPWS, 2021e; Pettigrew et al., 1986).	et al., 1986; Tidemann et al., 1985).	unlikely the vegetation will be utilised for foraging.
Greater bilby *Macrotis lagotis*	VU	VU	This species occurs in south-western Queensland and in arid north-western Australia (Western Australia and Northern Territory). This species was previously widespread in arid and semi-arid Australia (Pavey, 2006). The most northern records are from Newcastle Waters and Wave Hill.	In the NT, this species is found on sandy soils dominated by spinifex. It also occurs in hummock grassland associated with low lying drainage systems and alluvial areas (Pavey, 2006). Recent surveys in the Beetaloo region have recorded greater bilby in Eucalyptus and Corymbia woodlands mixed tussock and hummock grasses in sandy/loam soils (DEPWS, 2021f).	**Unlikely** No recent records, occur in the vicinity of the Disturbance Footprint and suitable habitat is not present.
Bare-rumped sheath-tailed bat *Saccolaimus saccolaimus nudicluniatus*	VU	DD	Wide distribution from India through south-eastern Asia to the Solomon Islands, including north-eastern Queensland and the NT. Records of the species in the NT are sparsely scattered across the Top End (Threatened Species Scientific Committee, 2016b).	Previous specimens have been collected from Open *Pandanus* woodland fringing the sedgelands of the South Alligator River in Kakadu National Park, and from eucalypt woodlands and forests from coastal and adjacent inland areas (Murphy, 2002; Threatened Species Scientific Committee, 2016b).	**Unlikely** No recent records, occur in the vicinity of the Disturbance Footprint and habitat is not suitable.
Northern brushtail possum	VU	-	The common brushtail possum (northern subspecies) occurs discontinuously from the Gulf of Carpentaria hinterland near Borroloola, NT westward to the	The species occurs mainly in tall eucalypt open forests with large hollow-bearing trees, particularly where the	**Unlikely** No recent records occur within 200 km of the Disturbance Footprint. Marginally suitable foraging habitat occurs within the

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
Trichosurus vulpecula arnhemensis			Kimberley, WA (Threatened Species Scientific Committee, 2021). Nearest records of common brushtail possums to the Project is over 200 km north.	understorey includes some shrubs that bear fleshy fruits (Threatened Species Scientific Committee, 2021). Whilst suitable habitat occurs for this generalist speciest, is unlikely that suitable large hollow-bearing trees occur for denning within the Project Area.	Disturbance Footprint, however it is unlikely that suitable large hollow-bearing trees occur for denning.
Pale field-rat *Rattus tunneyi*	-	VU	Pale field-rat inhabits higher rainfall areas of northern and eastern Australia, including the Top End of the NT (Menkhorst & Knight, 2011).	This species favours dense vegetation found along rivers where it occupies burrows in loose colonies. Pale field-rat occurs within a variety of habitats including woodlands if a dense understorey of grasses is present (Menkhorst & Knight, 2011).	**Unlikely** No recent records occur within 100 km of the Disturbance Footprint.
Reptiles					
Plains death adder *Acanthophis hawkei*	VU	VU	Fragmented populations of the plains death adder are known to occur in the Mitchell Grass Downs of western Queensland, the Barkly Tableland on the Northern Territory / Queensland border and east of Darwin in the Northern Territory.	Suitable habitat for the plains death adder consists of flat, treeless, cracking-soil riverine floodplains (Cogger, 2014).	**Possible** No recent records occur within the vicinity of the Disturbance Footprint; however, suitable habitat occurs in the Disturbance Footprint as the species is a generalist.
Gulf snapping turtle *Elseya lavarackorum*	EN	-	Gulf snapping turtle is restricted to rivers draining into the Gulf of Carpentaria, including the Calvert and Nicholson River systems (DEPWS, 2021g).	The species occurs in deep pools in the upper catchments of permanently flowing spring-fed river systems, particularly	**Unlikely** No recent records or suitable habitat occurs within the vicinity of the Disturbance Footprint.

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
				in areas with intact riparian vegetation (DEPWS, 2021g).	
Northern blue-tongue skink *Tiliqua scincoides intermedia*	CE	-	The northern blue-tongue skink occurs across northern Australia from Eighty Mile Beach in Western Australia (WA), across the southern Kimberley and Top End of the Northern Territory (NT), to approximately the Gregory Downs / Cloncurry area in western Queensland (DCCEEW, 2023c).	The northern blue-tongue skink occurs in a wide variety of ecosystems, including riparian forest, vine scrub, monsoon rainforest, pandanus-lined gorges, melaleuca forest, eucalypt woodland and savanna, sparse and dense shrubland, and spinifex and tussock grassland. GPS tracking has shown that northern blue-tongue skinks move widely across savanna landscapes in the wet-season, but they spend most (~ 95 %) of their time in small, fragmented patches of relatively dense vegetation that provide cool, shaded, and damp conditions (DCCEEW, 2023c).	**Possible** Recent records occur within 40 km, and suitable habitat for dispersal occurs within the Disturbance Footprint. However, suitable dense vegetation preferred by the species does not occur within the Disturbance Footprint.
Mertens' water monitor *Varanus mertensi*	EN	VU	Mertens' water monitor has a broad distribution that encompasses coastal and inland waters across the far north of Australia. In the NT, the species has been recorded across most of the Top End and the Gulf region (DCCEEW, 2023d).	Mertens' water monitor is highly aquatic and rarely ventures more than 5 - 10 m from the edge of water. The species has been recorded in the following habitat: • Perennial and semi-permanent pools,	**Unlikely** Suitable habitat does not occur within the Disturbance Footprint.

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
				including springs, seeps, swamps, creeks and gorges, • The margins of permanent streams, rivers and lakes, • Floodplain billabongs, lagoons, swamps and soaks, • Perennial waterholes in woodlands, Man-made irrigation channels and the margins of dams (DCCEEW, 2023d).	
Mitchell's water monitor *Varanus mitchelli*	CE	VU	Mitchell's water monitor occurs across the wet-dry tropics of northern Australia from the far west Kimberley of WA across the Top End of the NT to far northwest Queensland (DEPWS, 2021h).	Mitchell's water monitor inhabits freshwater and saline wetlands that range from seasonal gorges in upper catchments to large rivers and coastal floodplains. It is recorded from rivers, creeks, gorges, springs, lagoons, swamps, mangroves, and foreshores (DEPWS, 2021h).	**Unlikely** Suitable habitat does not occur within the Disturbance Footprint.
Yellow-spotted monitor *Varanus panoptes*	-	VU	Occurs across a broad geographic range across northern Australia. In the NT most records are from the Top End but occurs as far south as Renner Springs (Ward et al., 2012).	Occupies a variety of habitats including coastal beaches, floodplains, grasslands and woodlands (Ward et al., 2012).	**Possible** Recent (2022) records occur within 20 km of the Disturbance Footprint and suitable habitat is present.
Shark					

Species	Status		Distribution	Habitat	Likelihood
	EPBC[1]	TPWC[2]			
Largetooth sawfish *Pristis pristis*	VU, Mi	VU	Largetooth sawfish have been recorded in numerous drainage systems in northern Australia in fresh and saline water including the Fitzroy, Durack, Robinson and Ord rivers (Western Australia), the Adelaide, Victoria, Daly, East and South Alligator, Roper, McArthur, Wearyan and Robinson rivers (Northern Territory), and the Gilbert, Mitchell, Normanby, Wenlock, Mission, Embley and Leichhardt rivers (Queensland) (Department of the Environment, 2014).	This species in northern Australia appears to be confined to freshwater drainages and the upper reaches of estuaries, occasionally being found as far as 400 km from the sea (Simpfendorfer et al., 2016).	**Unlikely** No rivers or large permanent water bodies occur within the Disturbance Footprint.

1: EPBC Act listing status. CE = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, Mi = Migratory, Ma = Marine.

2: TPWC Act listing status. CE = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, DD = Data Deficient.

Table 27 Likelihood of occurrence assessment for migratory species listed under EPBC Act and TPWC Act within the Disturbance Footprint

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
Migratory and marine birds					
Fork-tailed swift *Apus pacificus*	Mi, Ma	-	This species is found across most of Australia. In the northern Territory it is most commonly found in the northern region, although there are scattered records inland (DCCEEW, 2025a).	The fork-tailed swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. This species mostly occurs over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. They often occur over cliffs and beaches and over islands and sometimes well out to sea.	**Known** Approximately 20 fork-tailed swifts were observed during the field survey.

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
Red-rumped swallow *Cecropis daurica*	Mi, Ma	-	The red-rumped swallow is considered to be an irregular non-breeding migrant within Australia. Most records are in the northern section of Australia between Northern Territory and Western Australia.	Forages over open areas. Over its entire range it is found in open hilly country and mountains, river gorges, valleys, sea cliffs, as well as in cultivated areas and human habitations, including towns (BirdLife International, 2025a).	**Unlikely** Suitable habitat does not occur within the Disturbance Footprint and there are no recent records.
Oriental cuckoo *Cuculus optatus*	Mi	-	The oriental cuckoo is a regular migrant to Australia, where it spends the non-breeding season (Sept - May) in coastal regions across northern and eastern Australia as well as offshore islands (BirdLife International, 2019).	This species uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types. It mainly inhabits coniferous, deciduous and mixed forests. It feeds mainly on insects and their larvae, foraging for them in trees and bushes as well as on the ground.	**Possible** Species is common in the region and suitable habitat is present in the disturbance footprint. However, suitable dense forest vegetation preferred by the species does not occur within the Disturbance Footprint.
Barn swallow *Hirundo rustica*	Mi, Ma	-	The barn swallow usually occurs in northern Australia, on Cocos-Keeling Island, Christmas Island, Ashmore Reef, and patchily along the north coast of the mainland from the Pilbara region, Western Australia, to Fraser Island in Queensland) (Higgins & Davies, 2002).	In Australia, the barn swallow is recorded in open country in coastal lowlands, often near water, towns and cities. Birds are often sighted perched on overhead wires, and also in or over freshwater wetlands, paperbark Melaleuca woodland, mesophyll shrub thickets and tussock grassland.	**Unlikely** Habitat not suitable for this species and no nearby records occur.
Grey wagtail *Motacilla cinerea*	Mi, Ma	-	The grey wagtail is a rare non-breeding visitor to northern Australia, generally arriving during the last 10 days of October and departing	The species has a strong association with water. In their normal breeding range, grey wagtails are found across a variety of wetlands, especially watercourses, but also	**Unlikely**

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
			around March (Department of the Environment, 2015b).	on the banks of lakes and marshes, as well as artificial wetlands such as sewage farms, reservoirs and fishponds. This association with water extends into non-breeding habitats with all confirmed Australian records being associated with water; especially creeks, rivers and waterfalls.	Habitat not suitable for this species and no nearby records occur.
Yellow wagtail *Motacilla flava*	Mi, Ma	-	The yellow wagtail is a regular wet season visitor to northern Australia. In Queensland this species is a regular visitor from Mossman south to Townsville. The species is a vagrant further south and on Heron Island (BirdLife International, 2020).	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. Roosts in mangroves and other dense vegetation.	**Unlikely** Habitat is not suitable for this species and no nearby records occur.
Migratory wetland birds					
Common sandpiper *Actitis hypoleucos*	Mi, Ma	-	Found along all coastlines of Australia and in many areas inland, the common sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia (Department of Climate Change Energy the Environment and Water, 2023g).	The common sandpiper is known to occur in a range of wetland environments, both coastal and inland, with varying levels of salinity. Their primary habitat is rocky shorelines and narrow muddy margins of billabongs, lakes, estuaries and mangroves. The species has also been recorded on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties.	**Unlikely** Suitable wetland habitat does not occur within the Disturbance Footprint

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
Pectoral sandpiper *Calidris melanotos*	Mi, Ma	-	In the Northern Territory, the pectoral sandpiper has been recorded in Darwin and Alice Springs (Higgins & Davies, 1996).	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. This species is usually found in coastal or near coastal habitat but very occasionally found further inland.	**Unlikely** Suitable wetland habitat does not occur within the Disturbance Footprint.
Oriental plover *Charadrius veredus*	Mi, Ma	-	The oriental plover is a non-breeding migrant, primarily present in Australia during the months of summer. It has been recorded in all states, but is most common in the coastal areas and in northern Australia (Department of Climate Change Energy the Environment and Water, 2022).	Oriental plovers inhabit open grasslands in arid and semi-arid zones; and less often in estuarine or littoral environments. Preferred habitat has sparse cover of short grass.	**Unlikely** Suitable wetland habitat does not occur within the Disturbance Footprint.
Oriental pratincole *Glareola maldivarum*	Mi, Ma	-	Within Australia the oriental pratincole is widespread in northern areas, especially along the coasts of the Pilbara Region and the Kimberley Division in Western Australia, the Top End of the Northern Territory, and parts of the Gulf of Carpentaria. It is also widespread but scattered inland, mostly north of 20° S. There are occasional records in southern Australia, at sparsely scattered sites, with records in all states, including an unconfirmed report in Tasmania. The species has also been recorded on various outlying islands, including Lord Howe Island, and, in the Indian Ocean, Christmas Island and Cocos-Keeling Islands.	In non-breeding grounds in Australia, the oriental pratincole usually inhabits open plains, floodplains or short grassland (including farmland or airstrips), often with extensive bare areas. They often occur near terrestrial wetlands, such as billabongs, lakes or creeks, and artificial wetlands such as reservoirs, saltworks and sewage farms, especially around the margins. The species also occurs along the coast, inhabiting beaches, mudflats and islands, or around coastal lagoons. During the heat of the day, they usually loaf near water at the edges of terrestrial wetlands, and at one wetland they roosted in the hoofprints of stock. They	**Unlikely** Suitable wetland habitat does not occur within the Disturbance Footprint.

Species	Status		Distribution	Habitat	Likelihood
	EPBC	TPWC			
				usually roost in bare areas such as claypans or areas with low vegetation, such as saltmarsh or airfields (Department of Climate Change, Energy, the Environment and Water, 2023b).	
Osprey *Pandion haliaetus*	Mi, Ma	-	The breeding range of the osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia and clockwise around the Australian coast to Lake Macquarie in New South Wales; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island (Department of Climate Change Energy the Environment and Water, 2022).	Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging.	**Unlikely** Suitable wetland habitat does not occur within the Disturbance Footprint.
Migratory and marine reptiles					
Saltwater crocodile *Crocodylus porosus*	Mi, Ma	-	Saltwater crocodiles are found in most major rivers and waterways in the Northern Territory, extending from the coast up to 300 km inland.	Saltwater (or estuarine) crocodiles mostly occur in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150 km inland from the coast. Preferred nesting habitat includes elevated, isolated freshwater swamps that do not experience the influence of tidal movements. Floating rafts of vegetation also provide important nesting habitat.	**Unlikely** Suitable waterways are not present within the Disturbance Footprint.

Appendix B

Significant Impact Assessments

Appendix B Significant Impact Assessments

Significant Impact Assessments

The *EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance* (the Significant Impact Guidelines) (Department of the Environment, 2013) provides the framework to assess potential impacts to Matters of National Environmental Significance (MNES), as well as a process for determining the level of significance of impacts. In accordance with the Significant Impact Guidelines, impacts on MNES are assessed utilising the broadest scope of the Project, with consideration to both direct, indirect and facilitated impacts and proposed measures that may avoid and reduce impacts. Significance is tested through a set significant impact criteria stipulated in the Significant Impact Guidelines, which is tailored to each MNES and for some values, the conservation status of the MNES.

This Appendix documents the significant impact assessment for each species listed in Table 28. Significant impact assessments were undertaken for all MNES values considered known, likely or possible to occur as a result of the likelihood of occurrence assessment. In lieu of specific Northern Territory Government impact assessment, a significant impact assessment was also conducted for any TPWC Act listed threatened species considered known, likely or possible to occur.

Commonwealth guidelines used to support the assessment of MNES impacts include the Species Profile and Threats Database (SPRAT) and relevant approved conservation advice, recovery plan or threat abatement plans.

Table 28 EPBC Act listed and TWPC Act listed species subjected to Project impact considerations

MNES	EPBC Act status[1]	TPWC Act status[2]	Likelihood of occurrence
CONSIDERED IN IMPACT ASSESSMENT PROCESS			
Northern blue-tongue skink	CE	-	Possible
Gouldian finch	EN	VU	Likely
Red goshawk	EN	VU	Possible
Grey falcon	VU	VU	Possible
Northern shrike-tit	VU	NT	Possible
Plains death adder	VU	VU	Possible
Yellow-spotted monitor	-	VU	Possible
Fork-tailed swift	Mi, Ma	-	Known
Oriental cuckoo	Mi	-	Possible

EPBC Act Critically endangered species

Northern blue-tongue skink (*Tiliqua scincoides intermedia*)

Description and status under the EPBC Act

Northern blue-tongue skinks are listed as Critically Endangered under the EPBC Act. The northern blue-tongue skink is a large, robust, short-limbed lizard that can reach up to 37 cm in snout-to-vent length. It can vary in colour on its upper parts from pale yellow brown through fawn to light grey. It has smooth scales, cross-bands on the back and tail, and a large bright blue and UV-reflecting tongued that it protrudes out of its mouth during defensive displays.

Distribution

The northern blue-tongue skink occurs across northern Australia from Eighty Mile Beach in Western Australia, across the southern Kimberley and Top End of the Northern Territory, to approximately the Gregory Downs / Cloncurry area in western Queensland (DCCEEW, 2023c). Northern blue-tongue skinks may co-occur with eastern blue-tongue skinks (*T. scincoides scincoides*) and centralian blue-tongue skinks (*T. multifasciata*) over parts of their range.

Habitat requirements

The northern blue-tongue skink occurs in a wide variety of vegetation communities, eucalypt woodland and savanna, sparse and dense shrubland, and spinifex and tussock grassland. GPS tracking has shown that northern blue-tongue skinks move widely across savanna landscapes in the wet-season, but they spend most (~ 95 %) of their time in small, fragmented patches of relatively dense vegetation that provide cool, shaded, and damp conditions (Price-Rees et al., 2013).

Habitat critical to the survival of the species

Areas of dense vegetation that provide cool and moist conditions within hot, dry, and flammable landscapes are considered habitat critical to the survival of the species, as it provides the northern blue-tongue skink with food, water and protection from environmental exposure and predation. Examples of such habitat includes rainforest and vine thicket, riparian forests, well-vegetated creeks and drainage lines, well-vegetated swamps and springs, and dense thickets within floodplains, grasslands, shrublands, savannas and woodlands. Deep rocky crevices and underground burrows are also habitat critical to their survival (DCCEEW, 2023c).

Threats

The largest threat to northern blue-tongue skinks are cane toads. Declines of up to and greater than 95% of northern blue-tongue populations were observed with the arrival of cane toads (DCCEEW, 2023c). Declines have occurred due to the ingestion of cane toad poison; northern blue-tongue skinks frequently forage and feed on frogs, where small amounts of cane toad toxins are lethal and blue-tongue lizards are unable to learn to avoid cane toads (Pearson et al., 2013). Cane toads are also readily found in areas of refugia for northern blue-tongue skinks, increasing the chances of exposure to cane toad toxin.

Other threats include cattle, feral pigs and water buffalo altering the landscape, predation from feral cats and inappropriate fire regimes (Edwards et al., 2003; Price-Rees et al., 2013). Future concerns for northern blue-tongue skinks include water drawdown and land clearing from increased interest in mining activities (McCallum et al., 2010; Younger et al., 2004). These threats are likely to exacerbate the current impacts from cane toads.

Occurrence within the Disturbance Footprint

Recent records of northern blue-tongue skinks occur within 40 km of the Disturbance Footprint. The Disturbance Footprint occurs within mapped distributions of northern blue-tongue skinks, and habitat for foraging and movement during wet season occurs within the Disturbance Footprint.

Northern blue-tongue skinks were not observed during field surveys. This species is considered possible within the Disturbance Footprint due to the presence of suitable habitat for breeding, foraging and dispersal. Wetland and riparian habitat does not occur within the Disturbance Footprint, however refugia habitat may be present in the form of deep underground burrows or hollow logs. The Disturbance Footprint does not meet the definition of habitat critical to the survival of this species.

Potential Impacts and Mitigation Measures

A total of 46.9 ha of northern blue-tongue skink potential habitat may be cleared as part of the Project. The main impacts to the species would be related to introduction and exacerbation of cane toads in the Project Area. Other threats include direct mortality or injury during construction, habitat fragmentation and altered fire regimes.

Mitigation measures to prevent impact to the northern blue-tongue skink include engaging a fauna – spotter catcher prior to construction works commencing, which will identify any individuals in the direct clearing area and mitigate all interactions with wildlife.

Construction personnel, including contractors, will be made aware of the extent of any authorised area in which they will be working and where necessary, be advised of any specific limitations appropriate to the construction works being conducted in or within proximity to MNES species habitat. Any injured fauna species will be transported to a vet or recognised wildlife carer.

Refer to Section 7.0 of this report for avoidance, minimisation and mitigation measures.

Significant impact assessment

Details of the significant impact assessment for northern blue-tongue skinks is presented below in Table 29. Criteria for significant impact assessments are derived from the Significant Impact Guidelines (Department of the Environment, 2013). The assessment determined that the Project is unlikely to have a significant impact on the northern blue-tongue skink.

Table 29 Significant impact assessment for northern blue-tongue skinks

Criterion - is there a real chance or possibility that the project will…	Assessment
Lead to a long-term decrease in the size of a population?	**Unlikely** Potential habitat within the Disturbance Footprint is 46.9 ha and does not meet the definition of habitat critical to the survival of a species. Project activities are unlikely to exacerbate current threats to northern blue-tongue skink populations, such as cane toads, which will be managed through the EMP. A fauna spotter-catcher will be engaged to reduce the potential for direct mortality or injury. Therefore, it is unlikely the project will lead to a long-term decrease in the size of a population.
Reduce the area of occupancy of the species?	**Unlikely** There will be some reduction in useable habitat however this impact is likely to be small, as the impact area is minor in context of habitat available in the region (46.9 ha). Sections of this impact area have been previously disturbed, and some sections will be rehabilitated. Project activities are unlikely to increase threatening processes to northern blue-tongue skinks, nor is it likely to impact habitat outside of the impact area. Therefore, it is unlikely the Project will reduce the area of occupancy for the species.
Fragment an existing population into two or more populations?	**Unlikely** No northern blue-tongue skinks were found to utilise the Project Area. Populations of northern blue-tongue skinks are not well known; however the Project occurs within habitat that may be used as foraging habitat in the wet season so there may be some impacts to movement across the landscape during rain events. However, the species is mobile and there is equal quality habitat outside of the impact area for foraging. Some sections of the Disturbance Footprint will be rehabilitated so impacts to any population that may utilise the Project Area will be short term.

Criterion - is there a real chance or possibility that the project will…	Assessment
Adversely affect habitat critical to the survival of a species?	**Unlikely** Habitat critical to the survival of the species includes riparian or wetland habitat, or habitat with lots of cover to reduce temperature and provide shelter from predators. This type of habitat is absent from the Disturbance Footprint. Deep underground burrows may be present on the Disturbance Footprint – however these are difficult to observe and confirm. If these are present, then avoidance and mitigation actions detailed in Section 7.0 will reduce adverse impacts to northern blue-tongue skinks taking refuge in burrows by engaging a fauna spotter-catcher during clearing activities. The project is unlikely to adversely affect habitat critical to the survival of the northern blue-tongue skink.
Disrupt the breeding cycle of a population?	**Unlikely** There may be habitat suitable for breeding within the Disturbance Footprint, however there is similar or better-quality habitat outside of the Disturbance Footprint that will provide suitable breeding and nesting habitat for northern blue-tongue skinks. The impact area is small, largely linear and will not create large barriers for moving individuals looking for breeding partners, burrows or nesting areas.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**Unlikely** The Disturbance Footprint will only impact a small section of habitat that is non-critical to the survival of the species. Useable good quality habitat exists outside of the Disturbance Footprint and is unlikely to modify the landscape to the extent that it will cause a decline. The project will not impact habitat that northern blue-tongue skinks require for year-round shelter and foraging.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	**Unlikely** Invasive species that are known to result in harm to northern-blue tongue lizards are cane toads, which have already invaded and impacted northern blue tongues in the surrounding region. The project is unlikely to exacerbate local cane toad populations, and measures to prevent the creation of suitable breeding places for cane toads will be included in the MP for weed and pest management (Section 7.0), to prevent the spread of new invasive species or pathogens.
Introduce disease that may cause the species to decline?	**Unlikely** There are no known diseases that are likely to spread to reptiles from project activities.
Interfere with the recovery of the species?	**Unlikely** There is no recovery plan in place for northern blue-tongue skinks. Provided the project does not exacerbate current levels of threats (fire, cattle, invasive species) through the implementation of the EMP, it is unlikely to interfere with the recovery of the northern blue-tongue skink.

EPBC Act Endangered species

Gouldian finch (*Chloebia gouldiae*)

Description and status of the EPBC Act

Gouldian finches are listed as Endangered under the EPBC Act. The Gouldian finch is about 12 to 15 cm in length and weighs about 14 to 15 grams. The adults are vividly multi-coloured and exhibit three different facial colour-morphs.

Distribution

Formerly widespread across northern Australia. In the NT they are found in the Top End south past Daly Waters (Palmer *et al*., 2012).

Habitat requirements

Gouldian finches occupy different habitat types in the breeding and non-breeding season. Breeding habitat consists of hillsides with suitable nesting trees, usually mature eucalypts with hollows created by termites. Outside of the breeding season they are found in lowland drainages to feed on suitable perennial grasses (Dostine et al., 2001).

Habitat critical to the survival of the species

The recovery plan identifies key areas with significant populations of Gouldian finches as important strongholds for the species, with Limmen Gate National Park being the closest, located 80 km to the east of the Disturbance Footprint (O'Malley, 2006).

The recovery plan describes known breeding habitat for Gouldian finch in the Northern Territory as being characterised by rocky hills with hollow-bearing smooth-barked gums (*Eucalyptus tintinnans* or *E. brevifolia*), within 2-4 km of small waterholes or springs that persist throughout the dry season (O'Malley, 2006). In the dry season, foraging habitat is dominated by annual spear grasses or native sorghum (*Sarga* spp.), and in the wet season foraging habitat is dominated by cockatoo grass (*Alloteropsis semialata*), golden beard grass (*Chrysopogon fallax*) or spinifex-dominated communities (*Triodia* spp.). Other important wet season grasses include giant spear grass (*Heteropogon triticeus*), white grass (*Sehima nervosum*), ricegrass (*Xerochloa laniflora*) and kangaroo grass (*Themeda triandra*) (O'Malley, 2006). During the wet season, Gouldian finches move from breeding habitat on hillsides with suitable trees down to lower lying areas where they forage on these preferred wet season perennial grasses (Palmer et al., 2012b). Gouldian Finches feed exclusively on seed from a restricted range of grass species, and do not supplement their diet with seed from forbs, shrubs or insects.

The recovery plan notes that the Gouldian finch's preferred wet season grasses are selectively grazed by cattle and horses leading to reduced species diversity and vegetative cover of foraging grasses (O'Malley, 2006). Whilst some of the perennial foraging grasses were recorded during recent surveys, they were observed at low density and species diversity. Cattle disturbance is common within the Disturbance Footprint, which has likely impacted ground species diversity. Some vegetation communities also have a structure with minimal grass cover due to a shrubby understorey, or large bare patches of earth.

Based on the definitions above, the Disturbance Footprint is not considered to contain breeding habitat that would be critical to the survival of the Gouldian finch. The preferred nesting trees are not present, with potential nesting trees rare to occasional (*Corymbia dichromophloia* and *Eucalyptus leucophloia*). Suitable permanent water sources are not present within a sufficient distance of the Disturbance Footprint to support breeding habitat. The Disturbance Footprint is not considered to contain foraging habitat that would meet the above definition. The species is unlikely to utilise the floodplain habitat within the Disturbance Footprint in the dry season, preferencing the rocky hills near breeding habitat during this time. The Disturbance Footprint contains a low diversity and cover of preferred wet season foraging grasses (four species observed within the 200 ha survey area), which will be insufficient to support the species for a duration.

In summary, nesting trees are occasional, not of the preferred species, and not combined with the required landscape position, foraging or water resources to be considered breeding or foraging habitat critical to the survival of the species. The foraging opportunities within the Disturbance Footprint are restricted in species diversity and ground cover, likely due to grazing pressure which is a known threat

to the species, as well as some areas with a shrubby vegetation composition in the understorey. Therefore, the Disturbance Footprint is not considered to contain habitat critical to the survival of the Gouldian finch.

Threats

Vegetation changes through altered fire regimes and grazing by introduced herbivores (cattle) are the factors most likely to have caused past declines, and to be preventing recovery, in Gouldian finch populations (O'Malley, 2006).

Occurrence within the Disturbance Footprint

The Gouldian finch was not observed during the bird surveys, however the species is considered likely to occur based on general habitat suitability (eucalypt woodland) and recent records within 10 km. Eucalyptus trees that are potentially suitable for nesting have been observed within the Disturbance Footprint. The Disturbance Footprint does not contain habitat critical to the survival of the species, however it may contain marginal habitat utilised during opportunistic wet season foraging or dispersal. Potential nesting trees *Corymbia dichromophloia* and *Eucalyptus leucophloia* were observed sparsely distributed throughout the Disturbance Footprint, but were more common within the wider landscape in areas preferentially avoided through design. Preferred nesting tree species were not observed. The landscape is predominantly flat floodplain, and does not consist of the preferred hillsides with suitable trees for dry season habitat. Habitat within the Disturbance Footprint was only moderately suitable for wet season foraging of Gouldian finch, due to the low density and diversity of preferred foraging grasses.

Existing threats relevant to the Gouldian finch include moderate to high grazing pressure within the Disturbance Footprint, with pugging commonly observed, particularly where soils were seasonally waterlogged. Grazing has likely impacted ground species diversity, with the recovery plan noting that the Gouldian finch's preferred wet season grasses are selectively grazed by cattle and horses leading to reduced species diversity and vegetative cover of foraging grasses (O'Malley, 2006).

Potential Impacts and Mitigation Measures

A total of 46.9 ha of Gouldian finch habitat may be cleared as part of the Project. Other impacts that may result from the Project include reduction in foraging habitat, fragmentation and inappropriate fire regimes.

Mitigation measures to prevent impact to the Gouldian finch include engaging a fauna – spotter catcher prior to construction works commencing, which will identify any individuals in the direct clearing area and mitigate all interactions with wildlife.

Construction personnel, including contractors, will be made aware of the extent of any authorised area in which they will be working and where necessary, be advised of any specific limitations appropriate to the construction works being conducted in or within proximity to MNES species habitat. Any injured fauna species will be transported to a vet or recognised wildlife carer.

Refer to Section 7.0 of this report for avoidance, minimisation and mitigation measures.

Significant impact assessment

Details of the significant impact assessment for Gouldian finch is presented below in Table 30. Criteria for significant impact assessments are derived from the Significant Impact Guidelines (Department of the Environment, 2013). The assessment determined that the Project is unlikely to have a significant impact on the Gouldian finch.

Table 30 Significant impact assessment for Gouldian finch

Criterion - is there a real chance or possibility that the project will…	Assessment
Lead to a long-term decrease in the size of a population?	**Unlikely** The impact area is 46.9 ha, which consists of linear tracks and smaller sections for well pads over a larger area. Gouldian finches are highly mobile species, and are likely to prefer nearby habitat that is of higher quality to the

Criterion - is there a real chance or possibility that the project will…	Assessment
	habitat within the Disturbance Footprint, which is unlikely to support breeding habitat due to lack of permanent water, and contains marginal wet season foraging opportunities due to existing grazing pressures. Therefore, land clearing and disturbances to the area are unlikely to cause a long-term decrease in the size of Gouldian finch population. The project is unlikely to cause water drawdown, so will not impact habitat that occurs outside the Disturbance Footprint.
Reduce the area of occupancy of the species?	**Unlikely** There will be some reduction in useable habitat however this impact is likely to be small, as the impact area is minor in context of habitat available in the region (46.9 ha). The Disturbance Footprint is unlikely to contribute significantly to the species' area of occupancy due to its marginal habitat suitability. Sections of this impact area have been previously disturbed, and some sections will be rehabilitated. Project activities are unlikely to increase threatening processes to Gouldian finch. The presence and abundance of invasive predators such as feral cats are unlikely to change because of project activities. The project is unlikely to cause significant drawdown of the water table, or impact nearby water sources. Furthermore, habitat within the Disturbance Footprint is mapped as mid – low likelihood for Gouldian finch presence, and better-quality habitat occurs outside of the Disturbance Footprint. Therefore, it is unlikely that the Project will reduce the area of occupancy for Gouldian finch.
Fragment an existing population into two or more populations?	**Unlikely** Populations of Gouldian finch are not well known, as they are highly mobile species that will move to where there are favourable conditions. The nearest stronghold for the species is more than 80 km to the east at Limmen Gate National Park, and the nearest records are 8 km to the east. A population of Gouldian finch is unlikely to be dependent on the marginal habitat within the Disturbance Footprint, and therefore impacts to this habitat will not result in fragmentation of a population. The Project will involve clearing and maintaining access tracks, with three non-linear areas being cleared for exploration. This means that large sections of the Project are linear and is unlikely to prevent species from moving between habitat fragments. Some sections of the Disturbance Footprint will be rehabilitated so impacts to these will be short term (see Section 7.0).
Adversely affect habitat critical to the survival of a species?	**Unlikely** As detailed above, habitat critical to the survival of the species is not considered to occur within the Disturbance Footprint. Habitat of higher quality with lower grazing intensity is present outside of the Disturbance Footprint. The Disturbance Footprint will be rehabilitated to the condition it was pre-disturbance. The Project has avoided larger stands of hollow-bearing trees through the design process. Therefore, adverse impacts to habitat critical to the survival of Gouldian finch is unlikely.

Criterion - is there a real chance or possibility that the project will…	Assessment
Disrupt the breeding cycle of a population?	**Unlikely** There is a low density of non-preferred nesting trees within the Disturbance Footprint, with better-quality habitat avoided by the Project, located outside the Disturbance Footprint. The nearest stronghold for the species is more than 80 km to the east at Limmen Gate National Park, and the nearest records are 8 km to the east. A population of Gouldian finch is unlikely to be dependent on the marginal habitat within the Disturbance Footprint, and therefore impacts to this habitat will not result in disruption to the breeding cycle. It is unlikely that breeding will occur within the Disturbance Footprint, due to the non-preferred landscape position and water availability. The impact area is largely linear and will not create significant barriers for moving individuals looking for breeding partners or nesting areas. Clearing activities are likely to occur outside breeding season (wet season) as the landscape is too waterlogged for machinery during this time.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**Unlikely** The Disturbance Footprint will temporarily impact and modify 46.9 ha of habitat that may be used by Gouldian finch. Useable habitat exists outside of the Disturbance Footprint and the Project is unlikely to modify the landscape to the extent that it will cause a decline in the species. Further, much of the disturbance is linear in nature and will not reduce the species' utilisation of the area.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?	**Unlikely** Invasive species that are known to result in harm to Gouldian finch include invasive predators such as cats. Whilst not observed during field surveys it is likely that feral cats are already present in the area. Grazing pressure is already present within the Disturbance Footprint. Another threat is exotic grasses competing with native foraging grasses. The Project will have a weed management plan that is considered suitable for identifying and preventing the spread of weeds from project activities.
Introduce disease that may cause the species to decline?	**Unlikely** The project is unlikely to cause the spread of diseases that will impact Gouldian finches.
Interfere with the recovery of the species?	**Unlikely** A large aspect of the recovery plan for Gouldian finches is suitably managing fire regimes to promote growth of foraging grasses and to prevent large fires from removing nesting trees (O'Malley, 2006). The project will have a fire management plan in place and will not increase threatening processes towards finches in key areas. It is unlikely that the Project will interfere with the recovery of Gouldian finch.

Red goshawk (*Erythrotriorchis radiatus)*

Description and status under the EPBC Act

The red goshawk is listed as endangered under the EPBC Act. The red goshawk is a large, swift and powerful hawk, rufous brown in colour, and growing to a length of 45 to 60 cm, with a wingspan of 100 to 135 cm. The red goshawk is among the most sexually dimorphic raptors in the world, with females nearly twice the weight of males. Adult males are boldly mottled with rufous tones and barred underwings, while females are larger, paler, and more heavily streaked with some white on the underbody (DCCEEW, 2023a).

Distribution

The red goshawk is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia, from western Kimberley Division to north-eastern New South Wales. It inhabits coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers, and the edges of rainforests. The area of occupancy has been estimated at 200,000 km2 with low reliability. In the NT most records are from the Top End, but there are records from central Australia (Pizzey & Knight, 2012).

Habitat requirements

Red goshawks occupy a range of habitats, often at ecotones, including coastal and sub-coastal tall open forest, tropical savannahs crossed by wooded or forested watercourses. In the NT, it inhabits tall open forest/woodland as well as tall riparian woodland (Aumann & Baker-Gabb, 1991). Nesting habitat usually comprises a tall stand of trees (average 31 m) within 1 km of permanent water, often adjacent to rivers or clearings. They are believed to stay within their nesting territory year around, the species is thought to have a very large home range covering between 50 and 220 km^2 (Department of Agriculture Water and the Environment, 2022).

Habitat critical to the survival of the species

According to the recent conservation advice for the species (DCCEEW, 2023a), due to the small population sizes, foraging and breeding habitat in areas of known or likely occurrence are considered critical to the survival of the species. Habitat critical to the survival in terms of habitat utilisation includes (DCCEEW, 2023a):

- Foraging habitat:
  - Coastal and subcoastal tall open forests and woodlands
  - Tropical savannas traversed by wooded or forested creeks and rivers
  - Freshwater wetlands and their margins
  - Edges of rainforest
- Breeding habitat:
  - Areas with large, tall trees (>14 m) within proximity to a watercourse (within 2.5 km), that occur within foraging habitat. Particularly important breeding habitat includes:
    - Riparian vegetation supporting tall stands of remnant paperbark trees (*Melaleuca* sp.) with horizontal limbs along watercourses
    - Tall dry woodlands in proximity to watercourses with Darwin stringybark (*Eucalyptus tetrodonta*) dominated woodlands the primary breeding habitat across northern Australia.
  - These breeding habitats are often found in areas of topographic ruggedness such as plateaus or gorges where breeding can occur on elevated country in dry woodlands or on lower creek systems
  - Research demonstrated that breeding success declines when a threshold level of greater than 25% of forest is cleared within 4 km of nesting birds. Other research suggested the removal of actual or potential nest trees is detrimental to their ongoing persistence in an area, particularly as they select for the tallest stands in a given area (DCCEEW, 2023a).

The breeding range is likely continuous and the species can be described as consisting of one large population.

Based on the above definition from the conservation advice (DCCEEW, 2023a), and the Project being located in the “species or species habitat may occur” distribution on SPRAT, the Disturbance Footprint is not considered to consist of habitat critical to the species survival. The Disturbance Footprint does not contain breeding habitat, with a lack of suitable water sources or tall trees. It is not situated in the preferred coastal or sub-coastal rugged and elevated terrain. The Disturbance Footprint is a predominantly flat floodplain with a short and open canopy that does not contain the preferred nesting tree height or species, with a lack of tall paperbarks (*Melaleuca* sp.) or Darwin stringybark trees. The Disturbance Footprint does not contain the preferred foraging habitat types, rather it contains open woodland and shrublands that are low to mid high with some overland water flow and drainage features, however an absence of creeks or rivers. Further to this, the Disturbance Footprint is located within the “species or species habitat may occur” distribution on SPRAT, and the definition for habitat critical to the survival highlights being located in the known or likely habitat distribution. The habitat can be described as marginally suitable for red goshawk dispersing from its home breeding territory, or a dispersing juvenile, however it is more likely this species would utilise existing connectivity pathways closer to the coastline to the far north and north-east of the Project Area.

Threats

The main threats causing a decline of the red goshawk are fragmentation, extensive habitat loss and degradation. Particularly land clearing and modification for agriculture, forestry and mining are the major known threats to the species.

Occurrence within the Disturbance Footprint

Red goshawk were not observed in the Disturbance Footprint during the field surveys. This species is considered possible within the Disturbance Footprint due to the presence of marginally suitable foraging or dispersal habitat, which is located within the “species or species habitat may occur” distribution on SPRAT. The nearest records to the Disturbance Footprint are over >150 km away and are temporally and spatially uncertain. Suitable breeding habitat in the form of tall trees near a watercourse does not occur within the Disturbance Footprint. As red goshawk have very large ranges (over 200 km^2), the species may use the Disturbance Footprint transiently for foraging or dispersal, however is more likely to disperse along the north to north-east corridor where more suitable habitat occurs along large watercourses.

Potential Impacts and Mitigation Measures

A total of 46.9 ha of marginal red goshawk foraging and dispersal habitat may be cleared as part of the Project. As this species is highly mobile and construction works will be completed in phases, areas of disturbance can be temporarily avoided. Threats to prey (smaller birds) are unlikely to be increased beyond current levels with the implementation of mitigation measures detailed in Section 7.0.

Mitigation measures to prevent impact to the red goshawk include engaging a fauna – spotter catcher prior to construction works commencing, which will identify any new nests in the direct clearing area and mitigate all interactions with wildlife. However, the occurrence of nests is highly unlikely as tall trees preferred by the species are not present within the Disturbance Footprint.

Construction personnel, including contractors, will be made aware of the extent of any authorised area in which they will be working and where necessary, be advised of any specific limitations appropriate to the construction works being conducted in or within proximity to MNES species habitat. Any injured fauna species will be transported to a vet or recognised wildlife carer.

Refer to Section 7.0 of this report for avoidance, minimisation and mitigation measures.

Significant impact assessment

Details of the significant impact assessment for red goshawk is presented below in Table 31. Criteria for significant impact assessments are derived from the Significant Impact Guidelines (Department of the Environment, 2013). In summary it is unlikely the Project will have a significant impact on red goshawk.

Table 31 Significant impact assessment for red goshawk

Criterion - is there a real chance or possibility that the project will…	Assessment
Lead to a long-term decrease in the size of a population?	**Unlikely** The red goshawk was not recorded during field surveys, and the nearest known record is over 150 km away. The habitat within the Disturbance Footprint is marginal and not considered critical for breeding or long-term occupancy. Given the species' large home range (up to 200 km²), the linear nature of the proposed disturbance (46.9 ha), and the unlikely presence or utilisation of the Disturbance Footprint, the Project is unlikely to affect population size or viability.
Reduce the area of occupancy of the species?	**Unlikely** The area of occupancy will not be meaningfully reduced. The habitat within the Disturbance Footprint is not known to support a resident population and is likely only used transiently by dispersing individuals. Similar or higher-quality habitat is abundant in the surrounding landscape, ensuring continued occupancy opportunities.
Fragment an existing population into two or more populations?	**Unlikely** The red goshawk population in the region is already sparse and widely dispersed. The project footprint is not located within or between known core habitat areas and will not create barriers to movement, due to the species' high mobility. The risk of fragmenting an existing population is unlikely.
Adversely affect habitat critical to the survival of a species?	**Unlikely** The habitat within the Disturbance Footprint does not meet the criteria for critical habitat. It lacks tall riparian forests, permanent water sources, or nesting trees typically associated with red goshawk breeding. The area may be used occasionally for foraging but is not essential to the species' survival. Therefore, the project will not impact critical habitat for red goshawk.
Disrupt the breeding cycle of a population?	**Unlikely** There is no evidence of breeding activity within or near the Disturbance Footprint. The nearest known breeding records are over 200 km away. The habitat is unsuitable for nesting due to the absence of tall trees and proximity to water. Therefore, the project will not disrupt the breeding cycle of a population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**Unlikely** The Project will impact a small area of marginal habitat (46.9 ha), which is not expected to support a population or pair of red goshawks. It is possible that dispersing or foraging individuals may occasionally occur within the Disturbance Footprint. The surrounding region contains extensive, higher-quality habitat, particularly towards the coastal region to the east. The scale and nature of the disturbance are insufficient to cause a decline in the species.
Result in invasive species that are harmful to a critically endangered or endangered species becoming	**Unlikely** The project includes a weed and pest management plan. While invasive species such as cane toads and feral cats are present in the region, the

Criterion - is there a real chance or possibility that the project will…	Assessment
established in the endangered or critically endangered species' habitat?	project is not expected to increase their abundance or distribution in a way that would affect red goshawk habitat or prey availability.
Introduce disease that may cause the species to decline?	**Unlikely** There are no known diseases associated with gas exploration activities that would affect raptors like the red goshawk. The project does not involve activities likely to introduce novel pathogens.
Interfere with the recovery of the species?	**Unlikely** The project does not intersect with any known recovery areas or priority conservation zones for the red goshawk. The habitat is not critical, and the project includes mitigation measures to avoid and minimise impacts. Therefore, it will not interfere with the species' recovery.

EPBC Act Vulnerable species

Grey falcon (*Falco hypoleucos*)

Description and status of the EPBC Act

The grey falcon is listed as vulnerable under the EPBC Act. The grey falcon is a medium sized raptor weighing about 400 to 500 g and is compact, pale grey with a heavy think chest, long wings and dark wing tips. The under-body is pale grey and the tail has narrow blackish bars (DCCEEW, 2020).

Distribution

The grey falcon is widely distributed across the arid and semi-arid regions of Australia including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia (extent of occurrence estimated at 6.1 million km^2). Across this distribution the species occurs at low densities. Current population estimates indicate <1000 individuals remain. Records occur throughout the NT, however, most records are from arid and semi-arid regions (Pizzey & Knight, 2012).

Habitat requirements

Grey falcon is typically found on inland drainage systems in lightly treed lowland plains, pastoral lands, timbered watercourses and, occasionally, the driest deserts (Department of the Environment and Energy, 2019). The grey falcon primarily occurs where annual rainfall is less than 500 mm, except when wet years are followed by drought when the species becomes more widespread. At night, roosting may occur on areas of bare ground (Schoenjahn, 2018). When breeding, this species utilises the disused nests of other raptors or corvids. Nests that occur in the tallest trees along watercourses, particularly *Eucalyptus camaldulensis* and *E. coolabah*, are preferred.

Habitat critical to the survival of the species

Important populations and habitat critical to the survival of the species are not defined specifically for the grey falcon. The conservation advice identifies the species as consisting of a single population across its known range, therefore any individuals utilising the Project Area are considered an important population. However, the Project Area is unlikely to meet the needs of any one individual as it consists of marginal foraging habitat, and nesting trees are considered unlikely to occur. Therefore, using the generic definition from the Significant Impact Guidelines 1.1, the Project Area is unlikely to contain habitat critical to the survival of the grey falcon.

Threats

There have been limited studies carried out specifically on threats to the grey falcon. As a result, potential threats identified in studies are based on general considerations and extrapolations from better studies species and are therefore speculative. Threats that are expected to be the most severe to the

grey falcon are predation by cats, increased temperatures in arid and semi-arid Australia and habitat loss and fragmentation due to grazing by exotic herbivores (Schoenjahn, 2018).

Occurrence within the Disturbance Footprint

The species was not recorded during field surveys, however records are common near the Carpentaria Highway approximately 140 km from the Disturbance Footprint. This species is considered to possible to occur within the Disturbance Footprint due to suitable habitat present for foraging. Suitable habitat for nesting is absent from the Disturbance Footprint, as the Disturbance Footprint has avoided riparian areas and does not intersect with watercourses. It is possible that grey falcon use habitat within the Disturbance Footprint as foraging habitat.

Grey falcons are known to have a very large distribution and occur at low densities, only a very small number of individuals are expected to utilise the Disturbance Footprint at any time. Nonetheless, any individuals within the Disturbance Footprint are considered an important population.

Potential Impacts and Mitigation Measures

A total of 46.9 ha of grey falcon foraging habitat may be cleared as part of the Project. Threats include habitat clearing and fragmentation, direct mortality or injury during construction, and exacerbation of feral cats.

Mitigation measures to prevent impact to the grey falcon include engaging a fauna – spotter catcher prior to construction works commencing. Tall trees suitable for the species to nest were not found to occur within the Disturbance Footprint. Regardless, the fauna spotter-catcher will search for nests in the direct clearing area and mitigate all interactions with wildlife.

Construction personnel, including contractors, will be made aware of the extent of any authorised area in which they will be working and where necessary, be advised of any specific limitations appropriate to the construction works being conducted in or within proximity to MNES species habitat. Any injured fauna species will be transported to a vet or recognised wildlife carer.

Refer to Section 7.0 of this report for avoidance, minimisation and mitigation measures.

Significant impact assessment

Details of the significant impact assessment for grey falcon is presented below in Table 32. Criteria for significant impact assessments are derived from the Significant Impact Guidelines (Department of the Environment, 2013). The assessment determined that the Project is unlikely to have a significant impact on the grey falcon.

Table 32 Significant impact assessment for grey falcon

Criterion - is there a real chance or possibility that the project will…	Assessment
Lead to a long-term decrease in the size of an important population?	**Unlikely** The grey falcon is sparsely distributed and highly mobile, with individuals occupying large home ranges. The 46.9 ha of foraging habitat to be disturbed represents a very small fraction of the available habitat in the region. The Disturbance Footprint is unlikely to provide suitable habitat for one individual or a breeding pair, but may provide marginal foraging habitat. Given the absence of nesting habitat and the transient nature of potential use, the project is not expected to affect the size or viability of an important population long-term.
Reduce the area of occupancy of an important population?	**Unlikely** The area of occupancy is defined by the species' broad and low-density distribution across arid and semi-arid Australia. The habitat within the Disturbance Footprint is not unique or limiting, and similar or better-quality foraging habitat is widespread in the surrounding landscape. Therefore, the Project will not meaningfully reduce the species' area of occupancy.

Criterion - is there a real chance or possibility that the project will…	Assessment
Fragment an existing important population into two or more populations?	**Unlikely** The grey falcon's ecology is characterised by wide-ranging movement and low population density. The Project does not contain known breeding territories or core habitat, and the disturbance is not of a scale or configuration that would create barriers to movement or gene flow. The Disturbance Footprint is unlikely to provide suitable habitat for one individual or a breeding pair, but may provide marginal foraging habitat. Therefore, the Project is unlikely to fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species?	**Unlikely** Habitat critical to the survival of the grey falcon is not considered to occur within the Disturbance Footprint. The vegetation does not include breeding habitat for the grey falcon, as they prefer tall trees along watercourses for nesting. The Disturbance Footprint has been designed to avoid riparian areas and does not intersect with watercourses or contain tall nesting trees. Therefore, the habitat to be impacted is not considered critical to the species' survival.
Disrupt the breeding cycle of an important population?	**Unlikely** There is no evidence of breeding activity within or near the Disturbance Footprint. The absence of suitable nesting trees and watercourses makes the Disturbance Footprint unsuitable for breeding. As such, the Project will not interfere with the species' reproductive success. The Disturbance Footprint is likely marginal foraging habitat, and removal of this habitat is unlikely to negatively impact breeding or fledgelings.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**Unlikely** The Project will result in the loss of 46.9 ha of potential foraging habitat, but this is not expected to be of sufficient quality or extent to cause a decline in the species. The surrounding region contains extensive, intact habitat that can continue to support the species' foraging needs.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	**Unlikely** The Project includes a weed and pest management plan to prevent the introduction or spread of invasive species. There is no evidence that the project would increase the abundance of invasive species that pose a threat to grey falcons or their prey base.
Introduce disease that may cause the species to decline?	**Unlikely** The Project does not involve activities that would introduce disease to raptors. There is no known disease pathway associated with the proposed exploration activities that would affect the grey falcon.
Interfere with the recovery of the species?	**Unlikely** The Project does not intersect with known recovery areas or breeding territories. The habitat to be disturbed is not critical, and the project includes mitigation and rehabilitation measures to minimise residual impacts. Therefore, it will not interfere with the species' recovery.

Northern shrike-tit (*Falcunculus whitei)*

Description and status under the EPBC Act

The northern shrike-tit is listed as vulnerable under the EPBC Act. The northern shrike-tit has a bold black and white head, short black crest, green back and wings and yellow breast and belly. The chin and throat of males are black, while those of females are green.

Distribution

This species has been recorded from widely scattered localities from near Timber Creek to the east Gulf Country, north to Kakadu National Park and in north-eastern Arnhem Land (DEPWS, 2021d).

Habitat requirements

The northern shrike-tit has been recorded in eight different woodland types in northern Australia, mainly those that are dominated by Darwin Woollybutt (*Eucalyptus miniata*), Darwin Stringybark (*E. tetrodonta*) or Smooth-stemmed Bloodwood (*E. bleeseri*) (Robinson & Woinarski, 1992). It is thought to forage for invertebrates, mostly in foliage, branches, and the trunk and bark across a range of eucalypt and other tree species (Woinarski, 2004). It has been recorded in wet Melaleuca open woodlands and woodlands dominated by Nutwood (*Terminalia arostrata*) and Bloodwoods with flaky bark and ironwood (Ward, 2009). In the NT, nesting has been recorded from September through to January and nests are built in terminal branches at the top of trees (Ward, 2009).

Habitat critical to the survival of the species

Based on the general definition presented in SIG 1.1, the habitat within the Disturbance Footprint is unlikely to be considered habitat critical to the survival of the northern shrike-tit.

Threats

Threats to the northern shrike-tit includes frequent high intensity fires in the late dry season. It may also be adversely affected by habitat fragmentation as they typically occur in small groups across large home ranges. Broad-scale environmental changes as a result of altered fire regimes, grazing by livestock and feral animals and invasion of native woodlands by exotic plants also pose a threat (Threatened Species Scientific Committee, 2016a).

Occurrence within the Disturbance Footprint

Northern shrike-tits were not observed during field surveys and there are no recent records nearby. The subspecies appears to have a fragmented distribution. The stronghold of this species is north of the Disturbance Footprint, with NR Maps showing only four records south of -16.25° latitude. Targeted surveys by the NT Government in the Beetaloo Basin failed to detect the species south of -16.0° latitude despite significant survey effort (>30 call playback surveys). However, it is not known for certain to have disappeared from any area where it was recorded historically. It occurs in very low densities in many isolated subpopulations (S. T. Garnett & Crowley, 2000).

This species is considered to possibly occur within the Disturbance Footprint. This species is largely data deficient, due to a small number of records. There is no recovery plan in place. This assessment takes a conservative approach by assuming all individuals are representative of important populations of the subspecies. Therefore, suitable habitat occurs over most of the Disturbance Footprint.

Potential Impacts and Mitigation Measures

A total of 46.9 ha of northern shrike-tit habitat may be cleared as part of the Project. Impacts may include habitat clearing and fragmentation, direct mortality or injury during construction, and inappropriate fire regimes.

Mitigation measures to prevent impact to the northern shrike-tit include engaging a fauna – spotter catcher prior to construction works commencing, which will identify any new nests in the direct clearing area and mitigate all interactions with wildlife.

Construction personnel, including contractors, will be made aware of the extent of any authorised area in which they will be working and where necessary, be advised of any specific limitations appropriate to the construction works being conducted in or within proximity to MNES species habitat. Any injured fauna species will be transported to a vet or recognised wildlife carer.

Refer to Section 7.0 of this report for avoidance, minimisation and mitigation measures.

Significant impact assessment

Details of the significant impact assessment for northern shrike-tit is presented below in Table 33. Criteria for significant impact assessments are derived from the Significant Impact Guidelines (Department of the Environment, 2013). The assessment determined that the Project is unlikely to have a significant impact on the northern shrike-tit.

Table 33 Significant impact assessment for northern shrike-tit

Criterion - is there a real chance or possibility that the project will…	Assessment
Lead to a long-term decrease in the size of an important population?	**Unlikely** While the project will disturb 46.9 ha of suitable habitat, the northern shrike-tit is not currently known to the area. The surrounding landscape contains similar or better-quality habitat, and the Project's scale is not sufficient to cause a measurable population decline.
Reduce the area of occupancy of an important population?	**Unlikely** The species' area of occupancy is already limited and fragmented, but the Disturbance Footprint is not known to support an important population. The habitat to be disturbed is common in the wider landscape, and the species can utilise the broader region.
Fragment an existing important population into two or more populations?	**Unlikely** There is no evidence of a continuous population in the area that could be fragmented. The Disturbance Footprint is mostly linear in nature, and the species' mobility allows for continued movement across the landscape.
Adversely affect habitat critical to the survival of a species?	**Unlikely** While the habitat is suitable for foraging and nesting, it is unlikely to be habitat critical to the species' survival. There are no known breeding territories or high-density areas within the Disturbance Footprint. Similar habitat is widespread in the region.
Disrupt the breeding cycle of an important population?	**Unlikely** Although the habitat could support nesting, there is no evidence of breeding activity in the area, and the Disturbance Footprint is unlikely to contain an important population. The Project avoids key features such as dense riparian vegetation and large hollow-bearing trees where possible.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**Unlikely** The Project will impact a small area of habitat relative to the regional availability. The habitat is common within the landscape, and the Project includes rehabilitation measures to restore ecological function post-disturbance. The species' decline is more strongly linked to broader-scale threats such as fire and grazing, which the Project is not expected to exacerbate.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	**Unlikely** The Project includes a weed and pest management plan. While feral cats and invasive grasses are regional threats, the Project is not expected to

Criterion - is there a real chance or possibility that the project will…	Assessment
	increase their prevalence or impact in a way that would affect the northern shrike-tit.
Introduce disease that may cause the species to decline?	**Unlikely** There is no known disease pathway associated with the project that would affect this species. The project does not involve activities that would introduce novel pathogens.
Interfere with the recovery of the species?	**Unlikely** There is no formal recovery plan for the northern shrike-tit. However, the Project does not intersect with known strongholds or priority conservation areas. With mitigation in place, the project is not expected to interfere with the species' recovery or persistence.

Plains death adder (*Acanthophis hawkei)*

Description and status under the EPBC Act

The plains death adder is listed as vulnerable under the EPBC Act. The plains death adder is a relatively short stout snake with a triangular head and narrow neck. It is pale brown to great with irregular dark transverse bands along its body.

Distribution

Fragmented populations of the plains death adder are known to occur in the Mitchell Grass Downs of western Queensland, the Barkly Tableland on the Northern Territory / Queensland border and east of Darwin in the Northern Territory. In the Beetaloo Basin records of the species occur on cracking clays close to Lake Woods, Lake Sylvester and Lake Tarrabool.

Habitat requirements

The plains death adder occurs on the flat, treeless cracking soils riverine floodplains of northern Australia (Cogger, 2014).

Habitat critical to the survival of the species

Based on the generic definition presented in SIG 1.1, the habitat within the Disturbance Footprint is unlikely to be considered habitat critical to the survival of the plains death adder. The species occurs in fragmented populations known to occur on cracking clays more than 50 km south of the Disturbance Footprint near large inland water bodies, and therefore an important population is unlikely to occur within the Project Area.

Threats

The cane toad is the main threat facing the plains death adder. Habitat modification due to over-grazing by cattle and inappropriate fire regimes are also potential threats. Both over-grazing and fire regimes that result in large-scale wildfires reduce ground cover and prey availability for the species (DSEWPC, 2012).

Occurrence within the Disturbance Footprint

The Disturbance Footprint occurs between mapped known and potential habitat of plains death adder, and the presence of suitable clay soils, high density of woody debris and occasional leaf litter means that there is potential habitat for the plains death adder within the Disturbance Footprint. This species was not observed during field surveys and no recent sightings occur near the Disturbance Footprint. The species may possibly occur within the Disturbance Footprint, particularly following heavy wet season rainfall.

Potential Impacts and Mitigation Measures

A total of 46.9 ha of plains death adder habitat may be cleared as part of the Project. The main impacts to the species would be related to introduction and exacerbation of cane toads in the Project Area. Other threats include direct mortality or injury during construction, habitat fragmentation and altered fire regimes.

Mitigation measures to prevent impact to the plains death adder include engaging a fauna – spotter catcher prior to construction works commencing, which will identify any individuals in the direct clearing area and mitigate all interactions with wildlife.

Construction personnel, including contractors, will be made aware of the extent of any authorised area in which they will be working and where necessary, be advised of any specific limitations appropriate to the construction works being conducted in or within proximity to MNES species habitat. Any injured fauna species will be transported to a vet or recognised wildlife carer.

Refer to Section 7.0 of this report for avoidance, minimisation and mitigation measures.

Significant impact assessment

Details of the significant impact assessment for plains death adder is presented below in Table 34. Criteria for significant impact assessments are derived from the Significant Impact Guidelines (Department of the Environment, 2013). The assessment determined that the Project is unlikely to have a significant impact on the plains death adder.

Table 34 Significant impact assessment for plains death adder

Criterion - is there a real chance or possibility that the project will…	Assessment
Lead to a long-term decrease in the size of an important population?	**Unlikely** The Project will disturb 46.9 ha of potential habitat, but this represents a small fraction of the available habitat in the region. The plains death adder is cryptic and sparsely distributed, and the Disturbance Footprint is not considered to support an important population. It is unlikely the Project will lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population?	**Unlikely** The Disturbance Footprint is not considered to support an important population. The area of occupancy is unlikely to be affected, as the species' distribution is broad and patchy. The habitat to be disturbed is common and similar or better-quality habitat is widespread in the surrounding landscape.
Fragment an existing important population into two or more populations?	**Unlikely** There is no evidence of an important population in the Disturbance Footprint that could be fragmented. The Disturbance Footprint unlikely to create barriers to movement for the plains death adder.
Adversely affect habitat critical to the survival of a species?	**Unlikely** While the habitat is marginally suitable for the species, it is not considered to consist of habitat critical to the species' survival. The area may be used opportunistically during favourable conditions.
Disrupt the breeding cycle of an important population?	**Unlikely** There is no evidence of breeding activity within the Disturbance Footprint, and an important population does not occur. The species' cryptic nature and seasonal activity patterns reduce the likelihood of direct interference.

Criterion - is there a real chance or possibility that the project will…	Assessment
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**Unlikely** The scale of impact is small relative to the regional extent of suitable habitat. The project includes rehabilitation measures to restore ecological function post-disturbance. The species is unlikely to decline due to disturbances within the Disturbance Footprint.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	**Unlikely** The primary threat to plains death adders is the presence of cane toads, which are already established in the region. The project includes mitigation measures to prevent the creation of artificial water sources or other conditions that could increase local cane toad populations.
Introduce disease that may cause the species to decline?	**Unlikely** There is no known disease pathway associated with the project that would affect reptiles. The project does not involve activities that would introduce novel pathogens.
Interfere with the recovery of the species?	**Unlikely** The Project does not intersect with known recovery areas or core populations. With mitigation measures in place, the Project is not expected to interfere with the species' recovery or persistence in the region.

TPWC Act Vulnerable species

Yellow-spotted monitor (*Varanus panoptes)*

Description and status under the TWPC Act

The yellow-spotted monitor is listed as vulnerable under the TWPC Act. The yellow-spotted monitor is a large heavy-built terrestrial monitor totalling up to 1.4 m in length. It is dark brown to reddish-brown on the back with alternating transverse bands of large black spots and smaller dark-edged pale yellow spots. The underside is pale but often marked with lines of spots extending from the pattern on the back. The tail is laterally compressed, and the last quarter is pale with narrow dark bands (Ward et al., 2012).

Distribution

The yellow-spotted monitor occurs across a broad geographic range across northern Australia. In the NT most records are from the Top End but occurs as far south as Renner Springs (Ward et al., 2012).

Habitat requirements

The yellow-spotted monitor occupies a variety of habitats including coastal beaches, floodplains, grasslands and woodlands (Ward et al., 2012).

Habitat critical to the survival of the species

Based on the general definition presented in SIG 1.1, the habitat within the Disturbance Footprint is unlikely to be considered habitat critical to the survival of the yellow-spotted monitor. Any individuals within the Disturbance Footprint are unlikely to be considered an important population. As the species prefers to live and hunt near water and drainage lines, the Disturbance Footprint is unlikely to solely fulfil the species' preferred breeding and foraging requirements.

Threats

Cane toads present the most acute threat to the yellow-spotted monitor. The species is highly susceptible to cane toad toxin and monitors can easily eat a cane toad large enough to kill them (G. Smith & L. Phillips, 2006).

Occurrence within the Disturbance Footprint

Habitat modelling indicates that there is a high probability for the species across most of the Project Area (Young et al., 2022). Recent (2022) records occur within 20 km of the Disturbance Footprint and suitable habitat is present. No individuals were observed during the field surveys.

Significant impact assessment

Details of the significant impact assessment for yellow-spotted monitor is presented below in Table 35. Criteria for significant impact assessments are derived from the Significant Impact Guidelines (Department of the Environment, 2013). The assessment determined that the Project is unlikely to have a significant impact on the yellow-spotted monitor.

Table 35 Significant impact assessment for yellow-spotted monitor

Criterion - is there a real chance or possibility that the project will…	Assessment
Lead to a long-term decrease in the size of an important population?	**Unlikely** The yellow-spotted monitor is widely distributed across northern Australia. The 46.9 ha of habitat to be disturbed is small relative to the regional extent of suitable habitat. The species is mobile and capable of relocating to adjacent undisturbed areas. As the Disturbance Footprint does not support an important population, the project is not expected to impact population viability.
Reduce the area of occupancy of an important population?	**Unlikely** The area of occupancy is unlikely to be affected, as the species' range is broad and the Disturbance Footprint does not support an important population. The surrounding landscape offers extensive, similar habitat that can continue to support the species.
Fragment an existing important population into two or more populations?	**Unlikely** The Disturbance Footprint does not support an important population. The Project is unlikely to create barriers to movement for this highly mobile species. The yellow-spotted monitor is a wide-ranging species capable of traversing disturbed areas. Habitat connectivity will remain intact.
Adversely affect habitat critical to the survival of a species?	**Unlikely** While the habitat is suitable for general utilisation, it is not preferred habitat near water and therefore is not considered habitat critical to the species' survival. The Disturbance Footprint does not contain known breeding sites or high-density populations. The species is likely to use the area opportunistically rather than depend on it exclusively.
Disrupt the breeding cycle of an important population?	**Unlikely** The Disturbance Footprint does not support an important population. There is no evidence of breeding activity within the Disturbance Footprint. The species' mobility and the availability of similar habitat nearby reduce the likelihood of breeding disruption. Construction activities will be phased, further reducing potential impacts.

Criterion - is there a real chance or possibility that the project will…	Assessment
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**Unlikely** The Project will result in the loss of a small area of habitat relative to the regional availability. The habitat is not unique, and the project includes rehabilitation measures to restore ecological function post-disturbance. The species' decline is more strongly linked to broader threats such as cane toads, which the Project is not expected to exacerbate and will manage through implementation of the EMP.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?	**Unlikely** The primary threat to yellow-spotted monitors is lethal poisoning from ingesting cane toads. While cane toads are already present in the region, the Project includes mitigation measures in the EMP to prevent the creation of artificial water sources or other conditions that could increase local populations of cane toads.
Introduce disease that may cause the species to decline?	**Unlikely** There is no known disease pathway associated with the project that would affect this species. The project does not involve activities that would introduce novel pathogens.
Interfere with the recovery of the species?	**Unlikely** The Project does not intersect with known recovery areas or core populations. With mitigation measures in place, the Project is not expected to interfere with the species' recovery or persistence in the region.

EPBC Act Migratory species

Fork-tailed swift (*Apus pacificus*)

Description and status under the EPBC Act

The fork-tailed swift is listed as migratory under the EPBC Act.

Distribution

This species and is generally recorded east of the Great Dividing Range from Cooktown to the New South Wales border but extends further west in southern Queensland (DCCEEW, 2025a).

Habitat requirements

The fork-tailed swift is an aerial forager, spending most of its time in Australia on the wing. In Australia, this species mostly occurs over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. Fork-tailed swifts also occur over settled areas, including towns, urban areas and cities. This species forages aerially, up to hundreds of metres above ground, but also less than 1 m above open areas or over water. They feed in flocks ranging from 10 to 1000 birds (Higgins, 1999). The fork-tailed swift does not breed in Australia.

Threats

There are no significant threats to fork-tailed swifts in Australia. Potential threats include habitat destruction and predation by feral animals.

Occurrence within the Disturbance Footprint

Fork-tailed swifts are a non-breeding migrant to Australia. A total of 46.9 ha of foraging and dispersal habitat for fork-tailed swifts occurs within the Disturbance Footprint. Surveys recorded a small flock of fork-tailed swifts foraging aerially above the Disturbance Footprint. Important habitat for the fork-tailed swift is defined in the *Referral guideline for 14 birds listed as migratory species under the EPBC Act* as “Non-breeding habitat only: Found across a range of habitats, from inland open plains to wooded areas, where it is exclusively aerial”. Based on this definition, majority of mainland Australia is important habitat for the fork-tailed swift, including habitat within the Disturbance Footprint.

Actions which constitute a substantial loss or modification of important habitat and therefore a likely significant impact are those actions that are likely to meet or exceed the upper area thresholds (1%) presented in Table 4 of the *Referral guideline for 14 birds listed as migratory species under the EPBC Act* (Department of the Environment, 2015c). The fork-tailed swift does not have an identified threshold, however the smallest threshold for all 14 species is 865 ha.

Potential Impacts and Mitigation Measures

On the project a total of 46.9 ha of fork-tailed swift habitat may be cleared as part of the Project. Other project related potential impacts relevant to fork-tailed swift includes:

- Introduction and spread of introduced flora, fauna and pathogens
- Increased light, noise and vibration
- Dust
- Exacerbation of fragmentation impacts/barriers to movement
- Fauna mortality via strike from moving vehicles and machinery
- Gas flaring during well testing may impact the above airspace that this species occupies.

Given this species is predominately aerial and is widespread within Australia, clearing impacts are unlikely to affect the persistence of the species. Mitigation measures to prevent impact to the fork-tailed swift include engaging a fauna – spotter catcher prior to construction works commencing, which will identify any individuals in the direct clearing area and mitigate all interactions with wildlife.

Construction personnel, including contractors, will be made aware of the extent of any authorised area in which they will be working and where necessary, be advised of any specific limitations appropriate to

the construction works being conducted in or within proximity to MNES species habitat. Any injured fauna species will be transported to a vet or recognised wildlife carer.

Refer to Section 7.0 of this report for avoidance, minimisation and mitigation measures.

Significant Impact Assessment

Assessing significance of impacts to the fork-tailed swift is a process to determine whether the project will adversely impact 1) important habitat to the species and 2) will the project impact an ecologically significant proportion of the population. Table 36 details whether these impacts are likely to occur as a result of the project.

These outcomes are considered in the full assessment under the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (Department of the Environment, 2013). The assessment determined that the Project is unlikely to have a significant impact on the fork-tailed swift.

Table 36 Significant impact assessment for fork-tailed swift

Criterion – is there a real chance or possibility that the Project will…	Assessment
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?	**Unlikely** The project is not considered likely to result in the creation of barriers to movement to, between or within habitat for this aerial species, nor will it alter the fire regimes, nutrient cycles or hydrological cycles. The Disturbance Footprint contains important habitat for the fork-tailed swift due to the generalised definition in the referral guideline, however there is no identified threshold area for important habitat likely to result in a significant impact (Department of the Environment, 2015c). As the fork-tailed swift does not have an identified threshold, the smallest threshold for all 14 species is used as a proxy being 865 ha. This is considered a conservative approach, as the modelled distribution of the fork-tailed swift is the most widespread across Australia of the 14 species in the referral guideline (Department of the Environment, 2015c). Approximately 46.9 ha of woodland habitat is mapped within the Disturbance Footprint. As this species is almost exclusively aerial, the core distribution is considered to be all of Australia, and the Disturbance Footprint is less than 6% of the proxy area threshold, the project is unlikely to substantially modify, destroy or isolate an area of important habitat for the fork-tailed swift. Irregular flaring from gas testing will occur due to the Project and impact the air space directly above. This may cause temporary avoidance of small areas by the species, however will not destroy or modify an area used by this species permanently. The small flock observed during field surveys were flying high in the sky, and this behaviour is unlikely to be interrupted by flaring activities.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	**Unlikely** Invasive flora and fauna species have not been identified as a key threat to the species, and it is unlikely that the project will exacerbate invasive species beyond current levels. A weed management plan will be developed to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Seriously disrupt the lifecycle (breeding, feeding, migration or	**Unlikely**

Criterion – is there a real chance or possibility that the Project will…	Assessment
resting behaviour) of an ecologically significant proportion of the population of a migratory species?	The global population of the fork-tailed swift is probably at least 100,000 mature individuals, and it is probable that the entire global population visits Australia. An ecologically significant proportion of the fork-tailed swift population is identified in the referral guideline as 1,000 individuals (1%, internationally important threshold) and 100 individuals (0.1%, nationally important threshold) (Department of the Environment, 2015c). Approximately 20 individuals were observed during the field survey in one observation event, foraging aerially high in the sky. This species is a non-breeding migrant to Australia. It arrives in Australia around October, returning to its breeding grounds from mid-April. They are highly mobile while in Australia, with large flocks often preceding or following low pressure systems as they cross the country in search of food. Approximately 46.9 ha of woodland habitat is mapped within the Disturbance Footprint, which is not considered large enough to support an ecologically significant proportion of the fork-tailed swift population. Furthermore, the Disturbance Footprint does not contain breeding or roosting/resting habitat, and the Project is unlikely to impact feeding or migration patterns as the species forages aerially, and the Disturbance Footprint is less than 6% of the proxy area threshold for a “likely significant impact”. Gas flare testing will occur as part of the Project. These activities will likely mean the area will be avoided by fork-tailed swifts while this is occurring. Gas flaring is temporary and will not prevent fork-tailed swifts from using the airspace in the future. It is unlikely that the Project activities would result in mortality of fork-tailed swift individuals. Given the unlikely presence of the nationally important ecologically significant proportion of the population, combined with the predominantly linear impact with strong implementation of mitigation measures and amount of clearing required within a highly in-tact landscape, the Project is unlikely to seriously disrupt the lifecycle of an ecologically significant proportion of the population.

Oriental cuckoo (*Cuculus optatus*)

Description and status of the EPBC Act

The oriental cuckoo is listed as migratory under the EPBC Act. The oriental cuckoo is typically 30 to 32 cm long with a wingspan of 51 to 57 cm and a weight of 73 to 156 g. The adult male has a grey head, breast and upperparts. The belly is creamy-white with dark bars. The legs and feet are orange-yellow and there is a bare yellow ring around the eye. Adult females and juveniles occur in two morphs. The grey morph is similar to the male but has a brownish wash on the breast. The rufous morph is reddish-brown above, paler on the underparts and with strong dark bands all over including the rump (ALA, n.d.).

Distribution

The oriental cuckoo is a regular migrant to Australia, where it spends the non-breeding season (September to May) in coastal regions across northern and eastern Australia as well as offshore islands (BirdLife International, 2025b).

Habitat requirements

The oriental cuckoo species uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types (Department of the Environment, 2015a). It mainly inhabits coniferous, deciduous and mixed forests. It feeds mainly on insects and their larvae, foraging for them in trees and bushes as

well as on the ground. The *Referral guideline for 14 birds listed as migratory species under the EPBC Act*, defines important habitat for the species as “monsoonal rainforest, vine thickets, wet sclerophyll forest or open *Casuarina, Acacia* or *Eucalyptus* woodlands. Frequently at edges or ecotones between habitat types”.

Based on estimates of population sizes within Europe, the global population may be greater than 20 million. An ecologically significant proportion of the population is 1000 individuals (0.1% threshold). The lower area threshold for impacts on important habitat is 25,000 ha. There is no information regarding known threats to this species while in Australia.

Threats

Loss of habitat in its breeding range is suspected to be the dominant threat to the oriental cuckoo. This is predominantly attributed to fires. Forest loss in its non-breeding range may also be a threat (BirdLife International, 2025b).

Occurrence within the Disturbance Footprint

This species potentially occurs within the Disturbance Footprint based on the presence of suitable habitat. This species was not recorded during the field survey program. A total of 46.9 ha of potential habitat occurs within the Disturbance Footprint. All potential habitat is suitable for foraging and dispersal only as this species does not breed in Australia. Generally, records of oriental cuckoo tend to occur closer to the coast and north of the Project.

Potential habitat does meet the definition of important habitat for the species but does not meet the area requirements to be considered nationally or internationally significant habitat and is unlikely to support an ecologically significant proportion of the population as defined under the *Referral guideline for 14 birds listed as migratory species under the EPBC Act*.

Potential Impacts and Mitigation Measures

A total of 46.9 ha of marginally suitable foraging and dispersal habitat for the oriental cuckoo may be cleared as part of the Project. This area is well below the clearing threshold for significant impacts as defined by the referral guidelines. This species is highly mobile and unlikely to be sensitive to potential indirect impacts associated with the Project.

Mitigation measures to prevent impact to the oriental cuckoo include engaging a fauna – spotter catcher prior to construction works commencing, which will identify any individuals in the direct clearing area and mitigate all interactions with wildlife.

Construction personnel, including contractors, will be made aware of the extent of any authorised area in which they will be working and where necessary, be advised of any specific limitations appropriate to the construction works being conducted in or within proximity to MNES species habitat. Any injured fauna species will be transported to a vet or recognised wildlife carer.

Refer to Section 7.0 of this report for avoidance, minimisation and mitigation measures.

Significant Impact Assessment

Assessing significance of impacts to the oriental cuckoo is a process to determine whether the project will adversely impact 1) important habitat to the species and 2) will the project impact an ecologically significant proportion of the population. Table 37 will discuss whether these impacts are likely to occur as a result of the project.

These outcomes are considered in the full assessment under the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (Department of the Environment, 2013). The assessment determined that the Project is unlikely to have a significant impact on the oriental cuckoo.

Table 37 Significant impact assessment for oriental cuckoo

Criterion – is there a real chance or possibility that the Project will…	Assessment
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate	**Unlikely** The 46.9 ha of habitat to be disturbed is not considered important habitat under the EPBC Act referral guidelines. While the area may be

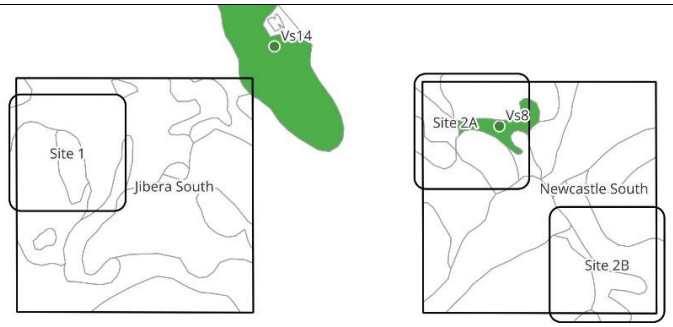
Criterion – is there a real chance or possibility that the Project will…	Assessment
an area of important habitat for a migratory species?	used for foraging or resting, it does not support an ecologically significant proportion of the population, nor is it known to be a key site for the species. The habitat is not unique and is widely available in the surrounding landscape.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species?	**Unlikely** The project includes a weed and pest management plan. While invasive species such as feral cats and cane toads are present in the region, the Project is not expected to increase their abundance or distribution in a way that would affect the oriental cuckoo.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species?	**Unlikely** The oriental cuckoo does not breed in Australia and is a solitary, wide-ranging migrant. The Disturbance Footprint is not known to support a significant proportion of the population. The scale and nature of the disturbance are not expected to disrupt feeding or resting behaviour, especially given the availability of similar habitat nearby.

Appendix C

Vegetation community descriptions

Appendix C Vegetation community descriptions

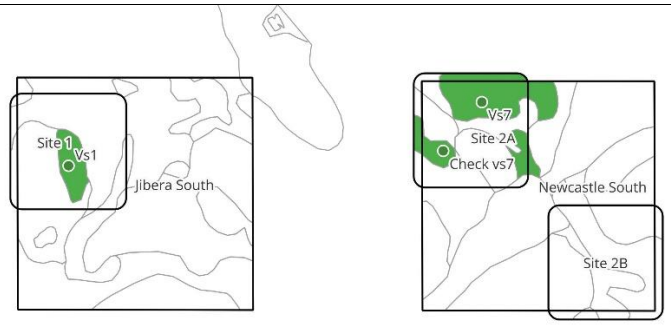
Table 38 Vegetation community description – community 1a

Community 1a *Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys,* mid high open woodland over *Petalostigma pubescens* ± *Terminalia canescens, Acacia cowleana*, over *Triodia bitextura, Grass sp. 4, Aristida latifolia* mid high hummock grassland.
Upper 1: *Corymbia dichromophloia* (fq 100%), *Eucalyptus leucophloia* (fq 100%), *Erythrophleum chlorostachys* (fq 100%).
Mid 1: *Petalostigma pubescens* (fq 100%), *Terminalia canescens* (fq 50%), *Acacia cowleana* (fq 50%).
Ground 1: *Triodia bitextura* (fq 50%), *Grass sp. 4* (fq 50%), *Aristida latifolia* (fq 50%).

No. of sites: (2) VS8, VS14
Other common species
Upper stratum (U1): -
Mid stratum (M1): *Flueggea virosa, Carissa lanceolata*
Ground stratum (G1): *Sorghum plumosum, Chrysopogon fallax*
Landform: Level plains of residual plateau surface
Soil: Sandy loam
Total area of the study area: 12.6 ha (1.5%)

Community structural summary

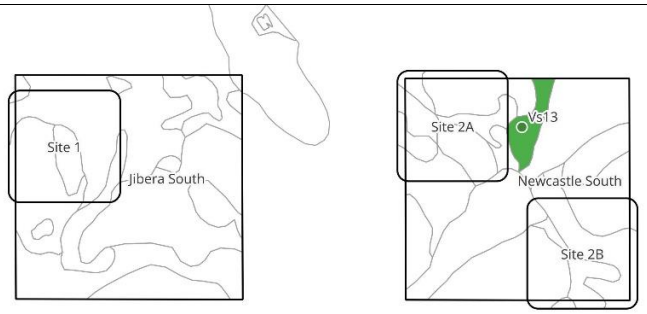
Strata	Modal growth form	Mean cover %	Mean height (m)
Upper U1	Tree	14.5 (14 – 15)	11 (10 – 12)
Mid M1	Shrub	13.5 (12 – 15)	7.5 (7 - 8)
Ground G1	Hummock grassland	30 (20 – 40)	0.5

Table 39 Vegetation community description – community 1b

Community 1b *Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys,* mid high open woodland, over *Acacia calligera, Terminalia canescens*, ± *Petalostigma pubescens* low shrubland, over *Triodia bitextura* ± *Chrysopogon fallax, Sehima nervosum, Aristida contorta*, mid high sparse hummock grassland.	
Upper 1: *Corymbia dichromophloia* (fq 100%), *Eucalyptus leucophloia* (fq 100%), *Erythrophleum chlorostachys* (fq 100%)	
Mid 1: *Acacia calligera* (fq 100%), *Terminalia canescens* (fq 100%), *Petalostigma pubescens* (fq 50%)	
Ground 1: *Triodia bitextura* (fq 100%), *Chrysopogon fallax* (fq 50%), *Sehima nervosum* (fq 50%), *Aristida contorta* (fq 50%)	
	
No. of sites: (2) VS1, VS7	

Other common species			
Upper stratum (U1): -			
Mid stratum (M1): -			
Ground stratum (G1): -			
Landform: Level plains of residual plateau surface			
Soil: Sandy loam			
Total area of the study area: 59.6 ha (7.1%)			
Community structural summary			
Strata	**Modal growth form**	**Mean cover %**	**Mean height (m)**
Upper U1	Tree	12 (8 – 16)	10
Mid M1	Shrub	65 (60 – 70)	(6.5 (6 – 7)
Ground G1	Hummock grass	20 (5 – 35)	0.5

Table 40 Vegetation community description – community 1d

Community 1d *Corymbia dichromophloia, Erythrophleum chlorostachys, Eucalyptus tectifica,* mid high open woodland, over *Terminalia canescens, Petalostigma pubescens, Macropteranthes kekwickii*, mid high open shrubland, over *Sorghum plumosum, Sehima nervosum*, mid high tussock grassland.	
Upper 1: *Corymbia dichromophloia* (fq 100%), *Erythrophleum chlorostachys* (fq 100%), *Eucalyptus tectifica* (fq 100%)	
Mid 1: *Terminalia canescens* (fq 100%), *Petalostigma pubescens* (fq 100%), *Macropteranthes kekwickii* (fq 100%)	
Ground 1: *Sorghum plumosum* (fq 100%), *Sehima nervosum* (fq 100%)	
	
No. of sites: (1) VS13	
Other common species	
Upper stratum (U1): -	
Mid stratum (M1): -	
Ground stratum (G1): -	
Landform: Level, imperfectly drained margins and run on areas	
Soil: Sandy loam	
Total area of the study area: 15.3 ha (1.8%)	

Community structural summary

Strata	Modal growth form	Mean cover %	Mean height (m)
Upper U1	Tree	12	12
Mid M1	Shrub	15	7
Ground G1	Tussock grass	30	0.5

Table 41 Vegetation community description – community 2a

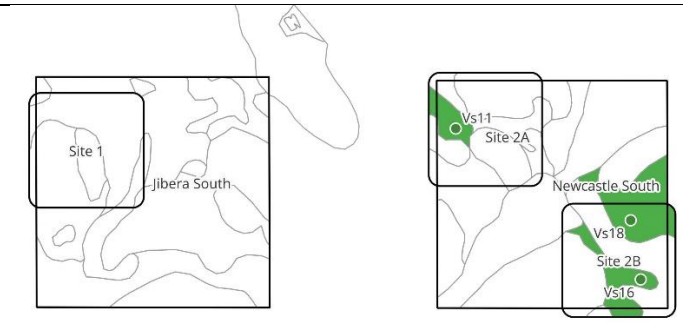
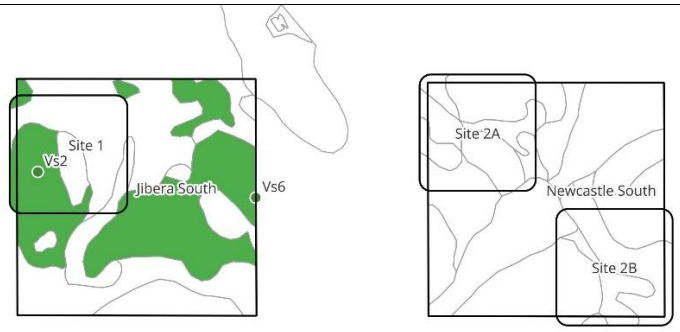
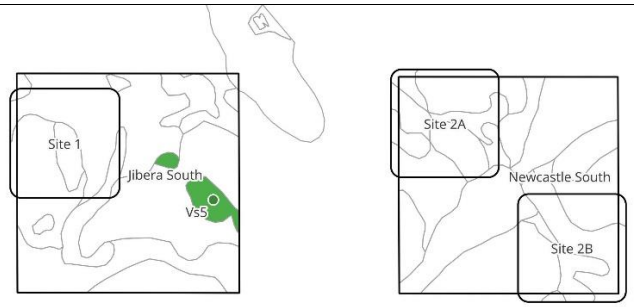
Community 2a *Acacia shirleyi, Corymbia dichromophloia, ± Corymbia terminalis*, mid high woodland over *Macropteranthes kekwickii, ± Erythrophleum chlorostachys, Acacia shirleyi*, mid high open shrubland, over *Chrysopogon fallax, ± Panicum effusum, Aristida exserta*, mid high tussock grassland.			
Upper 1: *Acacia shirleyi* (fq 100%), *Corymbia dichromophloia* (fq 66%), *Corymbia terminalis* (fq 33%)			
Mid 1: *Macropteranthes kekwickii* (fq 100%), *Erythrophleum chlorostachys* (fq 33%), *Acacia shirleyi* (fq 33%)			
Ground 1: *Chrysopogon fallax* (fq 66%), *Panicum effusum* (fq 33%), *Aristida exserta* (fq 33%)			
			
No. of sites: (3) VS11, VS16, VS18			
Other common species			
Upper stratum (U1): -			
Mid stratum (M1): *Flueggea virosa*, *Dodonaea physocarpa, Acacia hammondii, Terminalia volucris*			
Ground stratum (G1): -			
Landform: Level plains of residual plateau surface			
Soil: Sandy loam			
Total area of the study area: 60.4 ha (7.2%)			
Community structural summary			
Strata	**Modal growth form**	**Mean cover %**	**Mean height (m)**
Upper U1	Tree	31.3 (14 – 45)	12
Mid M1	Shrub	26.6 (25 – 30)	8 (6 – 30)
Ground G1	Tussock grassland	43.3 (40 – 50)	0.6 (0.5 – 1)

Table 42 Vegetation community description – Community 2b

Community 2b *Eucalyptus leucophloia, Macropteranthes kekwickii* ± *Acacia shirleyi,* mid high woodland, over *Macropteranthes kekwickii, Petalostigma pubescens, Terminalia volucris*, mid high open shrubland, over Grass sp. 3, *Aristida exserta, Cheilanthes tenuifolia*, mid high open tussock grassland.	
Upper 1: *Eucalyptus leucophloia* (fq 100%), *Macropteranthes kekwickii* (fq 100%), *Acacia shirleyi* (fq 50%)	
Mid 1: *Macropteranthes kekwickii* (fq 50%)*, Petalostigma pubescens* (fq 50%), *Terminalia volucris* (fq 50%)	
Ground 1: Grass sp. 3 (fq 50%), *Aristida exserta* (fq 50%), *Cheilanthes tenuifolia* (fq 50%)	
	
No. of sites: (2) VS2, VS6	
Other common species	
Upper stratum (U1): -	
Mid stratum (M1): *Carissa lanceolata, Eucalyptus leucophloia, Calytrix exstipulata*	
Ground stratum (G1): *Grewia savannicola*	
Landform: Level plains of residual plateau surface	
Soil: Sandy loam	
Total area of the study area: 167 ha (19.8%)	

Community structural summary			
Strata	**Modal growth form**	**Mean cover %**	**Mean height (m)**
Upper U1	Tree	32.5 (25 – 40)	10 (8 – 12)
Mid M1	Shrub	17.5 (15 – 20)	7 (6 – 8)
Ground G1	Tussock grass	10 (5 – 15)	0.5

Table 43 Vegetation community description – Community 3

Community 3 *Eucalyptus chlorophylla*, mid high open shrubland, over *Acacia holosericea, Carissa lanceolata*, mid high sparse tussock grassland, over Grass sp. 2 mid high tussock grassland.	
Upper 1: *Eucalyptus chlorophylla* (fq 100%).	
Mid 1: *Acacia holosericea* (fq 100%), *Carissa lanceolata* (fq 100%).	
Ground 1: Grass sp. 2 (fq 100%).	
	
No. of sites: (1) VS5	
Other common species	
Upper stratum (U1): -	
Mid stratum (M1): -	
Ground stratum (G1): -	
Landform: Broad, imperfectly drained lower-lying areas on level plains	
Soil: Sandy clay loam	
Total area of the study area: 14.9 ha (1.8%)	

Community structural summary

Strata	Modal growth form	Mean cover %	Mean height (m)
Upper U1	Tree	12	10
Mid M1	Shrub	8	6
Ground G1	Tussock grass	30	0.5

Table 44 Vegetation community description – Community 4a

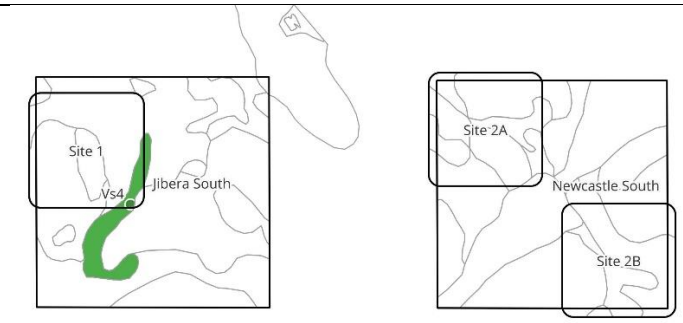
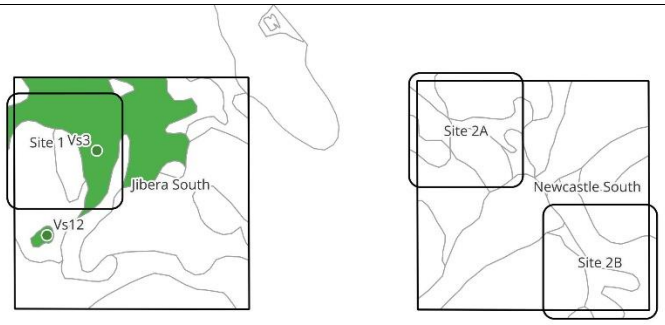
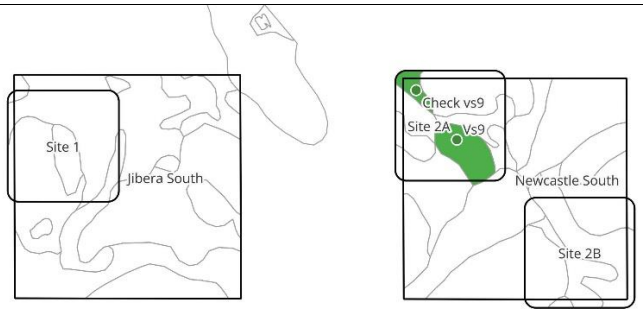
Community 4a *Eucalyptus leucophloia, Corymbia terminalis, Acacia shirleyi*, mid high open woodland, over *Macropteranthes kekwickii, Melaleuca viridiflora, Melaleuca citrolens,* mid high open shrubland, over Grass sp.1 mid high open tussock grassland			
Upper 1: *Eucalyptus leucophloia* (fq 100%), *Corymbia terminalis* (fq 100%), *Acacia shirleyi* (fq 100%).			
Mid 1: *Macropteranthes kekwickii* (fq 100%)*, Melaleuca viridiflora* (fq 100%), *Melaleuca citrolens* (fq 100%).			
Ground 1: Grass sp. 1 (fq 100%).			
			
No. of sites: (1) VS4			
Other common species			
Upper stratum (U1): -			
Mid stratum (M1): -			
Ground stratum (G1):			
Landform: Broad, imperfectly drained lower-lying areas on level plains			
Soil: Sandy clay loam			
Total area of the study area: 22.1 ha (2.6%)			
Community structural summary			
Strata	**Modal growth form**	**Mean cover %**	**Mean height (m)**
Upper U1	Tree	15	10
Mid M1	Shrub	15	7
Ground G1	Tussock grassland	15	1

Table 45 Vegetation community description – Community 4b

Community 4b *Melaleuca citrolens, Macropteranthes kekwickii, Eucalyptus tectifica*, mid high open woodland, over *Melaleuca citrolens, Terminalia volucris, Melaleuca viridiflora*, mid high open shrubland, over *Dichanthium fecundum,* Grass sp. 1, mid high open tussock grassland.	
Upper 1: *Melaleuca citrolens* (fq 100%), *Macropteranthes kekwickii* (fq 50%), *Eucalyptus tectifica* (fq 50%).	
Mid 1: *Melaleuca citrolens* (fq 100%), *Terminalia volucris* (fq 50%), *Melaleuca viridiflora* (fq 50%).	
Ground 1: *Dichanthium fecundum* (fq 50%), Grass sp. 1 (fq 50%).	
	
No. of sites: (2) VS2, VS12	
Other common species	
Upper stratum (U1): *Corymbia terminalis*	
Mid stratum (M1): *Macropteranthes kekwickii*	
Ground stratum (G1):	
Landform: Broad, imperfectly drained lower-lying areas on level plains	
Soil: Sandy clay loam	
Total area of the study area: 99.6 ha (11.8%)	

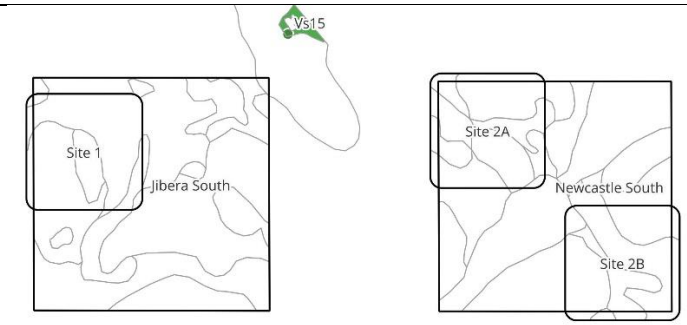
Community structural summary			
Strata	**Modal growth form**	**Mean cover %**	**Mean height (m)**
Upper U1	Tree	6	5
Mid M1	Shrub	12	2
Ground G1	Tussock grass	30	0.5

Table 46 Vegetation community description – Community 5

Community 5 *Eucalyptus microtheca, Eucalyptus pruinosa,* mid high open woodland, over *Melaleuca viridiflora, Melaleuca citrolens, Vachellia ditricha*, mid high open shrubland, over *Eulalia aurea, Aristida latifolia* mid high tussock grassland.	
Upper 1: *Eucalyptus microtheca* (fq 100%), *Eucalyptus pruinosa* (fq 100%).	
Mid 1: *Melaleuca viridiflora* (fq 100%)*, Melaleuca citrolens* (fq 100%), *Vachellia ditricha* (fq 100%).	
Ground 1: *Eulalia aurea* (fq 100%), *Aristida latifolia* (fq 100%).	
	
No. of sites: (1) VS9	
Other common species	
Upper stratum (U1): -	
Mid stratum (M1): -	
Ground stratum (G1): -	
Landform: Broad, imperfectly drained lower-lying areas on level plains	
Soil: Sandy clay loam	
Total area of the study area: 23.8 ha (2.8%)	

Community structural summary			
Strata	**Modal growth form**	**Mean cover %**	**Mean height (m)**
Upper U1	Tree	10	8
Mid M1	Shrub	6	6
Ground G1	Tussock grass	60	1

Table 47 Vegetation community description – Community 6

Community 6 (Historically cleared resprout) *Erythrophleum chlorostachys*, low open woodland, over *Erythrophleum chlorostachys, Carissa lanceolata*, mid high sparse shrubland, over *Aristida latifolia*, mid high open tussock grassland.			
Upper 1: *Erythrophleum chlorostachys* (fq 100%).			
Mid 1: *Erythrophleum chlorostachys* (fq 100%)*, Carissa lanceolata* (fq 100%).			
Ground 1: *Aristida latifolia* (fq 100%).			
			
No. of sites: (1) VS15			
Other common species			
Upper stratum (U1): -			
Mid stratum (M1): -			
Ground stratum (G1): -			
Landform: Level plains of residual plateau surface			
Soil: Sandy loam			
Total area of the study area: 4.2 ha (outside the study area)			
Community structural summary			
Strata	**Modal growth form**	**Mean cover %**	**Mean height (m)**
Upper U1	Tree	10	5
Mid M1	Shrub	5	5
Ground G1	Tussock grass	20	0.5

Appendix D

Land condition assessments

Appendix D Land condition assessments

Table 48 Land condition assessment – VS1

<table>
<tr><th colspan="6">VS1</th></tr>
<tr><td>Location</td><td>GDA94, Zone 53, 458935E, 8181344N</td><td>Vegetation community</td><td colspan="3">Comm 1b: Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys, mid high open woodland, over Acacia calligera, low shrubland.</td></tr>
<tr><td>Vegetation description</td><td colspan="5">Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys, mid high open woodland, over Acacia calligera, Terminalia canescens low shrubland, over Aristida contorta, Triodia bitextura mid high sparse tussock grassland.</td></tr>
<tr><td>Vegetation transect</td><td colspan="5">Acacia calligera (44.8%), Terminalia canescens (6.8%), Corymbia dichromophloia (5.8%), Erythrophleum chlorostachys (4.5%), Eucalyptus leucophloia (2.5%), Dodonaea platyptera (1.5%), Petalostigma pubescens (1%), Tephrosia brachyodon (0.5%), Corymbia terminalis (0.5%), Flueggea virosa (0.5%), Acacia cowleana (0.3%).</td></tr>
<tr><td>Basal area (5 sweeps)</td><td colspan="3">Eucalyptus leucophloia (7), Corymbia dichromophloia (5), Erythrophleum chlorostachys (3), Petalostigma pubescens (2), Terminalia canescens (1), Corymbia ferruginea (1), Dead tree (8).</td><td>Stand basal area (average)</td><td>3.8 m²/ha</td></tr>
<tr><td>Landform</td><td>Level plains of residual plateau surface.</td><td>Habitat</td><td colspan="3">Tree hollows scattered, fallen logs scattered, flowering plants common, litter shallow.</td></tr>
<tr><td>Disturbance
Weeds – Mesosphaerum suaveolens around existing water bore
Termite mounds
Sparse</td><td colspan="5"> </td></tr>
<tr><td>Slope
1%
Ground cover
5% vegetation, 25% litter, 70% bare soil.</td><td colspan="5"> </td></tr>
<tr><td rowspan="3">Vegetation structure</td><td colspan="2">Upper storey: 6 - 10 m</td><td colspan="3">Corymbia dichromophloia (4%), Eucalyptus leucophloia (3%), Erythrophleum chlorostachys (1%).</td></tr>
<tr><td colspan="2">Mid-storey: 1 – 6 m</td><td colspan="3">Acacia calligera (45%), Terminalia canescens (15%).</td></tr>
<tr><td colspan="2">Understorey: 0 – 1 m</td><td colspan="3">Aristida contorta (3%), Triodia bitextura (1%).</td></tr>
<tr><td>Soil texture</td><td colspan="2">Sandy loam</td><td colspan="3" rowspan="3"> </td></tr>
<tr><td>Soil drainage</td><td colspan="2">Well drained</td></tr>
<tr><td>Soil colour</td><td colspan="2">Brown</td></tr>
</table>

Table 49 Land condition assessment – VS2

<table>
<tr><th colspan="6">VS2</th></tr>
<tr><td>Location</td><td>GDA94, Zone 53, 458673E, 8181318N</td><td>Vegetation community</td><td colspan="3">Comm 2b: Eucalyptus leucophloia, Macropteranthes kekwickii ± Acacia shirleyi, mid high woodland.</td></tr>
<tr><td>Vegetation description</td><td colspan="5">Acacia shirleyi mid high woodland over Macropteranthes kekwickii, Terminalia volucris, Eucalyptus leucophloia mid high woodland, over Aristida exserta, Cheilanthes tenuifolia and Grewia savannicola mid high sparse tussock grassland.</td></tr>
<tr><td>Vegetation transect</td><td colspan="5">Macropteranthes kekwickii (30.3%), Acacia shirleyi (21.8%), Eucalyptus leucophloia (10.8), Terminalia volucris (0.8%).</td></tr>
<tr><td>Basal area (5 sweeps)</td><td colspan="3">Acacia shirleyi (20), Eucalyptus leucophloia (11), Macropteranthes kekwickii (9), Erythrophleum chlorostachys (2), Dead tree (10).</td><td>Stand basal area (average)</td><td>8.4m²/ha</td></tr>
<tr><td>Landform</td><td colspan="2">Level plains of residual plateau surface.</td><td>Habitat</td><td colspan="2">Tree hollows scattered, fallen logs abundant, flowering plants scattered, litter shallow.</td></tr>
<tr><td>Disturbance
Weeds – Mesosphaerum suaveolens within survey site cattle tracks</td><td colspan="5"> </td></tr>
<tr><td>Termite mounds
Common</td><td colspan="5"></td></tr>
<tr><td>Slope
< 1%</td><td colspan="5"> </td></tr>
<tr><td>Ground cover
5% vegetation, 20% litter, 65% bare soil.</td><td colspan="5"></td></tr>
<tr><td rowspan="3">Vegetation structure</td><td colspan="2">Upper storey: 8 - 12 m</td><td colspan="3">Acacia shirleyi (40%).</td></tr>
<tr><td colspan="2">Mid-storey: 1 – 8 m</td><td colspan="3">Macropteranthes kekwickii (12%), Terminalia volucris (5%) Eucalyptus leucophloia (2%).</td></tr>
<tr><td colspan="2">Understorey: 0 – 1 m</td><td colspan="3">Aristida exserta (1%), Cheilanthes tenuifolia (1%), Grewia savannicola (1%).</td></tr>
<tr><td>Soil texture</td><td colspan="2">Sandy loam</td><td colspan="3" rowspan="3"> </td></tr>
<tr><td>Soil drainage</td><td colspan="2">Rapidly drained</td></tr>
<tr><td>Soil colour</td><td colspan="2">Brown</td></tr>
</table>

Table 50 Land condition assessment – VS3

<table>
<tr><th colspan="6">VS3</th></tr>
<tr><td>Location</td><td>GDA94, Zone 53, 459208E, 8181471N</td><td>Vegetation community</td><td colspan="3">Comm 4b: Melaleuca citrolens, Macropteranthes kekwickii, Eucalyptus tectifica, mid high open woodland, over Melaleuca citrolens, Terminalia volucris, Melaleuca viridiflora, mid high open shrubland.</td></tr>
<tr><td>Vegetation description</td><td colspan="5">Macropteranthes kekwickii, Melaleuca citrolens, Corymbia terminalis, mid high open woodland, over Melaleuca citrolens, Melaleuca viridiflora, mid high open shrubland, over Grass sp.1 mid high open tussock grassland.</td></tr>
<tr><td>Vegetation transect</td><td colspan="5">Macropteranthes kekwickii (18.8%), Melaleuca citrolens (5%), Corymbia terminalis (3%), Melaleuca viridiflora (2%), Terminalia volucris (1.3%), Brachychiton diversifolius (0.8%), Acacia hammondii (0.5%), Carissa lanceolata (0.3%).</td></tr>
<tr><td>Basal area (5 sweeps)</td><td colspan="3">Macropteranthes kekwickii (25), Melaleuca citrolens (10), Corymbia terminalis (6), Acacia shirleyi (4) Dead tree (3).</td><td>Stand basal area (average)</td><td>9m²/ha</td></tr>
<tr><td>Landform</td><td>Broad, imperfectly drained lower-lying areas on level plains.</td><td>Habitat</td><td colspan="3">Tree hollows scattered, fallen logs scattered, flowering plants scattered, litter moderate.</td></tr>
<tr><td>Disturbance
Cattle tracks
Termite mounds
Abundant</td><td colspan="5"> </td></tr>
<tr><td>Slope
< 1%
Ground cover
10% vegetation, 60% litter, 30% bare soil.</td><td colspan="5"> </td></tr>
<tr><td rowspan="3">Vegetation structure</td><td>Upper storey: 6 - 12 m</td><td colspan="4">Macropteranthes kekwickii (10%), Melaleuca citrolens (3%), Corymbia terminalis (2%).</td></tr>
<tr><td>Mid-storey: 1 – 6 m</td><td colspan="4">Melaleuca citrolens (5%), Melaleuca viridiflora (5%).</td></tr>
<tr><td>Understorey: 0 – 1 m</td><td colspan="4">Grass sp.1 (10%).</td></tr>
<tr><td>Soil texture</td><td>Sandy clay loam</td><td colspan="4" rowspan="3"> </td></tr>
<tr><td>Soil drainage</td><td>Poorly drained</td></tr>
<tr><td>Soil colour</td><td>Yellowish brown</td></tr>
</table>

Table 51 Land condition assessment – VS7

<table>
<tr><th colspan="6">VS7</th></tr>
<tr><td>Location</td><td>GDA94, Zone 53, 469528E, 8169570N</td><td>Vegetation community</td><td colspan="3">Comm 1b: Corymbia dichromophloia, Eucalyptus leucophloia, Erythrophleum chlorostachys, mid high open woodland, over Acacia calligera, low shrubland.</td></tr>
<tr><td>Vegetation description</td><td colspan="5">Eucalyptus leucophloia, Corymbia dichromophloia, Erythrophleum chlorostachys, mid high open woodland, over Acacia calligera, Terminalia canescens, Petalostigma pubescens, mid high shrubland, over Triodia bitextura, Chrysopogon fallax, Sehima nervosum mid high open hummock grassland.</td></tr>
<tr><td>Vegetation transect</td><td colspan="5">Acacia calligera (53.3%), Corymbia dichromophloia (9.8%), Eucalyptus leucophloia (7.5%), Erythrophleum chlorostachys (5.3%), Terminalia canescens (3.5%), Terminalia volucris (1.5%), Carissa lanceolata (1.5%), Corymbia ferruginea (0.8%), Flueggea virosa (0.5%).</td></tr>
<tr><td>Basal area (5 sweeps)</td><td colspan="3">Eucalyptus leucophloia (11), Corymbia dichromophloia (9.5), Erythrophleum chlorostachys (2.5), Erythroxylum ellipticum (1), Terminalia canescens (0.5), Dead tree (1.5).</td><td>Stand basal area (average)</td><td>4.9m²/ha</td></tr>
<tr><td>Landform</td><td>Level plains of residual plateau surface.</td><td>Habitat</td><td colspan="3">Tree hollows common, fallen logs scattered, flowering plants scattered, litter shallow.</td></tr>
<tr><td>Disturbance
None recorded.
Termite mounds
Sparse</td><td colspan="5"> </td></tr>
<tr><td>Slope
< 1%
Ground cover
35% vegetation, 20% litter, 45% bare soil, 5% gravel.</td><td colspan="5"> </td></tr>
<tr><td rowspan="3">Vegetation structure</td><td>Upper storey: 7 - 10 m</td><td colspan="4">Eucalyptus leucophloia (7%), Corymbia dichromophloia (6%), Erythrophleum chlorostachys (3%).</td></tr>
<tr><td>Mid-storey: 0.5 – 7 m</td><td colspan="4">Acacia calligera (60%), Terminalia canescens (5%), Petalostigma pubescens (3%).</td></tr>
<tr><td>Understorey: 0 – 0.5 m</td><td colspan="4">Triodia bitextura (15%), Chrysopogon fallax (5%), Sehima nervosum (5%).</td></tr>
<tr><td>Soil texture</td><td>Sandy loam</td><td colspan="4" rowspan="3"> </td></tr>
<tr><td>Soil drainage</td><td>Rapidly drained</td></tr>
<tr><td>Soil colour</td><td>Brown</td></tr>
</table>

Table 52 Land condition assessment – VS11

<table>
<tr><th colspan="6">VS11</th></tr>
<tr><td>Location</td><td>GDA94, Zone 53, 469172E, 8169330N</td><td>Vegetation community</td><td colspan="3">Comm 2a: Acacia shirleyi, Corymbia dichromophloia, ± Corymbia terminalis, mid high woodland over Macropteranthes kekwickii mid high open shrubland.</td></tr>
<tr><td>Vegetation description</td><td colspan="5">Acacia shirleyi, Corymbia dichromophloia, Corymbia terminalis, mid high open woodland, over Macropteranthes kekwickii, Dodonaea physocarpa, Acacia hammondii, mid high shrubland, over Chrysopogon fallax, mid high tussock grassland.</td></tr>
<tr><td>Vegetation transect</td><td colspan="5">Macropteranthes kekwickii, (15.8%), Acacia hammondii (6.3%), Eucalyptus tectifica (5.8%), Corymbia terminalis (3.5%), Eucalyptus leucophloia (2%), Terminalia canescens (1.3%), Corymbia dichromophloia (1%), Erythrophleum chlorostachys (0.8%), Carissa lanceolata (0.5%), Petalostigma pubescens (0.3%).</td></tr>
<tr><td>Basal area (5 sweeps)</td><td colspan="3">Macropteranthes kekwickii (5), Corymbia terminalis (3), Erythrophleum chlorostachys (3), Eucalyptus tectifica (3), Corymbia dichromophloia (2), Petalostigma pubescens (1.5) Dead tree (3.5).</td><td>Stand basal area (average)</td><td>3.5 m²/ha</td></tr>
<tr><td>Landform</td><td colspan="2">Level plains of residual plateau surface.</td><td>Habitat</td><td colspan="2">Tree hollows scattered, fallen logs scattered, flowering plants scattered, litter shallow.</td></tr>
<tr><td>Disturbance
None recorded.
Termite mounds
Common</td><td colspan="5"> </td></tr>
<tr><td>Slope
< 1%
Ground cover
50% vegetation, 40% litter, 10% bare soil</td><td colspan="5"> </td></tr>
<tr><td rowspan="3">Vegetation structure</td><td colspan="2">Upper storey: 6 - 12 m</td><td colspan="3">Acacia shirleyi (10%), Corymbia dichromophloia (5%), Corymbia terminalis (5%)</td></tr>
<tr><td colspan="2">Mid-storey: 1 – 6 m</td><td colspan="3">Macropteranthes kekwickii (25%), Dodonaea physocarpa (3%), Acacia hammondii (2%)</td></tr>
<tr><td colspan="2">Understorey: 0 – 1 m</td><td colspan="3">Chrysopogon fallax (50%)</td></tr>
<tr><td>Soil texture</td><td colspan="2">Sandy loam</td><td colspan="3" rowspan="3"> </td></tr>
<tr><td>Soil drainage</td><td colspan="2">Rapidly drained</td></tr>
<tr><td>Soil colour</td><td colspan="2">Brown</td></tr>
</table>

Table 53 Land condition assessment – VS13

<table>
<tr><th colspan="6">VS13</th></tr>
<tr><td>Location</td><td>GDA94, Zone 53, 470059E, 8169314N</td><td>Vegetation community</td><td colspan="3">Comm 1d: Corymbia dichromophloia, Erythrophleum chlorostachys, Eucalyptus tectifica, mid high open woodland</td></tr>
<tr><td>Vegetation description</td><td colspan="5">Corymbia dichromophloia, Erythrophleum chlorostachys, Eucalyptus tectifica, mid high open woodland, over Terminalia canescens, Petalostigma pubescens, Macropteranthes kekwickii, mid high open shrubland, over Sorghum plumosum, Sehima nervosum high tussock grassland</td></tr>
<tr><td>Vegetation transect</td><td colspan="5">Terminalia canescens (10.5%), Corymbia dichromophloia (8.3%), Petalostigma pubescens (6%), Acacia hammondii (3.8%), Erythrophleum chlorostachys (3.5%), Gardenia sp. (2.3%), Macropteranthes kekwickii (2%), Corymbia ferruginea (1.8%)</td></tr>
<tr><td>Basal area (5 sweeps)</td><td colspan="3">Corymbia dichromophloia (5.5), Erythrophleum chlorostachys (4.5), Petalostigma pubescens (4.5), Terminalia canescens (3), Corymbia. ferruginea (1) Dead tree (3)</td><td>Stand basal area (average)</td><td>3.7 m²/ha</td></tr>
<tr><td>Landform</td><td>Level, imperfectly drained margins and run on areas.</td><td>Habitat</td><td colspan="3">Tree hollows scattered, fallen logs scattered, flowering plants scattered, litter shallow.</td></tr>
<tr><td>Disturbance
None recorded.
Termite mounds
Common</td><td colspan="2"> </td><td colspan="3"> </td></tr>
<tr><td>Slope
< 1%
Ground cover
30% vegetation, 30% litter, 35% bare soil, 5% gravel</td><td colspan="2"> </td><td colspan="3"> </td></tr>
<tr><td rowspan="3">Vegetation structure</td><td>Upper storey: 7 - 12 m</td><td colspan="4">Corymbia dichromophloia (8%), Erythrophleum chlorostachys (2%), Eucalyptus tectifica (2%)</td></tr>
<tr><td>Mid-storey: 0.5 – 7 m</td><td colspan="4">Terminalia canescens (10%), Petalostigma pubescens (3%), Macropteranthes kekwickii (2%)</td></tr>
<tr><td>Understorey: 0 – 0.5 m</td><td colspan="4">Sorghum plumosum (20%), Sehima nervosum (10%)</td></tr>
<tr><td>Soil texture</td><td>Sandy loam</td><td colspan="4" rowspan="3"> </td></tr>
<tr><td>Soil drainage</td><td>Moderately drained</td></tr>
<tr><td>Soil colour</td><td>Brown</td></tr>
</table>

Appendix E

PMST

Appendix E Protected Matters Search Tool Report 50 km

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-Oct-2025

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	18
Listed Migratory Species:	15

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

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

Details

Matters of National Environmental Significance

Listed Threatened Species			[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris acuminata Sharp-tailed Sandpiper [874]	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
Chloebia gouldiae listed as Erythrura gouldiae Gouldian Finch [90091]	Endangered	Species or species habitat known to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area	In feature area
Falcunculus frontatus whitei Crested Shrike-tit (northern), Northern Shrike-tit [26013]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area	In buffer area only
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat may occur within area	In feature area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Trichosurus vulpecula arnhemensis Northern Brushtail Possum [83091]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Elseya lavarackorum Gulf Snapping Turtle [67197]	Endangered	Species or species habitat may occur within area	In feature area
Tiliqua scincoides intermedia Northern Blue-tongued Skink [89838]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Varanus mertensi Mertens' Water Monitor [1568]	Endangered	Species or species habitat known to occur within area	In feature area
Varanus mitchelli Mitchell's Water Monitor [1569]	Critically Endangered	Species or species habitat may occur within area	In feature area
SHARK			
Pristis pristis Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Marine Species			
[Crocodylus porosus](#) Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In buffer area only
[Pristis pristis](#) Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
[Cecropis daurica](#) Red-rumped Swallow [80610]		Species or species habitat may occur within area	In feature area
[Cuculus optatus](#) Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
[Hirundo rustica](#) Barn Swallow [662]		Species or species habitat may occur within area	In feature area
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may 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]	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

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius veredus			
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area
Glareola maldivarum			
Oriental Pratincole [840]		Species or species habitat may occur within area	In feature area
Pandion haliaetus			
Osprey [952]		Species or species habitat likely to occur within area	In buffer area only

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
Anseranas semipalmata			
Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
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
Cecropis daurica as Hirundo daurica Red-rumped Swallow [80610]		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 may occur within area overfly marine area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Glareola maldivarum Oriental Pratincole [840]		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 likely to occur within area	In feature area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla cinerea			
Grey Wagtail [642]		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
Pandion haliaetus			
Osprey [952]		Species or species habitat likely to occur within area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Reptile			
Crocodylus johnstoni			
Freshwater Crocodile, Johnston's Crocodile, Johnstone's Crocodile [1773]		Species or species habitat may occur within area	In feature area
Crocodylus porosus			
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In buffer area only

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Bullwaddy	Conservation Reserve	NT	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Geological and Bioregional Assessments [Resource Information]

Name	State	Website	Buffer Status
Beetaloo GBA region	NT	GBA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is 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 on the contents of this report.

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 point locations and environmental data layers.

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 when time permits.

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 breeding sites; and
- 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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Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix F

Survey species list

Appendix F Survey species list

Table 54 Flora species within the Project Area

Family	Common name	Scientific name	EPBC Act status[1]	TPWC Act status[2]
Leguminosae		*Acacia calligera*	NL	LC
Leguminosae		*Acacia cowleana*	NL	LC
Leguminosae		*Acacia hammondii*	NL	LC
Leguminosae		*Acacia holosericea*	NL	LC
Leguminosae		*Acacia lysiphloia*	NL	LC
Leguminosae	Lancewood	*Acacia shirleyi*	NL	LC
Poaceae	Bunched kerosene grass	*Aristida contorta*	NL	LC
Poaceae		*Aristida exserta*	NL	LC
Poaceae	Feathertop wiregrass	*Aristida latifolia*	NL	LC
Sterculiaceae		*Brachychiton diversifolius*	NL	LC
Myrtaceae		*Calytrix exstipulata*	NL	LC
Apocynaceae		*Carissa lanceolata*	NL	LC
Pteridaceae	Rock fern	*Cheilanthes tenuifolia*	NL	LC
Poaceae		*Chrysopogon fallax*	NL	LC
Myrtaceae		*Corymbia dichromophloia*	NL	LC
Myrtaceae		*Corymbia ferruginea*	NL	LC
Myrtaceae		*Corymbia terminalis*	NL	LC
Poaceae	Curly bluegrass	*Dichanthium fecundum*	NL	LC
Sapindaceae		*Dodonaea physocarpa*	NL	LC
Leguminosae		*Erythrophleum chlorostachys*	NL	LC
Erythroxylaceae		*Erythroxylum ellipticum*	NL	LC
Myrtaceae		*Eucalyptus chlorophylla*	NL	LC
Myrtaceae		*Eucalyptus leucophloia*	NL	LC
Myrtaceae	Coolibah	*Eucalyptus microtheca*	NL	LC
Myrtaceae	Silver box	*Eucalyptus pruinosa*	NL	LC
Myrtaceae	Darwin box	*Eucalyptus tectifica*	NL	LC
Poaceae	Silky browntop	*Eulalia aurea*	NL	LC
Phyllanthaceae		*Flueggea virosa*	NL	LC
Rubiaceae		*Gardenia sp.*	NL	LC
Sparrmanniaceae		*Grewia savannicola*	NL	LC
Combretaceae		*Macropteranthes kekwickii*	NL	LC
Myrtaceae		*Melaleuca citrolens*	NL	LC
Myrtaceae		*Melaleuca viridiflora*	NL	LC
Poaceae		*Panicum effusum*	NL	LC

Family	Common name	Scientific name	EPBC Act status[1]	TPWC Act status[2]
Picrodendraceae	Quinine tree	*Petalostigma pubescens*	NL	LC
Poaceae		*Sehima nervosum*	NL	LC
Poaceae		*Sorghum plumosum*	NL	LC
Leguminosae		*Tephrosia brachyodon*	NL	LC
Combretaceae		*Terminalia canescens*	NL	LC
Combretaceae		*Terminalia volucris*	NL	LC
Poaceae		*Triodia bitextura*	NL	LC
Leguminosae		*Vachellia ditricha*	NL	LC

Table 55 Fauna species within the Project Area

Family	Common name	Scientific name	EPBC Act status[1]	TPWC Act status[2]
Birds				
Corcoracidae	Apostlebird	*Struthidea cinerea*	NL	LC
Meliphagidae	Banded honeyeater	*Cissomela pectoralis*	NL	LC
Columbidae	Bar-shouldered dove	*Geopelia humeralis*	NL	LC
Campephagidae	Black faced cuckoo shrike	*Coracina novaehollandiae*	NL	LC
Artamidae	Black faced woodswallow	*Artamus cinereus*	NL	LC
Charadriidae	Black fronted dotterel	*Elseyornis melanops*	NL	LC
Accipitridae	Black kite	*Milvus migrans*	NL	LC
Meliphagidae	Blue-faced honeyeater	*Entomyzon cyanotis*	NL	LC
Accipitridae	Brown goshawk	*Accipiter fasciatus*	NL	LC
Phasianidae	Brown quail	*Synoicus ypsilophorus*	NL	LC
Otididae	Australian bustard	*Ardeotis australis*	NL	LC
Columbidae	Common bronzewing	*Phaps chalcoptera*	NL	LC
Columbidae	Crested pigeon	*Ocyphaps lophotes*	NL	LC
Estrildidae	Double barred finch	*Taeniopygia bichenovii*	NL	LC
Alcedinidae	Forest kingfisher	*Todiramphus macleayii*	NL	LC
Cacatuidae	Galah	*Eolophus roseicapilla*	NL	LC
Maluridae	Grass wren	*Amytornis sp*	NL	-
Pomatostomidae	Grey crowned babbler	*Pomatostomus temporalis*	NL	LC
Meliphagidae	Grey fronted honeyeater	*Ptilotula plumula*	NL	LC
Caprimulgidae	Large-tailed nightjar	*Caprimulgus macrurus*	NL	LC
Monarchidae	Leadens flycatcher	*Myiagra rubecula*	NL	LC
Monarchidae	Magpie-lark	*Grallina cyanoleuca*	NL	LC
Charadriidae	Masked lapwing	*Vanellus miles*	NL	LC
Monarchidae	Paperbark flycatcher	*Myiagra inquieta subsp nana*	NL	LC
Columbidae	Peaceful dove	*Geopelia placida*	NL	LC

Family	Common name	Scientific name	EPBC Act status[1]	TPWC Act status[2]
Motacillidae	Australasian pipit	*Anthus novaeseelandiae*	NL	LC
Corvidae	Australian raven	*Corvus coronoides*	NL	LC
Cacatuidae	Red-tailed black-cockatoo	*Calyptorhynchus banksii*	NL	LC
Pachycephalidae	Rufous whistler	*Pachycephala rufiventris*	NL	LC
Threskiornithidae	Straw necked ibis	*Threskiornis spinicollis*	NL	LC
Accipitridae	Whistling kite	*Haliastur sphenurus*	NL	LC
Acanthizidae	White throated gerygone	*Gerygone olivacea*	NL	LC
Meliphagidae	White throated honeyeater	*Melithreptus albogularis*	NL	LC
Campephagidae	White-winged triller	*Lalage tricolor*	NL	LC
Rhipiduridae	Willie wagtail	*Rhipidura leucophrys*	NL	LC
Meliphagidae	Yellow throated miner	*Manorina flavigula*	NL	LC
Migratory birds				
Apodidae	Fork-tailed swift	*Apus pacificus*	Mi	-
Mammals				
Suidae	Pig	*Sus scrofa**	-	-
Macropodidae	Agile wallaby	*Notamacropus agilis*	NL	LC
Reptiles				
Scincidae	Carlia sp	*Carlia sp.*	-	-
Agamidae	Two lined dragon	*Diporiphora sp.*	-	-
Insects				
Apidae	Blue banded bee	*Amegilla cingulata*	NL	LC
Araneidae	Jewel spider	*Austracantha minax*	NL	LC

1 Conservation status under the EPBC Act: NL = Not Listed, Mi = Migratory

2 Conservation status under the TPWC Act: LC = Least concern.