

# **Appendix X**

## **Regulatory Approvals Plan**



# Haughton Pipeline Duplication Project – Stage 2

**Regulatory Approvals Plan**

Townsville City Council

17 March 2022

→ **The Power of Commitment**

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# 1. Introduction

## 1.1 Purpose of this report

This report is intended to be used for internal purposes between GHD and Townsville City Council. The purpose of the report is to:

- Identify Commonwealth, State and local government legislation and policies relevant to the proposed works and project area/site, including planning and environmental requirements that need to be considered during the design, tender, construction, commissioning and operational phases of the project.
- Describe the approvals framework, process and recommended approvals pathway in obtaining the necessary project approvals and permits.
- Identify approval timeframes, fees and site-specific technical investigations, studies and reports that will need to be progressed and included as supporting information in the development application process.

This report will be reviewed and amended as required in line with design changes. Triggers for amendments to this report may include changes to the preferred pipeline alignment and/or pump station site and layout, the availability of additional or more detailed design information, updated feedback from regulatory authorities as a result of stakeholder engagement and agency meetings, changes to assessment and approvals processes, lodgement of applications and issue of decision notices.

## 1.2 Scope and limitations

This report: has been prepared by GHD for Townsville City Council and may only be used and relied on by Townsville City Council for the purpose agreed between GHD and the Townsville City Council as set out in section 1.1 of this report. GHD otherwise disclaims responsibility to any person other than Townsville City Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible. The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared. The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.3). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Townsville City Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has identified possible approval timeframes and application fees as set out in the Approvals Register of this report using information reasonably available to the GHD employee who prepared this report; and based on assumptions and judgments made by GHD. The approval timeframes and application fees have been provided for the purpose of determining a preferred approvals pathway and must not be used for any other purpose. The cost estimates are preliminary estimates only. Actual application fees at the time of lodgement and other variables may be different to those identified and may change with CPI increases or updates to fee schedules.

GHD excludes and disclaims all liability for all claims, expenses, losses, damages and costs, including indirect, incidental or consequential loss, legal costs, special or exemplary damages and loss of profits, savings or economic benefit, Townsville City Council may incur as a direct or indirect result of the Approvals Register, for any reason being inaccurate, incomplete or failing to achieve any particular purpose. To the extent permitted by law, GHD excludes any warranty, condition, undertaking or term, whether express or implied, statutory or otherwise, as to the condition, quality, performance, merchantability or fitness for purpose of the Approvals Register. Townsville City Council absolves GHD from any consequence of Townsville City Council's or other person's use of or reliance on, the Approvals Register.

## 1.3 Qualifications

This report has been prepared with respect to the following assumptions:

- Site details as established through Commonwealth, State and local desktop assessments are correct and reflect current site conditions at the time the searches were conducted unless otherwise verified by field surveys
- Initial desktop assessments and searches undertaken to date have been based on preliminary design concept arrangements and the preferred pipeline alignment (alternative pipeline alignment dated 27 January 2021). Noting that the final alignment and construction footprint may change as a result of field investigations, landholder discussions and as the design progresses
- Approvals and/or permits associated with construction related activities such as environmentally relevant activities and the source of bulk construction materials will be the responsibility of the construction contractor to obtain
- Non-resident workforce accommodation or construction camps are considered unlikely to be required given the proximity of the site to Ayr and Townsville.

## 1.4 Abbreviations

Table 1      *Abbreviations*

Abbreviation	Meaning
CEMP	Construction Environmental Management Plan
DAF	Department of Agriculture and Fisheries
DSDSATSIP	Department of Seniors, Disability Services, Aboriginal and Torres Strait Islander Partnerships
DAWE	Department of Agriculture, Water and the Environment
DES	Department of Environment and Science
DoR	Department of Resources
DRDMW	Department of Regional Development, Manufacturing and Water
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning
DTMR	Department of Transport and Main Roads
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESCP	Concept Erosion and Sediment Control Plan
EVNT	Endangered, vulnerable, near threatened species
FEED	Front-End-Engineering-Design
HPS2	Haughton Pipeline Stage 2
HV	High Voltage
ILUA	Indigenous Land Use Agreement
LGID	Local Government Infrastructure Designation
MCU	Material Change of Use
MID	Ministerial Infrastructure Designation
MGR	Minister's Guidelines and Rules
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
Op Works	Operational Works
PD	Preliminary Documentation
PIA	Pavement impact assessment

Abbreviation	Meaning
PMST	Protected Matters Search Tool
RaL	Reconfiguring a Lot
RE	Regional Ecosystem
RFI	Request for Information
RIDA	Regional Interest Development Approval (application)
RPP	Riverine Protection Permit
RSA	Road Safety Impact Assessment
SARA	State Assessment and Referral Agency
SCR	State Controlled Road
SDAP	State Development Assessment Provisions
SLAM	State Land and Asset Management Unit
SMP	Species Management Programs
SQMP	Stormwater Quality Management Plan
TBC	To be confirmed
TIA	Traffic Impact Assessment
DTMR	Department of Transport and Main Roads
WWBW	Waterway Barrier Works

## 1.5 Project background

### 1.1.1 Overview

The Houghton Pipeline Stage 2 (HPS2) project involves the construction of a new water supply pipeline and pump station capable of transferring 364 ML/day of water over a 22-hour period of raw water from the Burdekin River to the Ross River Dam (RRD) to contribute to meeting the bulk water supply for Townsville.

The project is a joint funding arrangement between the Queensland Government (the State) and Townsville City Council.

### 1.1.2 Stage 1

Stage 1 of the project was completed in 2020 and comprised approximately 33 km of DN1800 pipeline constructed from the Houghton River to Toonpan Creek at the head of the RRD.

Stage 1.1 of the project was completed in 2021 and is an extension of the Stage 1 pipeline works from the Houghton River by 3 km, directed towards the Stage 2 pipeline alignment. The Stage 1.1 works end with an isolation valve pit and is the connection point for Stage 2.

### 1.1.3 Stage 2

Stage 2 (this project) comprises of the construction of a pump station at the Sunwater HMC (Lot 22 GS1042) and pipeline from the pump station to Stage 1.1, to provide an integrated water transfer system.

## 1.6 Stage 2 – general system components

The general pipeline only system components comprise of:

#### Pipeline

- Single pipeline (approximately 28.5 km in length) connecting to the completed Stage 1.1 pipeline

- DN1800 Glass Reinforced Polymer (GRP), rubber ring jointed with concrete thrust blocks where thrust restraint is required
- Trenchless construction (pipe jacking) with an RCP enveloper pipe and fully welded OD1829 Mild Steel Cement Lined (MSCL) carrier pipe beneath the state-controlled Ayr-Dalbeg Rd, SunWater Siphons (in Landowner 3 property), Scott Creek and SunWater Haughton Main Channel crossings
- Open trench construction with RCP enveloper pipe and fully welded OD1829 MSCL carrier pipe beneath state-controlled Ayr Ravenswood Road and Burdekin Shire Council controlled Keith Venables Rd
- Concrete encased fully welded OD1829 MSCL through creek crossings
- Inline PA thrust blocks where transitioning from restrained MSCL to GRP RRJ pipe
- Air valves, scour valves and isolation valves for operation and maintenance of the pipeline

**Pipeline Alignment Surge Tank**

- One (1) 300 kL open surge tank to be constructed off the Stage 1 pipeline to limit negative transient pressures in the pipeline
- Additional surge protection will be required as part of the pump station design development to limit transients

The final pipeline alignment is shown in Figure 1.

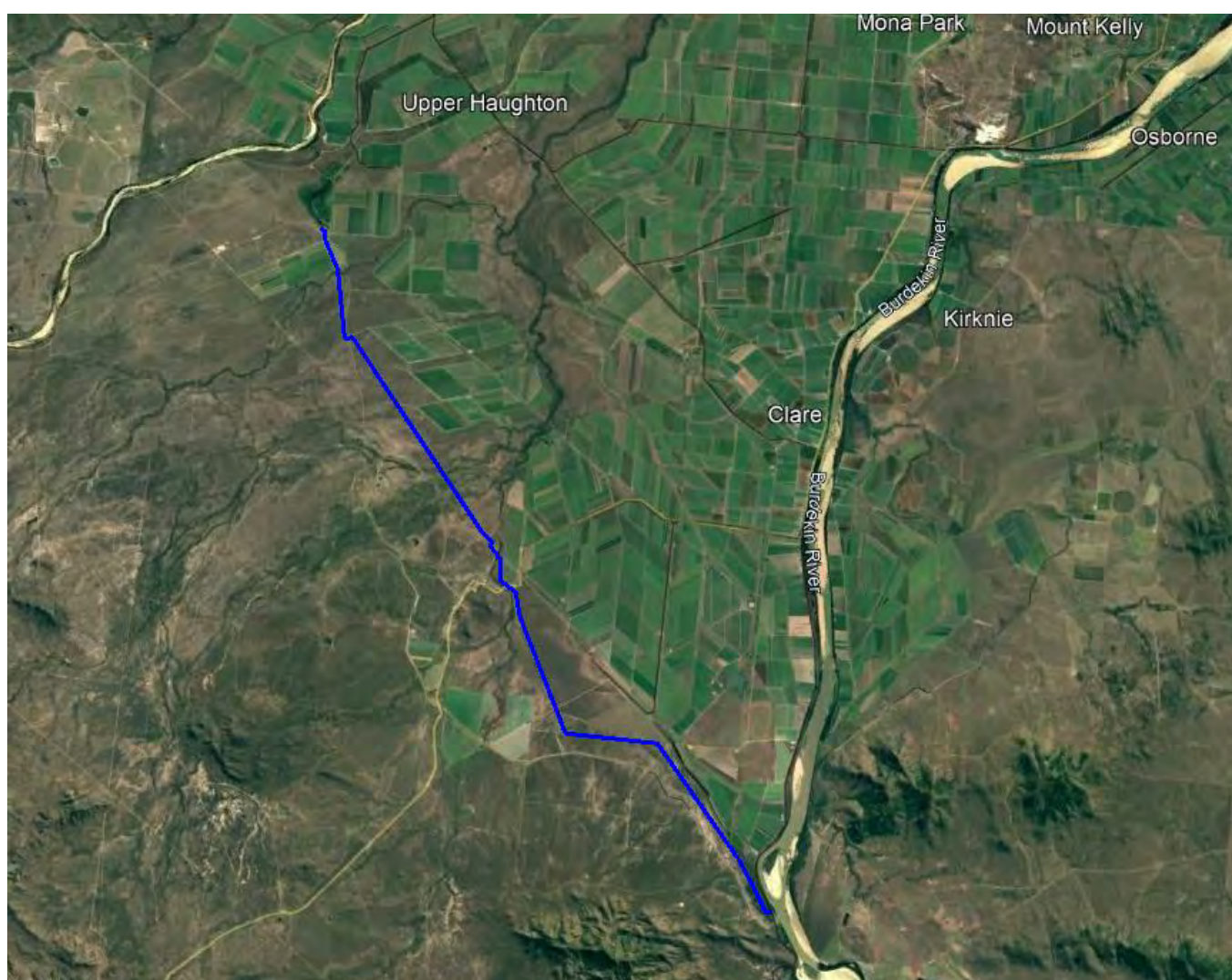


Figure 1 Final pipeline alignment

**Pump Station and Intake Structure**

The pump station and intake structure comprise of:



- **Intake:** The intake structure will be a box-in-bank type reinforced concrete structure with five (5) bays consisting of the following:
  - Intake bay with aluminium trash screens, nominal 100 mm aperture, fixed in position to the concrete intake structure. Trash screens sized for a 25% blockage allowance. Cleaning of the screens will be via removal with a Franna crane for pressure cleaning.
  - Pump chamber housing submersible transfer pump (total of 4 duty plus 1 hot standby pumps), complete with guide rails, lifting chains, pump condition monitoring and well level instrumentation. Pump motors fully submerged for motor cooling. Minimum operating level of RL36 m based on constructing the intake opening 0.25 m to 0.5 m above the channel bed level and to limit the width of the intake structure.
  - Openings to the pump chamber provided with penstocks to enable isolation and maintenance. Penstocks hydraulically operated with portable hydraulic power pack. Future replacement of penstocks at end of life (25 years) via commercial diving operations.
  - Intake sized for 273 ML/day abstraction capacity.
  - Open roof construction with Webforge access panels for removal of pumpsets and access for maintenance.
  - Intake roof level RL39.45 m based on matching the levee bank of the HMC.
- **Pipe Manifold:** An above ground pipe manifold will be located on the top of the bank consisting of the following:
  - Each outlet main will be fitted with a check valves to inhibit backflow into the intake structure.
  - Each outlet main will be fitted with an electromagnetic flowmeter.
  - Each outlet main will have a butterfly valve to allow for isolation.
  - Two of the five outlet mains will be fitted with a bypass pressure control valve arrangement to provide controlled filling of the pipeline under the empty pipe condition (duty / standby fill mode operation).
- **HV building structure:** The HV building will consist of slab on ground foundation with braced steel framed structure located on the top of the bank. The building will have Colorbond wall and roof cladding. The HV infrastructure will include:
  - HV switchboard and related services inside the HV building
  - 6 No. x 1 MVA step down transformers located external to the HV building
  - Kiosk substation and generator for LV main and back up emergency supply (to run low voltage control/lighting systems and the dry well sump pumps, not the HV transfer pumps) located external to the HV building.
- **LV building structure:** The HV building will consist of slab on ground foundation with braced steel framed structure located on the top of the bank. The building will have Colorbond wall and roof cladding. The LV building infrastructure will include:
  - Pump variable speed drives (VSD's), LV switch room and related services
  - Package air-conditioned for temperature control of electrical equipment in the LV building
  - The LV building will contain a control room, amenities facility, Package water treatment (UV and filter) for potable water supply to amenities and basin and onsite septic system.
- **Surge vessel:** As part of the pipeline surge protection a hydropneumatic surge vessel (pressure vessel) and open tank will be required to reduce negative pressures within the pipeline. The surge vessel will be a proprietary pressure vessel structure.
- **Site access roads and pad:** Internal site access roads and hardstands are required to provide vehicular access to the pump station and surrounding infrastructure. The general arrangement of these access roads will comprise of:
  - A new seven (7) metre wide unsealed access road has been allowed at this stage off Ayr Dalbeg Road
  - Bitumen sealed surfacing for the site pad
  - Appropriate turn radii for mobile crane and single unit truck
  - The site pad will be security fenced around its perimeter with lockable gates to allow site access.

- A six (6) metre wide unsealed access road has been allowed around the outside of the perimeter fencing to allow for normal Sunwater maintenance vehicle access.

The proposed pump station site and layout is shown in Figure 2.

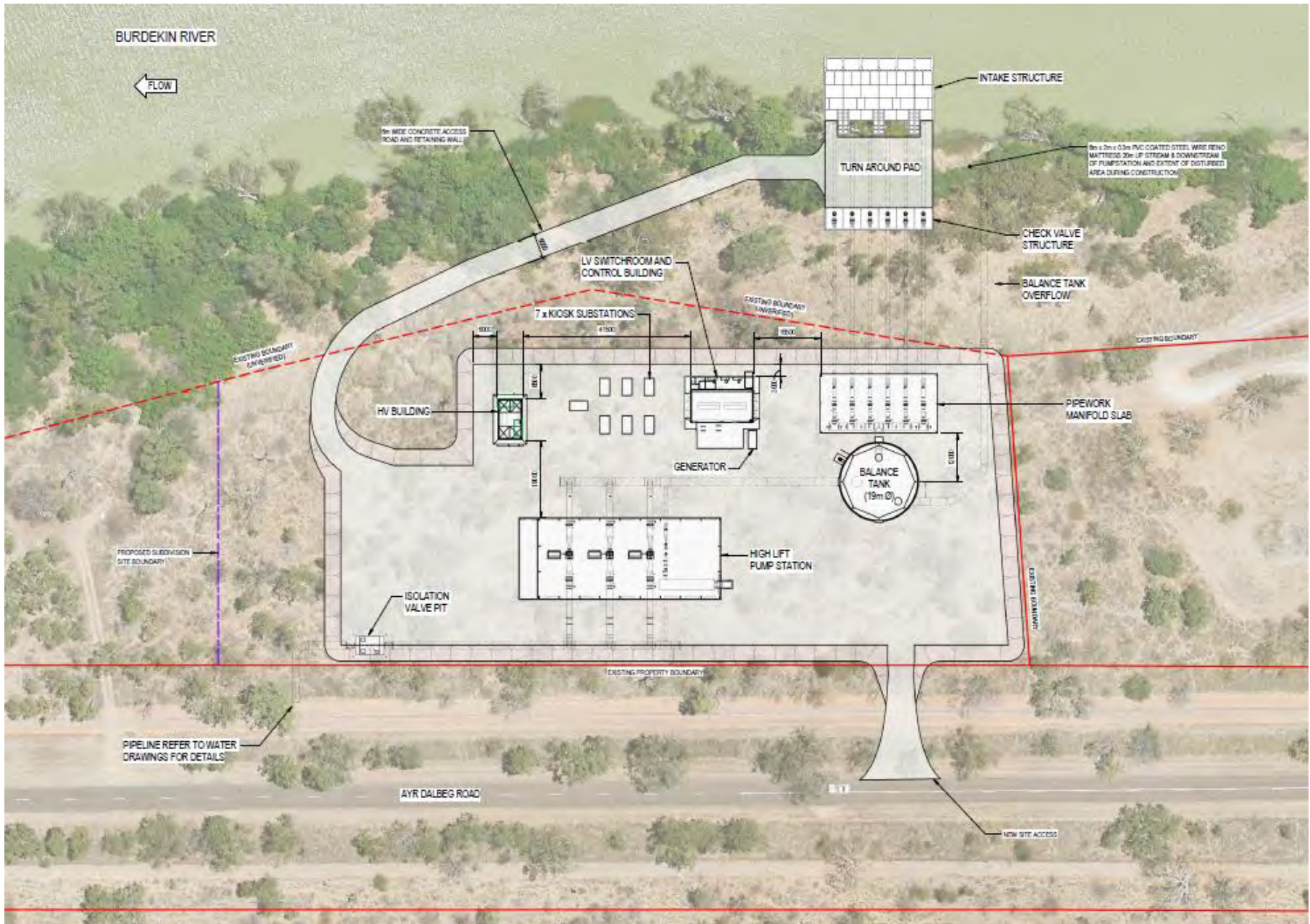


Figure 2 Proposed pump station site and layout

## Power Supply Works

HV power connection is required to the pump station. Townsville City Council are currently awaiting offers from Ergon and Powerlink for HV supply.

## Ancillary Works

Ancillary work areas required to complete Stage 2 are expected to include:

- Construction contractor parking, site office and storage areas
- Temporary erosion and sediment control devices
- Fit out of the constructed Haughton Pipeline Stage 1 Head Control Towers with power, instrumentation and communications.

## 1.7 Methodology

The following desktop searches of environmental databases were carried out for the proposed project area to inform the approvals review:

- *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (PMST) to identify Matters of National Environmental Significance (MNES) - 10 km buffer applied to the pipeline alignment
- Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) cultural heritage database for known sites of cultural heritage significance
- Protected Plants Flora Survey Trigger Map showing high-risk areas around protected plant records that require a flora survey to be undertaken in accordance with the Flora Survey Guidelines – Protected Plants
- Queensland Globe mapping
- Regulated vegetation mapping
- State Planning Policy interactive mapping system to identify Matters of State Environmental Significance (MSES)
- State Assessment and Referral Agency (SARA) development assessment online mapping which identifies additional environmental features and approval triggers
- The Australian Heritage Database and Queensland Heritage Register for recorded places of heritage significance
- WetlandMaps.

Copies of desktop search results are provided in Appendix A.

Both Burdekin Shire Council and SARA have been briefed on the project and initial pre-lodgement advice sought on regulatory approval matters. A copy all written pre-lodgement advice received from these agencies is included in Appendix B.

## 2. Key legislation and approval requirements

The following section describes the overarching environmental and planning legislation and primary approvals that are likely to apply to construction and operation of HPS2 project.

### 2.1 Commonwealth requirements

#### 2.1.1 *Environment Protection Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the principle environmental legislation administered by the Commonwealth Government. Part 3 of the EPBC Act determines that an action cannot be taken that is likely to have a significant impact on a MNES without approval from the Minister who



administers the EPBC Act. An action that the Minister decides is likely to have a significant impact on MNES is deemed a 'controlled action' and requires assessment under the provisions of the EPBC Act.

The nine MNES protected under the EPBC Act are as follows, with those considered most relevant to the construction of the project highlighted in bold:

- World heritage properties
- National heritage places
- **Wetlands of international importance (listed under the Ramsar Convention)**
- **Listed threatened species and ecological communities**
- **Migratory species protected under international agreements**
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- A water resource, in relation to coal seam gas development and large coal mining development.

### **EPBC Act PMST results**

The following MNES were identified from the EPBC Act PMST (accessed on 10/02/2021) within 10 km of the proposed pipeline alignment:

- 1 wetland of international importance - Bowling Green Bay located approximately 20 km upstream of the project area
- 2 threatened ecological communities - Poplar Box Grassy Woodland on Alluvial Plains and Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions are listed as likely to occur in the area
- 23 threatened species – one bird (Southern Black-throated Finch (BTF)), one mammal (Koala) and one plant (Bluegrass) are listed as known to occur in the area
- 18 migratory species – the Black-faced Monarch and Satin Flycatcher are listed as known to occur in the area
- 23 marine species – the Great Egret/White Egret, Black-faced Monarch and Satin Flycatcher are listed as known to occur in the area
- 31 invasive species – the Cane Toad is listed as known to occur in the area
- 2 nationally important wetlands – the Barratta Channels Aggregation and Haughton Balancing Storage Aggregation are listed as being in the project area

### **Initial baseline ecological field survey results**

The initial ecological field survey for the HPS2 project was undertaken by NRA Environmental Consultants (NRA) on 21 April and 25-26 May 2021.

The field survey included:

- Verification of RE mapping via quaternary vegetation assessments along the pipeline alignment to ground-truth existing mapping.
- Searches for, and assessment of, potential habitat for Threatened, Near Threatened and Migratory (T/NT&M) flora and fauna species as listed under State and Commonwealth legislation. Information (e.g. location, abundance and behaviour) on any T/NT&M species sighted opportunistically will be recorded.
- Deployment and collection (approximately 10 days later) of acoustic bat detectors to assess the presence of Threatened and Near Threatened micro-bat species, including Bare-rumped Sheath-tailed Bat (*Saccolaimus nudicluniatatus*).
- Searches for and, if necessary, ground-truthing to confirm the presence of Matters of National Environmental Significance (MNES) (according to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)) and MSES (according to State Planning Policy and the Queensland *Environmental Offsets Regulation 2014*) identified by the desk-based assessment.

- Searches for weeds, including those of national significance with the potential to invade natural ecosystems, to provide an understanding of their baseline condition prior to pipeline construction.
- Assessment of other environmental matters, such as watercourses and wetlands, relevant to the planning and approvals process.

Results of the field survey and recommended mitigation and management measures are contained in NRA's Environmental Analysis Report at Appendix D.

Listed threatened species with the potential to be impacted by construction of the project based on a review of NRA's Environmental Analysis Report include the koala, bare-rumped sheathtail bat, southern black-throated finch and black ironbox.

Further targeted MNES surveys for these species were carried out in October 2021 to demonstrate sufficient survey effort has been undertaken and to better define the nature and extent of impact on each species. Results from these surveys assisted in completing the online EPBC Act referral form.

### ***EPBC Act online referral and assessment process***

TCC requested GHD submit an EPBC Act Referral to DAWE for HPS2 on the basis that Stage 1 of the project was previously referred. This is consistent with the approach and EPBC Act Referral submitted for Stage 1 of the project (EPBC Act Referral Ref: EPBC 2015/7606 determined to be 'Not a Controlled Action' on 5 January 2016).

A pre-referral meeting was requested with DAWE to discuss the potential impacts the project may have on MNES prior to making a referral. This will help to ensure that the referral process and any assessment and approvals are managed efficiently reducing overall costs.

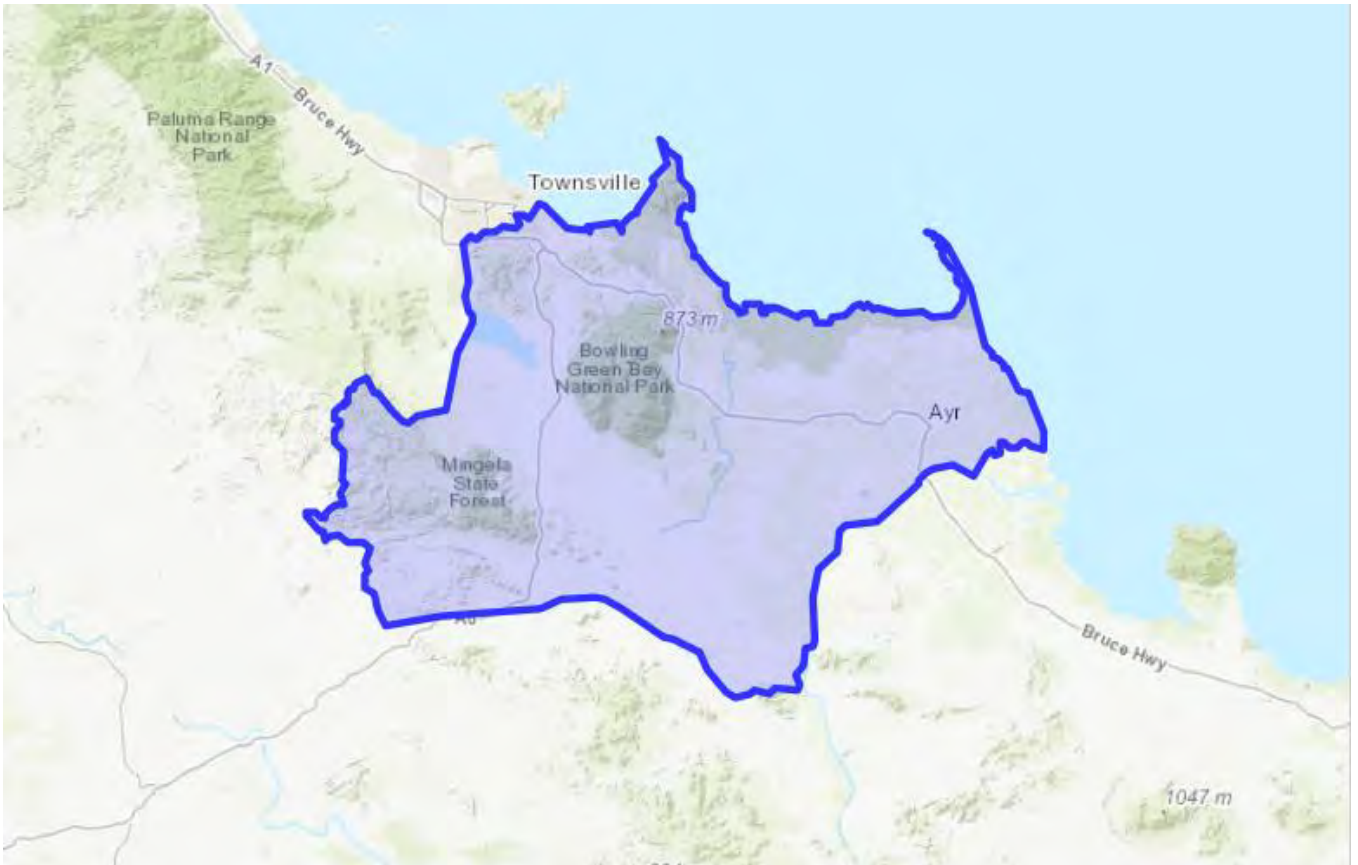
The EPBC referral for HPS2 was submitted to DAWE 21 January 2022. On the 18 February 2022, a delegate for the Minister for the Environment decide that the proposed action was a 'controlled action' and that it will be assessed by PD. Assessment by PD involves the referral form and any other relevant material identified by the Minister as being necessary to adequately assess a proposed action.

An RFI was issued by DAWE on 10 March 2022. A response to the RFI was being developed at the time of preparation of this RAP.

## **2.1.2 Native Title Act 1993**

The *Native Title Act 1993* recognises the rights and interests of Indigenous people in respect of land on which they historically resided. Where a proposed development impacts on a parcel of land which is subject to a native title claim, and the impact will alter the existing rights and interests of Indigenous people in respect of that land, the proponent is usually required to enter into an ILUA. The ILUA is between the proponent and the relevant native title holders or claimants about how land and waters in the area covered by the agreement will be used and managed in the future and may include some form of compensation.

A search of the National Native Title Tribunal Register of Native Title Claims confirmed that there is a current claim over the project area, registered as QC2016/005 - Bindal People #2. The claim area is shown in Figure 3 below.



**Figure 3** Map of claim area for QC2016/005 - Bindal People #2

(Source: National Native Title Tribunal Register of Native Title Claims, accessed 10/12/2020)

Townsville City Council are currently consulting with the DoR and Bindal People in relation to the need to alter existing land tenure under the *Land Act 1994* for the pump station site as well as establishing the pipeline infrastructure under a public utility easement.

## 2.2 State requirements

### 2.2.1 Planning Act 2016

The *Planning Act 2016* (Planning Act) is Queensland’s principal planning legislation that coordinates planning at a local, regional and State level. The purpose of the Planning Act is to establish an efficient, effective, transparent, coordinated and accountable system of land use planning, and development assessment that facilitates the achievement of ecological sustainability.

The Planning Act identifies the following hierarchy between planning documents:

- State Planning Policy
- Regional Plans
- Local planning instruments
- Infrastructure designations
- Other statutory documents such as Development Assessment Rules.

The Planning Act also defines:

- The different types of development – defined as a MCU of premises, RaL, building work, plumbing and drainage work or Op Works
- Categories of development (Prohibited, Assessable, Accepted)
- Categories of assessment for assessable development (Code or Impact).

## 2.2.2 Planning Regulation 2017

The *Planning Regulation 2017* (Planning Regulation) supports the principal planning laws by outlining the mechanics for the operation of the *Planning Act 2016*. It documents practical matters such as:

- How development applications are categorised
- Who will assess the development application
- The matters that trigger state interests
- Applicable assessment criteria and benchmarks
- Application fees payable to the State

### **Schedule 6 provisions for public sector entities**

Schedule 6 of the Planning Regulation identifies development that a local categorising instrument is prohibited from stating is assessable development. This includes operational work carried out by or for public sector entity (such as a Local Government) under a State law to carry out the work, as long as it is not development stated in section 26 of Schedule 6.

Although the current Burdekin Shire Council (BSC) IPA Planning Scheme does not make Op Works assessable in the Rural zone (refer Section 2.3.1), the Schedule 6 provisions are considered to apply to Op Works associated with construction of the HPS2. While unlikely, if BSC were to identify any assessable Op Works development triggers under the Draft Burdekin Shire Planning Scheme (refer Section 2.3.2), independent legal advice could be sought in relation to the Schedule 6 provisions.

### **Schedule 7 provisions for public sector entities**

Schedule 7 of the Planning Regulation identifies development that is Accepted development, meaning that a development approval is not required as long as the development or work complies with the applicable requirements (where listed). Building work, other than building work mentioned in section 1, carried out by or for the State or a public sector entity, to the extent the building work complies with the relevant provisions for the building work is listed as Accepted development.

This will apply to any buildings and structures associated with the pump station. However, it is noted that public sector entities often choose to engage a private building certifier or suitably qualified RPEQ to ensure that construction contractors engaged to complete any building works comply with the relevant provisions for the building work even though a development permit may not be required. It is difficult to confirm at this stage if the proposed building work for the pump station and/or substation will be able to comply with all of the acceptable development requirements listed under the *Building Act 1975*.

## 2.2.3 Ministerial Infrastructure Designation

A request for a MID can be made by a public sector entity, a non-public sector entity or a local government, and can be made, amended, extended or repealed by the Planning Minister. A local government can also make, amend, extend, or repeal a Local Government Infrastructure Designation (LGID) to enable local infrastructure to be delivered more efficiently.

Three statutory instruments support the MID process:

- Planning Act, which prescribes the process and decision-making criteria for making, amending, extending or repealing IDs
- Planning Regulation, which identifies the types of infrastructure that may be delivered through an MID
- *Minister's Guidelines and Rules* (MGR), which includes a process for making or amending both Ministerial and Local government MIDs.

The MID process gives applicants a streamlined, considered whole-of-government response on a request for community-supporting infrastructure and avoids later approvals that would otherwise be required under the Planning Act. An approved MID doesn't directly authorise development; instead, the effect of the MID is to make specified work 'Accepted development' under the Planning Act. Any proposed development that departs from the MID would be classed as assessable development.



As shown in Figure 4, after an eligible project has submitted appropriate supporting information and reports to the Minister (guidance material), public notification of the proposal is required. This enables members of the public, State agencies and the local Council to provide submissions and feedback to the Minister on the proposal. These submissions are considered in the Minister’s assessment of the proposal and inform the final decision. This process could take between 6-9 months to complete, and it is noted that a MID was not applied for in Stage 1.

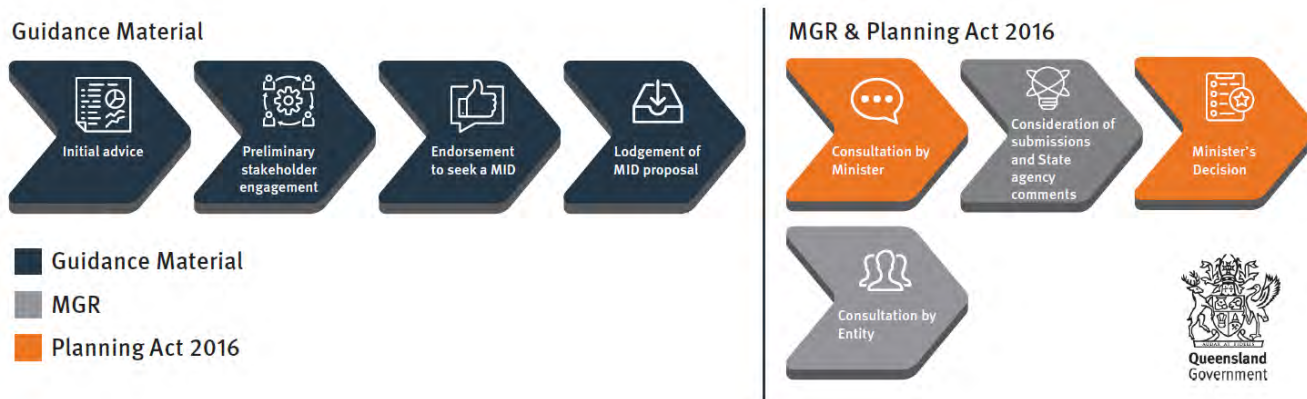


Figure 4 Process for making a MID

(Source: <https://dsdmipprd.blob.core.windows.net/general/MID-flow-chart-making-an-amendment.pdf>)

There are existing MIDs located in close vicinity to the proposed pipeline alignment which appear to be for electricity infrastructure and a substation.

## 2.2.4 Regional Planning Interests Act 2014

The *Regional Planning Interests Act 2014* seeks to strike a balance between protecting priority land uses and managing the impacts of (and supporting coexistence with) mining and petroleum activities, which are outside the jurisdiction of the Planning Act. This is achieved through a consistent application of the State's land-use planning objectives contained in Regional Plans.

### North Queensland Regional Plan

The first North Queensland Regional Plan was given effect on 6 March 2020. The plan provides a 25-year framework to guide growth and support future jobs in North Queensland. The regional plan enables the Burdekin, Charters Towers, Hinchinbrook, Palm Island and Townsville Councils to work together to drive a leading economy in regional Australia. It also highlights opportunities for prosperity and liveability.

The project area is mapped as containing a small portion of strategic cropping land and falls entirely within the priority agricultural area. Non-agricultural development within priority agricultural areas is not supported unless the proposed use demonstrates net benefits for regional agricultural production or is for public infrastructure. Furthermore, the integrity of the stock route network within the region must not be compromised.

While the HPS2 is not considered to constitute a resource activity or regulated activity that would require a Regional Interests Development Approval, additional assessment benchmarks may be applicable to any MCU and/or RaL applications requiring assessment by BSC and/or SARA as outlined in Table 5 of the North Qld Regional Plan. Where development is for public infrastructure, these benchmarks may be able to be overlooked.

## 2.2.5 Land Title Act 1994

Relevant provisions under the *Land Title Act 1994* will be applicable in dealings related to obtaining a legal interest over State land (reserve and/or roads) required for the construction and operation of the project.

This will predominantly consist of options to grant a public utility easement with landowners affected by the new pipeline or tenure changes where new lots are proposed to be applied for and registered for the construction and ongoing operation of the pump station and substation.

As mentioned in section 2.1.2, the proposed pump station is likely to be constructed on Reserve land, which is currently trusted to BSC for the purpose of camping and water, whereas the substation is likely to be constructed on Freehold land. Changes to land tenure are being investigated and managed by Townsville City Council.

## 2.2.6 *Vegetation Management Act 1999*

The *Vegetation Management Act 1999* (VMA) regulates the clearing of native vegetation in Queensland. Vegetation is classified into various categories, which determine the regulation that applies to clearing of the vegetation. This includes:

- Category A: Vegetation that is in an offset or exchange area, has been illegally cleared and must be restored, or is in a declared area under the VMA.
- Category B: Remnant vegetation, or it is not high value regrowth and is a Land Act tenure to be converted under the *Land Act 1994* to another form of tenure; and contains an endangered regional ecosystem; or an of concern regional ecosystem; or a least concern regional ecosystem.
- Category C: High value regrowth vegetation on Freehold land, Indigenous land, or land subject of a lease issued under the *Land Act 1994* for agriculture or grazing purposes or an occupation licence under that Act; and in an area that has not been cleared (other than for relevant clearing activities) for at least 15 years, if the area is an endangered regional ecosystem; or an of concern regional ecosystem; or a least concern regional ecosystem.
- Category R: an area which is a regrowth watercourse and drainage feature area located within 50 metres of a watercourse located in the Burdekin, Burnett–Mary, Eastern Cape York, Fitzroy, Mackay–Whitsunday or Wet Tropics catchments.
- Category X: all areas other than Category A, B, C and R areas, ‘exempt areas’ that are not covered by the VMA.

The design corridor for the proposed pipeline alignment includes a small portion of Category R vegetation containing ‘least concern’ regional ecosystems and Category B vegetation containing ‘least concern’ and ‘of concern’ regional ecosystems as well as an area of essential habitat for the estuarine crocodile.

The following watercourse features will likely be impacted by the proposed pipeline and pump station works:

- 8 stream order 1 watercourses
- 1 stream order 3 watercourse
- 2 stream order 4 watercourses
- 2 stream order 5 watercourses

Similar to Stage 1 and Stage 1.1, Stage 2 of the project will involve clearing of native vegetation and will trigger assessment under the provisions of the Planning Act and the VMA.

### ***Relevant purpose determination***

Under Schedule 10, Part 3, Division 3, Table 1, Item 1 of the Planning Regulation, clearing of native vegetation is prohibited development unless it is for a relevant purpose under section 22A of the VMA. Applicants must apply directly to DoR for a determination on whether the proposal meets the relevant purpose requirements under section 22A of the VMA.

Accordingly, a relevant purpose determination application was submitted to DoR on 17 November 2020. Additional information with a revised pipeline alignment and spatial data was subsequently provided to DE on 7 December 2020. The relevant purpose determination was approved by DoR on 12 January 2021 and is valid for 2 years. Changes to the pipeline alignment on 27 January 2021 (resulting in the alternative pipeline alignment) meant that a new section 22A relevant purpose determination was required and determined before the Op Works development application could be lodged with SARA.

On 17 March 2021, a new relevant purpose determination was submitted to DoR. The purpose of this new relevant purpose determination was to address changes to the alternate pipeline duplication and was to replace the previous relevant purpose determination dated 12 January 2021. DoR provided correspondence on 5 May 2021

advising that the proposed development to clear vegetation for the purpose of relevant infrastructure activities met the requirements of section 22A of the VMA.

On 7 October 2021, a revised relevant purpose determination application was submitted to DoR. Following ongoing negotiation with the landholders and filed investigations/surveys, some further design changes to the pipeline alignment occurred and temporary construction access tracks and pipe stockpile sites for use during construction were identified. On 21 December 2021, DoR provided correspondence advising that the proposed development to clear vegetation for the purpose of relevant infrastructure activities met the requirements of section 22A of the VMA.

Any vegetation clearing associated with the pump station, HV power supply and substation will form part of a separate relevant purpose application to be submitted to DoR.

## 2.2.7 Fisheries Act 1994

The *Fisheries Act 1994* (Fisheries Act) sets out Fisheries Queensland's responsibilities for the economically viable, socially acceptable and ecologically sustainable development of Queensland's fisheries resources. Activities involving aquaculture or disturbance to fish habitats are considered assessable or accepted development under planning legislation and fisheries legislation. For example, to construct or raise waterway barrier works within a waterway, a development application under the Planning Act, or compliance with the *Accepted development requirements for operational work that is constructing or raising waterway barrier works*, is needed. To determine the legislative requirements for assessment, it is first necessary to identify whether the proposed works are within a defined waterway.

Pre-lodgement advice received from SARA and the Department of Agriculture and Fisheries (DAF) on 7 January 2021 has confirmed that the proposed pipeline corridor will cross multiple waterways according to the Queensland waterway for waterway barrier works GIS spatial data layer as well as several features mapped as "drains" and "channels" according to the Watercourse layer on Queensland Globe. If the drain and channel features meet the criteria "*What is a waterway?*" factsheet, they are required to be considered as a waterway providing for fish passage. Pre-lodgement advice provided was for the pipeline alignment only. Further pre-lodgement meetings will be required with SARA and DAF prior to lodging the MCU for the pump station and RAL for the HV power supply and substation works should construction activities have the potential to disturb a defined waterway.

### ***Development that is not waterway barrier works***

The proposed permanent works (underground pipeline and any scour protection) will not be considered waterway barrier works, if the following can be achieved:

- The placement of the permanent infrastructure does not raise the natural bed level of each waterway
- The placement of the permanent infrastructure does not reduce the cross-sectional area of each waterway
- Post construction, each waterway is reinstated to pre-existing conditions, using natural substrate of similar composition on the waterway bed with no changes in elevation, banks are reprofiled to pre-existing conditions and stabilised with suitable riparian vegetation.

### ***Development that is waterway barriers works***

If any aspect of the permanent works (underground pipeline and any scour protection) reduces the cross-sectional area of the waterway, or raises the natural bed level of the waterway, a development approval will be required for assessable development that is constructing or raising waterway barrier works.

### ***Temporary waterway barrier works for erosion and sediment control devices***

The placement of temporary waterway barriers to facilitate construction of the pipeline and associated infrastructure may be conducted under Work type 7.2 of DAF's *Accepted development requirements for operational work that is constructing or raising waterway barrier works*. Noting that the requirements for all work completed under the Accepted development requirements state that the development must minimise impacts to waterways and fish passage (e.g. directional drilling instead of open trenching through waterways).

Compliance with DAF's accepted development requirements will be the responsibility of the construction contractor, including any pre and post-work notifications. Where works cannot comply with the accepted development requirements, a development permit may be required.

## 2.2.8 Transport Infrastructure Act 1994

The objectives of the *Transport Infrastructure Act 1994* (TIA) are to provide a system that allows for and encourages effective integrated planning and efficient management of a system of transport infrastructure. State transport interests include protection of state transport infrastructure such as SCRs, rail, busway, light rail, strategic ports, strategic airports and aviation facilities transport network connectivity, accessibility and operational efficiency; and maritime safety.

Pre-lodgement advice received from SARA and DTMR on 7 January 2021 confirms that a development approval is required for operational work within 25 m of a State Transport Corridor for the pipeline and pump station works. DTMR have requested that sufficiently detailed plans and supporting documentation which clearly identify all aspects of the proposed development in relation to the SCR corridor and railway corridor are submitted with the development application (refer Appendix B). This includes a Traffic Impact Assessment, Pavement Impact Assessment, Road Safety Impact Assessment, Construction Management Plan and details on how stormwater, drainage and flooding impacts will be managed.

DTMR have also indicated that open trenching at Ayr-Dalbeg Road may be considered exempt works subject to additional information being supplied on how this would be achieved. The pipeline will need to be perpendicular where it crosses the SCR and the access location to the pump station should be finalised and included for approval by DTMR.

An Exemption request for open trenching at the Ayr-Dalbeg Road was lodged in the fourth quarter of 2021. The Exemption request was approved by DTMR on 10 February 2022.

### ***Other permits or approvals for works that interfere with the operation of a SCR***

It will also be necessary to obtain a Road Corridor Permit for approval to undertake and/or located any activity, structure or thing within the boundaries of a SCR such as the installation of pipes, planting/removing of trees and erecting fences. A permitted road access location and road works approval may also be required for any proposed entry and exit points onto the SCR for construction and operation of the HPS2 Stage 2, even if the access point has been assessed as part of an RaL or Op Works development application.

Following assessment of the application, and if approved, DTMR will issue a 'Letter of Conditional Approval'. This does not necessarily authorise works to commence and may contain conditions that must be complied with prior to any construction works commencing.

## 2.2.9 Environmental Offsets Act 2014

The proposed clearing of native vegetation (in particular essential habitat) could result in an environmental offset being required under the *Environmental Offsets Act 2014*. Offsets are generally only required where there is a significant residual impact on a prescribed matter. The Significant Residual Impact Guideline can be used to determine if there is likely to be a significant residual impact. This will be investigated further as part of the Op Works development application process and through discussions with regulatory authorities.

### ***Proposed approval strategy***

Op Works development approvals will be required under the Planning Act and Planning Regulation for the HPS2 Stage 2 pipeline and pump station as the project involves clearing of native vegetation, impacts to state transport infrastructure and the potential for WWBWs to be assessable development. This application will be lodged with SARA as the assessment manager.

Owners' consent may also be required to support MCU and RaL development applications where applicable to different components of the project such as the creation of a new lot for the substation site or if the pump station/substation is deemed to constitute an MCU a 'Public Purpose' under the Burdekin Shire IPA Planning Scheme or another use defined in the Draft Burdekin Shire Planning Scheme. Further details relating to the local planning scheme requirements are provided in Section 2.3.

Once the development application is drafted, a second pre-lodgement meeting may be held with BSC and SARA to ensure that all necessary primary approvals for the pipeline and pump station have been captured and are being applied for. Any secondary approvals and/or permits relating to specific construction related activities (such as sources of construction material, on-site storage of materials/fuel/chemicals and any non-planning act approvals like road works permits, protected plant clearing permits, species management plans or damage mitigation permits, etc.) will be the responsibility of the construction contractor to apply for and obtain once details have been confirmed.

Townsville City Council will be responsible for managing the purchase of any Reserve land from DoR and for the preparation and lodgement of any RAL development applications associated with the creation of new lots on Freehold estate.

Subsequent pre-lodgement advice will be sought for the HV power supply and substation in relation to MCU, RAL and Op Works triggers once design details are known and preliminary site layouts can be provided to SARA (and the relevant technical agencies) for advice and confirmation on approval requirements.

## 2.3 Local requirements

### 2.3.1 Burdekin Shire IPA Planning scheme

The project area is located in the Rural Zone under the Burdekin Shire IPA Planning Scheme.

The most appropriate defined use for the proposed infrastructure is '**Public Purpose**' - *Premises used by government, or an instrumentality of government for the provision or delivery of services, or for the conduct of its statutory duties and affairs*. A MCU development application for a 'Public Purpose' is Code assessable development in the Rural Zone. The requirement for lodgement of a MCU application based on planning scheme definitions/triggers will require further consultation with BSC.

With respect to the creation of new lots, development involving an RaL is Code assessable in the Rural Zone. This will mainly apply to the substation site should it need to be constructed on a new parcel of land (i.e. 1 into 2 lot subdivision from an existing Freehold estate). Applications made to DoR for the purchase of Reserve land managed under the *Land Act 1994* generally do not require RAL applications to be assessed by Council under a local planning instrument unless certain circumstances or criteria apply. This will need to be confirmed with DoR and Burdekin Shire Council as part of tenure discussions.

Operational work involving excavation and filling is Exempt development in the Rural Zone meaning no assessment or approvals are required.

Schedule 6 of the Planning Regulation is also considered to be applicable to the pipeline and pump station works which states that operational work undertaken by or for a public sector entity cannot be made to be assessable development under a local planning instrument. Therefore, it is assumed that an Op Works application would not be required to be submitted to BSC for assessment under the IPA Planning Scheme, regardless of the level of assessment identified in the table of assessment.

### 2.3.2 Draft Burdekin Shire Council Planning Scheme

The Draft BSC Planning Scheme was publicly notified from August to October 2021. It is expected that the new planning scheme could come into by July 2022, replacing the Burdekin Shire IPA Planning Scheme.

The project area is located in the Rural Zone under the Draft BSC Planning Scheme.

For MCU triggers, the most appropriate defined use for the proposed infrastructure includes:

- '**Utility installation**' for the pump station as this includes supplying or treating water
- '**Substation**' for the substation
- '**Major electricity infrastructure**' for the HV power supply.

All three defined uses are Code assessable in the Rural Zone if undertaken by a public sector entity such as Townsville City Council.

When creating new lots, the assessment level for a RAL in the Rural Zone depends on the size of each lot being created. Code assessable development is applicable where each lot size is 30 ha or larger in an important agricultural area or agricultural land class A and B area. Most of the project area is located in the mapped important agricultural land classes. Should the lot size of each lot being created be less than 30 ha an Impact assessable development application would be required.

For excavation and filling, operation work is identified as accepted development for the project area and not considered to require assessment against any specific codes or provisions.

Schedule 6 of the Planning Regulation is also considered to be applicable to the pipeline and pump station works which states that operational work undertaken by or for a public sector entity cannot be made to be assessable development under a local planning instrument.

### ***Proposed approval strategy***

GHD will commence preparation of the Op Works development application and supporting information for the pipeline and pump station. MCU requirements for the pump station require further consultation.

The Op Works application for the HPS2 was lodged with SARA as the assessment manager on 17 January 2022. An Action Notice was received on 7 February 2022 relating to fees payable. The Op Works application was considered Properly Made on 15 February 2022 when the Confirmation Notice was received from SARA. A RFI and SARA advice notice was received on 24 February 2022.

A response to the SARA RFI and advice notice is required to be submitted to SARA on or before 24 May 2022.

Further approvals review and pre-lodgement advice will be sought for the HV power supply and substation works in relation to MCU, RaL and Op Works triggers once design details are known and preliminary site layouts can be provided to BSC for advice on approval requirements under the local planning scheme that is in effect at the time.

## **2.4 Approvals Register**

Appendix C includes an approvals register with the key approvals, relevant legislation, administering authorities, approval triggers, approval timeframes, fees, supporting information and who is responsible for obtaining approvals for HPS2 Stage 2.



## 3. Recommendations

In considering the relevant legislation described in section 1.5 and the approvals register outlined in section 2.4 and Appendix C, the following approach and program are provided in order to progress the key project approvals and permits in a timely manner.

### 3.1 Approvals approach

#### 3.1.1 Pipeline and pump station

1. Apply for a section 22A relevant purpose determination under the *Vegetation Management Act 1999* for the proposed pump station
2. Seek clarification from BSC on the requirement for lodgement of a MCU application for the pump station
3. Ongoing consultation with key stakeholders (i.e. Sunwater, Wilmar, Ergon, Powerlink, etc) to confirm potential design or construction related impacts to their assets, including specific design requirements, construction methodologies, access protocols or notification requirements, and any particular permits that need to be obtained and/or provided by the construction contractor prior to commencement of construction works
4. Complete biocondition assessments to respond to a DAWE RFI regarding the EPBC Act Referral and assessment by preliminary documentation
5. Arrange follow up pre-lodgement meeting with SARA and BSC (where required):
  - a. Initial SARA pre-lodgement meeting held on 23 December 2020 and meeting record received on 7 January 2021.

#### 3.1.2 HV power supply and substation

1. Apply for section 22A relevant purpose determination under the VMA
2. Request initial pre-lodgement meeting with SARA and Burdekin Shire Council to confirm approval requirements (MCU, RAL, Op Works and State referral matters) and the assessment manager for development applications
3. Ongoing consultation with key stakeholders (i.e. Sunwater, Wilmar, Ergon, Powerlink, etc) to confirm potential design or construction related impacts to their assets, including specific design requirements, construction methodologies, access protocol or notification requirements, and any particular permits that need to be obtained and/or provided by the construction contractor prior to commencement of construction works
4. Commence preparation of MCU and/or Op Works development application and supporting documentation (e.g. planning reports, environmental and rehabilitation management plans, TIA, PIA, RSA, SQMP, CEMP, ESCP, etc.) – in progress
5. Arrange follow up pre-lodgement meeting with SARA and Burdekin Shire Council (where required)
6. Lodge MCU, RAL and Op Works development applications with Burdekin Shire Council and SARA.

# Appendices

# **Appendix A**

**Database searches**



Queensland Government

Department of Environment and Science

Environmental Reports

## **Biodiversity and Conservation Values**

***Biodiversity Planning Assessments and Aquatic Conservation Assessments***

For the selected area of interest

## Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or Area of Interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "Central co-ordinates" option, the resulting assessment area encompasses an area extending from 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: [biodiversity.planning@des.qld.gov.au](mailto:biodiversity.planning@des.qld.gov.au)

### Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.





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## Summary Information

Tables 1 to 8 provide an overview of the AOI with respect to selected topographic and environmental values.

**Table 1: Area of interest details:**

Size (ha)	15,299.31
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Bogie River Hills, Townsville Plains
Catchment(s)	Burdekin, Haughton

The following table identifies available Biodiversity Planning Assessments (BPAs) and Aquatic Conservation Assessments (ACAs) with respect to the AOI.

**Table 2: Available Biodiversity Planning and Aquatic Conservation Assessments**

Assessment Type	Assessment Area and Version
Biodiversity Planning Assessment(s)	Brigalow Belt v2.1
Aquatic Conservation Assessment(s) (riverine)	Great Barrier Reef Catchments v1.1
Aquatic Conservation Assessment(s) (non-riverine)	Great Barrier Reef Catchments v1.3

**Table 3: Remnant regional ecosystems within the AOI as per the Qld Herbarium's 'biodiversity status'**

Biodiversity Status	Area (Ha)	% of AOI
Endangered	16.96	0.11
Of concern	3,655.10	23.89
No concern at present	4,098.81	26.79

The following table identifies the extent and proportion of the user specified area of interest (AOI) which is mapped as being of "State", "Regional" or "Local" significance via application of the Queensland Department of Environment and Science's *Biodiversity Assessment and Mapping Methodology* (BAMM).

**Table 4: Summary table, biodiversity significance**

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	19.06	0.12
State	4,826.78	31.55
Regional	1,781.75	11.65
Local or Other Values	1,253.53	8.19

**Table 5: Non-riverine wetlands intersecting the AOI**

Non-riverine wetland types intersecting the area of interest	#
Number of Palustrine wetlands	7
Number of Lacustrine wetlands	5
Total number of non-riverine wetlands	12

*NB. The figures presented in the table above are derived from the relevant non-riverine Aquatic Conservation Assessment(s). Later releases of wetland mapping produced via the Queensland Wetland Mapping Program may provide more recent information in regards to wetland extent.*

**Table 6: Named waterways intersecting the AOI**

Name	Permanency
BARRATTA CREEK	Non-perennial
BURDEKIN RIVER	Non-perennial
OAKY CREEK	Non-perennial

Refer to **Map 1** for general locality information.

The following two tables identify the extent and proportion of the user specified AOI which is mapped as being of "Very High", "High", "Medium", "Low", or "Very Low" aquatic conservation value for riverine and non-riverine wetlands via application of the Queensland Department of Environment and Science's *Aquatic Biodiversity Assessment and Mapping Method* (AquaBAMM).

**Table 7: Summary table, aquatic conservation significance (riverine)**

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	1,868.36	12.21
High	11,516.77	75.28
Medium	1,911.36	12.49
Low	0.0	0.0
Very Low	0.0	0.0

**Table 8: Summary table, aquatic conservation significance (non-riverine)**

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	1.69	0.01
High	6.05	0.04
Medium	13.77	0.09
Low	0.0	0.0
Very Low	374.54	2.45

# Biodiversity Planning Assessments

## Introduction

The Department of Environment and Science (DES) attributes biodiversity significance on a bioregional scale through a Biodiversity Planning Assessment (BPA). A BPA involves the integration of ecological criteria using the *Biodiversity assessment and Mapping Methodology* (BAMM) and is developed in two stages: 1) **diagnostic criteria**, and 2) **expert panel criteria**. The diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion, while the expert panel criteria allows for the refinement of the mapped information from the diagnostic output by incorporating local knowledge and expert opinion.

The BAMM methodology has application for identifying areas with various levels of significance solely for biodiversity reasons. These include threatened ecosystems or taxa, large tracts of habitat in good condition, ecosystem diversity, landscape context and connection, and buffers to wetlands or other types of habitat important for the maintenance of biodiversity or ecological processes. While natural resource values such as dryland salinity, soil erosion potential or land capability are not dealt with explicitly, they are included to some extent within the biodiversity status of regional ecosystems recognised by the DES.

Biodiversity Planning Assessments (BPAs) assign three levels of overall biodiversity significance.

- **State significance** - areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed by other studies/processes as being significant at national or international scales. In addition, areas flagged as being of State significance due to the presence of endangered, vulnerable and/or near threatened taxa, are identified as "State Habitat for EVNT taxa".
- **Regional significance** - areas assessed as being significant for biodiversity at the subregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.
- **Local significance and/or other values** - areas assessed as not being significant for biodiversity at state or regional scales. Local values are of significance at the local government scale.

For further information on released BPAs and a copy of the underlying methodology, go to:

<http://www.qld.gov.au/environment/plants-animals/biodiversity/planning/>

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

<http://qspatial.information.qld.gov.au/geoportal/>

The following table identifies the extent and proportion of the user specified AOI which is mapped as being of "State", "Regional" or "Local" significance via application of the BAMM.

**Table 9: Summary table, biodiversity significance**

Biodiversity significance	Area (Ha)	% of AOI
State Habitat for EVNT taxa	19.06	0.12
State	4,826.78	31.55
Regional	1,781.75	11.65
Local or Other Values	1,253.53	8.19

Refer to **Map 2** for further information.

## Diagnostic Criteria

Diagnostic criteria are based on existing data which is reliable and uniformly available across a bioregion. These criteria are diagnostic in that they are used to filter the available data and provide a "first-cut" or initial determination of biodiversity significance. This initial assessment is then combined through a second group of other essential criteria.

A description of the individual diagnostic criteria is provided in the following sections.

**Criteria A. Habitat for EVNT taxa:** Classifies areas according to their significance based on the presence of endangered, vulnerable and/or rare (EVNT) taxa. EVNT taxa are those scheduled under the *Nature Conservation Act 1992* and/or the

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*Environment Protection and Biodiversity Conservation Act 1999*. It excludes highly mobile fauna taxa which are instead considered in Criterion H and brings together information on EVNT taxa using buffering of recorded sites or habitat suitability models (HSM) where available.

**Criteria B. Ecosystem value:** Classifies on the basis of biodiversity status of regional ecosystems, their extent in protected areas (presence of poorly conserved regional ecosystems), the presence of significant wetlands; and areas of national importance such as the presence of Threatened Ecological Communities, World Heritage areas and Ramsar sites. Ecosystem value is applied at a bioregional (**B1**) and regional (**B2**) scale.

**Criteria C. Tract size:** Measures the relative size of tracts of vegetation in the landscape. The size of any tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts.

**Criteria D. Relative size of regional ecosystems:** Classifies the relative size of each regional ecosystem unit within its bioregion (**D1**) and its subregion (**D2**). Remnant units are compared with all other occurrences with the same regional ecosystem. Large examples of a regional ecosystem are more significant than smaller examples of the same regional ecosystem because they are more representative of the biodiversity values particular to the regional ecosystem, are more resilient to the effects of disturbance, and constitute a significant proportion of the total area of the regional ecosystem.

**Criteria F. Ecosystem diversity:** Is an indicator of the number of regional ecosystems occurring within an area. An area with high ecosystem diversity will have many regional ecosystems and ecotones relative to other areas within the bioregion.

**Criteria G. Context and connection:** Represents the extent to which a remnant unit incorporates, borders or buffers areas such as significant wetlands, endangered ecosystems; and the degree to which it is connected to other vegetation.

A summary of the biodiversity status based upon the diagnostic criteria is provided in the following table.



**Table 10: Summary of biodiversity significance based upon diagnostic criteria with respect to the AOI**

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains an RE that is one of the largest of its type in the bioregion (D1) & Remnant has high connectivity or buffers an endangered RE or Sig. Wetland (G)	16.78	0.11
State	Remnant contains at least 1 Endangered or 2 Vulnerable or Near Threatened species (A)	19.06	0.12
State	Remnant contains at least one Of Concern RE (B1) & Is part of moderately large Tract (C) & Contains a RE that is a moderately large RE of its type in the bioregion (D1) & Has high connectivity or buffers an endangered RE or Significant Wetland (G)	7.83	0.05
State	Remnant contains at least one Of Concern RE (B1) & Remnant contains an RE that is one of the largest of its type in the bioregion (D1)	617.77	4.04
State	Significant Wetland (B1)	190.93	1.25
Regional	Remnant contains at least 1 RE with 10-30 percent extent remaining in the subregion (B2) & Remnant is part of moderately large Tract (C) & Remnant has high connectivity or buffers an endangered RE or Significant Wetland (G)	130.02	0.85
Regional	Remnant contains at least 1 Vulnerable or Near Threatened species (A)	330.91	2.16
Regional	Remnant contains at least one Of Concern RE (B1)	3,565.09	23.3
Local or Other Values	Refer to diagnostic data for additional information	2,992.83	19.56

**Assessment of diagnostic criteria with respect to the AOI**

The following table reflects an assessment of the individual diagnostic criteria noted above in regards to the AOI.

**Table 11: Assessment of individual diagnostic criteria with respect to the AOI**

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
A: Habitat for EVNT Taxa	19.06	0.1	351.47	2.3	2,971.61	19.4	4,523.15	29.6
B1: Ecosystem Value (Bioregion)	190.91	1.2	4,328.54	28.3	3,351.82	21.9		
B2: Ecosystem Value (Subregion)			339.63	2.2	7,525.66	49.2		
C: Tract Size			7,446.46	48.7	191.33	1.3	227.5	1.5
D1: Relative RE Size (Bioregion)	634.55	4.1	1,506.61	9.8	771.31	5.0	4,952.82	32.4
D2: Relative RE Size (Subregion)	634.55	4.1	1,506.61	9.8	1,480.11	9.7	4,244.02	27.7
F: Ecosystem Diversity	1,592.67	10.4	3,715.47	24.3	2,069.50	13.5	487.65	3.2

Diagnostic Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
G: Context and Connection	2,042.46	13.4	1,673.23	10.9	4,041.52	26.4	108.08	0.7

## Other Essential Criteria

Other essential criteria (also known as expert panel criteria) are based on non-uniform information sources and which may rely more upon expert opinion than on quantitative data. These criteria are used to provide a "second-cut" determination of biodiversity significance, which is then combined with the diagnostic criteria for an overall assessment of relative biodiversity significance. A summary of the biodiversity status based upon the other essential criteria is provided in the following table.

**Table 12: Summary of biodiversity significance based upon other essential criteria with respect to the AOI**

Biodiversity significance	Description	Area (Ha)	% of AOI
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	3,008.65	19.67
State	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I) & Remnant forms part of a bioregional corridor (J)	370.16	2.42
State	Remnant forms part of a bioregional corridor (J)	1,413.43	9.24
Regional	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	7.26	0.05
Regional	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I) & Remnant forms part of a bioregional corridor (J)	0.58	0.0
Regional	Remnant forms part of a bioregional corridor (J)	287.25	1.88
Local	Refer to Expert Panel data for additional information	8.53	0.06
Local	Remnant contains Special Biodiversity Values (view Expert Panel data for further information) (I)	8.38	0.05

A description of each of the other essential criteria and associated assessment in regards to the AOI is provided in the following sections.

**Criteria H. Essential and general habitat for priority taxa:** Priority taxa are those which are at risk or of management concern, taxa of scientific interest as relictual (ancient or primitive), endemic taxa or locally significant populations (such as a flying fox camp or heronry), highly specialised taxa whose habitat requirements are complex and distributions are not well correlated with any particular regional ecosystem, taxa important for maintaining genetic diversity (such as complex spatial patterns of genetic variation, geographic range limits, highly disjunct populations), taxa critical for management or monitoring of biodiversity (functionally important or ecological indicators), or economic and culturally important taxa.

**Criteria I. Special biodiversity values:** areas with special biodiversity values are important because they contain multiple taxa in a unique ecological and often highly biodiverse environment. Areas with special biodiversity values can include the following:

- Ia - centres of endemism - areas where concentrations of taxa are endemic to a bioregion or subregion are found.
- Ib - wildlife refugia (Morton *et al.* 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.
- Ic - areas with concentrations of disjunct populations.
- Id - areas with concentrations of taxa at the limits of their geographic ranges.
- Ie - areas with high species richness.
- If - areas with concentrations of relictual populations (ancient and primitive taxa).

- Ig - areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.
- Ih - an artificial waterbody or managed/manipulated wetland considered by the panel/s to be of ecological significance.
- li - areas with a high density of hollow-bearing trees that provide habitat for animals.
- lj - breeding or roosting sites used by a significant number of individuals.
- lk - climate change refuge.

The following table identifies the value and extent area of the Other Essential Criteria H and I within the AOI.

**Table 13: Relative importance of expert panel criteria (H and I) used to assess overall biodiversity significance with respect to the AOI**

Expert Panel	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
H: Core Habitat Priority Taxa					89.47	0.6		
Ia: Centres of Endemism								
Ib: Wildlife Refugia	3,008.65	19.7	375.25	2.5	11.14	0.1		
Ic: Disjunct Populations								
Id: Limits of Geographic Ranges								
Ie: High Species Richness								
If: Relictual Populations								
Ig: Variation in Species Composition								
Ih: Artificial Wetland								
Ii: Hollow Bearing Trees								
Ij: Breeding or Roosting Site								
Ik: Climate Refugia								

*NB. Whilst biodiversity values associated with Criteria I may be present within the site (refer to tables 12 and 15), for the New England Tableland and Central Queensland Coast BPAs, area and % area figures associated with Criteria Ia through to Ij cannot be listed in the table above (due to slight variations in data formats between BPAs).*

**Criteria J. Corridors:** areas identified under this criterion qualify either because they are existing vegetated corridors important for contiguity, or cleared areas that could serve this purpose if revegetated. Some examples of corridors include riparian habitats, transport corridors and "stepping stones".

Bioregional and subregional conservation corridors have been identified in the more developed bioregions of Queensland through the BPAs, using an intensive process involving expert panels. Map 3 displays the location of corridors as identified under the Statewide Corridor network. The Statewide Corridor network incorporates BPA derived corridors and for bioregions where no BPA has been assessed yet, corridors derived under other planning processes. *Note: as a result of updating and*

developing a statewide network, the alignment of corridors may differ slightly in some instances when compared to those used in individual BPAs.

The functions of these corridors are:

- **Terrestrial** Bioregional corridors, in conjunction with large tracts of remnant vegetation, maintain ecological and evolutionary processes at a landscape scale, by:

- Maintaining long term evolutionary/genetic processes that allow the natural change in distributions of species and connectivity between populations of species over long periods of time;
- Maintaining landscape/ecosystems processes associated with geological, altitudinal and climatic gradients, to allow for ecological responses to climate change;
- Maintaining large scale seasonal/migratory species processes and movement of fauna;
- Maximising connectivity between large tracts/patches of remnant vegetation;
- Identifying key areas for rehabilitation and offsets; and

- **Riparian** Bioregional Corridors also maintain and encourage connectivity of riparian and associated ecosystems.

The location of the corridors is determined by the following principles:

- Terrestrial

- Complement riparian landscape corridors (i.e. minimise overlap and maximise connectivity);
- Follow major watershed/catchment and/or coastal boundaries;
- Incorporate major altitudinal/geological/climatic gradients;
- Include and maximise connectivity between large tracts/patches of remnant vegetation;
- Include and maximise connectivity between remnant vegetation in good condition; and

- Riparian

- Located on the major river or creek systems within the bioregion in question.

The total extent of remnant vegetation triggered as being of "State", "Regional" or "Local" significance due to the presence of an overlying BPA derived terrestrial or riparian corridor within the AOI, is provided in the following table. For further information on how remnant vegetation is triggered due to the presence of an overlying BPA derived corridor, refer to the relevant landscape BPA expert panel report(s).

**Table 14: Extent of triggered remnant vegetation due to the presence of BPA derived corridors with respect to the AOI**

Biodiversity Significance	Area (Ha)	% of AOI
State	1,783.59	11.66
Regional	287.83	1.88
Local	0.0	0.0

*NB: area figures associated with the extent of corridor triggered remnant vegetation are only available for those bioregions where a BPA has been undertaken.*

Refer to **Map 3** for further information.

**Threatening process/condition (Criteria K)** - areas identified by experts under this criterion may be used to amend (upgrade or downgrade) biodiversity significance arising from the "first-cut" analysis. The condition of remnant vegetation is affected by threatening processes such as weeds, ferals, grazing and burning regime, selective timber harvesting/removal, salinity, soil erosion, and climate change.

Assessment of Criteria K with respect to the AOI is not currently included in the "Biodiversity and Conservation Values" report, as it has not been applied to the majority of Queensland due to data/information limitations and availability.

### Special Area Decisions

Expert panel derived "Special Area Decisions" are used to assign values to Other Essential Criteria. The specific decisions which relate to the AOI in question are listed in the table below.

**Table 15: Expert panel decisions for assigning levels of biodiversity significance with respect to the AOI**

Decision Number	Description	Panel Recommended Significance	Criteria Values
brbn_I_17a	None	None	None
brbn_I_18a	None	None	None
brbn_I_18b	None	None	None
brbn_I_83	Core areas	State	lb (refugia): VH
brbn_I_92	Regionally significant natural palustrine & lacustrine wetlands	Regional	lb (refugia): H
brbn_I_93	Locally significant natural palustrine & lacustrine wetlands	Local	lb (refugia): M

**Expert panel decision descriptions:****brbn\_I\_17a**

None

**brbn\_I\_18a**

None

**brbn\_I\_18b**

None

**brbn\_I\_83**

Tracts are defined as patches of continuous remnant vegetation. The size of any tract is a major indicator of ecological significance and is strongly correlated with the long-term viability of biodiversity values. Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts. These areas can be considered core nodes/refugia in which a large proportion of the bioregions biodiversity is represented.

A modified tract size analysis (Criterion C) (EHP 2014) was used to identify and delineate discrete tracts of remnant vegetation at a bioregion scale. For the purpose of the assessment, a core area was identified as a relatively contiguous area of remnant vegetation (disregarding small perforations, or linear breaks) and which was generally greater than 5km in width (based upon the minimum width of the terrestrial corridor network). Tracts of greater than 10,000ha were included.

Refer to brbs\_I\_16 for the southern BRB implementation of this decision.

**brbn\_I\_92**

The panel considered that relatively natural palustrine and lacustrine wetlands and waterbodies within the Brigalow Belt bioregion act as important refugia, especially during periods of drought.

Whilst State significant wetlands are captured under Criterion B1, the panel agreed that all such natural wetland complexes with a combined area of greater than or equal to 5ha in size should be classed as being of at least regional significance.

Refer to brbs\_I\_47 for the southern BRB implementation of this decision.

**brbn\_I\_93**

The panel considered that relatively natural palustrine and lacustrine wetlands and waterbodies within the Brigalow Belt bioregion act as important refugia, especially during periods of drought.



Whilst State significant wetlands are captured under Criterion B1, and regionally significant wetlands under the decision brbn\_I\_92, the panel agreed that all remaining relatively natural wetland complexes of less than 5ha in size be classed as being of at least local significance.

Refer to brbn\_I\_48 for the southern BRB implementation of this decision.

# Aquatic Conservation Assessments

## Introduction

The Aquatic Biodiversity Assessment and Mapping Method or AquaBAMM (Clayton *et al.* 2006), was developed to assess conservation values of wetlands in Queensland, and may also have application in broader geographical contexts. It is a comprehensive method that uses available data, including data resulting from expert opinion, to identify relative wetland conservation/ecological values within a specified study area (usually a catchment). The product of applying this method is an Aquatic Conservation Assessment (ACA) for the study area.

An ACA using AquaBAMM is non-social, non-economic and identifies the conservation/ecological values of wetlands at a user-defined scale. It provides a robust and objective conservation assessment using criteria, indicators and measures that are founded upon a large body of national and international literature. The criteria, each of which may have variable numbers of indicators and measures, are naturalness (aquatic), naturalness (catchment), diversity and richness, threatened species and ecosystems, priority species and ecosystems, special features, connectivity and representativeness. An ACA using AquaBAMM is a powerful decision support tool that is easily updated and simply interrogated through a geographic information system (GIS).

Where they have been conducted, ACAs can provide a source of baseline wetland conservation/ecological information to support natural resource management and planning processes. They are useful as an independent product or as an important foundation upon which a variety of additional environmental and socio-economic elements can be added and considered (i.e. an early input to broader 'triple-bottom-line' decision-making processes). An ACA can have application in:

- determining priorities for protection, regulation or rehabilitation of wetlands and other aquatic ecosystems
- on-ground investment in wetlands and other aquatic ecosystems
- contributing to impact assessment of large-scale development (e.g. dams)
- water resource and strategic regional planning processes

For a detailed explanation of the methodology please refer to the summary and expert panel reports relevant to the ACA utilised in this assessment. These reports can be accessed at *Wetland Info*:

<http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca>

The GIS results can be downloaded from the Queensland Spatial Catalogue at:

<http://qspatial.information.qld.gov.au/geoportal/>

## Explanation of Criteria

Under the AquaBAMM, eight criteria are assessed to derive an overall conservation value. Similar to the Biodiversity Assessment and Mapping Methodology, the criteria may be primarily diagnostic (quantitative) or primarily expert opinion (qualitative) in nature. The following sections provide a brief description of each of the 8 criteria.

**Criteria 1. Naturalness - Aquatic:** This attribute reflects the extent to which a wetland's (riverine, non-riverine, estuarine) aquatic state of naturalness is affected through relevant influencing indicators which include: presence of exotic flora and fauna; presence of aquatic communities; degree of habitat modification and degree of hydrological modification.

**Criteria 2. Naturalness - Catchment:** The naturalness of the terrestrial systems of a catchment can have an influence on many wetland characteristics including: natural ecological processes e.g. nutrient cycling, riparian vegetation, water chemistry, and flow. The indicators utilised to assess this criterion include: presence of exotic flora and/or fauna; riparian, catchment and flow modification.

**Criteria 3. Naturalness - Diversity and Richness:** This criterion is common to many ecological assessment methods and can include both physical and biological features. It includes such indicators as species richness, riparian ecosystem richness and geomorphological diversity.

**Criteria 4. Threatened Species and Ecosystems:** This criterion evaluates ecological rarity characteristics of a wetland. This includes both species rarity and rarity of communities / assemblages. The communities and assemblages are best represented by regional ecosystems. Species rarity is determined by NCA and EPBC status with Endangered, Vulnerable or Near-threatened species being included in the evaluation. Ecosystem rarity is determined by regional ecosystem biodiversity status i.e. Endangered, Of Concern, or Not of Concern.

**Criteria 5. Priority Species and Ecosystems:** Priority flora and fauna species lists are expert panel derived. These are aquatic, semi-aquatic and riparian species which exhibit at least 1 particular trait in order to be eligible for consideration. For

flora species the traits included:

- It forms significant macrophyte beds (in shallow or deep water).
- It is an important food source.
- It is important/critical habitat.
- It is implicated in spawning or reproduction for other fauna and/or flora species.
- It is at its distributional limit or is a disjunct population.
- It provides stream bank or bed stabilisation or has soil binding properties.
- It is a small population and subject to threatening processes.

Fauna species are included if they meet at least one of the following traits:

- It is endemic to the study area (>75 per cent of its distribution is in the study area/catchment).
- It has experienced, or is suspected of experiencing, a serious population decline.
- It has experienced a significant reduction in its distribution and has a naturally restricted distribution in the study area/catchment.
- It is currently a small population and threatened by loss of habitat.
- It is a significant disjunct population.
- It is a migratory species (other than birds).
- A significant proportion of the breeding population (>one per cent for waterbirds, >75 per cent other species) occurs in the waterbody (see Ramsar criterion 6 for waterbirds).
- Limit of species range.

See the individual expert panel reports for the priority species traits specific to an ACA.

**Criteria 6. Special Features:** Special features are areas identified by flora, fauna and ecology expert panels which exhibit characteristics beyond those identified in other criteria and which the expert panels consider to be of the highest ecological importance. Special feature traits can relate to, but are not solely restricted to geomorphic features, unique ecological processes, presence of unique or distinct habitat, presence of unique or special hydrological regimes e.g. spring-fed streams. Special features are rated on a 1 - 4 scale (4 being the highest).

**Criteria 7. Connectivity:** This criterion is based on the concept that appropriately connected aquatic ecosystems are healthy and resilient, with maximum potential biodiversity and delivery of ecosystem services.

**Criteria 8. Representativeness:** This criterion applies primarily to non-riverine assessments, evaluates the rarity and uniqueness of a wetland type in relation to specific geographic areas. Rarity is determined by the degree of wetland protection within "protected Areas" estate or within an area subject to the *Fisheries Act 1994*, *Coastal Protection and Management Act 1995*, or *Marine Parks Act 2004*. Wetland uniqueness evaluates the relative abundance and size of a wetland or wetland management group within geographic areas such as catchment and subcatchment.

## Riverine Wetlands

Riverine wetlands are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water. AquaBAMM, when applied to riverine wetlands uses a discrete spatial unit termed subsections. A subsection can be considered as an area which encompasses discrete homogeneous stream sections in terms of their natural attributes (i.e. physical, chemical, biological and utilitarian values) and natural resources. Thus in an ACA, an aquatic conservation significance score is calculated for each subsection and applies to all streams within a subsection, rather than individual streams as such.

Please note, the area figures provided in Tables 16 and 17, are derived using the extent of riverine subsections within the AOI. Refer to **Map 5** for further information. A summary of the conservation significance of riverine wetlands within the AOI is provided in the following table.

**Table 16: Overall level/s of riverine aquatic conservation significance**

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
Very High	1,868.36	12.21

Aquatic conservation significance (riverine wetlands)	Area (Ha)	% of AOI
High	11,516.77	75.28
Medium	1,911.36	12.49
Low	0.0	0.0
Very Low	0.0	0.0

The individual aquatic conservation criteria ratings for riverine wetlands within the AOI are listed below.

**Table 17: Level/s of riverine aquatic conservation significance based on selected criteria**

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	12,642.22	82.6	286.3	1.9	1,056.09	6.9	1,311.88	8.6
2. Naturalness catchment	11,564.71	75.6	1,354.00	8.9	2,377.78	15.5		
3. Diversity and richness	437.81	2.9	6,974.05	45.6	7,884.63	51.5		
4. Threatened species and ecosystems			14,498.78	94.8				
5. Priority species and ecosystems	5,342.03	34.9	9,156.75	59.9				
6. Special features			12,598.70	82.3	339.53	2.2		
7. Connectivity	2,618.23	17.1	7,348.34	48.0	860.12	5.6	4,469.80	29.2
8. Representative-ness								

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to riverine wetlands within the AOI.

**Table 18: Expert panel decisions for assigning overall levels of riverine aquatic conservation significance**

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
bl_r_ec_04	Lower Landers Creek	Burdekin Lower	6.3.1	2
bl_r_fl_01	Blue Gum on Alluvial Floodplains / Delta land system -RE 11.3.25	Burdekin Lower	5.2.1	3
ha_r_ec_02	Upper Barratta Creek	Haughton	6.3.1 7.1.1	3
ha_r_fl_02	Blue Gum on Alluvial Floodplains / Delta land system -RE 11.3.25	Haughton	5.2.1	3
ha_r_fl_03	<i>Melaleuca dealbata</i> ecosystems on old alluvials (including gilgai landforms and seasonal drainage depressions with or without <i>livistona decipiens</i> ) -RE 11.3.12	Haughton	5.2.1	4
ha_r_ec_07	Glady's Lagoon	Haughton	6.2.1 6.3.1 6.3.3 6.4.1	3

4 is the highest rating/value

#### Expert panel decision descriptions:

##### bl\_r\_ec\_04

Site is hydrologically modified and receives a significant percentage of its flow from tailwater discharge from the Millaroo irrigation area however this is lower now. The perennial reaches support well developed riparian forest community and provide clear water sub catchment refugia for modified Burdekin main river channel.

##### bl\_r\_fl\_01

Rare (riparian) ecosystem

##### ha\_r\_ec\_02

The Upper Barratta Creek area provides good connectivity with a range of wetland types providing significant fish habitat areas and allowing for fish migration. Despite being supplemented by tailwaters and subject to encroachment by weeds (particularly *Hymenachne*), the creek contains good remnant riparian vegetation and is the best of its kind in the Haughton study area. The sites values are largely captured in the DIWA site listings for Barratta Channels Aggregation Qld 196 and the Jerona Aggregation Qld 201. A key feature of the palustrine wetlands in this area is the retention of thousands of hectares of floodplain vegetation, including riparian and back levee swamps, retained during the development of the Burdekin-Haughton Water Supply Scheme (see Tait and Veitch, 2007).

##### ha\_r\_fl\_02

Rare (riparian) ecosystem

##### ha\_r\_fl\_03

Rare (riparian) ecosystem

##### ha\_r\_ec\_07

This is one of the largest examples of a Burdekin River back levee lagoon. The area is largely upstream of irrigation tailwater inputs thereby retaining natural hydrology, water quality, macrophyte communities, seasonally important waterbird habitat and retains a good freshwater fish community. Connectivity for catadromous fish is impacted by downstream road and irrigation infrastructure but barramundi (*Lates calcarifer*) are stocked into the system. It probably represents a prior channel of the Burdekin River and sits high in the Barratta Creek distributary system (See Tait and Veitch, 2007).

## Non-riverine Wetlands

Non-riverine wetlands include both lacustrine and palustrine wetlands, however, do not currently incorporate estuarine, marine or subterranean wetland types. A summary of the conservation significance of non-riverine wetlands within the AOI is provided in the following table. Refer to **Map 6** for further information.

**Table 19: Overall level/s of non-riverine aquatic conservation significance**

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very High	1.69	0.01
High	6.05	0.04
Medium	13.77	0.09
Low	0.0	0.0

Aquatic conservation significance (non-riverine wetlands)	Area (Ha)	% of AOI
Very Low	374.54	2.45

The following table provides an assessment of non-riverine wetlands within the AOI and associated aquatic conservation criteria values.

**Table 20: Level/s of non-riverine aquatic conservation significance based on selected criteria**

Criteria	Very High Rating - Area (Ha)	Very High Rating - % of AOI	High Rating - Area (Ha)	High Rating - % of AOI	Medium Rating - Area (Ha)	Medium Rating - % of AOI	Low Rating - Area (Ha)	Low Rating - % of AOI
1. Naturalness aquatic	16.0	0.1			6.77		373.27	2.4
2. Naturalness catchment	8.07	0.1	379.56	2.5	8.41	0.1		
3. Diversity and richness			393.4	2.6				
4. Threatened species and ecosystems			20.13	0.1				
5. Priority species and ecosystems	11.82	0.1						
6. Special features								
7. Connectivity								
8. Representativeness	8.95	0.1	1.05		5.0		5.13	

The table below lists and describes the relevant expert panel decisions used to assign conservation significance values to non-riverine wetlands within the AOI.

**Table 21: Expert panel decisions for assigning overall levels of non-riverine aquatic conservation significance.**

Decision number	Special feature	Catchment	Criteria/Indicator/Measure	Conservation rating (1-4)
ha_nr_fl_02	Seasonal palustrine/ swamps of the floodplain with native macrophyte communities (regional ecosystem 11.3.27)	Haughton	5.2.1	4

*4 is the highest rating/value*

#### Expert panel decision descriptions:

##### ha\_nr\_fl\_02

Around 80 per cent of these communities have been filled, or become receptacles for irrigation tailwater. As a result, the native macrophyte community has been lost due to exotic emergent grasses (para grass (**Urochloa mutica**) and **Hymenachne**). The communities in this area have lost their seasonality and become subject to nutrient loading and floating exotics (such as hyacinth). The intact systems include native species such as native water lily (**Nymphaea**), ottelia, rice grasses and lisa. One of major drivers of impact is alienation of grazing in the presence of invasive exotic pastures. Water fowl used to use these frequently during the wet season.

**Note:** This priority ecosystem decision also applies to the following catchments: Belyando, Bowen, Burdekin Lower, Don and Ross.

## Threatened and Priority Species

### Introduction

This chapter contains a list of threatened and priority flora and/or fauna species that have been recorded on, or within 4km of the Assessment Area.

The information presented in this chapter with respect to species presence is derived from compiled databases developed primarily for the purpose of BPAs and ACAs. Data is collated from a number of sources and is updated periodically.

It is important to note that the list of species provided in this report, may differ when compared to other reports generated from other sources such as the State government's WildNet, HerbreCs or the federal government's EPBC database for a number of reasons.

Records for threatened and priority species are filtered and checked based on a number of rules including:

- Taxonomic nomenclature - current scientific names and status,
- Location - cross-check co-ordinates with location description,
- Taxon by location - requires good knowledge of the taxon and history of the record,
- Duplicate records - identify and remove,
- Expert panels - check records and provide new records,
- Flora cultivated records excluded,
- Use precise records less than or equal to 2000m,
- Use recent records greater than or equal to 1975 animals, greater than or equal to 1950 plants.

### Threatened Species

Threatened species are those species classified as "Endangered" or "Vulnerable" under the *Environment Protection and Biodiversity Conservation Act 1999* or "Endangered", "Vulnerable" or "Near threatened" under the *Nature Conservation Act 1992*.

The following threatened species have been recorded on, or within approximately 4km of the AOI.

**Table 22: Threatened species recorded on, or within 4km of the AOI**

Species	Common name	NCA status	EPBC status	Back on Track rank	Migratory species*	Wetland species**	Identified flora/fauna
<i>Crocodylus porosus</i>	estuarine crocodile	V		Low	Y	I	FA
<i>Phascolarctos cinereus</i>	koala	V	V	Low			FA
<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)	E	E	High			FA
<i>Saccolaimus saccolaimus nudicluniatu</i>	bare-rumped sheath-tail bat	E	V	High			FA

*NB. Please note that the threatened species listed in this section are based upon the most recently compiled DES internal state-wide threatened species dataset. This dataset may contain additional records that were not originally available for inclusion in the relevant individual BPAs and ACAs.*

\*JAMBA - Japan-Australia Migratory Bird Agreement; CAMBA - China-Australia Migratory Bird Agreement; ROKAMBA - Republic of Korea-Australia Migratory Bird Agreement; CMS - Convention on the Conservation of Migratory Species.

\*\*I - wetland indicator species; D - wetland dependent species.

### BPA Priority Species

A list of BPA priority species that have been recorded on, or within approximately 4km of the AOI is contained in the following table.

**Table 23: Priority species recorded on, or within 4km of the AOI**



Species	Common name	Back on Track rank	Identified flora/fauna
<i>Lagorchestes conspicillatus</i>	Spectacled Hare-wallaby	L	FA
<i>Macquaria ambigua</i>	Yellowbelly	L	FA
<i>Mogurnda adspersa</i>	Southern Purplespotted Gudgeon	L	FA
<i>Porochilus rendahli</i>	Rendahli's Catfish	L	FA

*NB. Please note that the list of priority species is based on those species identified in the BPAs, however records for these species may be more recent than the originals used. Furthermore, the BPA priority species databases are updated from time to time. At each update, the taxonomic details for all species are amended as necessary to reflect current taxonomic name and/or status changes.*

## ACA Priority Species

A list of ACA priority species used in riverine and non-riverine ACAs that have been recorded on, or within approximately 4km of the AOI are contained in the following tables.

**Table 24: Priority species recorded on, or within 4 km of the AOI - riverine**

Species	Common name	Back on Track rank	Identified flora/fauna
<i>Leersia hexandra</i>	swamp rice grass	None	FL
<i>Strongylura krefftii</i>	Freshwater Longtom	Low	FA

**Table 25: Priority species recorded on, or within 4 km of the AOI - non-riverine**

Species	Common name	Back on Track rank	Identified flora/fauna
<i>Bubulcus ibis</i>	Cattle Egret	Low	FA
<i>Leersia hexandra</i>	swamp rice grass	None	FL
<i>Ottelia ovalifolia</i>	swamp lily	None	FL
<i>Strongylura krefftii</i>	Freshwater Longtom	Low	FA

*NB. Please note that the priority species records used in the above two tables are comprised of those adopted for the released individual ACAs. The ACA riverine and non-riverine priority species databases are updated from time to time to reflect new release of ACAs. At each update, the taxonomic details for all ACAs records are amended as necessary to reflect current taxonomic name and/or status changes.*

# Maps

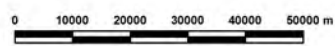
## Map 1 - Locality Map



### Locality Map

**Legend**

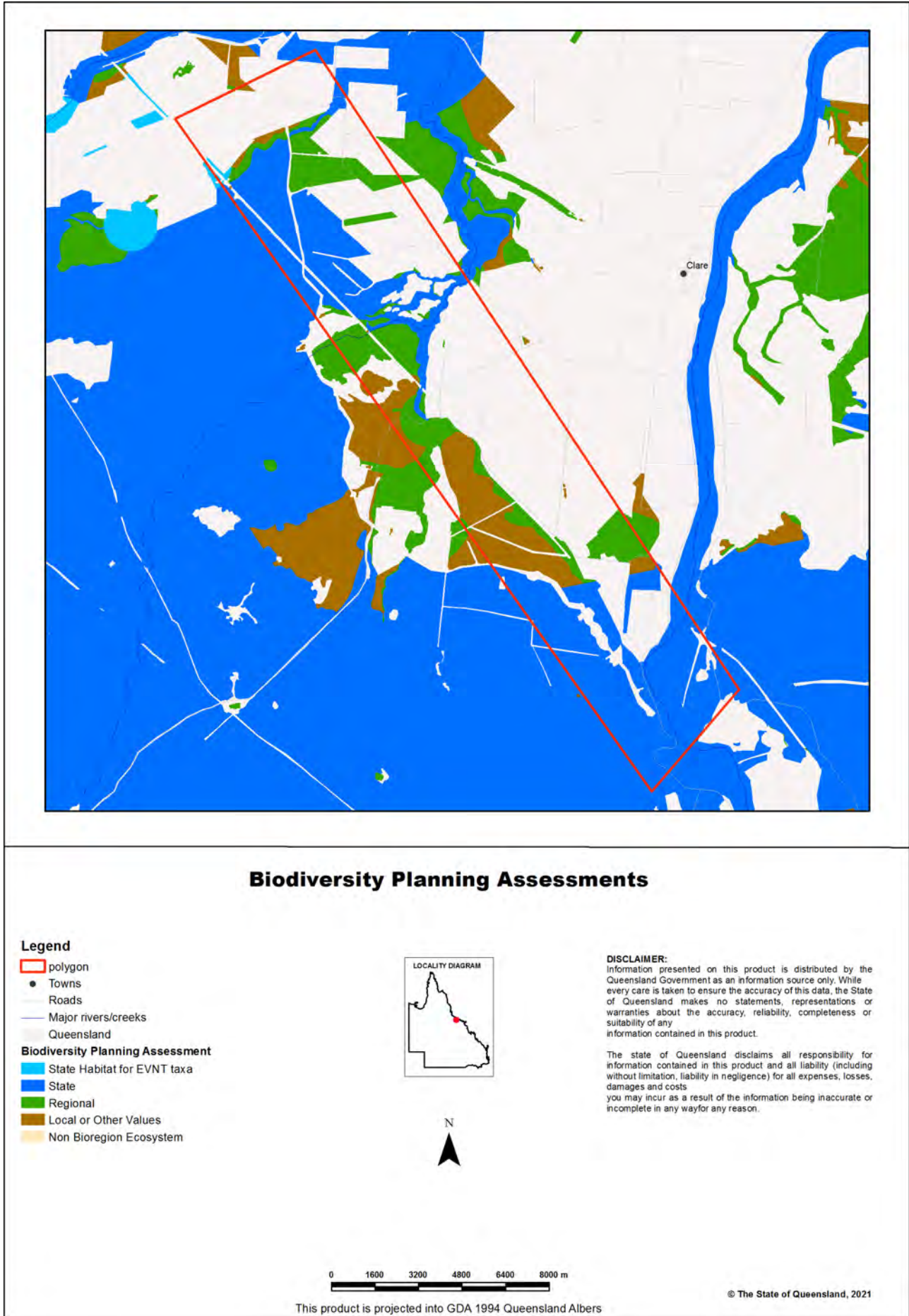
- polygon
- Towns
- Highway
- Connector
- Street/Local Road
- Reservoirs
- Lakes
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Coordinated Conservation Areas
- Major rivers/creeks
- Queensland



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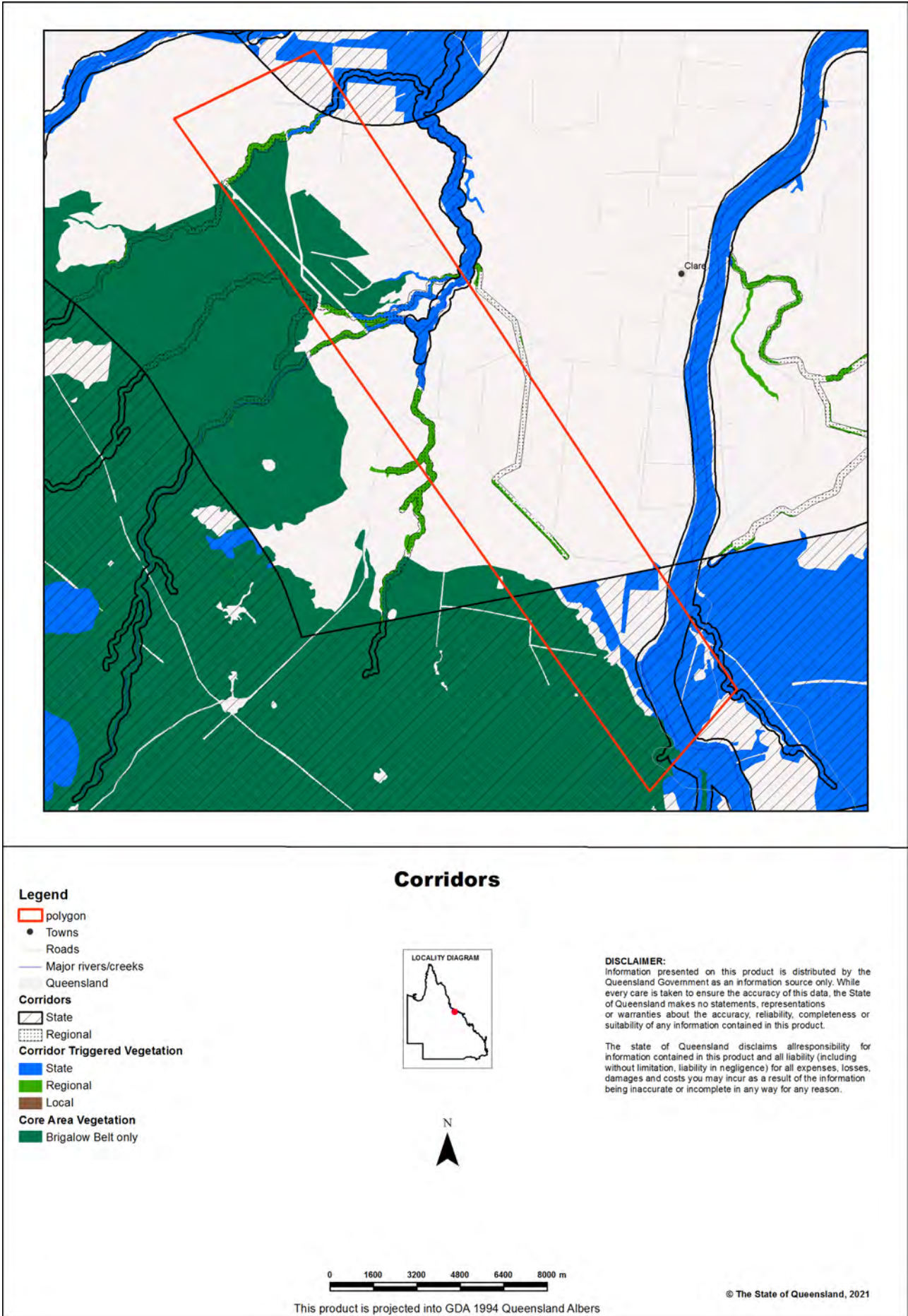
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## Map 2 - Biodiversity Planning Assessment (BPA)



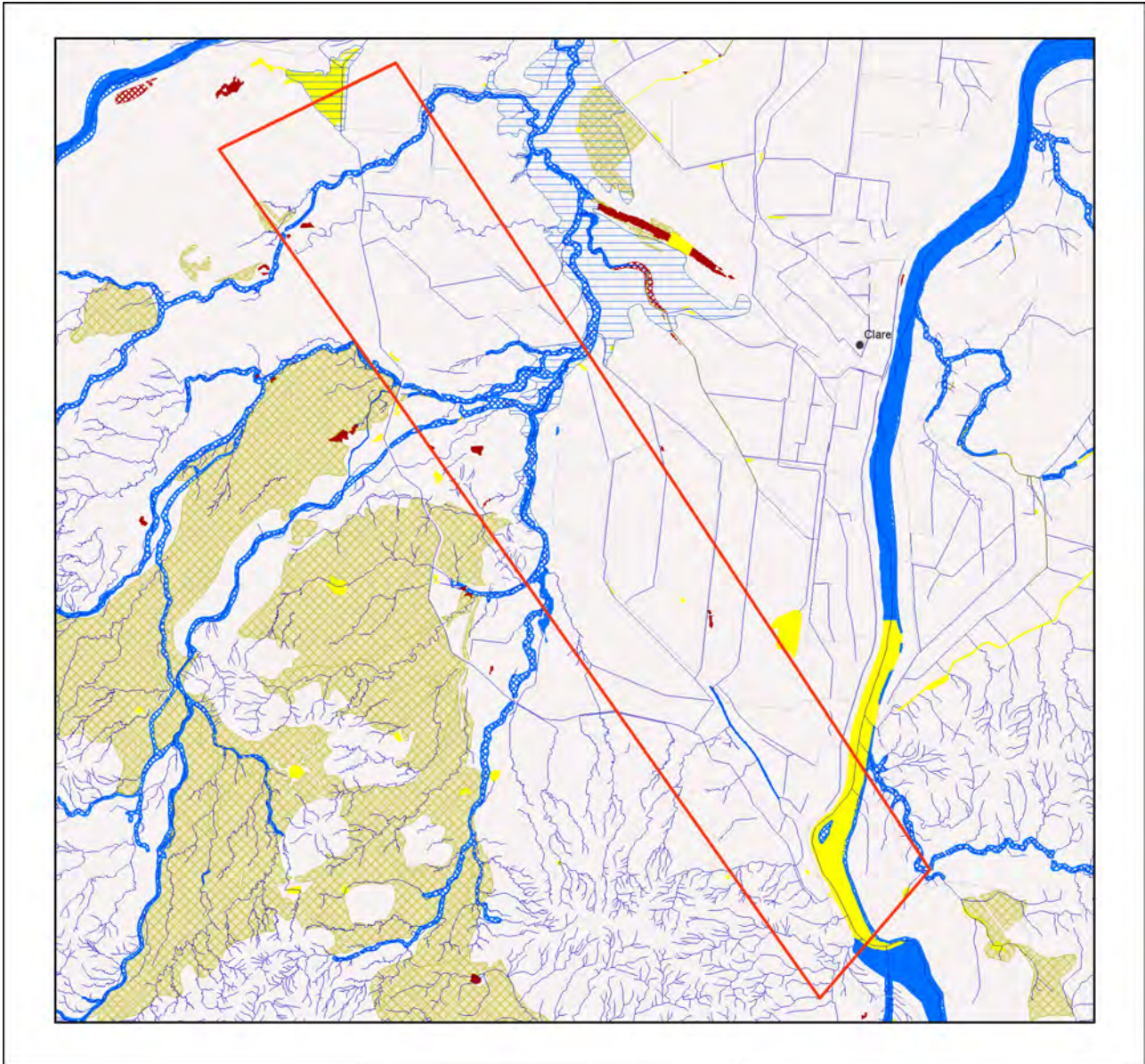


# Map 3 - Corridors





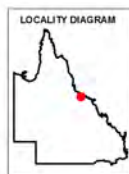
# Map 4 - Wetlands and waterways



## Wetlands and Waterways

### Legend

- polygon
  - Towns
  - Roads
  - Springs
  - Rivers/Creeks
  - Directory of Important Wetlands
  - ▨ Ramsar Sites - QLD
  - Queensland
- Wetland Type**
- Marine Waterbodies
  - Estuarine Waterbodies
  - Riverine Waterbodies
  - Lacustrine Waterbodies
  - Palustrine Waterbodies
  - Marine RE
  - Estuarine RE
  - Riverine RE
  - Lacustrine RE
  - Palustrine RE
  - RE 51-80% wetland (mosaic units)
  - RE 1-50% wetland (mosaic units)



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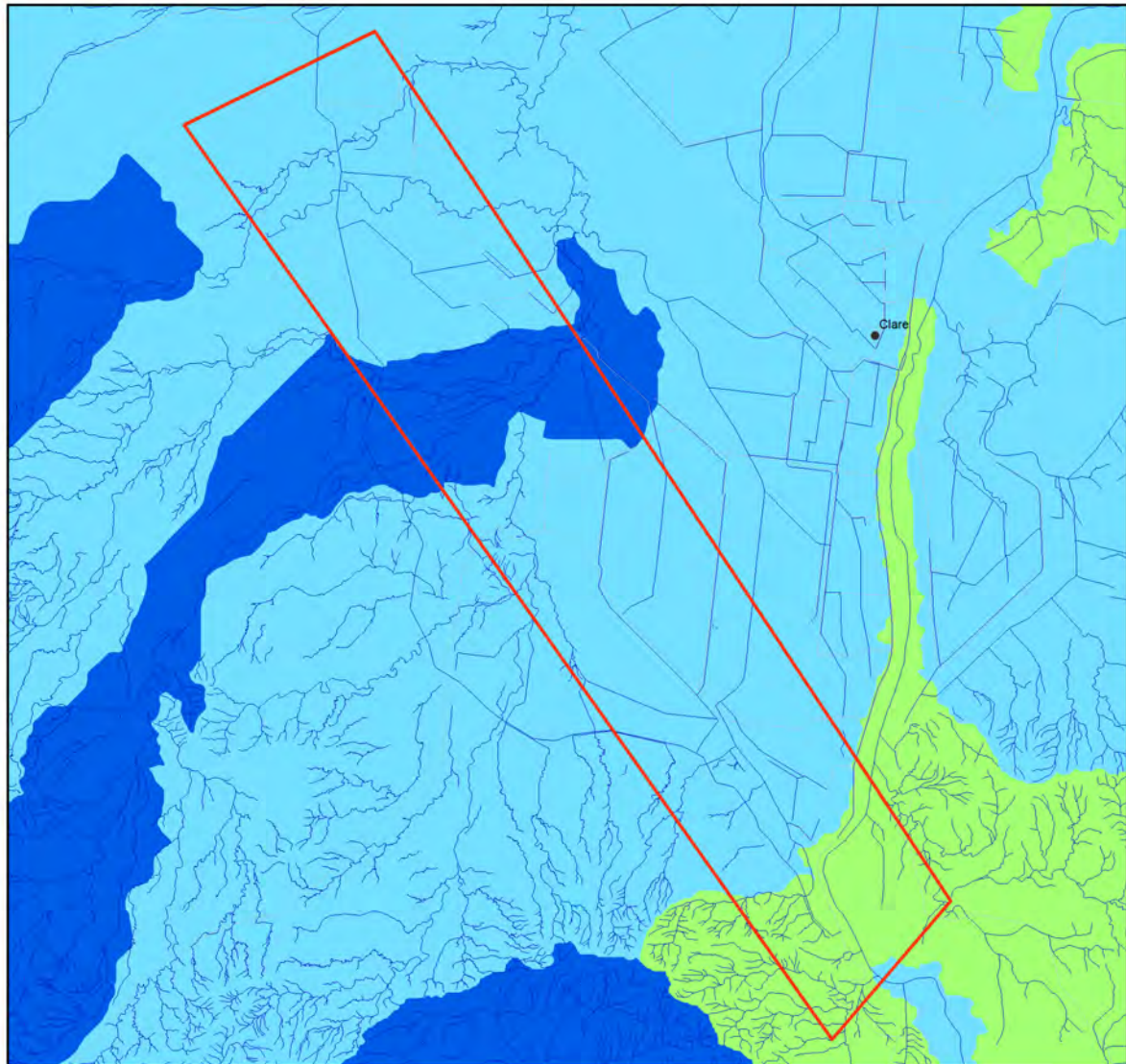
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# Map 5 - Aquatic Conservation Assessment (ACA) - riverine



## Aquatic Conservation Assessment (ACA) - riverine

**Legend**

- polygon
- Towns
- Roads
- Rivers/Creeks
- Queensland

**ACA Riverine - Subcatchment Significance**

- Very High
- High
- Medium
- Low
- Very Low



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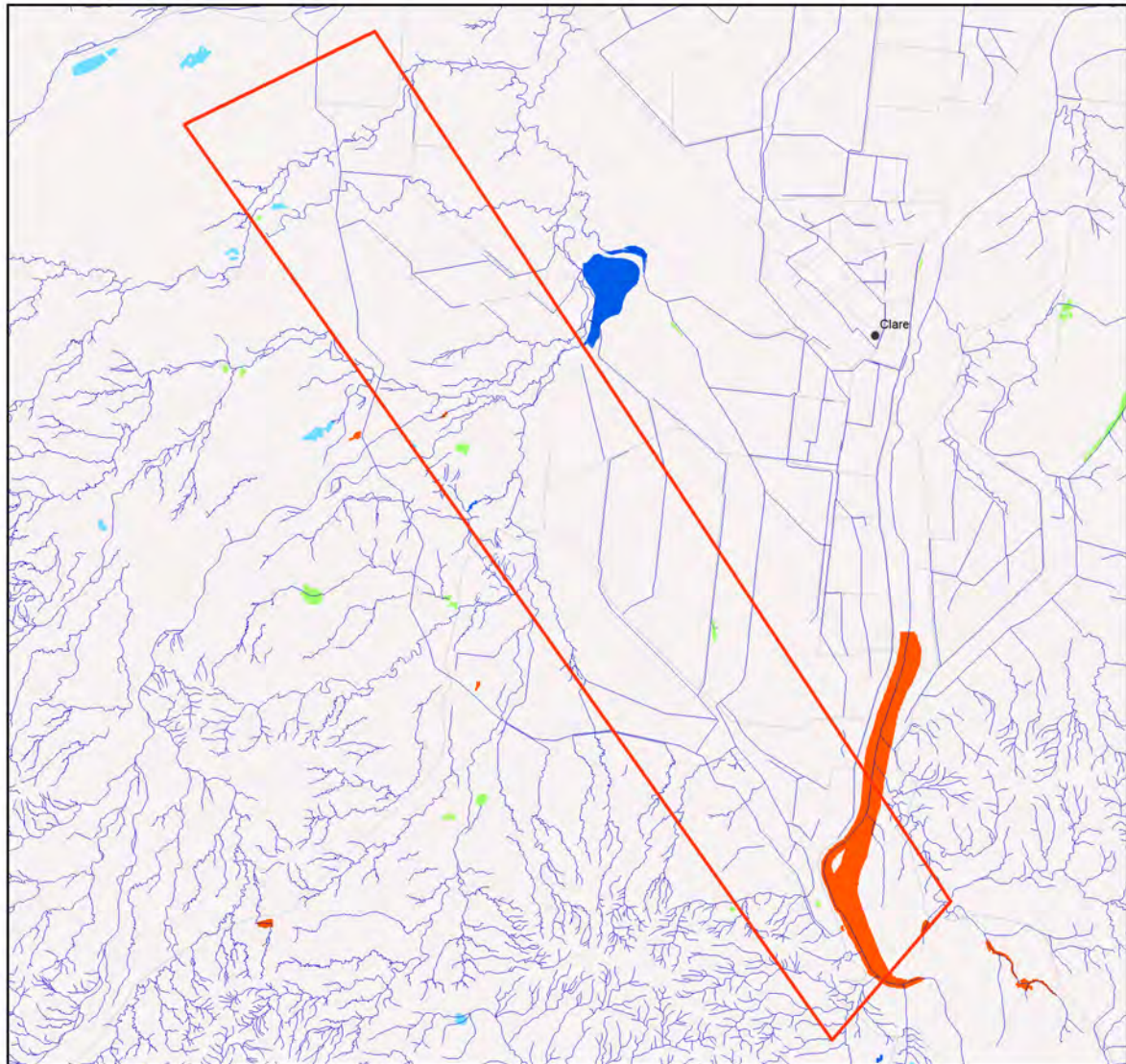
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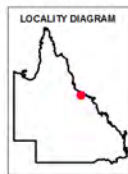
# Map 6 - Aquatic Conservation Assessment (ACA) - non-riverine



## Aquatic Conservation Assessment (ACA) - nonriverine

**Legend**

- polygon
  - Towns
  - Roads
  - Rivers/Creeks
  - Queensland
- ACA Non-riverine**
- Very High
  - High
  - Medium
  - Low
  - Very Low



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## References

Clayton, P.D., Fielder, D.F., Howell, S. and Hill, C.J. (2006) *Aquatic biodiversity assessment and mapping method (AquaBAMM): a conservation values assessment tool for wetlands with trial application in the Burnett River catchment*. Published by the Environmental Protection Agency, Brisbane. ISBN 1-90928-07-3. Available at

<http://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca/>

Environmental Protection Agency (2002) *Biodiversity Assessment and Mapping Methodology. Version 2.1, July 2002*. (Environmental Protection Agency, Brisbane).

Morton, S. R., Short, J. and Barker, R. D. with an Appendix by G.F. Griffin and G. Pearce (1995). *Refugia for Biological Diversity in Arid and Semi-arid Australia. Biodiversity Series*, Paper No. 4, Biodiversity Unit, Environment Australia.

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.



## Appendices

### Appendix 1 - Source Data

Theme	Datasets
Aquatic Conservation Assessments Non-riverine*	Combination of the following datasets: Cape York Peninsula Non-riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Non-riverine v1.3 Lake Eyre and Bulloo Basins v1.1 QMDB Non-riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Non-riverine ACA v1.1 Southern Gulf Catchments Non-riverine ACA v1.1
Aquatic Conservation Assessments Riverine*	Combination of the following datasets: Cape York Peninsula Riverine v1.1 Eastern Gulf of Carpentaria v1.1 Great Barrier Reef Catchment Riverine v1.1 Lake Eyre and Bulloo Basins v1.1 QMDB Riverine ACA v1.4 Southeast Queensland ACA v1.1 WBB Riverine ACA v1.1 Southern Gulf Catchments Riverine ACA v1.1
Biodiversity Planning Assessments*	Combination of the following datasets: Brigalow Belt BPA v2.1 Cape York Peninsula BPA v1.1 Central Queensland Coast BPA v1.3 Channel Country BPA v1.1 Desert Uplands BPA v1.3 Einasleigh Uplands BPA v1.1 Gulf Plains BPA v1.1 Mitchell Grass Downs BPA v1.1 Mulga Lands BPA v1.4 New England Tableland v2.3 Northwest Highlands v1.1 Southeast Queensland v4.1 Wet Tropics v1.1
Statewide BPA Corridors*	Statewide corridors v1.6
Threatened Species	An internal DES database compiled from Wildnet, Herbrecks, Corveg, the QLD Museum, as well as other incidental sources.
BPA Priority Species	An internal DES database compiled from Wildnet, Herbrecks, Corveg, the QLD Museum, as well as other incidental sources.
ACA Priority Species	An internal DES database compiled from Wildnet, Herbrecks, Corveg, the QLD Museum, as well as other incidental sources.

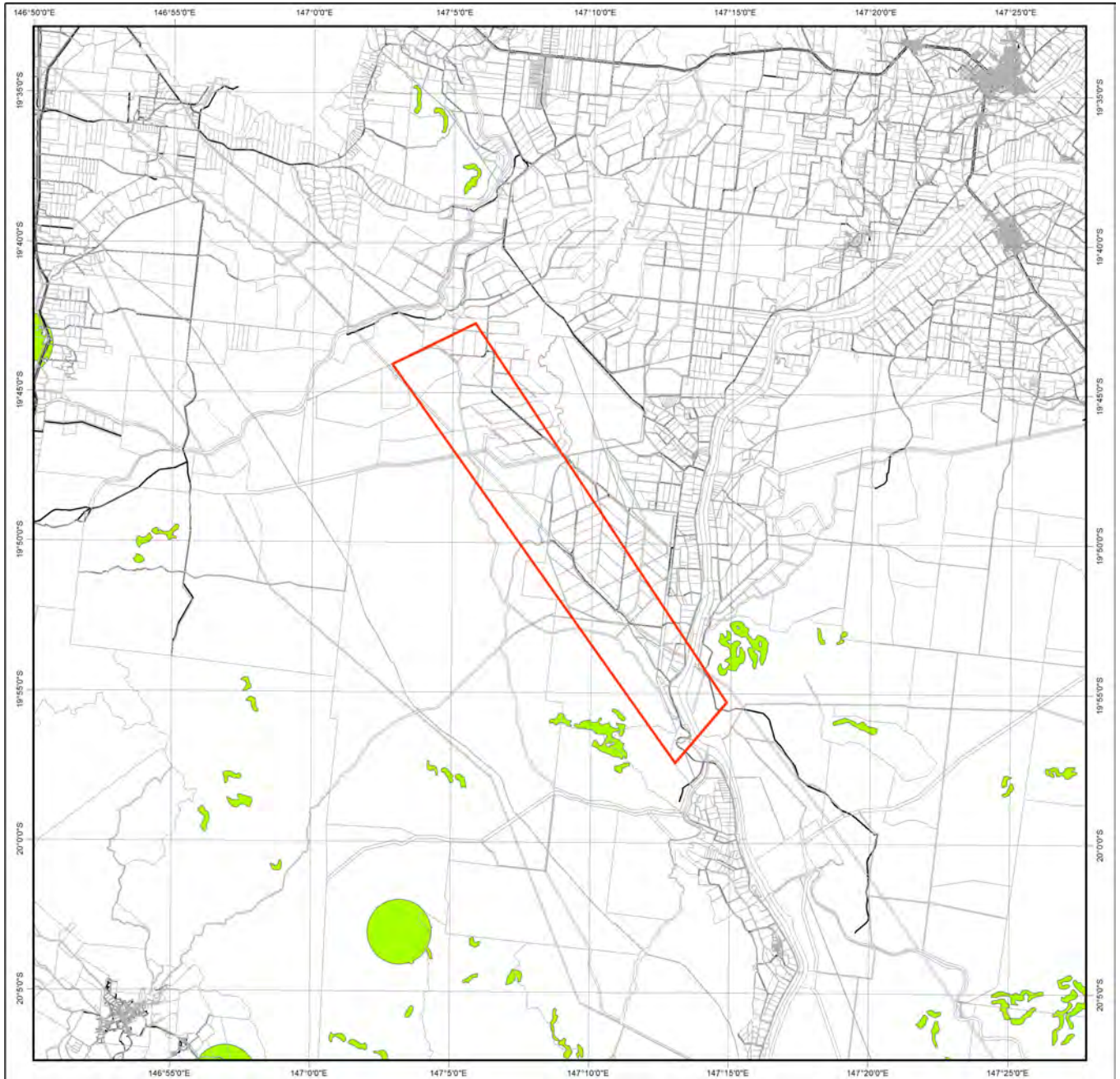
\*These datasets are available at:

<http://dds.information.qld.gov.au/DDS>

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## Appendix 2 - Acronyms and Abbreviations

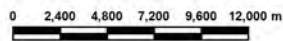
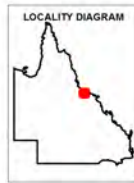
AOI	- Area of Interest
ACA	- Aquatic Conservation Assessment
AQUABAMM	- Aquatic Biodiversity Assessment and Mapping Methodology
BAMM	- Biodiversity Assessment and Mapping Methodology
BoT	- Back on Track
BPA	- Biodiversity Planning Assessment
CAMBA	- China-Australia Migratory Bird Agreement
DES	- Department of Environment and Science
EPBC	- <i>Environment Protection and Biodiversity Conservation Act 1999</i>
EVNT	- Endangered, Vulnerable, Near Threatened
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
JAMBA	- Japan-Australia Migratory Bird Agreement
NCA	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
ROKAMBA	- Republic of Korea-Australia Migratory Bird Agreement



### Protected Plants Flora Survey Trigger Map

**Legend**

- polygon
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets



This product is projected into:  
GDA 1994 Queensland Albers

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at [palm@des.qld.gov.au](mailto:palm@des.qld.gov.au)

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## Protected plants flora survey trigger map

The protected plants flora survey trigger map identifies 'high risk areas' where endangered, vulnerable or near threatened plants are known to exist or are likely to exist. Under the *Nature Conservation Act 1992* (the Act) it is an offence to clear protected plants that are 'in the wild' unless you are authorised or the clearing is exempt, for more information see [section 89](#) of the Act.

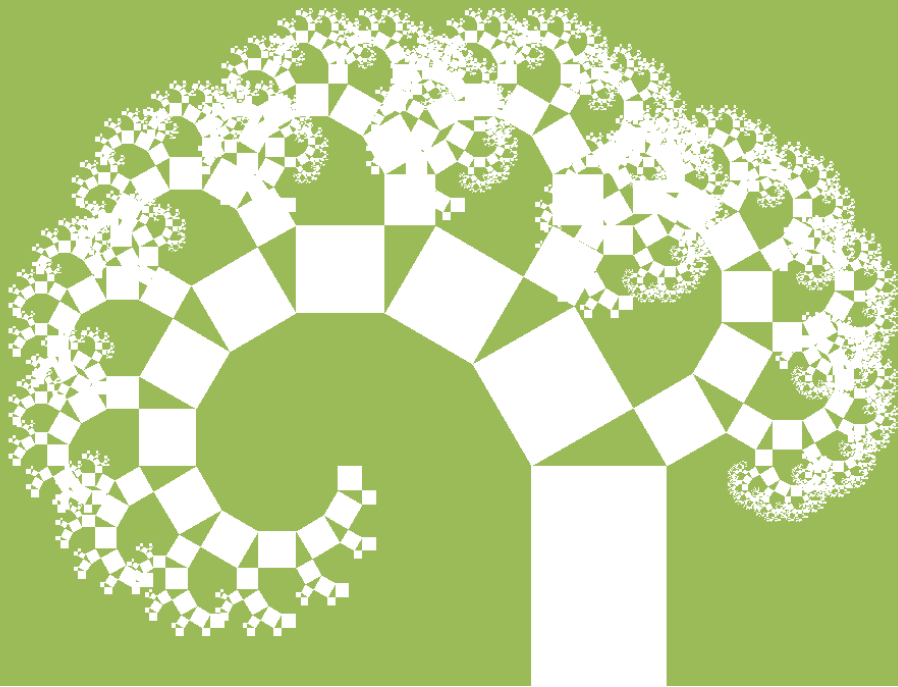
Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for information on what exemptions may apply in your circumstances, whether you may need to undertake a flora survey, and whether you may need a protected plants clearing permit.

### Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

### Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the [Queensland Spatial Catalogue](#), the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for more information.



## Modelled potential habitat

For the selected area of interest 15299.31ha

Current as at 29/09/2021

## Introduction

Species lists in this report are derived from Maxent pre-clear potential habitat models and buffered point coverages produced by the Queensland Herbarium for NCA listed 'endangered' or 'vulnerable' species, EPBC listed 'critically endangered', 'endangered' or 'vulnerable' species and other priority species.

The models utilise records of fauna species occurrence compiled for the purpose of Biodiversity Assessment by the Queensland Department of Environment and Resource Management (EPA 2002) and specimen backed flora records compiled from the Queensland Herbarium's Herbrex database. All records have a location precision of better than 2000 m, and all fauna records are less than 50 years old. Models were constrained within an occurrence mask for each species, defined by a buffer of 200 km around a convex hull that encompasses all records. All models were based on seven environmental layers, annual mean temperature, temperature seasonality (coefficient of variation), annual precipitation, mean moisture index of the lowest quarter moisture index, pre-clearing broad vegetation group (1:1M), land zone and taxonomic ruggedness. Climate layers were modelled using Anuclim software on an 83 m digital elevation model. A mask of Queensland's road network was used to down-weight species records collected along roads. Model performance was assessed by comparing the area under the ROC curve (AUC) with the 95th percentile AUC from 1000 null models for each species created by randomly selecting locations from within the minimum convex hull of species presence records. For species with very restricted ranges, model performance was further tested using randomly selected locations from within the species mask. Thresholds were applied (either equal training sensitivity and specificity logistic threshold or 10th percentile training presence logistic threshold, whichever was highest) in order to convert model output to a prediction of potential habitat. Any presence records excluded by the threshold applied were incorporated into the output with a 1km buffer. The output was clipped to the species mask and simplified using a majority filter algorithm to remove outlying orphan cells in the model output. The resulting shapefile defines the modelled pre-clear potential habitat for selected threatened and priority species.

If a species is not listed in the report, it does not indicate that its habitat is absent from the queried location and conversely, species listed may not currently inhabit the area.

## Threatened fauna species

**Threatened fauna species modelled to have pre-clear potential habitat within the area of interest , with an area of 15299.31ha hectares**

### Threatened Species animals

Class	Scientific name	Common name	NCA Status	EPBC Status	Area (ha)
birds	<i>Erythrorichis radiatus</i>	red goshawk	E	V	411.49
birds	<i>Rostratula australis</i>	Australian painted snipe	V	E	14659.23
birds	<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)	E	E	14519.07
birds	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)	V	V	1401.47
mammals	<i>Macroderma gigas</i>	ghost bat	E	V	295.71
mammals	<i>Phascolarctos cinereus</i>	koala	V	V	131.89
mammals	<i>Petrogale sharmani</i>	Sharman's rock-wallaby	V	V	240.82
mammals	<i>Dasyurus hallucatus</i>	northern quoll	C	E	126.93
mammals	<i>Saccolaimus saccolaimus nudicluniatus</i>	bare-rumped sheathtail bat	E	V	47.95
reptiles	<i>Egernia rugosa</i>	yakka skink	V	V	117.93

## Threatened flora species

**Threatened flora species modelled to have pre-clear potential habitat within the selected area**

### Threatened Species plants

Class	Scientific name	Common name	NCA Status	EPBC Status	Area (ha)
higher dicots	<i>Eucalyptus raveretiana</i>	black ironbox	C	V	65.87
higher dicots	<i>Myrmecodia beccarii</i>	None	V	V	458.61
higher dicots	<i>Marsdenia brevifolia</i>	None	V	V	131.78
monocots	<i>Livistona lanuginosa</i>	None	V	V	13803.81
monocots	<i>Dichanthium setosum</i>	None	C	V	717.13

## Links and support

[Modelled potential habitat for selected threatened and priority species in Queensland](#) - access the geodatabase of modelled potential habitat for Queensland's threatened species.

## Disclaimer

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Queensland Government

Department of Environment and Science

Environmental Reports

# **Matters of State Environmental Significance**

For the selected area of interest



## Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: [Planning.Support@des.qld.gov.au](mailto:Planning.Support@des.qld.gov.au)

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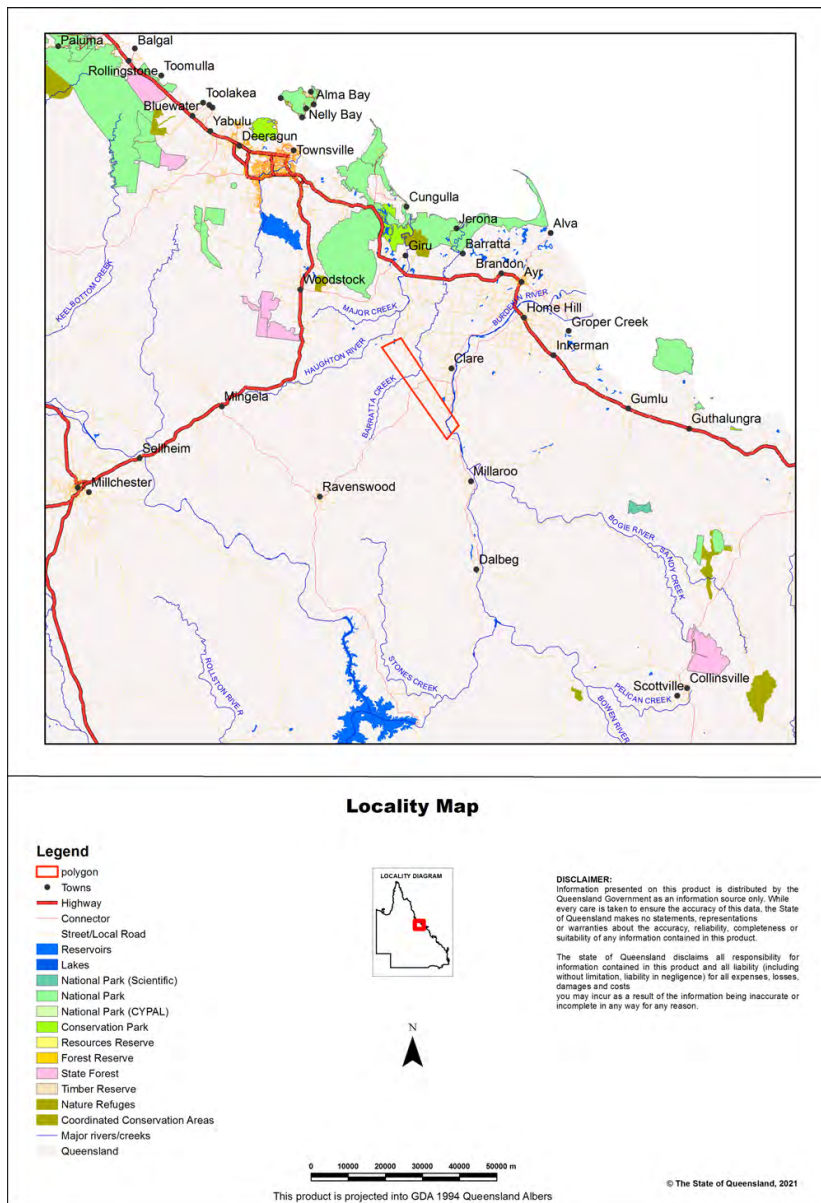
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## Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

**Table 1: Summary table, details for AOI**

Size (ha)	15,299.31
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Bogie River Hills, Townsville Plains
Catchment(s)	Burdekin, Haughton



## Matters of State Environmental Significance (MSES)

### MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;
- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;
- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;
- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;
- Regulated vegetation under the *Vegetation Management Act 1999* that is:
  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;
- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;
- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;
- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

## MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

**Table 2: Summary of MSES present within the AOI**

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
1c Protected Areas- special wildlife reserves	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	6.05 ha	0.0%
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	377.76 ha	2.5%
7b Special least concern animals	0.0 ha	0.0 %
7c i Koala habitat area - core (SEQ)	0.0 ha	0.0 %
7c ii Koala habitat area - locally refined (SEQ)	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	346.25 ha	2.3%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	5.65 ha	0.0%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	75.9 ha	0.5%
8d Regulated Vegetation - Essential habitat	378.44 ha	2.5%
8e Regulated Vegetation - intersecting a watercourse **	115.0 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	40.88 ha	0.3%
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

---

## **Additional Information with Respect to MSES Values Present**

### **MSES - State Conservation Areas**

#### **1a. Protected Areas - estates**

(no results)

#### **1b. Protected Areas - nature refuges**

(no results)

#### **1c. Protected Areas - special wildlife reserves**

(no results)

#### **2. State Marine Parks - highly protected zones**

(no results)

#### **3. Fish habitat areas (A and B areas)**

(no results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

### **MSES - Wetlands and Waterways**

#### **4. Strategic Environmental Areas (SEA)**

(no results)

#### **5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values**

Natural wetlands that are 'High Ecological Significance' (HES) on the Map of Queensland Wetland Environmental Values are present.

#### **6a. Wetlands in High Ecological Value (HEV) waters**

(no results)

#### **6b. Waterways in High Ecological Value (HEV) waters**

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

### **MSES - Species**

#### **7a. Threatened (endangered or vulnerable) wildlife**

Values are present

**7b. Special least concern animals**

Not applicable

**7c i. Koala habitat area - core (SEQ)**

Not applicable

**7c ii. Koala habitat area - locally refined (SEQ)**

Not applicable

**Threatened (endangered or vulnerable) wildlife habitat suitability models**

Species	Common name	NCA status	Presence
<i>Boronia keysii</i>		V	None
<i>Calyptorhynchus lathamii</i>	Glossy black cockatoo	V	None
<i>Casuarus casuarus johnsonii</i>	Sthn population cassowary	E	None
<i>Crinia tinnula</i>	Wallum froglet	V	None
<i>Denisonia maculata</i>	Ornamental snake	V	None
<i>Litoria freycineti</i>	Wallum rocketfrog	V	None
<i>Litoria olongburensis</i>	Wallum sedgefrog	V	None
<i>Melaleuca irbyana</i>		E	None
<i>Petaurus gracilis</i>	Mahogany Glider	E	None
<i>Petrogale persephone</i>	Proserpine rock-wallaby	E	None
<i>Phascolarctos cinereus</i>	Koala - outside SEQ*	V	None
<i>Pezoporus wallicus wallicus</i>	Eastern ground parrot	V	None
<i>Taudactylus pleione</i>	Kroombit tinkerfrog	E	None
<i>Xeromys myoides</i>	Water Mouse	V	None

\*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

**Threatened (endangered or vulnerable) wildlife species records**

Scientific name	Common name	NCA status	EPBC status	Migratory status
<i>Phascolarctos cinereus</i>	koala	V	V	
<i>Crocodylus porosus</i>	estuarine crocodile	V		M-B/E
<i>Saccolaimus saccolaimus nudicluniatus</i>	bare-rumped sheath-tail bat	E	V	

**Special least concern animal species records**

(no results)

\*Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL).  
Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

<https://www.qld.gov.au/environment/plants-animals/species-list/>

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** for an overview of the relevant MSES.

## MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

<https://environment.ehp.qld.gov.au/regional-ecosystems/>

### 8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.12.1/11.12.9/11.3.34/11.3.25	O-subdom	rem_oc
11.3.4	O-dom	rem_oc
11.3.4/11.3.25/11.3.13/11.3.25b	O-dom	rem_oc

### 8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.4	O-dom	hvr_oc
11.3.4/11.3.25/11.3.13/11.3.25b	O-dom	hvr_oc

### 8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number	RVM rule
R	8358	None

### 8d. Regulated Vegetation - Essential habitat

Values are present

### 8e. Regulated Vegetation - intersecting a watercourse\*\*

A vegetation management watercourse is mapped as present

### 8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Regulated vegetation map category	Map number	RVM rule
B	8358	None

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.



**MSES - Offsets**

**9a. Legally secured offset areas - offset register areas**

(no results)

**9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation**

(no results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

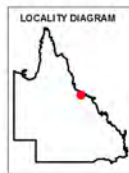
# Map 1 - MSES - State Conservation Areas



## MSES - State Conservation Areas

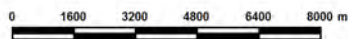
### Area of Interest

- polygon
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)



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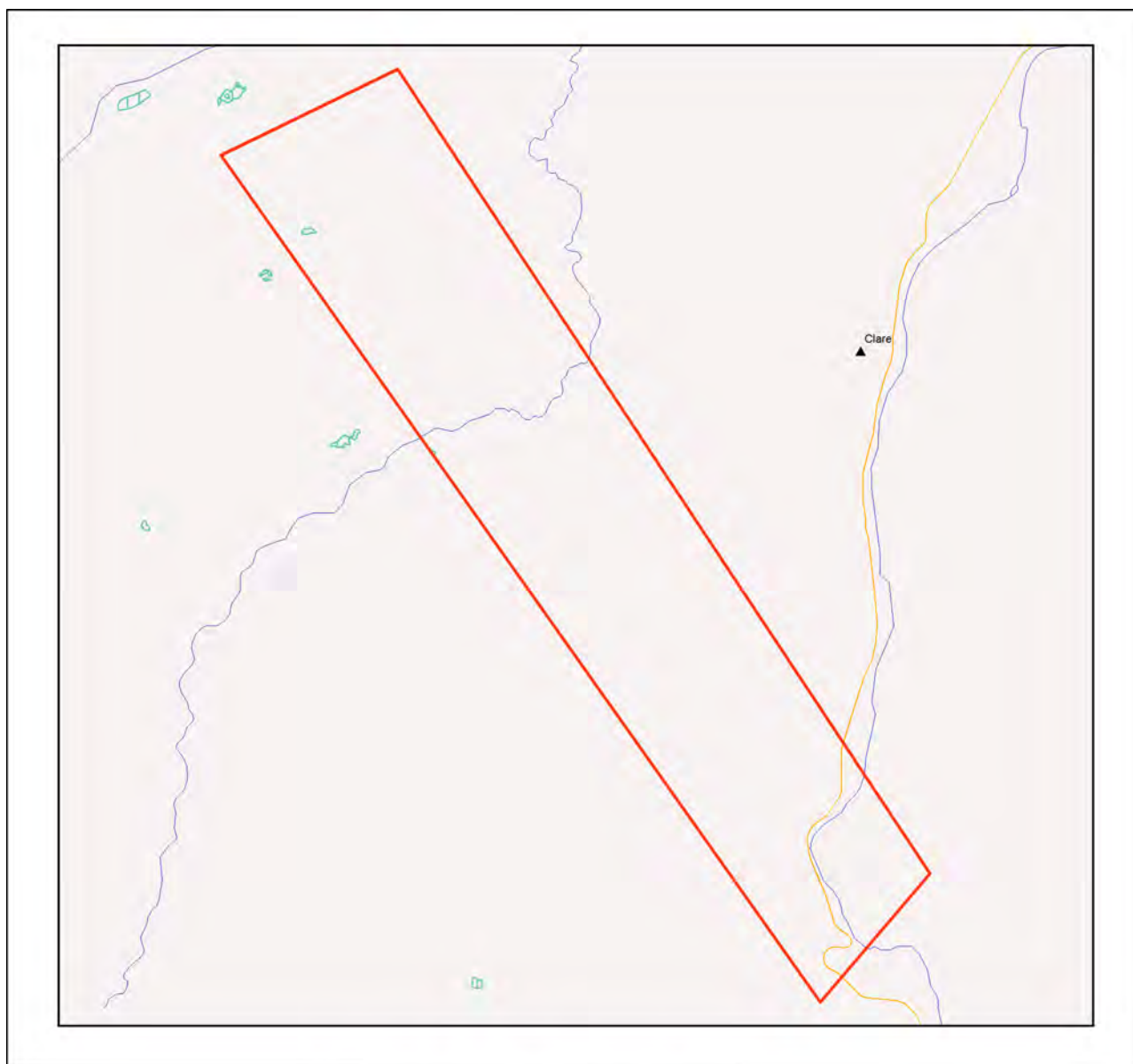
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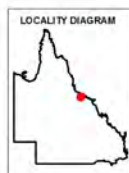
## Map 2 - MSES - Wetlands and Waterways



### MSES - Wetlands and Waterways

**Area of Interest**

- polygon
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands



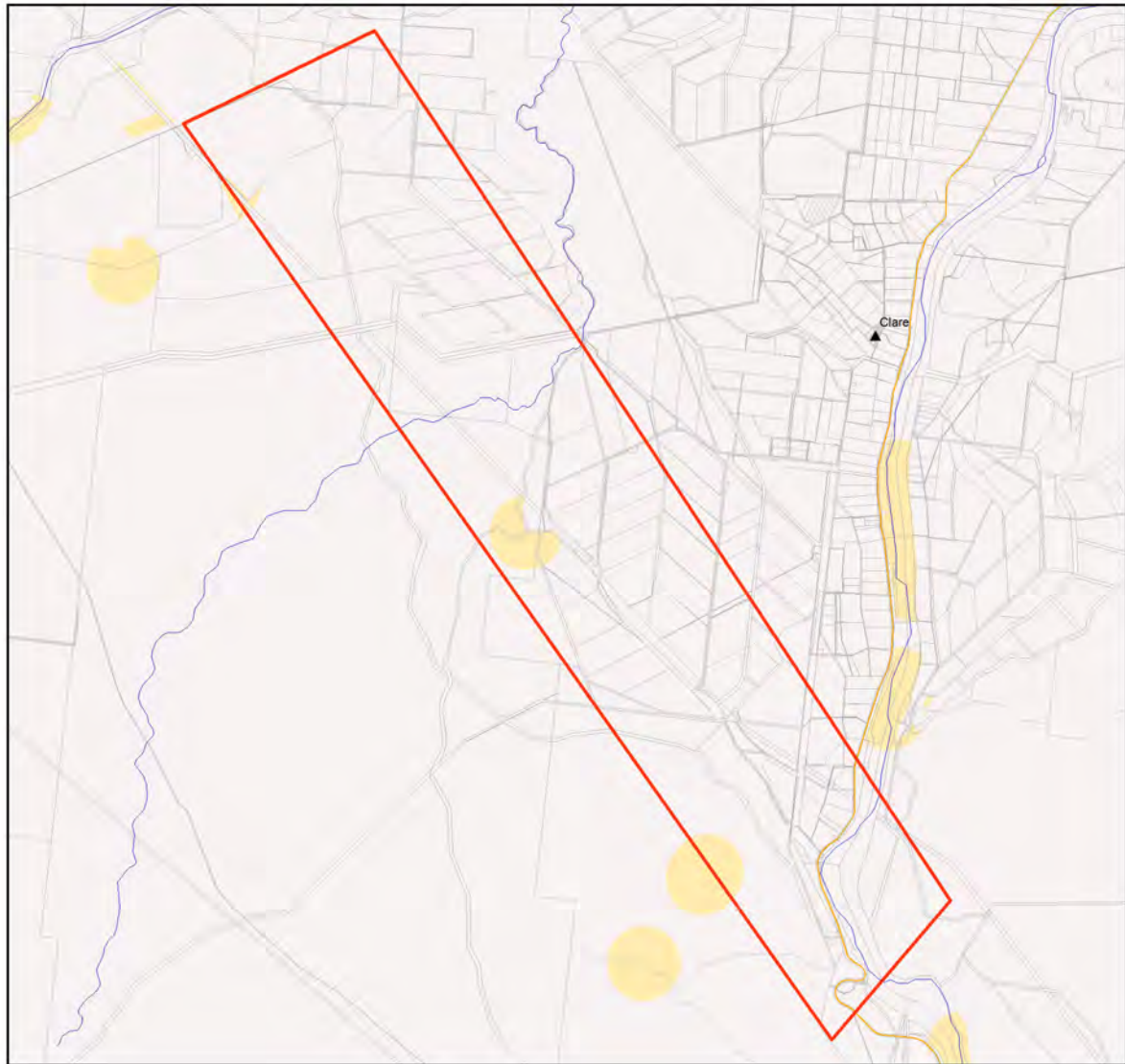
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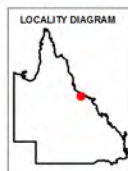
### Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



### MSES - Species Threatened (endangered or vulnerable) wildlife and special least concern animals

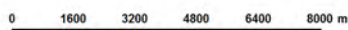
**Area of Interest**

- polygon
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)



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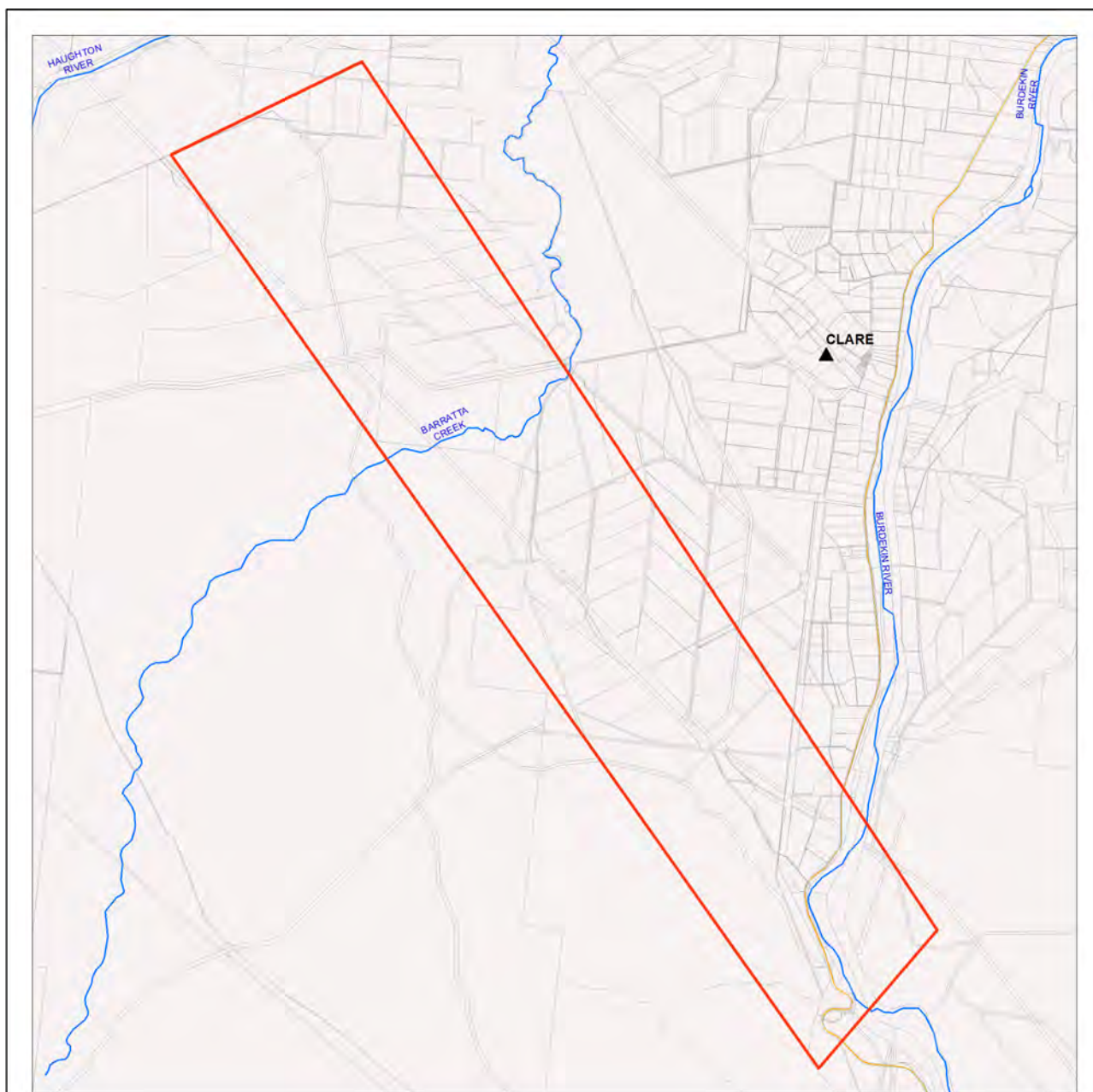


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### Map 3b - MSES - Species - Koala habitat area (SEQ)



#### MSES - Species Koala habitat area (SEQ)

**Area of Interest**

- polygon
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)



The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



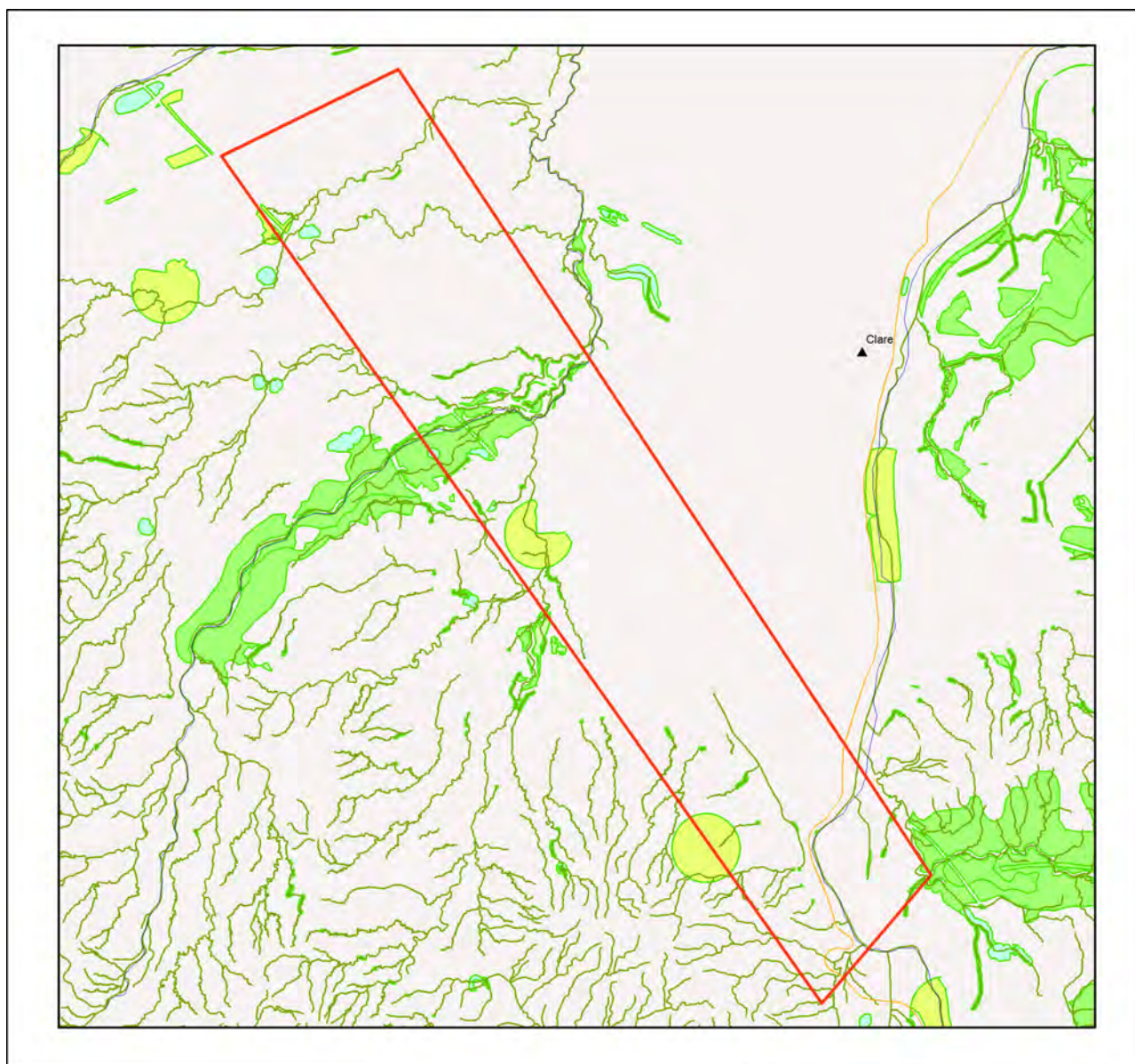
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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping>

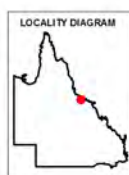
### Map 4 - MSES - Regulated Vegetation



### MSES - Regulated Vegetation

**Area of Interest**

- ▭ polygon
- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)



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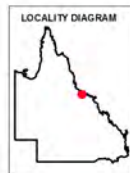
### Map 5 - MSES - Offset Areas



#### MSES - Offsets

**Area of Interest**

-  polygon
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Legally secured offset area (offset register)
-  Legally secured offset area (vegetation offsets)



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## Appendices

### Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

<http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html> .



## Appendix 2 - Source Data

The datasets listed below are available on request from:

<http://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

<b>MSES layers</b>	<b>current QSpatial data (<a href="http://qspatial.information.qld.gov.au">http://qspatial.information.qld.gov.au</a>)</b>
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DES
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

---

## Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DES	- Department of Environment and Science
EP Act	- <i>Environmental Protection Act 1994</i>
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- <i>Vegetation Management Act 1999</i>

# WildNet Records Pest List

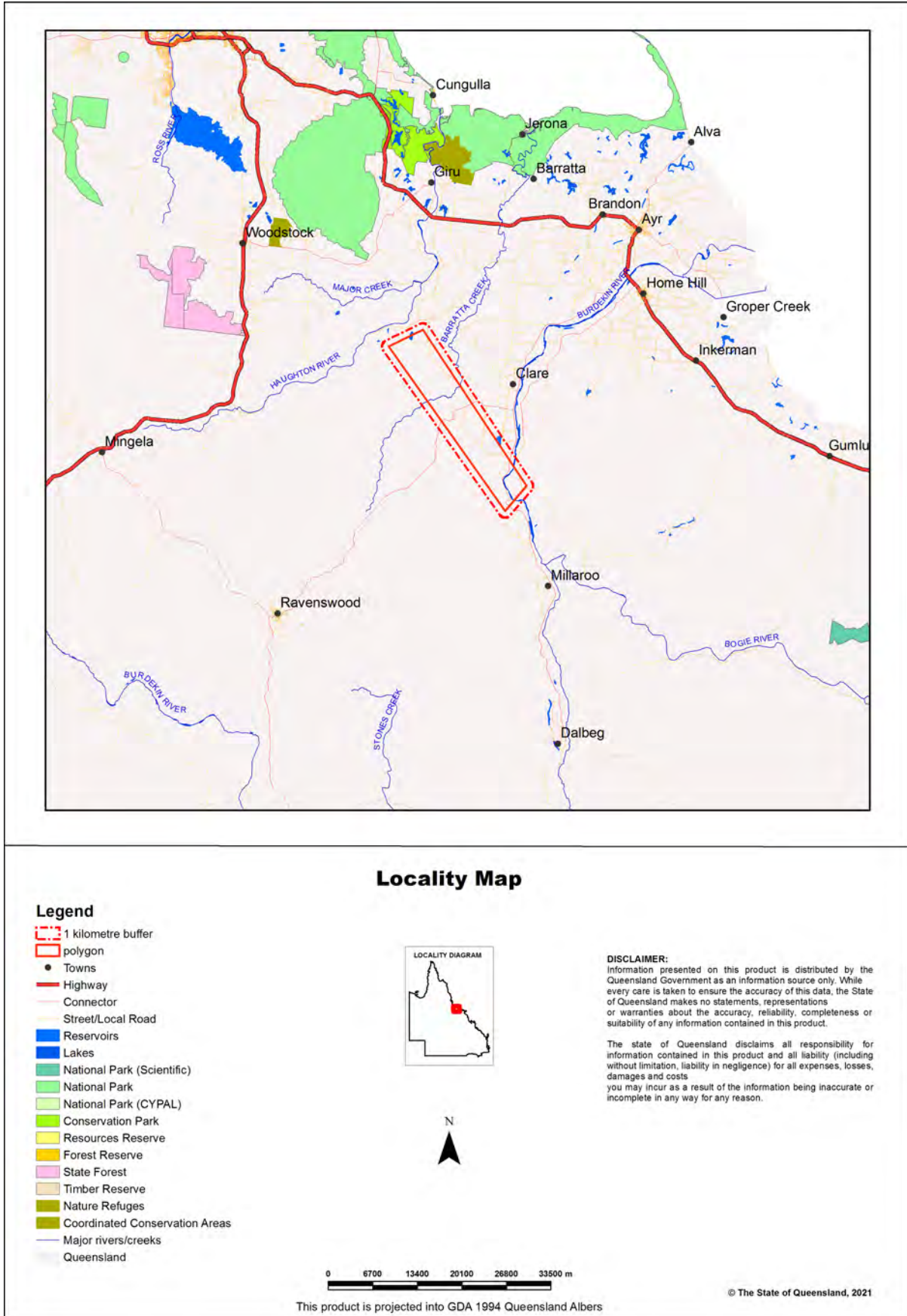


For the selected area of interest 15299.31ha

Current as at 29/09/2021

HaughtonPipeline

### Map 1. Locality Map



## Summary Information

The following table provides an overview of the area of interest .

**Table 1. Area of interest details**

Size (ha)	15,299.31
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Bogie River Hills, Townsville Plains
Catchment(s)	Burdekin, Haughton

### Protected Area(s)

No estates or reserves are located within the area of interest.

### World Heritage Area(s)

No World Heritage Areas are located within the area of interest.

### Ramsar Area(s)

No Ramsar Areas are located within the area of interest.

## Pest List

### Introduction

This report is derived from a spatial layer generated from the [WildNet database](#) managed by the Department of Environment and Science. The layer which is generated weekly contains the WildNet wildlife records that are not classed as erroneous or duplicate, that have a location precision equal to or less than 10000 metres and do not have a count of zero.

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a species is not listed in this report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area. It is recommended that you also access other internal and external data sources for species information in your area of interest (Refer Links and Support).

### Species Data

Contextual location information is presented in Map 1.

A summary of the pests recorded within the area of interest and its one kilometre buffer is presented in Table 2.

**Table 2. Pests recorded within the area of interest and its one kilometre buffer**

Taxon Id	Kingdom	Class	Family	Scientific Name	Common Name	Specimens	Records	Last record	Endemicity
12491	Plantae	Equisetopsida	Amaranthaceae	<i>Amaranthus spinosus</i>	needle burr	1	1	03/08/1991	IU
15479	Plantae	Equisetopsida	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	2	2	15/06/1974	IU
15438	Plantae	Equisetopsida	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	1	1	22/07/1998	IU
10959	Plantae	Equisetopsida	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	1	1	03/08/1991	IU
12761	Plantae	Equisetopsida	Caesalpiniaceae	<i>Parkinsonia aculeata</i>	parkinsonia	1	1	03/08/1991	IU
16841	Plantae	Equisetopsida	Euphorbiaceae	<i>Jatropha gossypifolia</i>	bellyache bush	1	1	03/08/1991	IU
11288	Plantae	Equisetopsida	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	1	1	03/08/1991	IU
15671	Plantae	Equisetopsida	Fabaceae	<i>Alysicarpus vaginalis</i>	None	1	1	03/08/1991	IU
5917	Plantae	Equisetopsida	Fabaceae	<i>Crotalaria pallida</i> var. <i>obovata</i>	None	1	1	03/08/1991	IU

Taxon Id	Kingdom	Class	Family	Scientific Name	Common Name	Specimens	Records	Last record	Endemicity
18679	Plantae	Equisetopsida	Lamiaceae	<i>Leucas lavandulifolia</i>	None	1	1	03/08/1991	IU
18722	Plantae	Equisetopsida	Lamiaceae	<i>Ocimum americanum</i>	None	1	1	03/08/1991	IU
15990	Plantae	Equisetopsida	Malvaceae	<i>Urena lobata</i>	urena weed	1	1	03/08/1991	IU
34114	Plantae	Equisetopsida	Mimosaceae	<i>Vachellia farnesiana</i>	None	1	1	20/06/1949	IU
14359	Plantae	Equisetopsida	Molluginaceae	<i>Mollugo verticillata</i>	None	1	1	03/08/1991	IU
17966	Plantae	Equisetopsida	Papaveraceae	<i>Argemone ochroleuca</i> <i>subsp. ochroleuca</i>	Mexican poppy	1	1	03/08/1991	IU
18225	Plantae	Equisetopsida	Plantaginaceae	<i>Mecardonia</i> <i>procumbens</i>	None	1	1	03/08/1991	IU
15463	Plantae	Equisetopsida	Poaceae	<i>Dichanthium</i> <i>annulatum</i>	sheda grass	1	1	22/06/1949	IU
10794	Plantae	Equisetopsida	Poaceae	<i>Sporobolus</i> <i>jacquemontii</i>	None	1	1	31/03/2002	IU
18339	Plantae	Equisetopsida	Poaceae	<i>Urochloa</i> <i>subquadrifera</i>	None	1	1	19/06/1949	IU
14129	Plantae	Equisetopsida	Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	1	1	20/06/1949	IU
14777	Plantae	Equisetopsida	Sapindaceae	<i>Cardiospermum</i> <i>halicacabum</i> var. <i>halicacabum</i>	None	1	1	03/08/1991	IU
17494	Plantae	Equisetopsida	Solanaceae	<i>Datura innoxia</i>	None	1	1	03/08/1991	IU
16126	Plantae	Equisetopsida	Solanaceae	<i>Solanum torvum</i>	devil's fig	1	1	03/08/1991	IU

## Species table headings and codes

**Taxon Id:** Unique identifier of the taxon from the WildNet database.

**Specimens:** The number of specimen-backed records of the taxon.

**Records:** The total number of records of the taxon.

**Last record:** Date of latest record of the taxon.

**Endemicity:** The endemicity code for the taxon (Introduced (Intranational) (IA), Introduced (International) (II), Introduced (Unknown), Exotic (Intranational) (XA), Exotic (International) (XI) and Exotic (Unknown) (XU)).

## Links and Support

Other sites that deliver species information from the [WildNet database](#) include:

- [Species profile search](#) - access species information approved for publication including species names, statuses, notes, images, distribution maps and records
- [Species lists](#) - generate species lists for Queensland protected areas, forestry areas, local governments and areas defined using coordinates
- [Biomaps](#) - view biodiversity information, including WildNet records approved for publication, and generate reports
- [Queensland Globe](#) - view spatial information, including WildNet records approved for publication
- [Qld wildlife data API](#) - access WildNet species information approved for publication such as notes, images and records etc.
- [WetlandMaps](#) - view species records, survey locations etc. approved for publication
- [WetlandSummary](#) - view wildlife statistics, species lists for a range of area types, and access WildNet species profiles
- [WildNet wildlife records - published - Queensland](#) - spatial layer of WildNet records approved for publication generated weekly
- [Generalised distribution and densities of Queensland wildlife](#) - Queensland species distributions and densities generalised to a 10 km grid resolution
- [Conservation status of Queensland wildlife](#) - access current lists of priority species for Queensland including nomenclature and status information
- [Queensland Confidential Species](#) - the list of species flagged as confidential in the WildNet database.

Please direct queries about this report to the [WildNet Team](#).

Other useful sites for accessing Queensland biodiversity data include:

- [Useful wildlife resources](#)
- [Queensland Government Data](#)
- [Atlas of Living Australia \(ALA\)](#)
- [Online Zoological Collections of Australian Museums \(OZCAM\)](#)
- [Australia's Virtual Herbarium \(AVH\)](#)
- [Protected Matters Search Tool](#)

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# 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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 29/09/21 10:19:31

## [Summary](#)

### [Details](#)

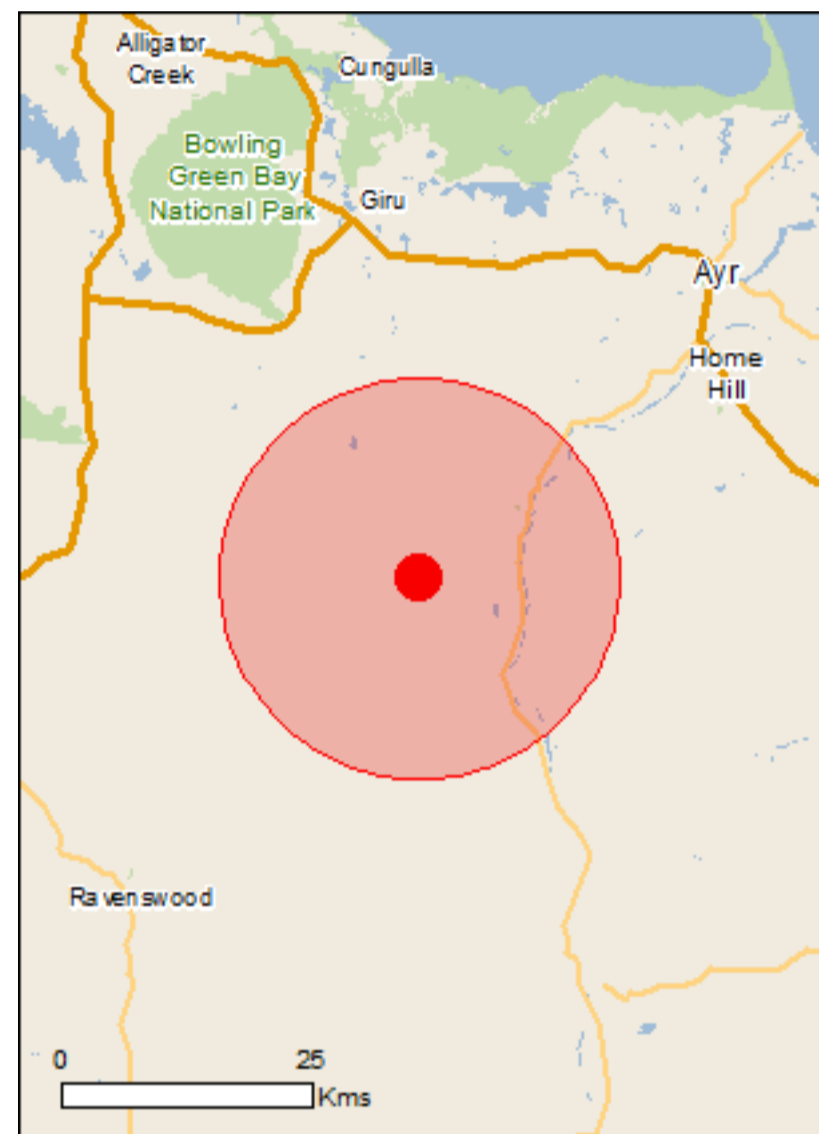
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

### [Caveat](#)

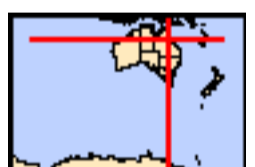
### [Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

[Coordinates](#)

Buffer: 20.0Km





# Summary

## Matters of National Environmental 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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	1
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	2
<a href="#">Listed Threatened Species:</a>	24
<a href="#">Listed Migratory Species:</a>	18

## 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 <http://www.environment.gov.au/heritage>

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

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	22
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	None
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	32
<a href="#">Nationally Important Wetlands:</a>	2
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[ Resource Information ]
Name	Proximity
<a href="#">Bowling green bay</a>	10 - 20km upstream

## Listed Threatened Ecological Communities

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
<a href="#">Poplar Box Grassy Woodland on Alluvial Plains</a>	Endangered	Community may occur within area
<a href="#">Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions</a>	Endangered	Community likely to occur within area

## Listed Threatened Species

Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Erythrotriorchis radiatus</a> Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
<a href="#">Neochmia ruficauda ruficauda</a> Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Poephila cincta cincta</a> Southern Black-throated Finch [64447]	Endangered	Species or species habitat likely to occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<a href="#">Turnix olivii</a> Buff-breasted Button-quail [59293]	Endangered	Species or species habitat may occur within area
<a href="#">Tyto novaehollandiae kimberli</a> Masked Owl (northern) [26048]	Vulnerable	Species or species

Name	Status	Type of Presence
habitat likely to occur within area		
<b>Mammals</b>		
<a href="#">Dasyurus hallucatus</a> Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
<a href="#">Hipposideros semoni</a> Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area
<a href="#">Macroderma gigas</a> Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Saccolaimus saccolaimus nudicluniatus</a> Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
<b>Plants</b>		
<a href="#">Dichanthium setosum</a> bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Eucalyptus raveretiana</a> Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Marsdenia brevifolia</a> [64585]	Vulnerable	Species or species habitat may occur within area
<a href="#">Omphalea celata</a> [64586]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Tephrosia leveillei</a> [16946]	Vulnerable	Species or species habitat may occur within area
<b>Reptiles</b>		
<a href="#">Denisonia maculata</a> Ornamental Snake [1193]	Vulnerable	Species or species habitat may occur within area
<a href="#">Egernia rugosa</a> Yakka Skink [1420]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Lerista vittata</a> Mount Cooper Striped Skink, Mount Cooper Striped Lerista [1308]	Vulnerable	Species or species habitat may occur within area
<b>Sharks</b>		
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area
<b>Listed Migratory Species</b>		<b>[ Resource Information ]</b>
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<b>Migratory Marine Species</b>		

Name	Threatened	Type of Presence
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area
Migratory Terrestrial Species		
<a href="#">Cuculus optatus</a> Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat may occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat may occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat likely to occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

## Other Matters Protected by the EPBC Act

### Listed Marine Species [ [Resource Information](#) ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a>		
Common Sandpiper [59309]		Species or species habitat likely to occur within area
<a href="#">Anseranas semipalmata</a>		
Magpie Goose [978]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a>		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a>		
Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a>		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a>		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a>		
Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Chrysococcyx osculans</a>		
Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
<a href="#">Gallinago hardwickii</a>		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
<a href="#">Haliaeetus leucogaster</a>		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Hirundapus caudacutus</a>		
White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
<a href="#">Merops ornatus</a>		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Monarcha melanopsis</a>		
Black-faced Monarch [609]		Species or species habitat may occur within area
<a href="#">Monarcha trivirgatus</a>		
Spectacled Monarch [610]		Species or species habitat may occur within area
<a href="#">Motacilla flava</a>		
Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a>		
Satin Flycatcher [612]		Species or species habitat known to occur



Name	Threatened	Type of Presence within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat known to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat likely to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat may occur within area
<b>Reptiles</b>		
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

## Extra Information

### Invasive Species [\[ Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
<b>Birds</b>		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species

Name	Status	Type of Presence
Sturnus vulgaris Common Starling [389]		habitat likely to occur within area  Species or species habitat likely to occur within area
<b>Frogs</b>		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
<b>Mammals</b>		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
<b>Plants</b>		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area



Name	Status	Type of Presence
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

#### Reptiles

Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat may occur within area
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#### Nationally Important Wetlands

[ [Resource Information](#) ]

Name	State
<a href="#">Barrattas Channels Aggregation</a>	QLD
<a href="#">Haughton Balancing Storage Aggregation</a>	QLD

# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

# Coordinates

-19.83293 147.13819

# 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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# 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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 22/11/21 13:08:58

[Summary](#)

[Details](#)

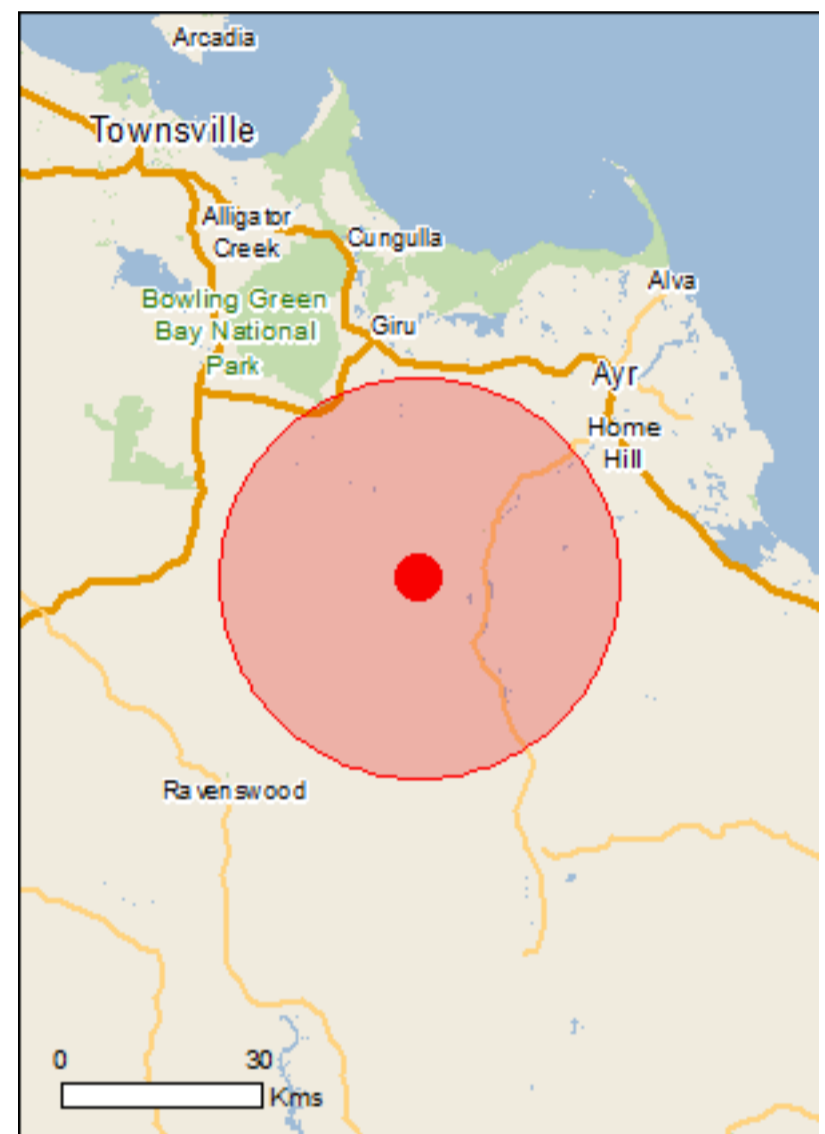
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

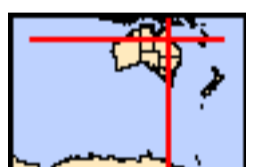
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

[Coordinates](#)

Buffer: 30.0Km



# Summary

## Matters of National Environmental 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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	1
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	2
<a href="#">Listed Threatened Species:</a>	27
<a href="#">Listed Migratory Species:</a>	18

## 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 <http://www.environment.gov.au/heritage>

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

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	22
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	1
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	32
<a href="#">Nationally Important Wetlands:</a>	5
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

### Wetlands of International Importance (Ramsar)

[\[ Resource Information \]](#)

Name	Proximity
<a href="#">Bowling green bay</a>	Within 10km of Ramsar

### Listed Threatened Ecological Communities

[\[ Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
<a href="#">Poplar Box Grassy Woodland on Alluvial Plains</a>	Endangered	Community may occur within area
<a href="#">Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions</a>	Endangered	Community likely to occur within area

### Listed Threatened Species

[\[ Resource Information \]](#)

Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Erythrotriorchis radiatus</a> Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Neochmia ruficauda ruficauda</a> Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Poephila cincta cincta</a> Southern Black-throated Finch [64447]	Endangered	Species or species habitat known to occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<a href="#">Turnix olivii</a> Buff-breasted Button-quail [59293]	Endangered	Species or species habitat may occur within area
<a href="#">Tyto novaehollandiae kimberli</a> Masked Owl (northern) [26048]	Vulnerable	Species or species



Name	Status	Type of Presence
<b>Mammals</b>		
<a href="#">Dasyurus hallucatus</a> Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
<a href="#">Hipposideros semoni</a> Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area
<a href="#">Macroderma gigas</a> Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Rhinolophus robertsi</a> Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Vulnerable	Species or species habitat may occur within area
<a href="#">Saccolaimus saccolaimus nudicluniatus</a> Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Xeromys myoides</a> Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area
<b>Plants</b>		
<a href="#">Bulbophyllum globuliforme</a> Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Dichanthium setosum</a> bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Eucalyptus raveretiana</a> Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Marsdenia brevifolia</a> [64585]	Vulnerable	Species or species habitat may occur within area
<a href="#">Omphalea celata</a> [64586]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Tephrosia leveillei</a> [16946]	Vulnerable	Species or species habitat likely to occur within area
<b>Reptiles</b>		
<a href="#">Denisonia maculata</a> Ornamental Snake [1193]	Vulnerable	Species or species habitat may occur within area
<a href="#">Egernia rugosa</a> Yakka Skink [1420]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Lerista vittata</a> Mount Cooper Striped Skink, Mount Cooper Striped Lerista [1308]	Vulnerable	Species or species habitat may occur within area
<b>Sharks</b>		
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish	Vulnerable	Species or species habitat likely to occur



Name	Status	Type of Presence
[60756]		within area
<b>Listed Migratory Species</b>		<b>[ Resource Information ]</b>
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a>		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<b>Migratory Marine Species</b>		
<a href="#">Crocodylus porosus</a>		
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
<a href="#">Pristis pristis</a>		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Cuculus optatus</a>		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
<a href="#">Hirundapus caudacutus</a>		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Monarcha melanopsis</a>		
Black-faced Monarch [609]		Species or species habitat likely to occur within area
<a href="#">Monarcha trivirgatus</a>		
Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla flava</a>		
Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a>		
Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Rhipidura rufifrons</a>		
Rufous Fantail [592]		Species or species habitat likely to occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a>		
Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Calidris acuminata</a>		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a>		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a>		
Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Gallinago hardwickii</a>		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a>		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur

Name	Threatened	Type of Presence within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

## Other Matters Protected by the EPBC Act

### Listed Marine Species [\[ Resource Information \]](#)

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Anseranas semipalmata</a> Magpie Goose [978]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Chrysococcyx osculans</a> Black-eared Cuckoo [705]		Species or species habitat known to occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat likely to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat known to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat likely to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
<b>Reptiles</b>		
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

## Extra Information

State and Territory Reserves	[ <a href="#">Resource Information</a> ]
Name	State
Bowling Green Bay	QLD

## Invasive Species

[ [Resource Information](#) ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
<b>Birds</b>		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
<b>Frogs</b>		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
<b>Mammals</b>		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

## Plants

Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

## Reptiles

Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area
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## Nationally Important Wetlands [ Resource Information ]

Name	State
<a href="#">Barrattas Channels Aggregation</a>	QLD

Name	State
<a href="#">Burdekin - Townsville Coastal Aggregation</a>	QLD
<a href="#">Haughton Balancing Storage Aggregation</a>	QLD
<a href="#">Jerona Aggregation</a>	QLD
<a href="#">Junction of the Bogie River and Kirknie Creek Aggregation</a>	QLD



# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

# Coordinates

-19.83293 147.13819

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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Queensland Government

Department of Environment and Science

Environmental Reports

## **Regional Ecosystems**

### ***Biodiversity Status***

For the selected area of interest

## Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the input coordinates.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no matters of interest have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

### Important Note to User

Information presented in this report is based upon the Queensland Herbarium's Regional Ecosystem framework. The Biodiversity Status has been used to depict the extent of "Endangered", "Of Concern" and "No Concern at Present" regional ecosystems in all cases, rather than the classes used for the purposes of the *Vegetation Management Act 1999* (VMA). Mapping and figures presented in this document reflect the Queensland Herbarium's Remnant and Pre-clearing Regional Ecosystem Datasets, and not the certified mapping used for the purpose of the VMA.

For matters relevant to vegetation management under the VMA, please refer to the Department of Resources website <https://www.dnrme.qld.gov.au/>

Please direct queries about these reports to: Queensland.Herbarium@qld.gov.au

### Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.



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## Summary Information

The following table provides an overview of the AOI with respect to selected topographic and environmental themes. Refer to **Map 1** for locality information.

**Table 1: Area of interest details:**

Size (ha)	15,299.31
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Bogie River Hills, Townsville Plains
Catchment(s)	Burdekin, Haughton

The table below summarizes the extent of remnant vegetation classed as "Endangered", "Of concern" and "No concern at present" regional ecosystems classified by Biodiversity Status within the area of interest (AOI).

**Table 2: Summary table, biodiversity status of regional ecosystems within the AOI**

Biodiversity Status	Area (Ha)	% of AOI
Endangered	16.96	0.11
Of concern	3,655.10	23.89
No concern at present	4,098.81	26.79
Total remnant vegetation	7,770.86	50.79

Refer to **Map 2** for further information.



# Regional Ecosystems

## 1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with particular combinations of geology, landform and soil (Sattler and Williams 1999). Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem classification and descriptions are reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and are usually distinguished by differences in dominant species, frequently in the shrub or ground layers and are denoted by a letter following the regional ecosystem code (e.g. a, b, c). Vegetation communities and regional ecosystems are amalgamated into a higher level classification of broad vegetation groups (BVGs).

A published methodology for survey and mapping of regional ecosystems across Queensland (Neldner et al 2020) provides further details on regional ecosystem concepts and terminology.

This report provides information on the type, status, and extent of vegetation communities, regional ecosystems and broad vegetation groups present within a user specified area of interest. Please note, for the purpose of this report, the Biodiversity Status is used. This report has not been developed for application of the *Vegetation Management Act 1999* (VMA). Additionally, information generated in this report has been derived from the Queensland Herbarium's Regional Ecosystem Mapping, and not the regulated mapping certified for the purposes of the VMA. If your interest/matter relates to regional ecosystems and the VMA, users should refer to the Department of Resources website.

<https://www.dnrme.qld.gov.au/>

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

- remnant vegetation is less than 10 per cent of its pre-clearing extent across the bioregion; or 10-30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares, or
- less than 10 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss\*, or
- 10-30 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 hectares; or
- it is a rare\*\* regional ecosystem subject to a threatening process.\*\*\*

"Of concern" regional ecosystems are described as those where:

- the degradation criteria listed above for 'Endangered' regional ecosystems are not met and,
- remnant vegetation is 10-30 per cent of its pre-clearing extent across the bioregion; or more than 20 per cent of its pre-clearing extent remains and the remnant extent is less than 10,000 hectares, or
- 10-30 percent of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss.\*\*\*\*

and "No concern at present" regional ecosystems are described as those where:

- remnant vegetation is over 30 per cent of its pre-clearing extent across the bioregion, and the remnant area is greater than 10,000 hectares, and
- the degradation criteria listed above for 'Endangered' or 'Of concern' regional ecosystems are not met.

*\*Severe degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 50 years even with the removal of threatening processes; or soil surface is severely degraded, for example, by loss of A horizon, surface expression of salinity; surface compaction, loss of organic matter or sheet erosion.*

*\*\*Rare regional ecosystem: pre-clearing extent (1000 ha); or patch size (100 ha and of limited total extent across its range).*

*\*\*\*Threatening processes are those that are reducing or will reduce the biodiversity and ecological integrity of a regional ecosystem. For example, clearing, weed invasion, fragmentation, inappropriate fire regime or grazing pressure, or infrastructure development.*

\*\*\*\*Moderate degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 20 years even with the removal of threatening processes; or soil surface is moderately degraded.

## 2. Remnant Regional Ecosystems

The following table identifies the remnant regional ecosystems and vegetation communities mapped within the AOI and provides their short descriptions, Biodiversity Status, and remnant extent within the selected AOI. Please note, where heterogeneous vegetated patches (mixed patches of remnant vegetation mapped as containing multiple regional ecosystems) occur within the AOI, they have been split and listed as individual regional ecosystems (or vegetation communities where present) for the purposes of the table below. In such instances, associated area figures have been generated based upon the estimated proportion of each regional ecosystem (or vegetation community) predicted to be present within the larger mixed patch.

**Table 3: Remnant regional ecosystems, description and status within the AOI**

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
11.12.1	Eucalyptus crebra woodland on igneous rocks	No concern at present	554.37	3.62
11.12.9	Eucalyptus platyphylla woodland on igneous rocks	No concern at present	1.25	0.01
11.3.10	Eucalyptus brownii woodland on alluvial plains	No concern at present	13.04	0.09
11.3.12	Melaleuca viridiflora, M. argentea +/- M. dealbata woodland on alluvial plains	No concern at present	30.94	0.2
11.3.13	Grevillea striata open woodland on coastal alluvial plains	Endangered	16.96	0.11
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	145.56	0.95
11.3.25b	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	534.95	3.5
11.3.25f	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	320.29	2.09
11.3.30	Eucalyptus crebra, Corymbia dallachiana woodland on alluvial plains	No concern at present	599.45	3.92
11.3.31	Ophiuros exaltatus, Dichanthium spp. grassland on alluvial plains	Of concern	3.32	0.02
11.3.34	Acacia tephрина woodland on alluvial plains	Of concern	0.5	less than 0.01
11.3.35	Eucalyptus platyphylla, Corymbia clarksoniana woodland on alluvial plains	No concern at present	1,602.87	10.48
11.3.35a	Eucalyptus platyphylla, Corymbia clarksoniana woodland on alluvial plains	No concern at present	34.92	0.23
11.3.4	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Of concern	205.58	1.34
11.3.7	Corymbia spp. open woodland on alluvial plains	Of concern	2,444.90	15.98
11.3.9	Eucalyptus platyphylla, Corymbia spp. woodland on alluvial plains	No concern at present	1,261.96	8.25
non-remnant	None	None	7,520.65	49.16
water	None	None	4.74	0.03

Refer to **Map 2** for further information. **Map 3** also provides a visual estimate of the distribution of regional ecosystems present before clearing.

**Table 4** provides further information in regards to the remnant regional ecosystems present within the AOI. Specifically, the extent of remnant vegetation remaining within the bioregion, the 1:1,000,000 broad vegetation group (BVG) classification, whether the regional ecosystem is identified as a wetland, and extent of representation in Queensland's Protected Area Estate. For a description of the vegetation communities within the AOI and classified according to the 1:1,000,000 BVG, refer to **Table 6**.

**Table 4: Remnant regional ecosystems within the AOI, additional information**

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.12.1	Pre-clearing 1421000 ha; Remnant 2019 854000 ha	13c	None	Low
11.12.9	Pre-clearing 113000 ha; Remnant 2019 97000 ha	9b	None	Medium
11.3.10	Pre-clearing 260000 ha; Remnant 2019 165000 ha	17a	None	Low
11.3.12	Pre-clearing 46000 ha; Remnant 2019 28000 ha	21a	Contains palustrine wetland (e.g. in swales).	Low
11.3.13	Pre-clearing 8000 ha; Remnant 2019 3000 ha	27c	None	Medium
11.3.25	Pre-clearing 797000 ha; Remnant 2019 514000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
11.3.25b	Pre-clearing 797000 ha; Remnant 2019 514000 ha	22c	Riverine wetland or fringing riverine wetland.	Low
11.3.25f	Pre-clearing 797000 ha; Remnant 2019 514000 ha	16d	Riverine wetland or fringing riverine wetland.	Low
11.3.30	Pre-clearing 105000 ha; Remnant 2019 70000 ha	18b	None	Low
11.3.31	Pre-clearing 43000 ha; Remnant 2019 17000 ha	32a	Floodplain (other than floodplain wetlands).	Low
11.3.34	Pre-clearing 16000 ha; Remnant 2019 9000 ha	27a	None	No representation
11.3.35	Pre-clearing 183000 ha; Remnant 2019 108000 ha	9e	None	Low
11.3.35a	Pre-clearing 183000 ha; Remnant 2019 108000 ha	9e	None	Low
11.3.4	Pre-clearing 684000 ha; Remnant 2019 180000 ha	16c	Floodplain (other than floodplain wetlands).	Low
11.3.7	Pre-clearing 139000 ha; Remnant 2019 61000 ha	9e	None	Low
11.3.9	Pre-clearing 144000 ha; Remnant 2019 63000 ha	9e	Floodplain (other than floodplain wetlands).	Low
non-remnant	None	None	None	None
water	None	None	None	None

*Representation in Protected Area Estate: High greater than 10% of pre-clearing extent is represented; Medium 4 - 10% is represented; Low less than 4% is represented, No representation.*

The distribution of mapped wetland systems within the area of interest is displayed in **Map 6**.

The following table lists known special values associated with a regional ecosystem type.

**Table 5: Remnant regional ecosystems within the AOI, special values**

Regional Ecosystem	Special Values
11.12.1	Potential habitat for NCA listed species: <i>Acacia islana</i> , <i>Capparis humistrata</i> , <i>Corymbia petalophylla</i> , <i>Cycas megacarpa</i> , <i>Cycas ophiolitica</i> , <i>Macrozamia crassifolia</i> , <i>Sannantha brachypoda</i> , <i>Solanum graniticum</i>
11.12.9	Potential habitat for NCA listed species: <i>Bertya sharpeana</i> , <i>Sannantha papillosa</i>
11.3.10	Potential habitat for NCA listed species: <i>Acacia armitii</i>
11.3.12	None
11.3.13	None
11.3.25	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle <i>Rheodytes leukops</i> . Known to be important habitat for other riparian freshwater turtle species. This ecosystem is also known to provide suitable habitat for koalas ( <i>Phascolarctos cinereus</i> ).
11.3.25b	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle <i>Rheodytes leukops</i> . Known to be important habitat for other riparian freshwater turtle species. This ecosystem is also known to provide suitable habitat for koalas ( <i>Phascolarctos cinereus</i> ).
11.3.25f	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle <i>Rheodytes leukops</i> . Known to be important habitat for other riparian freshwater turtle species. This ecosystem is also known to provide suitable habitat for koalas ( <i>Phascolarctos cinereus</i> ).
11.3.30	Potential habitat for NCA listed species: <i>Eucalyptus paedoglauca</i>
11.3.31	None
11.3.34	None
11.3.35	None
11.3.35a	None
11.3.4	Potential habitat for NCA listed species: <i>Acacia pedleyi</i> , <i>Callicarpa thozetii</i> , <i>Cycas megacarpa</i> , <i>Cycas ophiolitica</i> , <i>Digitaria porrecta</i> , <i>Eriocaulon carsonii</i> subsp. <i>orientale</i> , <i>Livistona nitida</i> , <i>Rhaponticum australe</i> , <i>Samadera bidwillii</i> , <i>Sannantha brachypoda</i> . This ecosystem is also known to provide suitable habitat for koalas ( <i>Phascolarctos cinereus</i> ).
11.3.7	Habitat of the endangered northern hairy-nosed wombat, <i>Lasiorhinus krefftii</i> .
11.3.9	Potential habitat for NCA listed species: <i>Macrozamia serpentina</i>
non-remnant	None
water	None

### 3. Remnant Regional Ecosystems by Broad Vegetation Group

BVGs are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid climatic zones. BVGs provide an overview of vegetation communities across the state or a bioregion and allow comparison with other states. There are three levels of BVGs which reflect the approximate scale at which they are designed to be used: the 1:5,000,000 (national), 1:2,000,000 (state) and 1:1,000,000 (regional)

scales.

A comprehensive description of BVGs is available at:

<https://publications.qld.gov.au/dataset/redd/resource/>

The following table provides a description of the 1:1,000,000 BVGs present and their associated extent within the AOI.

**Table 6: Broad vegetation groups (1 million) within the AOI**

BVG (1 Million)	Description	Area (Ha)	% of AOI
None	None	7,525.39	49.19
13c	Woodlands of <i>Eucalyptus crebra</i> (sens. lat.) (narrow-leaved red ironbark), <i>E. drepanophylla</i> (grey ironbark), <i>E. fibrosa</i> (dusky-leaved ironbark), <i>E. shirleyi</i> (shirley's silver-leaved ironbark) on granitic and metamorphic ranges (land zones 12, 11, 9, [5]) (BRB, EIU, SEQ, NET, CQC)	554.37	3.62
16a	Open forest and woodlands dominated by <i>Eucalyptus camaldulensis</i> (river red gum) (or <i>E. tereticornis</i> (blue gum)) and/or <i>E. coolabah</i> (coolabah) (or <i>E. microtheca</i> (coolabah)) fringing drainage lines. Associated species may include <i>Melaleuca</i> spp., <i>Corymbia tessellaris</i> (carbeen), <i>Angophora</i> spp., <i>Casuarina cunninghamiana</i> (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)	145.56	0.95
16c	Woodlands and open woodlands dominated by <i>Eucalyptus coolabah</i> (coolabah) or <i>E. microtheca</i> (coolabah) or <i>E. largiflorens</i> (black box) or <i>E. tereticornis</i> (blue gum) or <i>E. chlorophylla</i> on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL).	205.58	1.34
16d	River beds, open water or sand, or rock, frequently unvegetated. (land zone 3) (GUP, EIU, BRB, CYP, DEU, [CQC, MUL])	320.29	2.09
17a	Woodlands dominated by <i>Eucalyptus populnea</i> (poplar box) (or <i>E. brownii</i> (Reid River box)) on alluvium, sand plains and footslopes of hills and ranges. (land zones 3, 5, 10, 9, 4, 11, 12, [8]) (BRB, MUL, DEU, MUL, EIU)	13.04	0.09
18b	Woodlands dominated <i>Eucalyptus crebra</i> (sens. lat.) (narrow-leaved red ironbark) frequently with <i>Corymbia</i> spp. or <i>Callitris</i> spp. on flat to undulating plains. (land zones 5, 3) (BRB, DEU, EIU, GUP, CYP)	599.45	3.92
21a	Low woodlands and low open woodlands dominated by <i>Melaleuca viridiflora</i> (coarse-leaved paperbark) on depositional plains. (land zones 3, 5, 11, [10]) (GUP, CYP, BRB, CQC, EIU, WET, SEQ)	30.94	0.2
22c	Open forests dominated by <i>Melaleuca</i> spp. ( <i>M. argentea</i> (silver tea-tree), <i>M. leucadendra</i> (broad-leaved tea-tree), <i>M. dealbata</i> (swamp tea-tree) or <i>M. fluviatilis</i> ), fringing major streams with <i>Melaleuca saligna</i> or <i>M. bracteata</i> (black tea-tree) in minor streams. (land zone 3) (CYP, GUP, EIU, BRB, CQC, DEU, NWH, WET, [SEQ])	534.95	3.5
27a	Low open woodlands dominated by a variety of species including <i>Acacia tephрина</i> (boree), <i>Atalaya hemiglauca</i> (whitewood), <i>Ventilago viminalis</i> (supplejack) and <i>Lysiphyllum</i> spp. (land zones 9, 3, 4, [5]) (MGD, GUP, BRB, NWH, DEU, [CYP, EIU])	0.5	less than 0.01

BVG (1 Million)	Description	Area (Ha)	% of AOI
27c	Low open woodlands dominated by a variety of species including <i>Grevillea striata</i> (beefwood), <i>Acacia</i> spp., <i>Terminalia</i> spp. or <i>Cochlospermum</i> spp. (land zones 9, 12, 3, 11, 5) (NWH, EIU, DEU, GUP, [BRB])	16.96	0.11
32a	Closed tussock grasslands dominated by <i>Themeda arguens</i> , <i>Dichanthium sericeum</i> (Queensland bluegrass) or <i>Panicum</i> spp., <i>Eriachne</i> spp., <i>Fimbristylis</i> spp., <i>Aristida</i> spp. or <i>Imperata cylindrica</i> (blady grass) on marine and alluvial plains. (land zones 3, [5]) (GUP, CYP, [BRB,EIU, WET, CQC])	3.32	0.02
9b	Moist to dry woodlands dominated by <i>Eucalyptus platyphylla</i> (poplar gum) and/or <i>E. leptophleba</i> (Molloy red box). Other frequent tree species include <i>Corymbia clarksoniana</i> (grey bloodwood), <i>E. drepanophylla</i> (grey ironbark) and occasionally <i>E. chlorophylla</i> . (land zones 12, 11, 3, 10, 5). (CYP, CQC, BRB, WET, EIU)	1.25	0.01
9e	Open forests, woodlands and open woodlands dominated by <i>Corymbia clarksoniana</i> (grey bloodwood) (or <i>C. novoguineensis</i> or <i>C. intermedia</i> (pink bloodwood) or <i>C. polycarpa</i> (long-fruited bloodwood)) frequently with <i>Erythrophleum chlorostachys</i> (red ironwood) or <i>Eucalyptus platyphylla</i> (poplar gum) predominantly on coastal sandplains and alluvia. (land zones 3, 5, 2) (CYP, BRB, CQC, WET, EIU)	5,344.66	34.93

Refer to **Map 4** for further information. **Map 5** also provides a representation of the distribution of vegetation communities as per the 1:5,000,000 BVG believed to be present prior to European settlement.

#### 4. Technical and BioCondition Benchmark Descriptions

Technical descriptions provide a detailed description of the full range in structure and floristic composition of regional ecosystems (e.g. 11.3.1) and their component vegetation communities (e.g. 11.3.1a, 11.3.1b). See:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

The descriptions are compiled using site survey data from the Queensland Herbarium's CORVEG database. Distribution maps, representative images (if available) and the pre-clearing and remnant extent (hectares) of each vegetation community derived from the regional ecosystem mapping data are included. The technical descriptions should be used in conjunction with the fields from the regional ecosystem description database (REDD) for a full description of the regional ecosystem.

Technical descriptions include data on canopy height, canopy cover and native plant species composition of the predominant layer, which are attributes relevant to assessment of the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used for remnant assessment where possible (Neldner et al. 2020 (PDF)\* section 3.3 of:

<https://publications.qld.gov.au/dataset/redd/resource/>

The technical descriptions are subject to review and are updated as additional data becomes available.

When conducting a BioCondition assessment, these technical descriptions should be used in conjunction with BioCondition benchmarks for the specific regional ecosystem, or component vegetation community.

<http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance regimes has been considered throughout the geographic extent of the regional ecosystem. Local reference sites should be used for this spatial and temporal (seasonal and annual) variability.

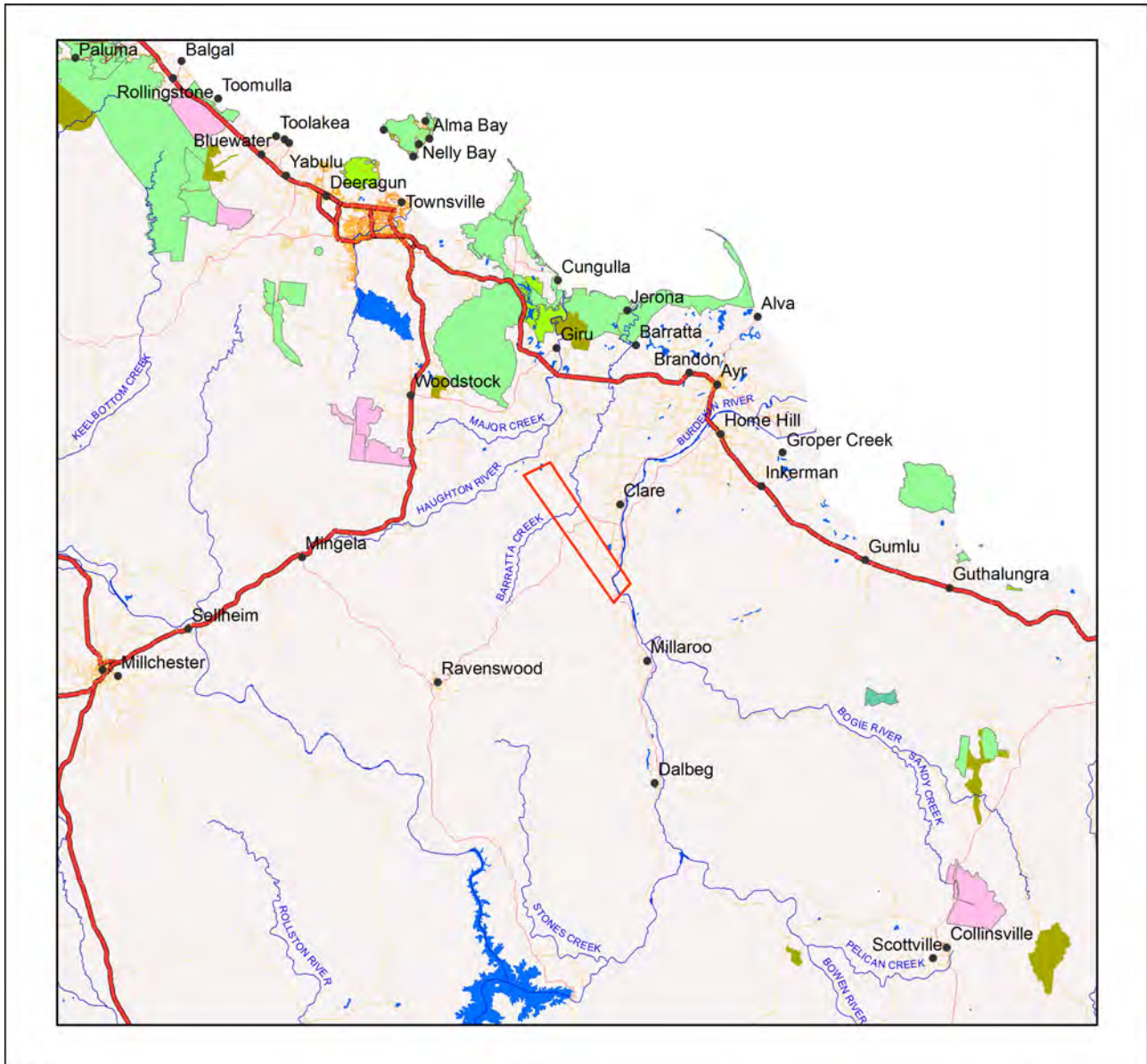


**Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available**

Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
11.12.1	Available	Available
11.12.9	Available	Available
11.3.10	Available	Available
11.3.12	Not currently available	Not currently available
11.3.13	Available	Not currently available
11.3.25	Available	Available
11.3.25b	Available	Available
11.3.25f	Not currently available	Not currently available
11.3.30	Available	Available
11.3.31	Available	Not currently available
11.3.34	Available	Not currently available
11.3.35	Available	Available
11.3.35a	Available	Available
11.3.4	Available	Available
11.3.7	Available	Available
11.3.9	Available	Available
non-remnant	Not currently available	Not currently available
water	Not currently available	Not currently available

# Maps

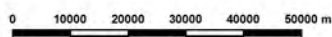
## Map 1 - Location



### Locality Map

#### Legend

- polygon
- Towns
- Highway
- Connector
- Street/Local Road
- Reservoirs
- Lakes
- National Park (Scientific)
- National Park
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Nature Refuges
- Coordinated Conservation Areas
- Major rivers/creeks
- Queensland

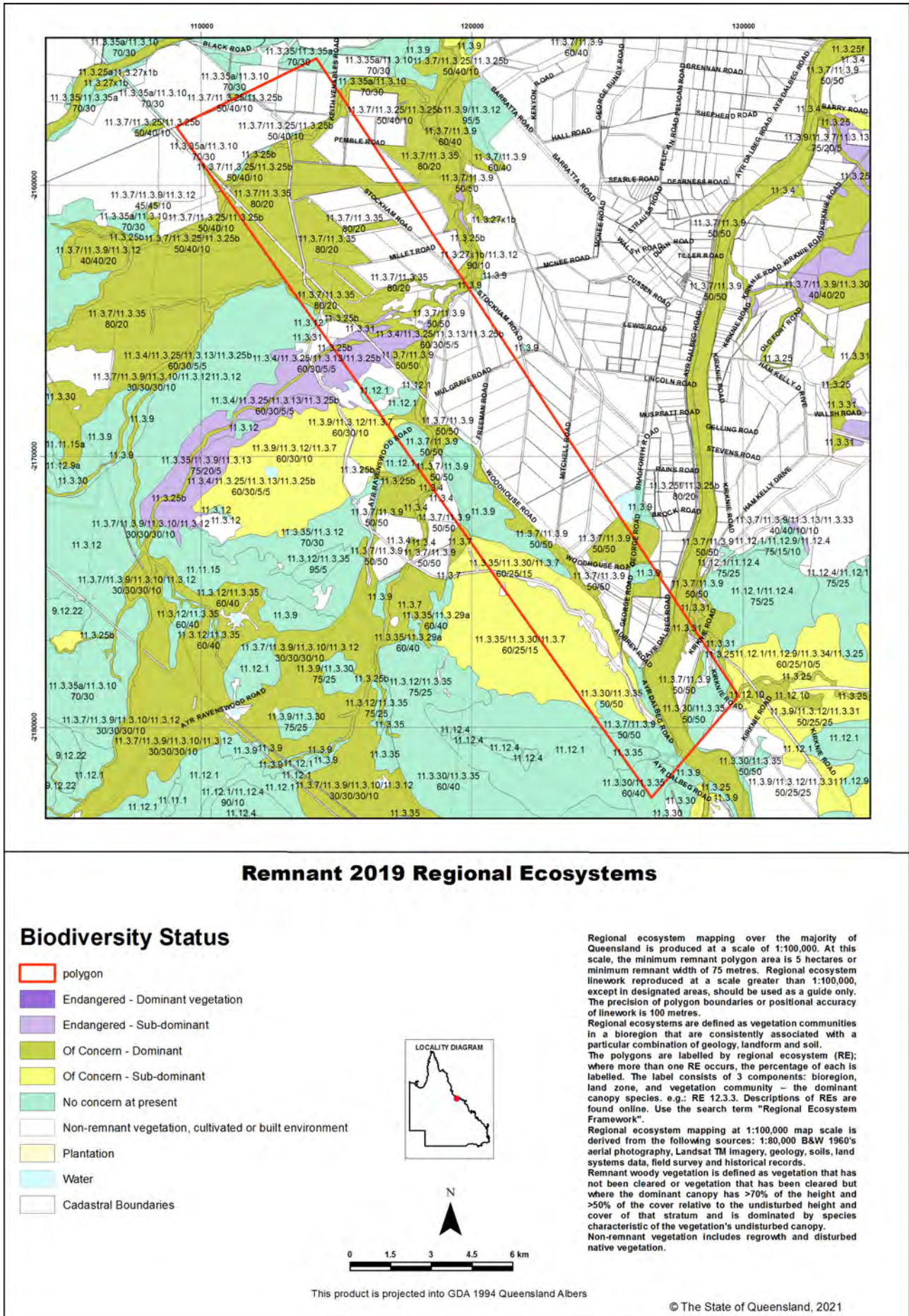


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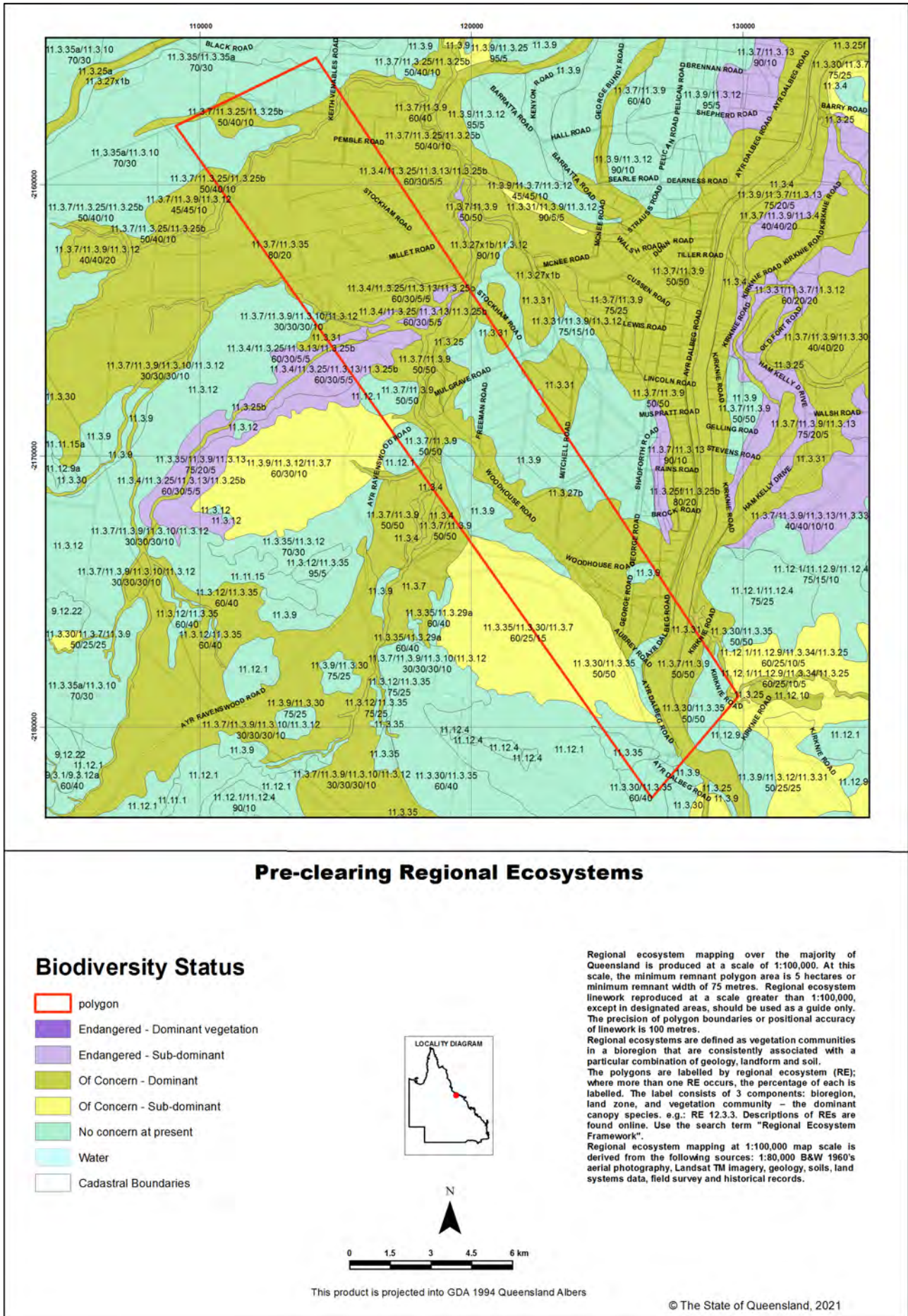


## Map 2 - Remnant 2019 regional ecosystems



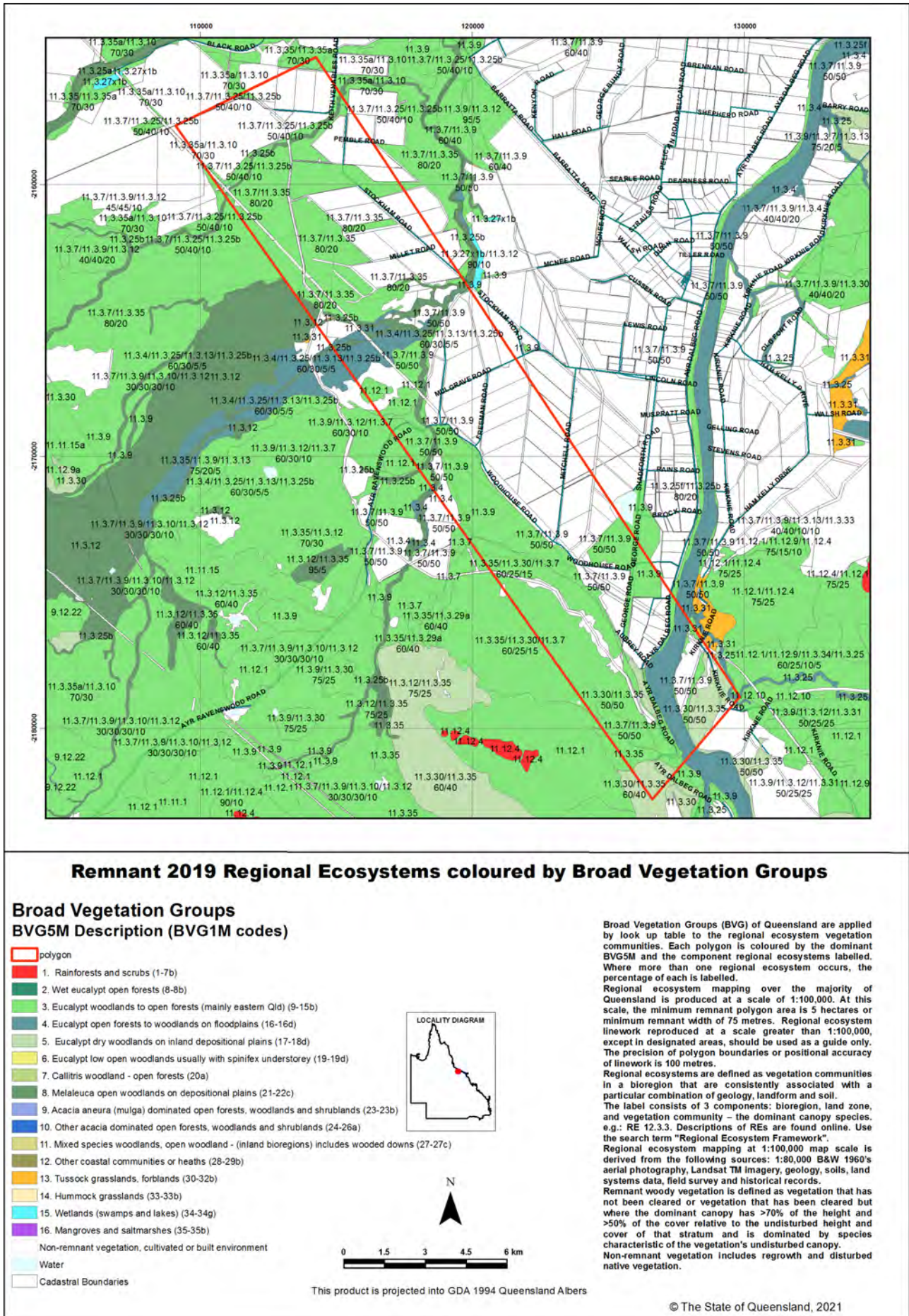


### Map 3 - Pre-clearing regional ecosystems





### Map 4 - Remnant 2019 regional ecosystems by BVG (5M)

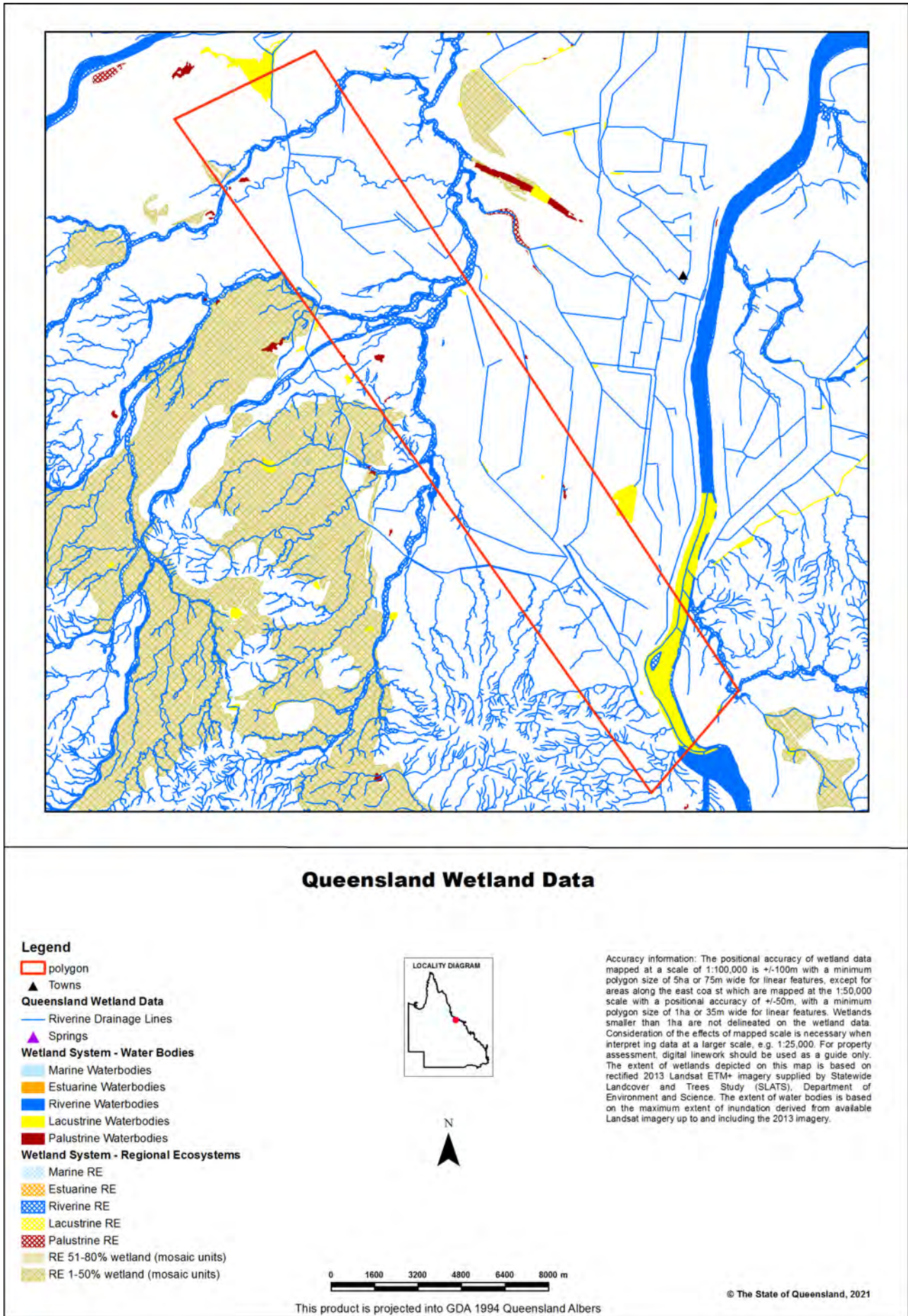








### Map 6 - Wetlands and waterways



## Links and Other Information Sources

The Department of Environment and Science's Website -

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

Descriptions of the broad vegetation groups of Queensland can be downloaded from:

<https://publications.qld.gov.au/dataset/redd/resource/>

The methodology for mapping regional ecosystems can be downloaded from:

<https://publications.qld.gov.au/dataset/redd/resource/>

Technical descriptions for regional ecosystems can be obtained from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

Benchmarks can be obtained from:

<http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Government Information System portal,

<http://dds.information.qld.gov.au/dds/>

The Queensland Globe is a mapping and data application. As an interactive online tool, Queensland Globe allows you to view and explore Queensland maps, imagery (including up-to-date satellite images) and other spatial data, including regional ecosystem mapping. To further view and explore regional ecosystems over an area of interest, access the Biota Globe (a component of the Queensland Globe). The Queensland Globe can be accessed via the following link:

<http://www.dnrm.qld.gov.au/mapping-data/queensland-globe>

## References

Neldner, V.J., Niehus, R.E., Wilson, B.A., McDonald, W.J.F., Ford, A.J. and Accad, A. (2019). The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 4.0. Queensland Herbarium, Department of Environment and Science.

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Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F., Addicott, E.P. and Appelman, C.N. (2020). Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 5.1. Updated March 2020. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.

<https://publications.qld.gov.au/dataset/redd/resource/6dee78ab-c12c-4692-9842-b7257c2511e4>

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

## Appendices

### Appendix 1 - Source Data

The dataset listed below is available for download from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/download/>

- Regional Ecosystem Description Database

The datasets listed below are available for download from:

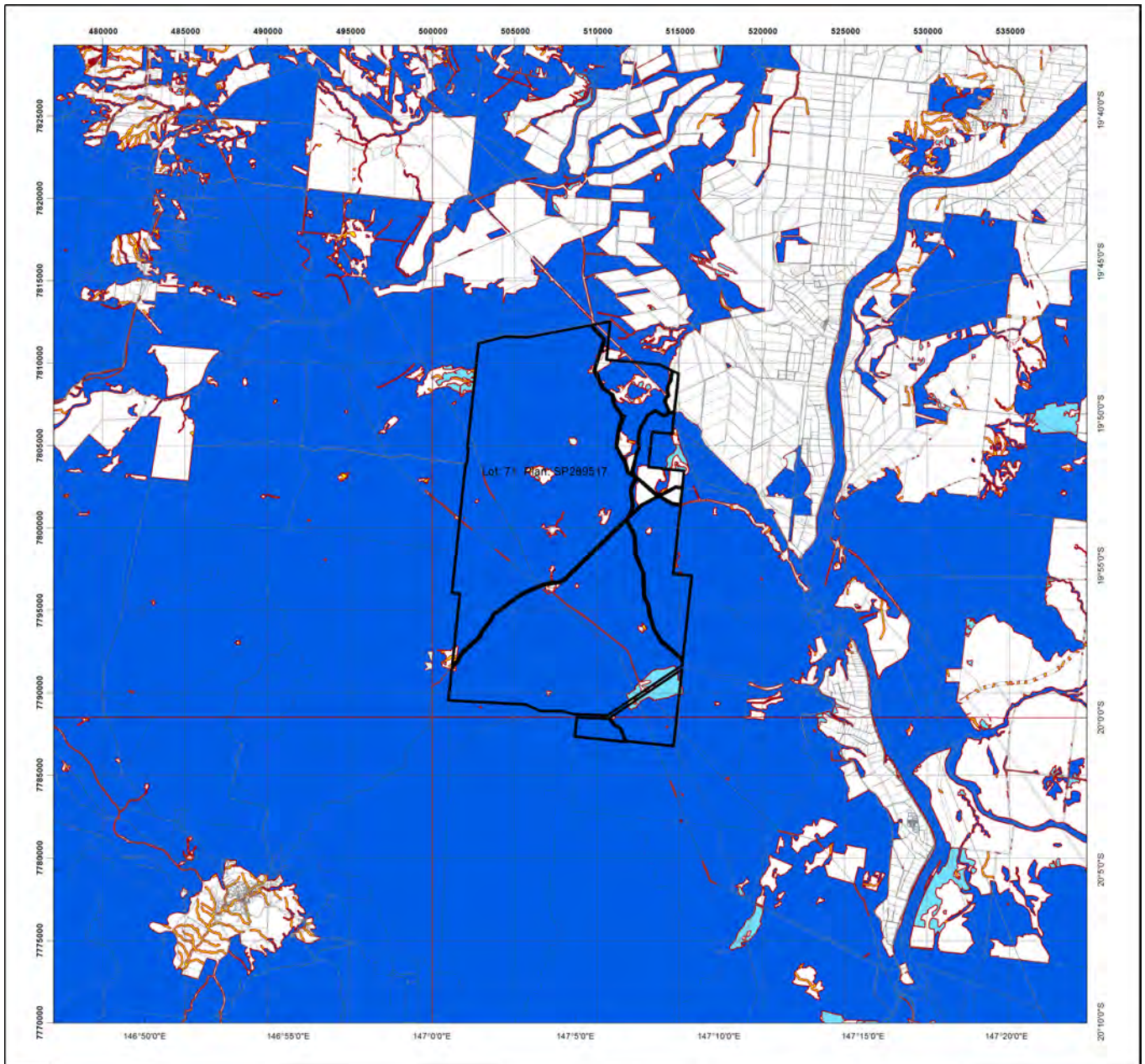
<http://dds.information.qld.gov.au/dds/>

- Biodiversity status of pre-clearing and 2019 remnant regional ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas

## Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- <i>Vegetation Management Act 1999</i>

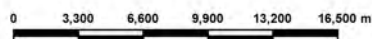




## Regulated Vegetation Management Map

### Legend

- Selected Lot and Plan
- Category A area (Vegetation offsets/compliance notices/VDecs)
- Category B area (Remnant vegetation)
- Category C area (High-value regrowth vegetation)
- Category R area (Reef regrowth watercourse vegetation)
- Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
- Water
- Area not categorised
- Other land parcel boundaries



This product is projected into:  
 GDA 1994 MGA Zone 55

### Disclaimer:

While every care is taken to ensure the accuracy of this product, the Department of Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: [www.resources.qld.gov.au](http://www.resources.qld.gov.au) or contact the Department of Resources.

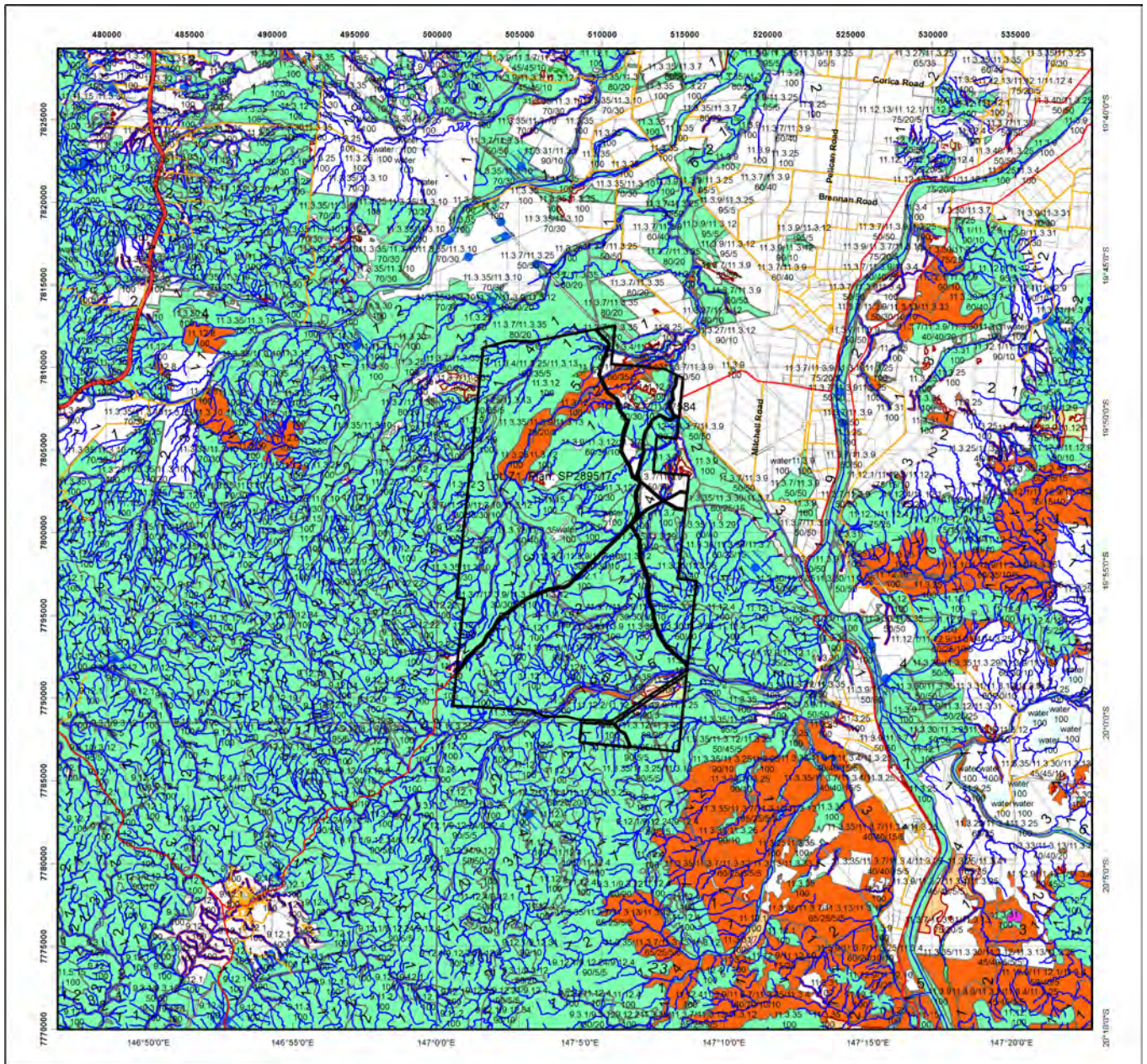
Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

Land parcel boundaries are provided as locational aid only.

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.



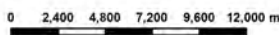
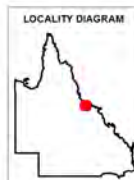




## Vegetation Management Supporting Map

### Legend

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
- Highway
- Connector
- Street/Local Road
- National Parks, State Forest and other reserves
- Other land parcel boundaries



This product is projected into:  
 GDA 1994 MGA Zone 55

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

#### Disclaimer:

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Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: [www.resources.qld.gov.au](http://www.resources.qld.gov.au) or contact the Department of Resources.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

Land parcel boundaries are provided as locational aid only.



# Vegetation Management Act 1999 - Extract from the essential habitat database

Essential habitat is required for assessment under the:

- State Development Assessment Provisions - State Code 16: Native vegetation clearing which sets out the matters of interest to the state for development assessment under the *Planning Act 2016*, and
- Accepted development vegetation clearing codes made under the *Vegetation Management Act 1999*

Essential habitat for one or more of the following species is found on and within 1.1 km of the identified subject lot/s on the accompanying essential habitat map.

This report identifies essential habitat in Category A, B and Category C areas.

The numeric labels on the essential habitat map can be cross referenced with the database below to determine which essential habitat factors might exist for a particular species.

Essential habitat is compiled from a combination of species habitat models and buffered species records.

The Department of Resources website (<http://www.dnrme.qld.gov.au>) has more information on how the layer is applied under the State Development Assessment Provisions - State Code 16: Native vegetation clearing and the *Vegetation Management Act 1999*.

Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated.

Essential habitat, for protected wildlife, means a category A area, a category B area or category C area shown on the regulated vegetation management map-

- 1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or
- 2) in which the protected wildlife, at any stage of its life cycle, is located.

Protected wildlife includes critically endangered, endangered, vulnerable or near-threatened native wildlife prescribed under the *Nature Conservation Act 1992*.

## Essential habitat in Category A and/or Category B and/or Category C

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
584	<i>Crocodylus porosus</i>	estuarine crocodile	V	Estuaries and major rivers, billabongs and swamps in dry season; freshwater swamps in wet season, occasionally found in open sea; also in dune swale swamps and dams; mostly within 40-50km of coastline (some breeding populations up to 100km from sea). Nest sites vegetated areas (preference for Melaleuca swamp forest with Thoracostachyum or Scleria sedgeswamp &/or Stenoclaena fern) near permanent freshwater (<100-200m), often on north-west banks, prime areas associated with productive deepwater estuaries; will also use marginal sites, e.g. grassy areas (Imperata, Ischaemum, Themeda, Sorghum) near forest edge or with sparse eucalypt, riverbank/fringe forest (Melaleuca, Corypha, Acacia), mangrove fringe, salt meadow behind mangrove, and sparse short (<40cm) sedgeland/swamp.	Sea level to 100m.	None	Near and in waterbodies.

Label	Regional Ecosystem (mandatory unless otherwise specified)
584	All regional ecosystems within the stream/wetland buffer as determined by VMA code.



## **Vegetation management report**

For Lot: 71 Plan: SP289517

29/09/2021

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# Recent changes

## Updated mapping

Updated vegetation mapping was released on 8 September 2021 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, wetland, high-value regrowth and essential habitat mapping.

The Department of Environment and Science have also updated their protected plant and koala protection mapping to align with the Queensland Herbarium scientific updates.

## Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

**Property details** - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s) and catchment(s);

**Vegetation management framework** - an explanation of the application of the framework and contact details for the Department of Resources who administer the framework;

**Vegetation management framework details for the specified Lot on Plan** including:

- the vegetation management categories on the property;
- the vegetation management regional ecosystems on the property;
- vegetation management watercourses or drainage features on the property;
- vegetation management wetlands on the property;
- vegetation management essential habitat on the property;
- whether any area management plans are associated with the property;
- whether the property is coastal or non-coastal; and
- whether the property is mapped as Agricultural Land Class A or B;

**Protected plant framework** - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework, including:

- high risk areas on the protected plant flora survey trigger map for the property;

**Koala protection framework** - an explanation of the application of the framework and contact details for the Department of Environment and Science who administer the framework; and

**Koala protection framework details for the specified Lot on Plan** including:

- the koala district the property is located in;
- koala priority areas on the property;
- core and locally refined koala habitat areas on the property;
- whether the lot is located in an identified koala broad-hectare area; and
- koala habitat regional ecosystems on the property for core koala habitat areas.

This information will assist you to determine your options for managing vegetation under:

- the vegetation management framework, which may include:

- exempt clearing work;
- accepted development vegetation clearing code;
- an area management plan;
- a development approval;

- the protected plant framework, which may include:

- the need to undertake a flora survey;
- exempt clearing;
- a protected plant clearing permit;

- the koala protection framework, which may include:

- exempted development;
- a development approval;
- the need to undertake clearing sequentially and in the presence of a koala spotter.

## Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 8 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.



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# 1. Property details

## 1.1 Tenure and title area

All of the lot, plan, tenure and title area information associated with property Lot: 71 Plan: SP289517, are listed in Table 1.

**Table 1: Lot, plan, tenure and title area information for the property**

Lot	Plan	Tenure	Property title area (sq metres)
71	SP289517	Lands Lease	295,000,000
A	GS681	Easement	66,490
B	GS681	Easement	291,880
H	GS684	Easement	0.0
BB	SP289517	Easement	3,709
GA	SP175281	Easement	0.0
H	SP175282	Easement	171,500
D	SP144889	Easement	0.0
A	SP145194	Easement	403,400
C	GS682	Easement	105,120
E	SP144889	Easement	626,500
AA	SP289517	Easement	6,787
FA	SP175281	Easement	269,100
A	AP11662	Lands Lease	2,683
A	GS680	Easement	217,010
G	GS684	Easement	5,086
EA	SP175281	Easement	79,420
F	SP144889	Easement	204,900

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

## 1.2 Property location

Table 2 provides a summary of the locations for property Lot: 71 Plan: SP289517, in relation to natural and administrative boundaries.

**Table 2: Property location details**

Local Government(s)
Burdekin Shire

Bioregion(s)	Subregion(s)
Brigalow Belt	Townsville Plains
Einasleigh Uplands	Broken River

Catchment(s)
Burdekin
Haughton

## 2. Vegetation management framework (administered by the Department of Resources)

The *Vegetation Management Act 1999* (VMA), the *Vegetation Management Regulation 2012*, the *Planning Act 2016* and the *Planning Regulation 2017*, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem prescribed under Schedule 5 of the *Vegetation Management Regulation 2012*; and
- a mangrove.

### 2.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify the Department of Resources or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 4.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact the Department of Resources before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at

<https://www.qld.gov.au/environment/land/vegetation/exemptions/>.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact the Department of Resources prior to clearing in any of these areas.

### 2.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at

<https://www.qld.gov.au/environment/land/vegetation/codes/>

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify the Department of Resources before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at

<https://apps.dnrm.qld.gov.au/vegetation/>

## 2.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an Area Management Plan applies to your property for which you can make a new notification, it will be listed in Section 3.6 of this report. Before clearing under one of these AMPs, you must first notify the Department of Resources and then follow the conditions and requirements listed in the AMP.

<https://www.qld.gov.au/environment/land/vegetation/area-plans/>

## 2.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval.

Information on how to apply for a development approval is available at

<https://www.qld.gov.au/environment/land/management/vegetation/development>

## 2.5. Contact information for the Department of Resources

For further information on the vegetation management framework:

**Phone** 135VEG (135 834)

**Email** [vegetation@resources.qld.gov.au](mailto:vegetation@resources.qld.gov.au)

**Visit** <https://www.dnrme.qld.gov.au/?contact=vegetation> to submit an online enquiry.

### 3. Vegetation management framework for Lot: 71 Plan: SP289517

#### 3.1 Vegetation categories

The vegetation categories on your property are shown on the regulated vegetation management map in section 4.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

**Table 3: Vegetation categories for subject property. Total area: 29464.05ha**

Vegetation category	Area (ha)
Category B	27549.8
Category C	420.4
Category R	77.3
Category Water	77.5
Category X	1339.1

**Table 4: Description of vegetation categories**

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact the Department of Resources to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact the Department of Resources to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

#### Property Map of Assessable Vegetation (PMAV)

There is no Property Map of Assessable Vegetation (PMAV) present on this property.



## 3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 4.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/>

**Table 5: Regional ecosystems present on subject property**

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
11.11.1	Least concern	B	44.03	Eucalyptus crebra +/- Acacia rhodoxylon woodland on old sedimentary rocks with varying degrees of metamorphism and folding	Sparse
11.11.15	Least concern	B	792.99	Eucalyptus crebra woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics	Sparse
11.11.15	Least concern	C	3.12	Eucalyptus crebra woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics	Sparse
11.11.15	Least concern	R	0.28	Eucalyptus crebra woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics	Sparse
11.12.1	Least concern	B	4,872.08	Eucalyptus crebra woodland on igneous rocks	Sparse
11.12.1	Least concern	C	27.48	Eucalyptus crebra woodland on igneous rocks	Sparse
11.12.1	Least concern	R	13.43	Eucalyptus crebra woodland on igneous rocks	Sparse
11.12.2	Least concern	B	655.20	Eucalyptus melanophloia woodland on igneous rocks	Sparse
11.12.2	Least concern	C	12.42	Eucalyptus melanophloia woodland on igneous rocks	Sparse
11.12.2	Least concern	R	1.01	Eucalyptus melanophloia woodland on igneous rocks	Sparse
11.12.4	Least concern	B	184.46	Semi-evergreen vine thicket and microphyll vine forest on igneous rocks	Dense
11.12.9	Least concern	B	262.08	Eucalyptus platyphylla woodland on igneous rocks	Sparse
11.12.9	Least concern	C	4.97	Eucalyptus platyphylla woodland on igneous rocks	Sparse
11.12.9	Least concern	R	0.41	Eucalyptus platyphylla woodland on igneous rocks	Sparse
11.3.10	Least concern	B	1,947.93	Eucalyptus brownii woodland on alluvial plains	Sparse
11.3.10	Least concern	C	0.37	Eucalyptus brownii woodland on alluvial plains	Sparse
11.3.10	Least concern	R	4.78	Eucalyptus brownii woodland on alluvial plains	Sparse
11.3.12	Least concern	B	4,945.56	Melaleuca viridiflora, M. argentea +/- M. dealbata woodland on alluvial plains	Sparse
11.3.12	Least concern	C	0.12	Melaleuca viridiflora, M. argentea +/- M. dealbata woodland on alluvial plains	Sparse

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
11.3.12	Least concern	R	7.89	Melaleuca viridiflora, M. argentea +/- M. dealbata woodland on alluvial plains	Sparse
11.3.13	Of concern	B	79.83	Grevillea striata open woodland on coastal alluvial plains	Very sparse
11.3.13	Of concern	C	0.50	Grevillea striata open woodland on coastal alluvial plains	Very sparse
11.3.13	Of concern	R	0.71	Grevillea striata open woodland on coastal alluvial plains	Very sparse
11.3.25	Least concern	B	1,547.02	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Sparse
11.3.25	Least concern	C	19.87	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Sparse
11.3.25	Least concern	R	6.92	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Sparse
11.3.29	Least concern	B	48.96	Eucalyptus crebra, E. exserta, Melaleuca spp. woodland on alluvial plains	Sparse
11.3.30	Least concern	B	776.76	Eucalyptus crebra, Corymbia dallachiana woodland on alluvial plains	Sparse
11.3.30	Least concern	R	0.51	Eucalyptus crebra, Corymbia dallachiana woodland on alluvial plains	Sparse
11.3.31	Least concern	B	9.79	Ophiuros exaltatus, Dichanthium spp. grassland on alluvial plains	Grassland Sch 4
11.3.31	Least concern	C	1.34	Ophiuros exaltatus, Dichanthium spp. grassland on alluvial plains	Grassland Sch 4
11.3.31	Least concern	R	0.42	Ophiuros exaltatus, Dichanthium spp. grassland on alluvial plains	Grassland Sch 4
11.3.35	Least concern	B	3,059.64	Eucalyptus platyphylla, Corymbia clarksoniana woodland on alluvial plains	Sparse
11.3.35	Least concern	C	249.02	Eucalyptus platyphylla, Corymbia clarksoniana woodland on alluvial plains	Sparse
11.3.35	Least concern	R	9.06	Eucalyptus platyphylla, Corymbia clarksoniana woodland on alluvial plains	Sparse
11.3.4	Of concern	B	734.34	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Sparse
11.3.4	Of concern	C	39.15	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Sparse
11.3.4	Of concern	R	6.02	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Sparse
11.3.7	Least concern	B	3,202.42	Corymbia spp. open woodland on alluvial plains	Very sparse
11.3.7	Least concern	C	29.56	Corymbia spp. open woodland on alluvial plains	Very sparse
11.3.7	Least concern	R	11.56	Corymbia spp. open woodland on alluvial plains	Very sparse
11.3.9	Least concern	B	4,313.90	Eucalyptus platyphylla, Corymbia spp. woodland on alluvial plains	Sparse
11.3.9	Least concern	C	32.42	Eucalyptus platyphylla, Corymbia spp. woodland on alluvial plains	Sparse
11.3.9	Least concern	R	14.32	Eucalyptus platyphylla, Corymbia spp. woodland on alluvial plains	Sparse

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
9.12.1	Least concern	B	49.69	Eucalyptus crebra and/or E. xanthoclada and/or E. drepanophylla low open woodland on igneous rocks	Very sparse
9.12.22	Least concern	B	17.58	Eucalyptus drepanophylla, Corymbia clarksoniana or C. intermedia and C. dallachiana woodland on steep rugged igneous ranges	Sparse
9.12.24	Least concern	B	2.76	Eucalyptus drepanophylla or E. crebra and/or E. xanthoclada and Corymbia peltata woodland on igneous rocks	Sparse
9.12.4	Least concern	B	2.76	Eucalyptus shirleyi and/or E. melanophloia and/or Corymbia peltata and/or Callitris intratropica low open woodland on igneous rocks	Very sparse
non-rem	None	X	1,339.10	None	None
water	None	Water	77.49	None	None

Please note:

1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.
2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work;
- accepted development vegetation clearing codes;
- performance outcomes in State Code 16 of the State Development Assessment Provisions (SDAP).

### 3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 4.2.

### 3.4 Wetlands

Vegetation management wetlands are present on this property and are shown on the vegetation management supporting map in section 4.2 of this report.

### 3.5 Essential habitat

Under the VMA, essential habitat for protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA) as critically endangered, endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 4.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map -

- 1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or
- 2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

### Category A and/or Category B and/or Category C

**Table 6: Essential habitat in Category A and/or Category B and/or Category C**

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
584	<i>Crocodylus porosus</i>	estuarine crocodile	V	Estuaries and major rivers, billabongs and swamps in dry season; freshwater swamps in wet season, occasionally found in open sea; also in dune swale swamps and dams; mostly within 40-50km of coastline (some breeding populations up to 100km from sea). Nest sites vegetated areas (preference for Melaleuca swamp forest with <i>Thoracostachyum</i> or <i>Scleria</i> sedgeswamp &/or <i>Stenoclaena</i> fern) near permanent freshwater (<100-200m), often on north-west banks, prime areas associated with productive deepwater estuaries; will also use marginal sites, e.g. grassy areas ( <i>Imperata</i> , <i>Ischaemum</i> , <i>Themeda</i> , <i>Sorghum</i> ) near forest edge or with sparse eucalypt, riverbank/fringe forest ( <i>Melaleuca</i> , <i>Corypha</i> , <i>Acacia</i> ), mangrove fringe, salt meadow behind mangrove, and sparse short (<40cm) sedgeland/swamp.	Sea level to 100m.	None	Near and in waterbodies.

Label	Regional Ecosystem (mandatory unless otherwise specified)
584	All regional ecosystems within the stream/wetland buffer as determined by VMA code.

## 3.6 Area Management Plan(s)

Area Management Plan for the control of pest plants in the Dry Tropics region

## 3.7 Coastal or non-coastal

**For the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP), this property is regarded as\***

Coastal

Non Coastal

\*See also Map 4.3

## 3.8 Agricultural Land Class A or B

The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

**Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?**

Class A (with urban areas masked as per SPP): 6282.58ha

Class B (with urban areas masked as per SPP): 16642.8ha

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See Map 4.4 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 71 Plan: SP289517.

## 4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:

<https://www.dnrme.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form>

### **Regulated vegetation management map**

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new [property maps of assessable vegetation \(PMAV\)](#).

### **Vegetation management supporting map**

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

### **Coastal/non-coastal map**

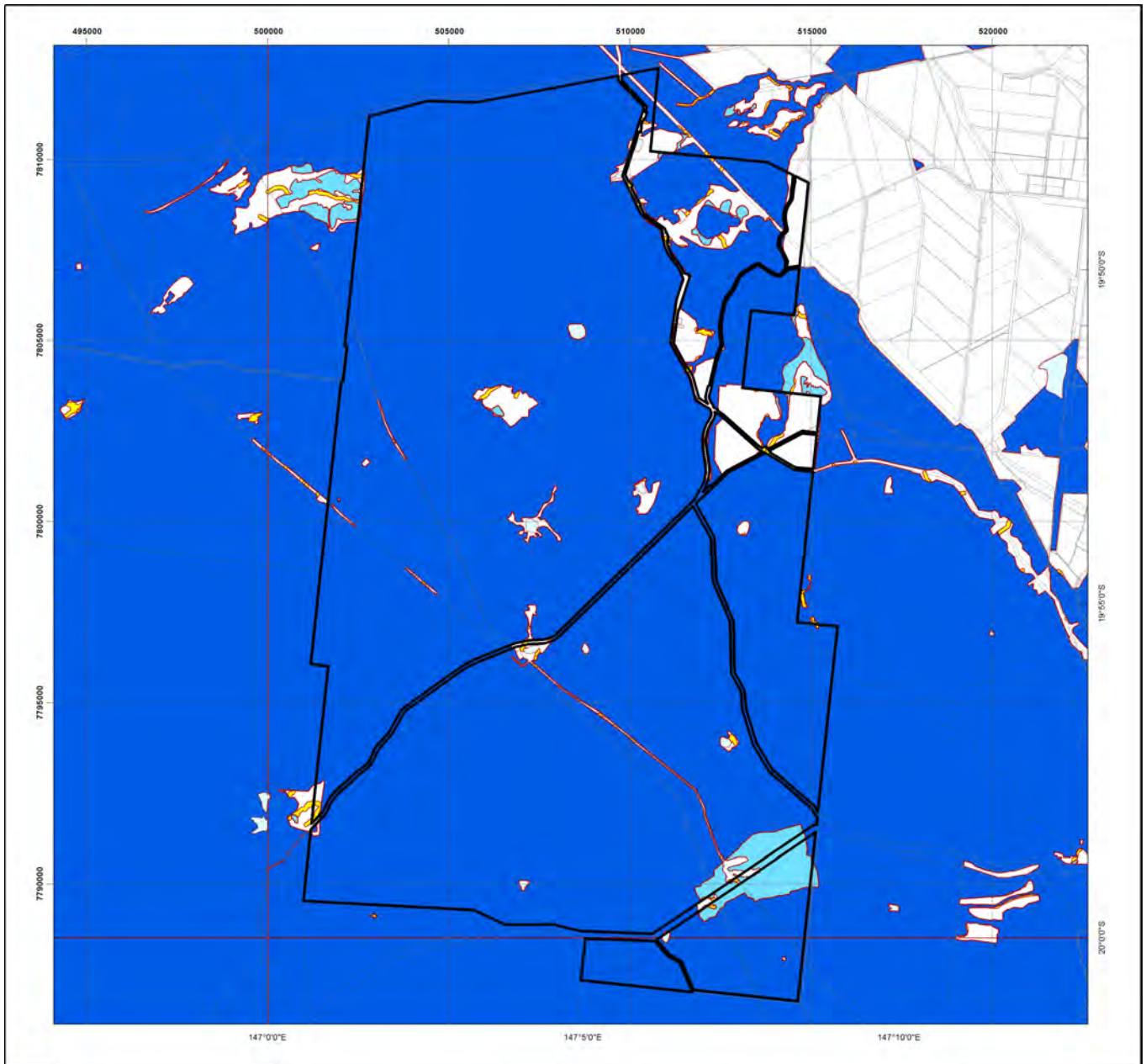
The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP).

### **Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture**

The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.



# 4.1 Regulated vegetation management map



## Regulated Vegetation Management Map

### Legend

- Selected Lot and Plan
- Category A area (Vegetation offsets/compliance notices/VDecs)
- Category B area (Remnant vegetation)
- Category C area (High-value regrowth vegetation)
- Category R area (Reef regrowth watercourse vegetation)
- Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
- Water
- Area not categorised
- Other land parcel boundaries



This product is projected into:  
GDA 1994 MGA Zone 55

### Disclaimer:

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Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: [www.resources.qld.gov.au](http://www.resources.qld.gov.au) or contact the Department of Resources.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

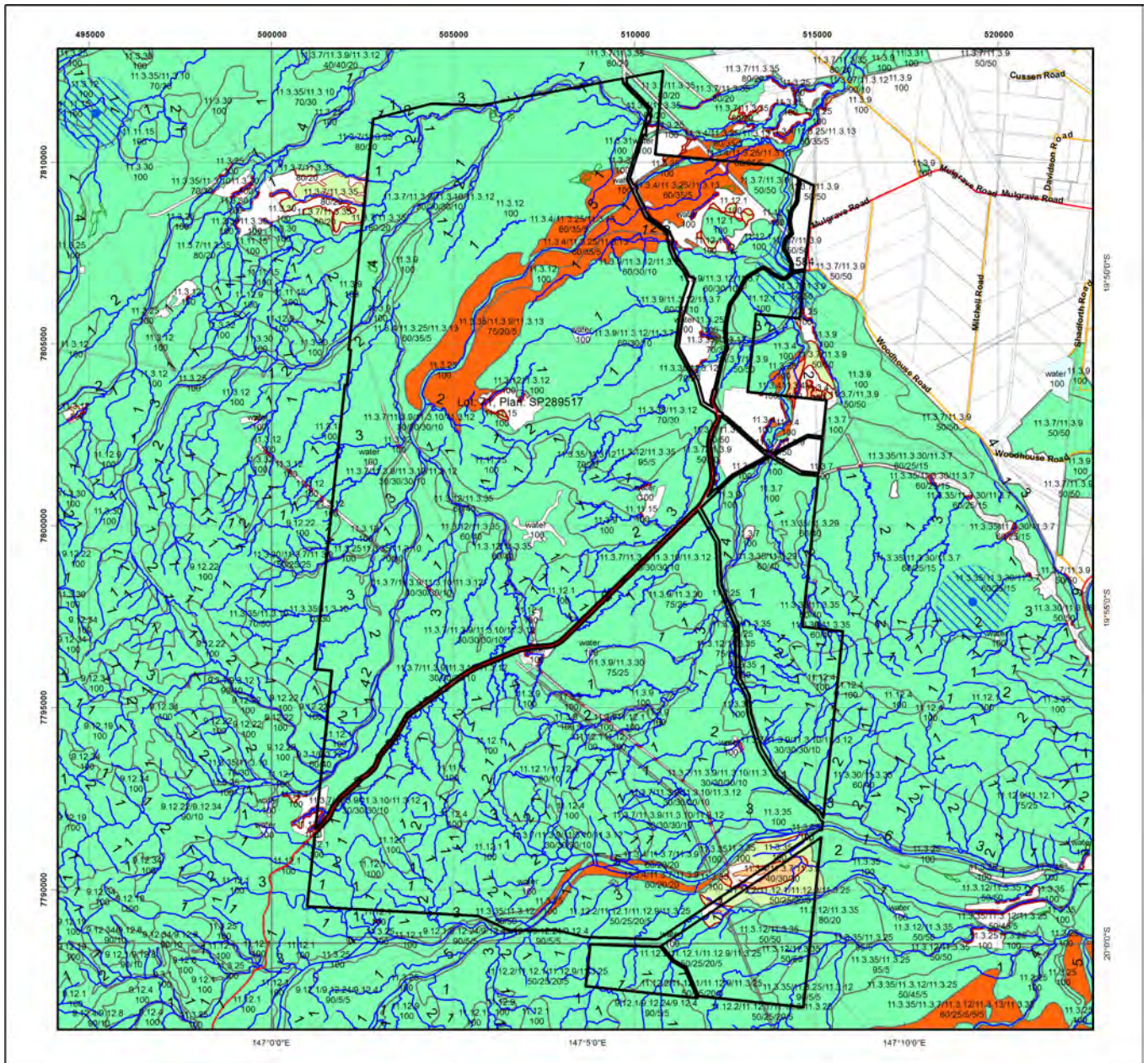
Land parcel boundaries are provided as locational aid only.

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.






# 4.2 Vegetation management supporting map



## Vegetation Management Supporting Map


**Legend**

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- ~ Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
- Highway
- Connector
- Street/Local Road
- National Parks, State Forest and other reserves
- Other land parcel boundaries




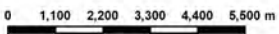
Queensland Government

LOCALITY DIAGRAM



N





0 1,100 2,200 3,300 4,400 5,500 m

This product is projected into:  
GDA 1994 MGA Zone 55

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

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Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: [www.resources.qld.gov.au](http://www.resources.qld.gov.au) or contact the Department of Resources.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at <http://www.information.qld.gov.au/>

Land parcel boundaries are provided as locational aid only.

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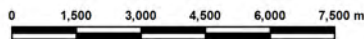
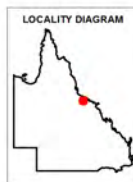
# 4.3 Coastal/non-coastal map



## Coastal/Non Coastal Map

### Legend

-  Selected Lot and Plan
-  Coastal
-  Non Coastal
-  Other land parcel boundaries



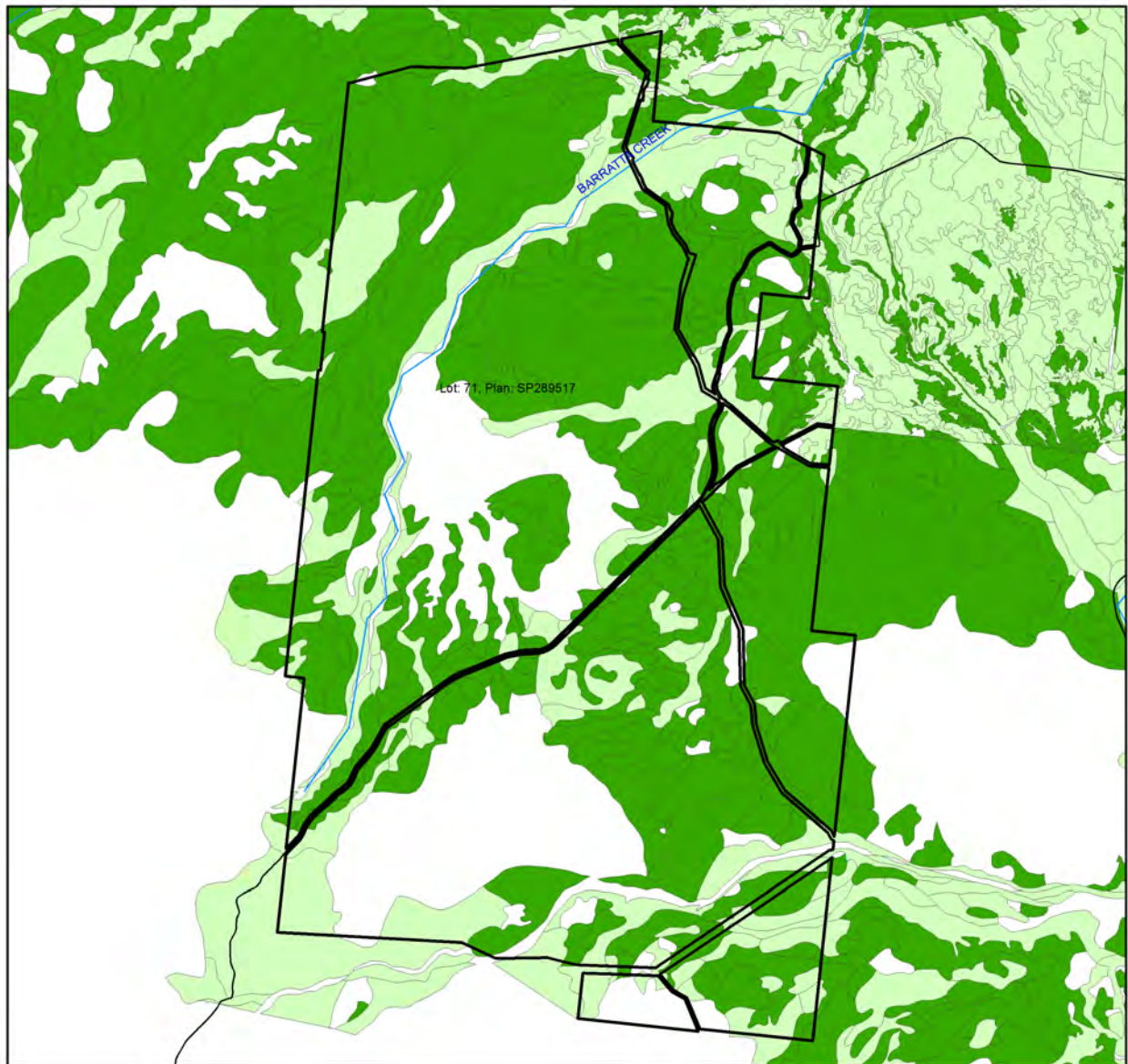
This product is projected into:  
GDA 1994 MGA Zone 55

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Land parcel boundaries shown are provided as a locational aid only.



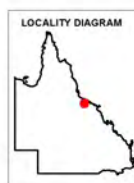
## 4.4 Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture



### Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture

#### Legend

- Selected Lot and Plan
- Towns
- Rivers and creeks
- Freeways / motorways; Highways
- Secondary roads; Streets
- Agricultural land class A or B
- A
- B
- Not class A or B



This product is projected into GDA 1994 MGA Zone 55

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## 5. Protected plants framework (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the [Nature Conservation Act 1992](#) (NCA). The NCA regulates the clearing of protected plants 'in the wild' (see [Operational policy: When a protected plant in Queensland is considered to be 'in the wild'](#)) that are listed as critically endangered, endangered, vulnerable or near threatened under the Act.

Please note that the protected plant clearing framework applies irrespective of the classification of the vegetation under the *Vegetation Management Act 1999* and any approval or exemptions given under another Act, for example, the *Vegetation Management Act 1999* or *Planning Regulation 2017*.

### 5.1 Clearing in high risk areas on the flora survey trigger map

The flora survey trigger map identifies high-risk areas for endangered, vulnerable or near threatened (EVNT) plants. These are areas where EVNT plants are known to exist or are likely to exist based on the habitat present. The flora survey trigger map for this property is provided in section 5.5.

If you are proposing to clear an area shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken by a suitably qualified person in accordance with the [Flora survey guidelines](#). The main objective of a flora survey is to locate any EVNT plants that may be present in the clearing impact area.

If the flora survey identifies that EVNT plants are not present within the clearing impact area or clearing within 100m of EVNT plants can be avoided, the clearing activity is exempt from a permit. An [exempt clearing notification form](#) must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that EVNT plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the [clearing permit application form](#).

### 5.2 Clearing outside high risk areas on the flora survey trigger map

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that EVNT plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

### 5.3 Exemptions

Many activities are 'exempt' under the protected plant clearing framework, which means that clearing of native plants that are in the wild can be undertaken for these activities with no need for a flora survey or a protected plant clearing permit. The Information sheet - General exemptions for the take of protected plants provides some of these exemptions.

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) under the *Vegetation Management Act 1999* (i.e. listed in Schedule 21 of the Planning Regulations 2017) while some are different.

### 5.4 Contact information for DES

For further information on the protected plants framework:

**Phone** 1300 130 372 (and select option four)

**Email** [palm@des.qld.gov.au](mailto:palm@des.qld.gov.au)

**Visit** <https://www.qld.gov.au/environment/plants-animals/plants/protected-plants>

## 5.5 Protected plants flora survey trigger map

This map included may also be requested individually at: <https://apps.des.qld.gov.au/map-request/flora-survey-trigger/>.

### Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

### Species information






Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the [Queensland Spatial Catalogue](#), the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for more information.

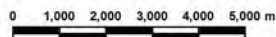
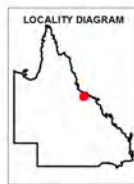




### Protected Plants Flora Survey Trigger Map

#### Legend

-  Selected Lot and Plan
-  High risk area
-  Other land parcel boundaries
-  Freeways / motorways / highways
-  Secondary roads / streets



This product is projected into:  
GDA 1994 MGA Zone 55

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at [palm@des.qld.gov.au](mailto:palm@des.qld.gov.au)

**Disclaimer:**  
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## 6. Koala protection framework (administered by the Department of Environment and Science (DES))

The koala (*Phascolarctos cinereus*) is listed in Queensland as vulnerable by the Queensland Government under *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Queensland Government's koala protection framework is comprised of the *Nature Conservation Act 1992*, the Nature Conservation (Animals) Regulation 2020, the Nature Conservation (Koala) Conservation Plan 2017, the *Planning Act 2016* and the Planning Regulation 2017.

### 6.1 Koala mapping

#### 6.1.1 Koala districts

The parts of Queensland where koalas are known to occur has been divided into three koala districts - koala district A, koala district B and koala district C. Each koala district is made up of areas with comparable koala populations (e.g. density, extent and significance of threatening processes affecting the population) which require similar management regimes.

Section 7.1 identifies which koala district your property is located in.

#### 6.1.2 Koala habitat areas

Koala habitat areas are areas of vegetation that have been determined to contain koala habitat that is essential for the conservation of a viable koala population in the wild based on the combination of habitat suitability and biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water). In order to protect this important koala habitat, clearing controls have been introduced into the Planning Regulation 2017 for development in koala habitat areas.

Please note that koala habitat areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

There are two different categories of koala habitat area (core koala habitat area and locally refined koala habitat), which have been determined using two different methodologies. These methodologies are described in the document [Spatial modelling in South East Queensland](#).

Section 7.2 shows any koala habitat area that exists on your property.

Under the Nature Conservation (Koala) Conservation Plan 2017, an owner of land (or a person acting on the owner's behalf with written consent) can request to make, amend or revoke a koala habitat area determination if they believe, on reasonable grounds, that the existing determination for all or part of their property is incorrect.

More information on requests to make, amend or revoke a koala habitat area determination can be found in the document [Guideline - Requests to make, amend or revoke a koala habitat area determination](#).

The koala habitat area map will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

Changes to the koala habitat area map which occur between annual updates because of a request to make, amend or revoke a koala habitat area determination can be viewed on the register of approved requests to make, amend or revoke a koala habitat area available at: <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/koalamaps>. The register includes the lot on plan for the change, the date the decision was made and the map issued to the landholder that shows areas determined to be koala habitat areas.

#### 6.1.3 Koala priority areas

Koala priority areas are large, connected areas that have been determined to have the highest likelihood of achieving conservation outcomes for koalas based on the combination of habitat suitability, biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water) and a koala conservation cost benefit analysis.

Conservation efforts will be prioritised in these areas to ensure the conservation of viable koala populations in the wild including a focus on management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring. This includes a prohibition on clearing in koala habitat areas that are in koala priority areas under the Planning Regulation 2017 (subject to some exemptions).

Please note that koala priority areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley,

Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Section 7.2 identifies if your property is in a koala priority area.

#### 6.1.4 Identified koala broad-hectare areas

There are seven identified koala broad-hectare areas in SEQ. These are areas of koala habitat that are located in areas committed to meet development targets in the SEQ Regional Plan to accommodate SEQ's growing population including bring-forward Greenfield sites under the Queensland Housing Affordability Strategy and declared master planned areas under the repealed *Sustainable Planning Act 2009* and the repealed *Integrated Planning Act 1997*.

Specific assessment benchmarks apply to development applications for development proposed in identified koala broad-hectare areas to ensure koala conservation measures are incorporated into the proposed development.

Section 7.2 identifies if your property is in an identified koala broad-hectare area.

## 6.2 Koala habitat planning controls

On 7 February 2020, the Queensland Government introduced new planning controls to the Planning Regulation 2017 to strengthen the protection of koala habitat in South East Queensland (i.e. koala district A).

More information on these planning controls can be found here:

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

As a high-level summary, the koala habitat planning controls make:

- development that involves interfering with koala habitat (defined below) in an area that is both a koala priority area and a koala habitat area, prohibited development (i.e. development for which a development application cannot be made);
- development that involves interfering with koala habitat (defined below) in an area that is a koala habitat area but is not a koala priority area, assessable development (i.e. development for which development approval is required); and
- development that is for extractive industries where the development involves interfering with koala habitat (defined below) in an area that is both a koala habitat area and a key resource area, assessable development (i.e. development for which development approval is required).

**Interfering with koala habitat means:**

- 1) Removing, cutting down, ringbarking, pushing over, poisoning or destroying in anyway, including by burning, flooding or draining native vegetation in a koala habitat area; but
- 2) Does not include destroying standing vegetation by stock or lopping a tree.

However, these planning controls do not apply if the development is exempted development as defined in Schedule 24 of the [Planning Regulation 2017](#). More information on exempted development can be found here:

<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy>.

There are also assessment benchmarks that apply to development applications for:

- building works, operational works, material change of use or reconfiguration of a lot where:
  - the local government planning scheme makes the development assessable;
  - the premises includes an area that is both a koala priority area and a koala habitat area; and
  - the development does not involve interfering with koala habitat (defined above); and
- development in identified koala broad-hectare areas.

The [Guideline - Assessment Benchmarks in relation to Koala Habitat in South East Queensland assessment benchmarks](#) outlines these assessment benchmarks, the intent of these assessment benchmarks and advice on how proposed development may meet these assessment benchmarks.

## 6.3 Koala Conservation Plan clearing requirements

Section 10 and 11 of the [Nature Conservation \(Koala\) Conservation Plan 2017](#) prescribes requirements that must be met when clearing koala habitat in koala district A and koala district B.

These clearing requirements are independent to the koala habitat planning controls introduced into the Planning Regulation 2017, which means they must be complied with irrespective of any approvals or exemptions offered under other legislation.

Unlike the clearing controls prescribed in the Planning Regulation 2017 that are to protect koala habitat, the clearing requirements prescribed in the Nature Conservation (Koala) Conservation Plan 2017 are in place to prevent the injury or death of koalas when koala habitat is being cleared.

## 6.4 Contact information for DES

For further information on the koala protection framework:

**Phone** 13 QGOV (13 74 68)

**Email** [koala.assessment@des.qld.gov.au](mailto:koala.assessment@des.qld.gov.au)

**Visit** <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping>

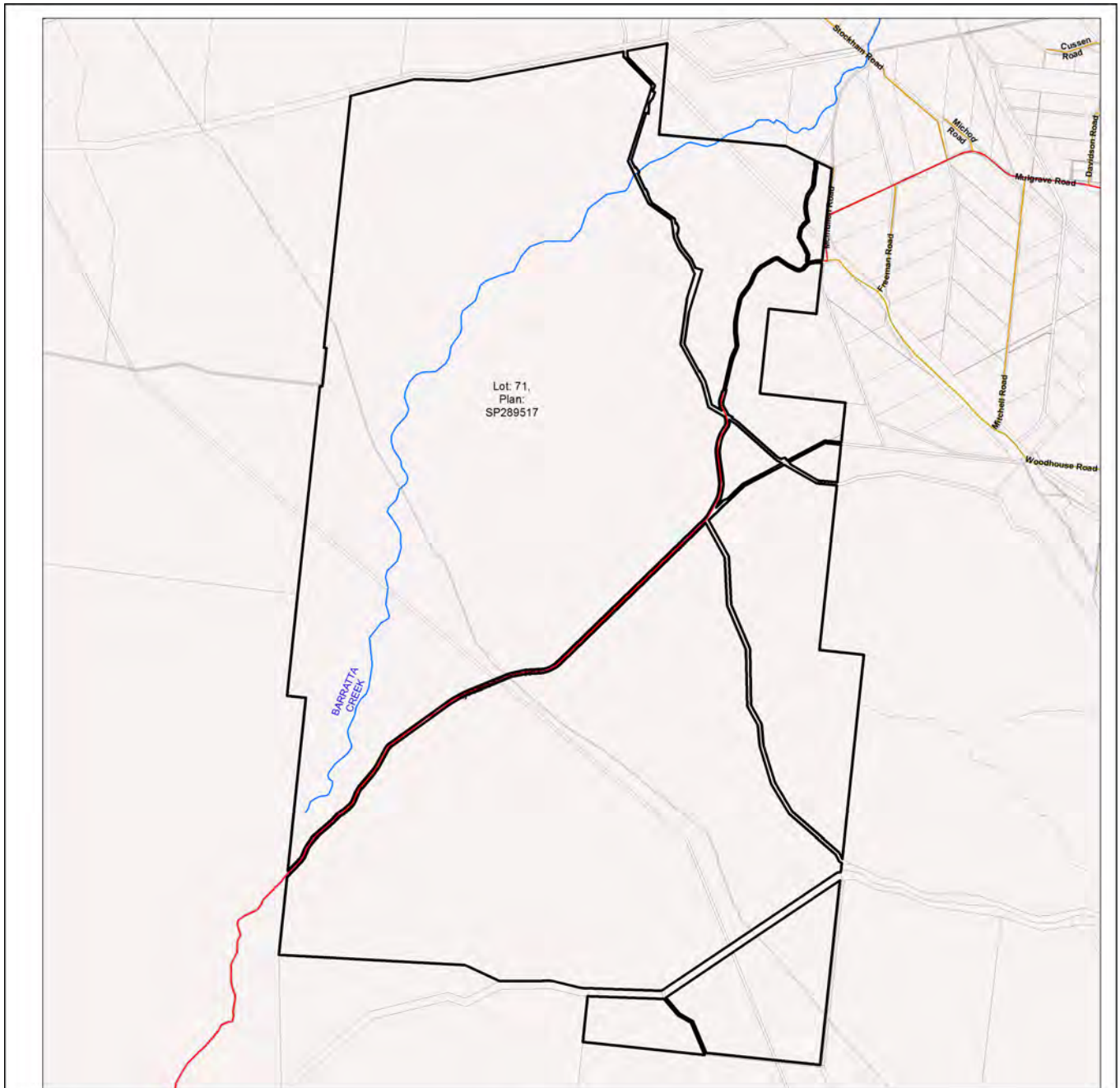
## 7. Koala protection framework details for Lot: 71 Plan: SP289517

### 7.1 Koala districts

Koala District C



## 7.2 Koala priority area, koala habitat area and identified koala broad-hectare area map



### Koala priority area, koala habitat area and identified koala broad-hectare area map

#### Legend

- Selected Lot and Plan
- Koala habitat area (core)
- Koala habitat area (locally refined)
- Koala priority area
- Identified koala broad-hectare area
- Cadastral Boundaries
- Towns
- Highway
- Connector
- Street/Local Road
- Major rivers/creeks
- Queensland

The koala habitat mapping within South East Queensland uses regional ecosystem line work compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



0 1,300 2,600 3,900 5,200 6,500 m

#### Disclaimer:

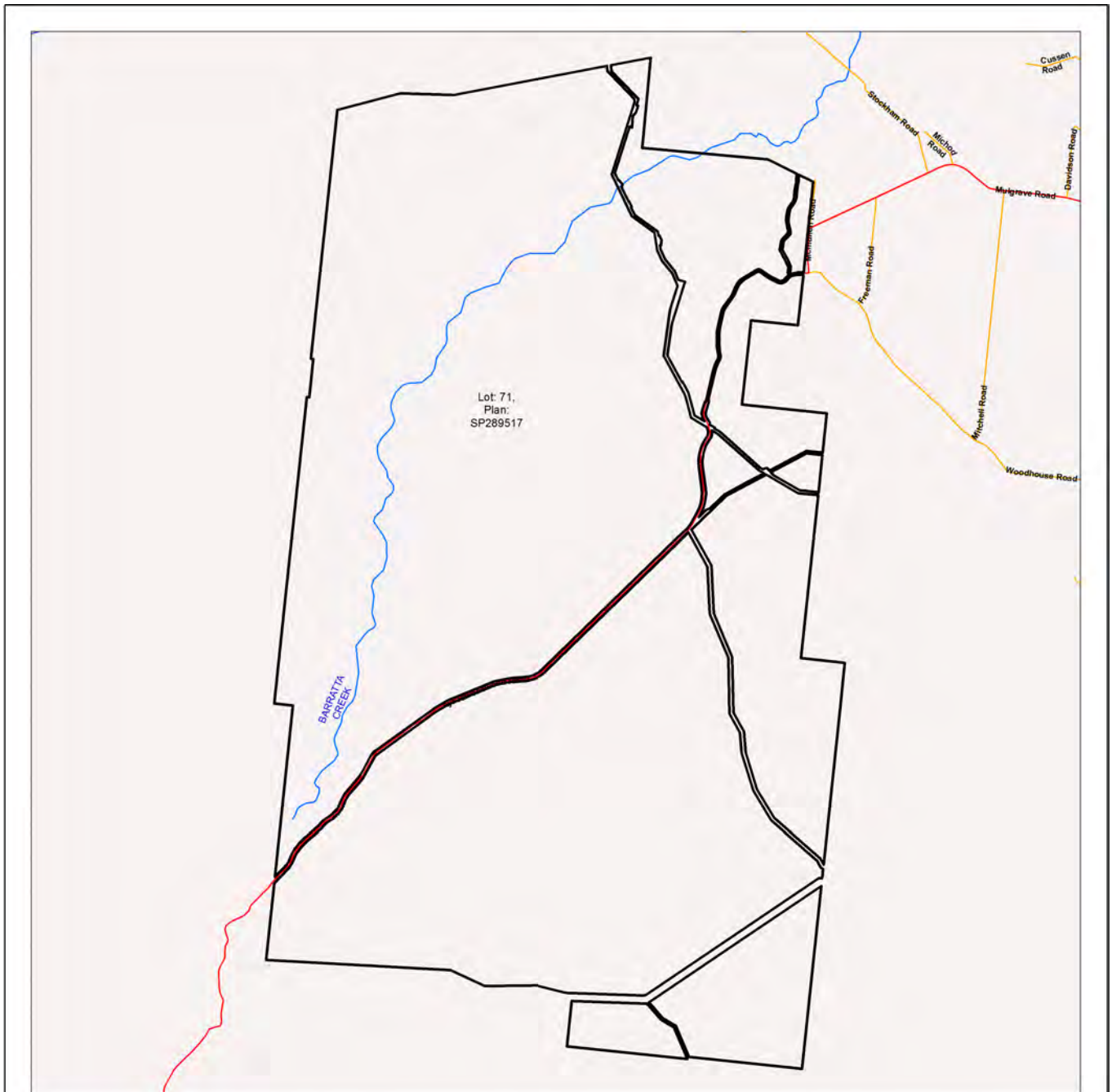
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The koala conservation plan maps will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

In order to ensure that the most recent map for an area of interest can be accessed, prior to the annual update, a register of changes made to koala habitat areas as a result of the map amendment process will be available at:  
<https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/>.  
 The register will include lot on plan for the change, the date the decision was made and the map issued to the landholder which shows areas determined to be koala habitat areas.



## 7.3 Koala habitat regional ecosystems for core koala habitat areas



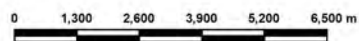
### Koala habitat regional ecosystems for core koala habitat areas

#### Legend

-  Selected Lot and Plan
-  Koala habitat area (core)
-  Towns
-  Highway
-  Connector
-  Street/Local Road
-  Major rivers/creeks
-  Queensland



N



The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.

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## 8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
<ul style="list-style-type: none"> <li>• Interference with overland flow</li> <li>• Earthworks, significant disturbance</li> </ul>	<i>Water Act 2000</i> <i>Soil Conservation Act 1986</i>	Department of Regional Development, Manufacturing and Water (Queensland Government) Department of Resources (Queensland Government)	Ph: 13 QGOV (13 74 68) <a href="http://www.dnrme.qld.gov.au">www.dnrme.qld.gov.au</a>
<ul style="list-style-type: none"> <li>• Indigenous Cultural Heritage</li> </ul>	<i>Aboriginal Cultural Heritage Act 2003</i> <i>Torres Strait Islander Cultural Heritage Act 2003</i>	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships	Ph: 13 QGOV (13 74 68) <a href="http://www.datsip.qld.gov.au">www.datsip.qld.gov.au</a>
<ul style="list-style-type: none"> <li>• Mining and environmentally relevant activities</li> <li>• Infrastructure development (coastal)</li> <li>• Heritage issues</li> </ul>	<i>Environmental Protection Act 1994</i> <i>Coastal Protection and Management Act 1995</i> <i>Queensland Heritage Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) <a href="http://www.des.qld.gov.au">www.des.qld.gov.au</a>
<ul style="list-style-type: none"> <li>• Protected plants and protected areas</li> </ul>	<i>Nature Conservation Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 1300 130 372 (option 4) <a href="mailto:palm@des.qld.gov.au">palm@des.qld.gov.au</a> <a href="http://www.des.qld.gov.au">www.des.qld.gov.au</a>
<ul style="list-style-type: none"> <li>• Koala mapping and regulations</li> </ul>	<i>Nature Conservation Act 1992</i>	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) <a href="mailto:Koala.assessment@des.qld.gov.au">Koala.assessment@des.qld.gov.au</a>
<ul style="list-style-type: none"> <li>• Interference with fish passage in a watercourse, mangroves</li> <li>• Forestry activities on State land tenures</li> </ul>	<i>Fisheries Act 1994</i> <i>Forestry Act 1959</i>	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) <a href="http://www.daf.qld.gov.au">www.daf.qld.gov.au</a>
<ul style="list-style-type: none"> <li>• Matters of National Environmental Significance including listed threatened species and ecological communities</li> </ul>	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Department of Agriculture, Water and the Environment (Australian Government)	Ph: 1800 803 772 <a href="http://www.environment.gov.au">www.environment.gov.au</a>
<ul style="list-style-type: none"> <li>• Development and planning processes</li> </ul>	<i>Planning Act 2016</i> <i>State Development and Public Works Organisation Act 1971</i>	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) <a href="http://www.dsdmip.qld.gov.au">www.dsdmip.qld.gov.au</a>
<ul style="list-style-type: none"> <li>• Local government requirements</li> </ul>	<i>Local Government Act 2009</i> <i>Planning Act 2016</i>	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office
<ul style="list-style-type: none"> <li>• Harvesting timber in the Wet Tropics of Qld World Heritage area</li> </ul>	<i>Wet Tropics World Heritage Protection and Management Act 1993</i>	Wet Tropics Management Authority	Ph: (07) 4241 0500 <a href="http://www.wettropics.gov.au">www.wettropics.gov.au</a>

# WildNet Records Weed List

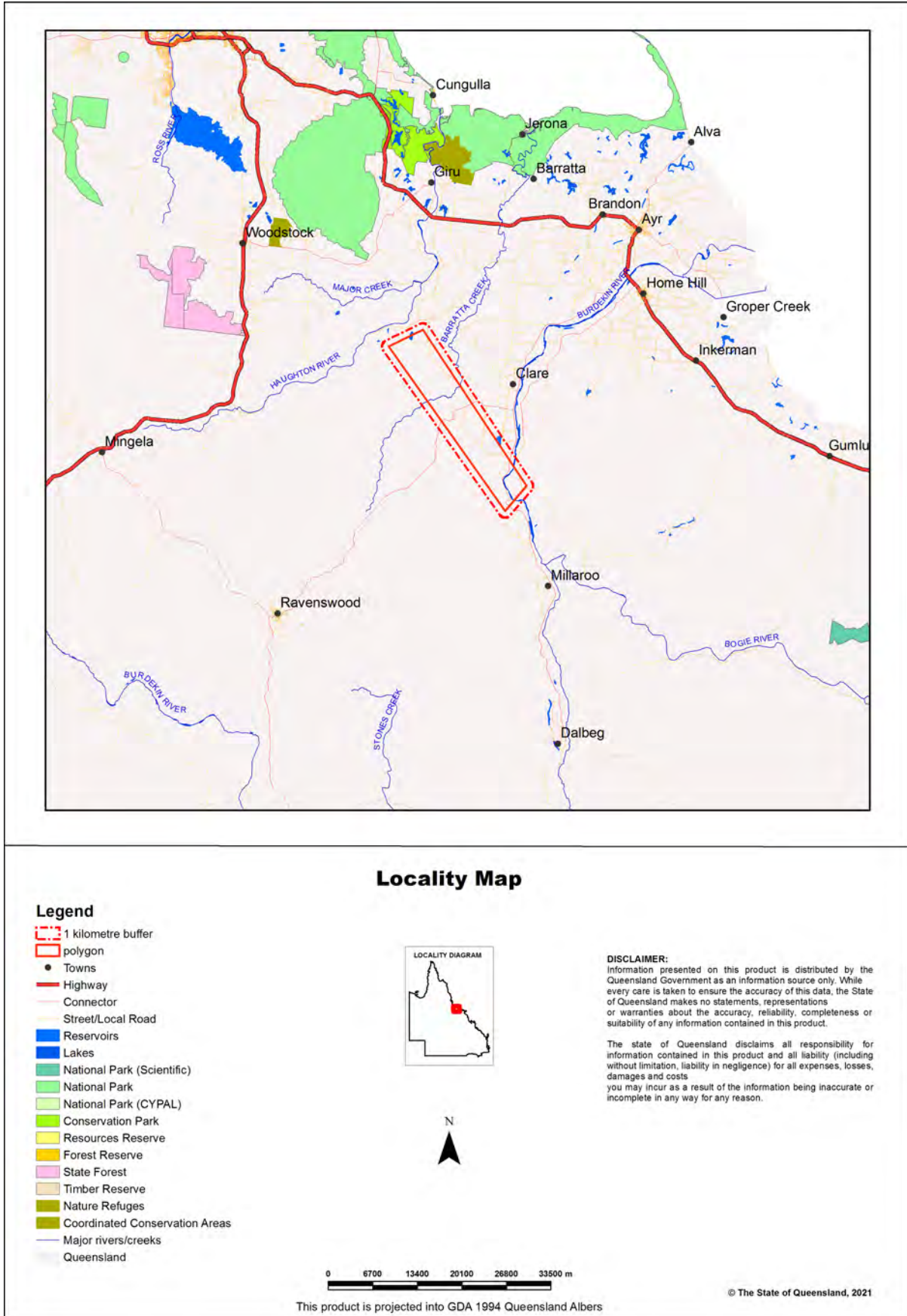


For the selected area of interest 15299.31ha

Current as at 29/09/2021

HaughtonPipeline

### Map 1. Locality Map



## Summary Information

The following table provides an overview of the area of interest .

**Table 1. Area of interest details**

Size (ha)	15,299.31
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Bogie River Hills, Townsville Plains
Catchment(s)	Burdekin, Haughton

### Protected Area(s)

No estates or reserves are located within the area of interest.

### World Heritage Area(s)

No World Heritage Areas are located within the area of interest.

### Ramsar Area(s)

No Ramsar Areas are located within the area of interest.

## Weed List

### Introduction

This report is derived from a spatial layer generated from the [WildNet database](#) managed by the Department of Environment and Science. The layer which is generated weekly contains the WildNet wildlife records that are not classed as erroneous or duplicate, that have a location precision equal to or less than 10000 metres and do not have a count of zero.

The WildNet dataset is constantly being enhanced and the taxonomic and status information revised. If a species is not listed in this report, it does not mean it doesn't occur there and listed species may also no longer inhabit the area. It is recommended that you also access other internal and external data sources for species information in your area of interest (Refer Links and Support).

### Species Data

Contextual location information is presented in Map 1.

A summary of the weeds recorded within the area of interest and its one kilometre buffer is presented in Table 2.

**Table 2. Weeds recorded within the area of interest and its one kilometre buffer**

Taxon Id	Family	Scientific Name	Common Name	Specimens	Records	Last record	Endemicity
12491	Amaranthaceae	<i>Amaranthus spinosus</i>	needle burr	1	1	03/08/1991	IU
15479	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	2	2	15/06/1974	IU
15438	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	1	1	22/07/1998	IU
10959	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	1	1	03/08/1991	IU
12761	Caesalpinaceae	<i>Parkinsonia aculeata</i>	parkinsonia	1	1	03/08/1991	IU
16841	Euphorbiaceae	<i>Jatropha gossypifolia</i>	bellyache bush	1	1	03/08/1991	IU
11288	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	1	1	03/08/1991	IU
15671	Fabaceae	<i>Alysicarpus vaginalis</i>	None	1	1	03/08/1991	IU
5917	Fabaceae	<i>Crotalaria pallida</i> var. <i>obovata</i>	None	1	1	03/08/1991	IU
18679	Lamiaceae	<i>Leucas lavandulifolia</i>	None	1	1	03/08/1991	IU
18722	Lamiaceae	<i>Ocimum americanum</i>	None	1	1	03/08/1991	IU
15990	Malvaceae	<i>Urena lobata</i>	urena weed	1	1	03/08/1991	IU



Taxon Id	Family	Scientific Name	Common Name	Specimens	Records	Last record	Endemicity
34114	Mimosaceae	<i>Vachellia farnesiana</i>	None	1	1	20/06/1949	IU
14359	Molluginaceae	<i>Mollugo verticillata</i>	None	1	1	03/08/1991	IU
17966	Papaveraceae	<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Mexican poppy	1	1	03/08/1991	IU
18225	Plantaginaceae	<i>Mecardonia procumbens</i>	None	1	1	03/08/1991	IU
15463	Poaceae	<i>Dichanthium annulatum</i>	sheda grass	1	1	22/06/1949	IU
10794	Poaceae	<i>Sporobolus jacquemontii</i>	None	1	1	31/03/2002	IU
18339	Poaceae	<i>Urochloa subquadriflora</i>	None	1	1	19/06/1949	IU
14129	Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	1	1	20/06/1949	IU
14777	Sapindaceae	<i>Cardiospermum halicacabum</i> var. <i>halicacabum</i>	None	1	1	03/08/1991	IU
17494	Solanaceae	<i>Datura innoxia</i>	None	1	1	03/08/1991	IU
16126	Solanaceae	<i>Solanum torvum</i>	devil's fig	1	1	03/08/1991	IU

## Species table headings and codes

**Taxon Id:** Unique identifier of the taxon from the WildNet database.

**Specimens:** The number of specimen-backed records of the taxon.

**Records:** The total number of records of the taxon.

**Last record:** Date of latest record of the taxon.

**Endemicity:** The endemicity code for the taxon (Introduced (Intranational) (IA), Introduced (International) (II), Introduced (Unknown), Exotic (Intranational) (XA), Exotic (International) (XI) and Exotic (Unknown) (XU)).

## Links and Support

Other sites that deliver species information from the [WildNet database](#) include:

- [Species profile search](#) - access species information approved for publication including species names, statuses, notes, images, distribution maps and records
- [Species lists](#) - generate species lists for Queensland protected areas, forestry areas, local governments and areas defined using coordinates
- [Biomaps](#) - view biodiversity information, including WildNet records approved for publication, and generate reports
- [Queensland Globe](#) - view spatial information, including WildNet records approved for publication
- [Qld wildlife data API](#) - access WildNet species information approved for publication such as notes, images and records etc.
- [WetlandMaps](#) - view species records, survey locations etc. approved for publication
- [WetlandSummary](#) - view wildlife statistics, species lists for a range of area types, and access WildNet species profiles
- [WildNet wildlife records - published - Queensland](#) - spatial layer of WildNet records approved for publication generated weekly
- [Generalised distribution and densities of Queensland wildlife](#) - Queensland species distributions and densities generalised to a 10 km grid resolution
- [Conservation status of Queensland wildlife](#) - access current lists of priority species for Queensland including nomenclature and status information
- [Queensland Confidential Species](#) - the list of species flagged as confidential in the WildNet database.

Please direct queries about this report to the [WildNet Team](#).

Other useful sites for accessing Queensland biodiversity data include:

- [Useful wildlife resources](#)
- [Queensland Government Data](#)
- [Atlas of Living Australia \(ALA\)](#)
- [Online Zoological Collections of Australian Museums \(OZCAM\)](#)
- [Australia's Virtual Herbarium \(AVH\)](#)
- [Protected Matters Search Tool](#)

## Disclaimer

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# WetlandMaps Report



For selected area of interest

Current as at 29/09/2021

## Environmental Reports - General Information

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the Area of Interest (AOI) (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no matters of interest have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

### Important Note to User

Information presented in this report is based upon the mapping of water bodies and wetland regional ecosystems across Queensland. The Queensland wetland mapping was produced using existing information including water body mapping derived from Landsat satellite imagery, regional ecosystem mapping, topographic data, and a springs database. The result is a consistent wetland map for the whole of Queensland.

Ancillary data, such as higher resolution imagery (for example SPOT and aerial photographs), other vegetation and wetland mapping, geology, soil and land system mapping was also used in attributing and assessing the derived Queensland Wetlands Program wetland mapping products.

The wetland mapping was done in accordance with a detailed peer reviewed methodology which included quality assurance measures for all steps in the process. For more detailed information on how the Queensland Wetlands Program wetland mapping was produced, please see the [Wetland Mapping and Classification Methodology](#).

### Disclaimer

The State of Queensland, as represented by this department, gives no warranty in relation to the data (including without limitation, accuracy, reliability, completeness or fitness for a particular purpose) hosted on this website.

The user accepts sole responsibility and risk associated with the use and results of department data hosted on this website, irrespective of the purpose to which such use or results are applied. It is recommended that users consider independently verifying any information obtained from this website.

To the maximum extent permitted by applicable law, in no event shall the department be liable for any special, incidental, indirect, or consequential loss whatsoever (including, but not limited to, damages for loss of profits or confidential or other information, for business interruption, for personal injury, for loss of privacy, for failure to meet any duty including of good faith or of reasonable care, for negligence, for any other pecuniary or other loss whatsoever including, without limitation, legal costs on a solicitor own client basis) arising out of, or in any way related to, the use of or inability to use the data.

## Summary Information

The following table provides an overview of the area of interest.

**Table 1. Area of interest details**

Size (ha)	15,299.31
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Bogie River Hills, Townsville Plains
Catchment(s)	Burdekin, Haughton
Drainage sub-basin	Lower Burdekin River, Barratta Creek

### NRM Regions

The following NRM region(s) are in the area of interest:

NQ Dry Tropics

### Water Resource Plan Boundaries

The following Water Resource Plan(s) are in the area of interest:

Burdekin Basin

## Learn more about how Wetlands are mapped in Queensland:

### Queensland Wetlands Mapping Definitions

Wetlands are areas of permanent or periodic/intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6 metres. To be a wetland the area must have one or more of the following attributes:

- at least periodically the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or
- the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or
- the substratum is not soil and is saturated with water, or covered by water at some time.

Examples under this definition **include**:

- those areas shown as a river, stream, creek, swamp, lake, marsh, waterhole, wetland, billabong, pool or spring on the latest Sunmap 1:25,000, 1:50,000, 1:100,000 or 1:250,000 topographic map
- areas defined as wetlands on local or regional maps prepared with the aim of mapping wetlands
- wetland regional ecosystems (REs) as defined by the Queensland Herbarium (Environmental Protection Agency 2005a)
- areas containing recognised hydrophytes as provided by the Queensland Herbarium
- saturated parts of the riparian zone
- artificial wetlands such as farm dams
- water bodies not connected to rivers or flowing water such as billabongs and rock pools.

Examples under this definition **exclude**:

- areas that may be covered by water but are not wetlands according to the definition
- floodplains that are intermittently covered by flowing water but do not meet the hydrophytes and soil criteria
- riparian zone above the saturation level.



## Wetland Systems

*Riverine wetlands* are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water.

*Palustrine wetlands* are primarily vegetated non-channel environments of less than 8 hectares. They include billabongs, swamps, bogs, springs, soaks etc, and have more than 30% emergent vegetation.

*Lacustrine wetlands* are large, open, water-dominated systems (for example, lakes) larger than 8ha. This definition also applies to modified systems (for example, dams), which are similar to lacustrine systems (for example, deep, standing or slow-moving waters).

*Marine wetlands* include the area of ocean from the coastline or estuary, extending to the jurisdictional limits of Queensland waters (3 nautical mile limit). This definition differs from that in Ramsar, as it includes waters deeper than 6m below the lowest astronomical tide.

*Estuarine wetlands* are those with oceanic water sometimes diluted with freshwater run-off from the land.

*Subterranean wetlands* are wetlands occurring below the surface of the ground and that are fed by groundwater i.e. caves and aquifers. These wetlands provide water to groundwater dependent ecosystems.

Methodology and Wetland Classification: <https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/wetland-background/>

## Links and support

Other sites that deliver wetland related information include:

WetlandSummary tool: <https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/>

Queensland Spatial Catalogue: <http://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

Queensland Globe: <https://qldglobe.information.qld.gov.au/>

Environmental reports online: <https://environment.ehp.qld.gov.au/report-request/environment/>

Wetland on-line education modules: <https://wetlandinfo.des.qld.gov.au/wetlands/resources/training/>

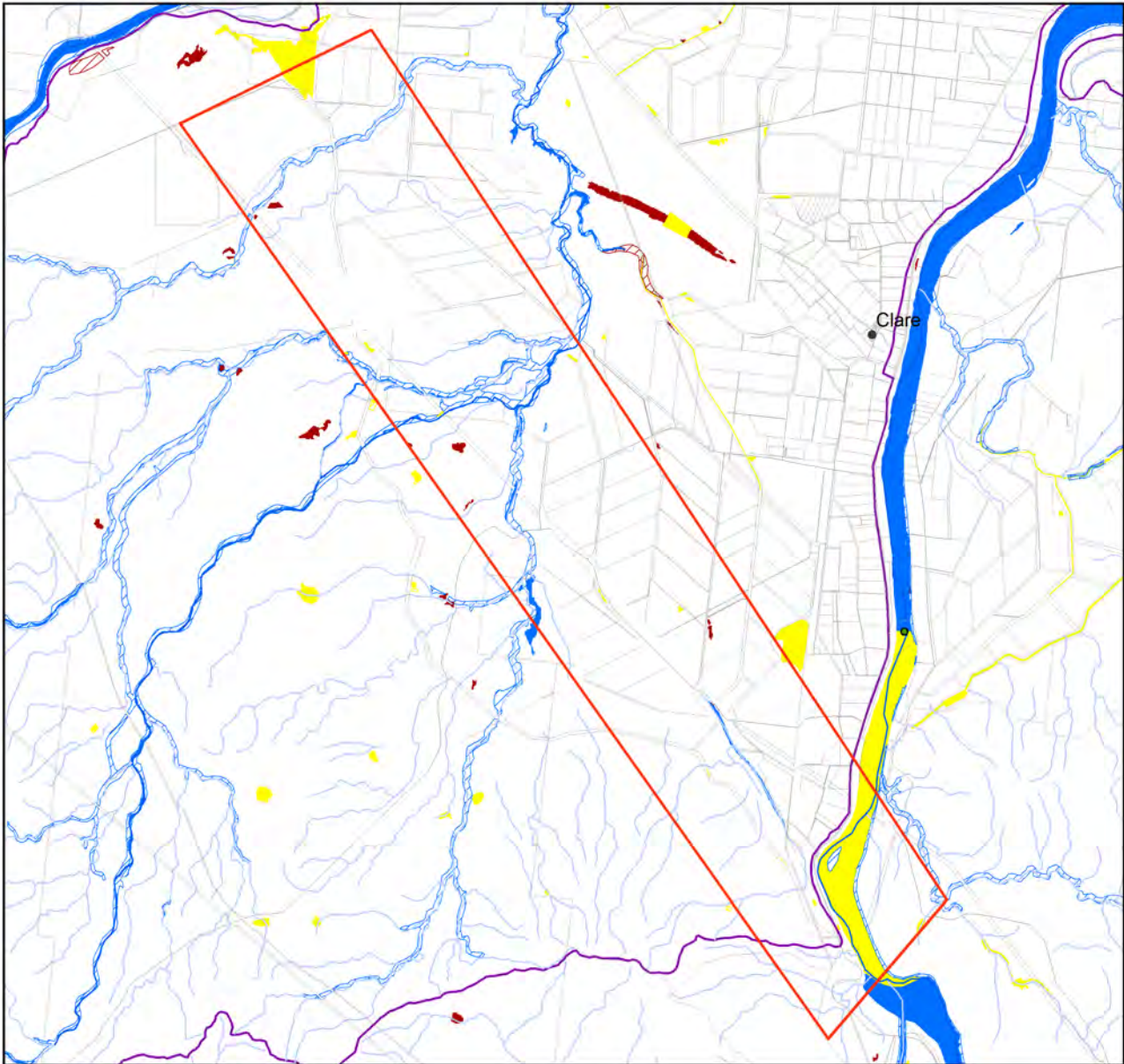
Regional Ecosystem Mapping information: :

<https://www.qld.gov.au/environment/plants-animals/plants/herbarium/mapping-ecosystems>

Aquatic Conservation Assessments: : <https://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca/>

Groundwater Dependant Ecosystems information:

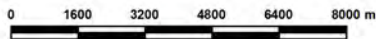
<https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/>



**Legend**

- polygon
- ▲ Springs
- Dams and weirs
- Towns
- Highways
- Roads
- Cadastral boundaries
- Sub-basin
- Wetland Mapping**
- Wetland System - Water Bodies**
- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies
- Wetland System - Regional Ecosystems**
- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51\_80% wetland (mosaic units)
- Riverine System Drainage Lines**
- Major
- Minor

**Queensland Wetland Map**

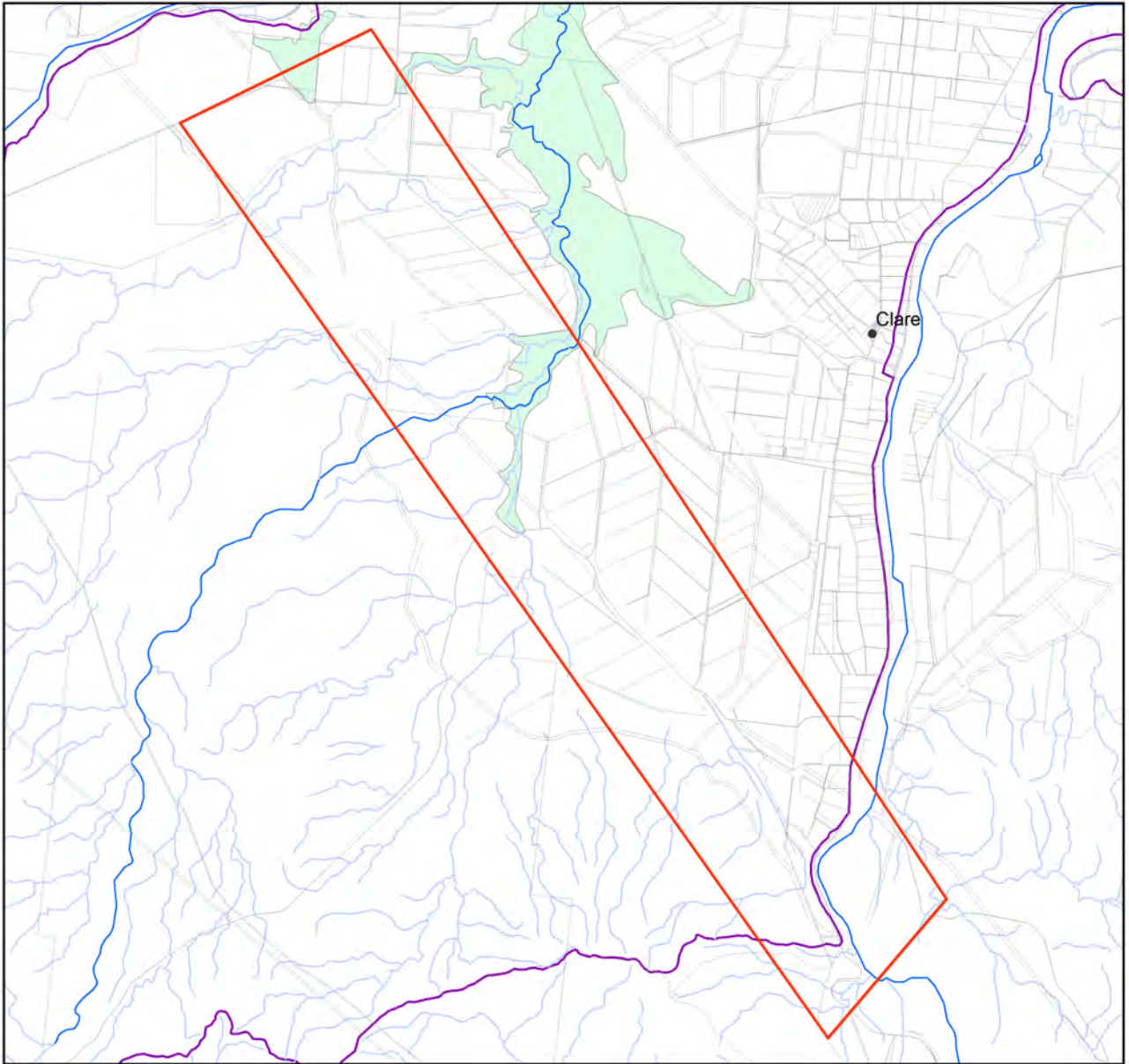


Horizontal Datum: Geographic Datum of Australia 1994 (GDA94)

This map was produced by the Queensland Wetlands Program, Department of Environment and Science, September 2021.  
For further information contact: [wetlands@des.qld.gov.au](mailto:wetlands@des.qld.gov.au)

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## Queensland Wetlands of Importance Map

### Legend

- polygon
- Towns
- Cadastral boundaries
- Highways
- Roads
- Sub-basin
- Directory of Important Wetlands
- Ramsar Wetlands
- Riverine System Drainage Lines**
- Major
- Minor

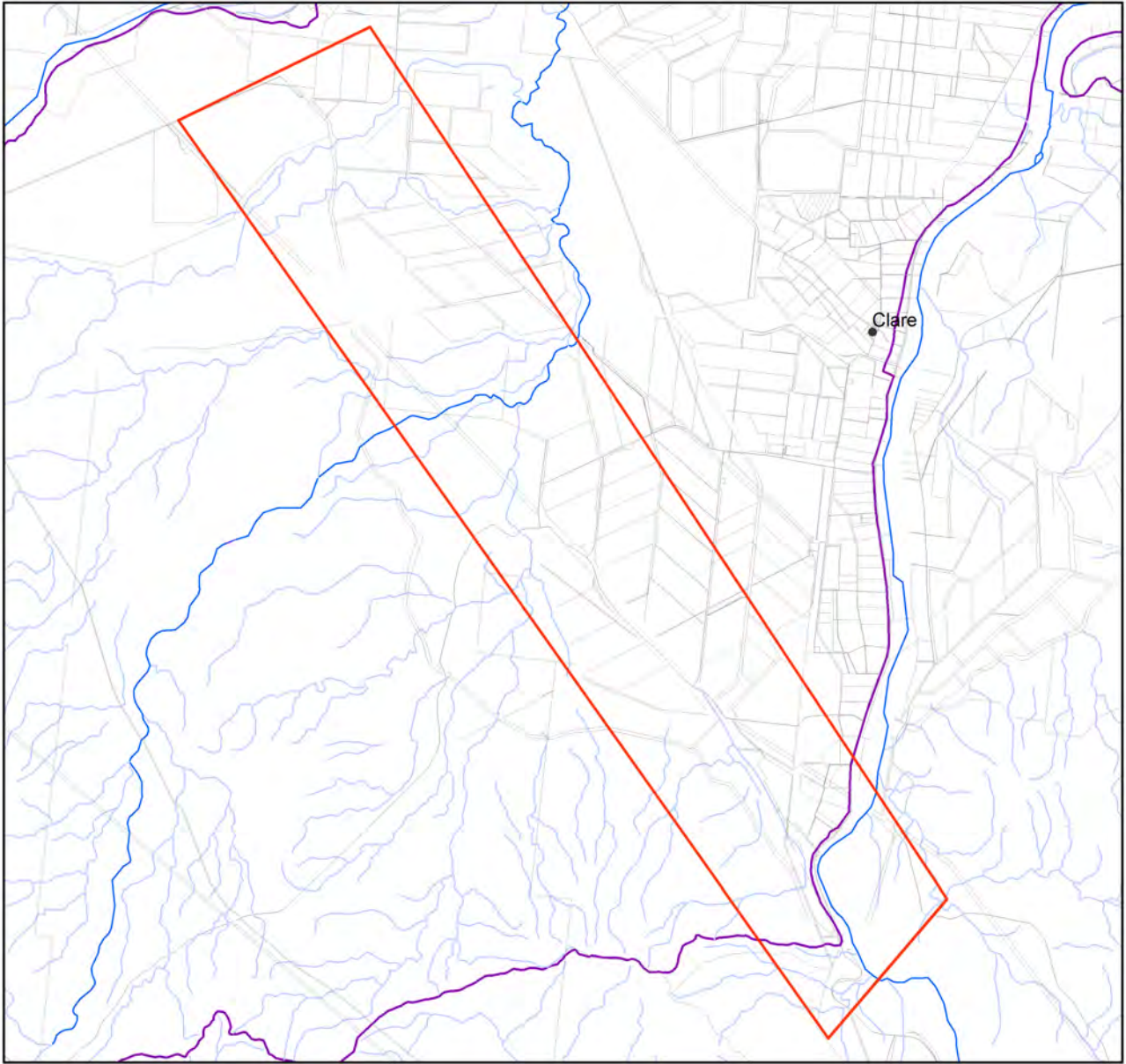


Horizontal Datum: Geographic Datum of Australia 1994 (GDA94)

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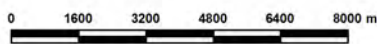
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**Legend**

- polygon
- Towns
- Cadastral boundaries
- Highways
- Roads
- Sub-basin
- Riverine System Drainage Lines**
- Major
- Minor
- Protected Areas**
- National Park
- National Park (Scientific)
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Marine Parks**
- General Use Zone
- Habitat Protection Zone
- Estuarine Conservation Zone
- Conservation Park Zone
- Buffer Zone
- Scientific Research Zone
- Marine National Park Zone
- Preservation Zone

**Queensland Protected Area Map**



Horizontal Datum: Geographic Datum of Australia 1994 (GDA94)

This map was produced by the Queensland Wetlands Program, Department of Environment and Science, September 2021.

For further information contact: [wetlands@des.qld.gov.au](mailto:wetlands@des.qld.gov.au)

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Wetland habitat types in the AOI. Total area: 1081.32ha

Wetland Class	Habitat type	Area (ha)
Riverine	Riverine	548.32
Lacustrine	Artificial/ highly modified wetlands (dams, ring tanks, irrigation channel)	445.64
	Coastal/ Sub-coastal floodplain tree swamps (Melaleuca and Eucalypt)	66.97
Palustrine	Coastal/ Sub-coastal floodplain tree swamps (Melaleuca and Eucalypt)	10.26
Palustrine	Coastal/ Sub-coastal floodplain grass, sedge and herb swamps	10.13

**Queensland wetland habitat typology: Major wetland habitat types for wetland conceptual models and wetland management profiles**

Wetland name	Conceptual model	Wetland profile
Mangrove Wetlands	Not developed	<a href="#">Mangrove Wetlands</a>
Saltmarsh Wetlands	Not developed	<a href="#">Saltmarsh Wetlands</a>
Coastal and subcoastal saline swamps of all substrates, water regimes, topographic types and vegetation communities	<a href="#">Coastal and subcoastal saline swamps</a>	<a href="#">Coastal grass-sedge wetlands</a>
Coastal and subcoastal non-floodplain tree swamps (Melaleuca and Eucalypt) of all substrates and water regimes	<a href="#">Coastal and subcoastal non-floodplain tree swamps - melaleuca and eucalypt</a>	<a href="#">Coastal and subcoastal tree swamps</a>
Coastal and subcoastal non-floodplain wet heath swamps of all substrates and water regimes	<a href="#">Coastal and subcoastal non-floodplain wet heath swamps</a>	<a href="#">Coastal and subcoastal wet heath swamps</a>
Coastal and subcoastal non-floodplain grass, sedge and herb swamps of all substrates and water regimes	<a href="#">Coastal and subcoastal non-floodplain grass, sedge and herb swamps</a>	<a href="#">Coastal grass-sedge wetlands</a>
Coastal and subcoastal spring swamps of all substrates, water types, water regimes and vegetation communities	Coastal and subcoastal spring swamps	<a href="#">Great Artesian Basin spring wetlands</a>
Coastal and subcoastal floodplain tree swamps - melaleuca and eucalypt of all substrates and water regimes	<a href="#">Coastal and subcoastal floodplain tree swamps - melaleuca and eucalypt</a>	<a href="#">Coastal and subcoastal tree swamps</a>
Coastal and subcoastal floodplain wet heath swamps of all substrates and water regimes	<a href="#">Coastal and subcoastal floodplain wet heath swamps</a>	<a href="#">Coastal and subcoastal wet heath swamps</a>
Coastal and subcoastal floodplain, grass, sedge herb swamps of all substrates and water regimes	<a href="#">Coastal and subcoastal floodplain grass, sedge, herb swamps</a>	<a href="#">Coastal grass-sedge wetlands</a>
Coastal and subcoastal tree swamps - palm of all substrates, topographic types and water regimes	<a href="#">Coastal and subcoastal floodplain tree swamps - palm</a>	<a href="#">Coastal Palm Swamps</a>
Coastal and subcoastal Floodplain Lakes of all substrates, water types and water regimes	<a href="#">Coastal and subcoastal Floodplain Lakes</a>	<a href="#">Coastal and subcoastal floodplain lakes and non-floodplain soil lakes</a>
Coastal and subcoastal non-floodplain rock lakes of all water types and water regimes	<a href="#">Coastal and subcoastal non-floodplain rock lakes</a>	<a href="#">Coastal and subcoastal non-floodplain rock lakes</a>
Coastal and subcoastal non-floodplain sand lakes (window) of all water types and water regimes	<a href="#">Coastal and subcoastal non-floodplain sand lakes - window</a>	<a href="#">Coastal non-floodplain sand lakes</a>
Coastal and subcoastal non-floodplain sand lakes (perched) of all water types and water regimes	<a href="#">Coastal and subcoastal non-floodplain sand lakes - perched</a>	<a href="#">Coastal non-floodplain sand lakes</a>



Wetland name	Conceptual model	Wetland profile
Coastal and subcoastal non-floodplain soil lakes of all water types and water regimes	<a href="#">Coastal and subcoastal non-floodplain soil lakes</a>	<a href="#">Coastal and subcoastal floodplain lakes and non-floodplain soil lakes</a>
Arid and semi-arid saline swamps of all substrates, water regimes, topographic types and vegetation communities	<a href="#">Arid and semi-arid saline swamps</a>	<a href="#">Semi-arid swamps</a>
Arid and semi-arid fresh tree swamps of all substrates, and water regimes and topographic types	<a href="#">Arid and semi-arid tree swamps</a>	<a href="#">Arid swamps</a> <a href="#">Semi-Arid swamps</a>
Arid and semi-arid lignum swamps of all substrates, and water regimes and topographic types	<a href="#">Arid and semi-arid lignum swamps</a>	<a href="#">Arid swamps</a> <a href="#">Semi-Arid swamps</a>
Arid and semi-arid grass, sedge, herb swamps of all substrates, water regimes and topographic types	<a href="#">Arid and semi-arid grass, sedge, herb swamps</a>	<a href="#">Arid swamps</a> <a href="#">Semi-Arid swamps</a>
Arid and semi-arid fresh non-floodplain tree swamps of all substrates and water regimes	<a href="#">Arid and semi-arid non-floodplain tree swamps</a>	<a href="#">Arid swamps</a> <a href="#">Semi-Arid swamps</a>
Arid and semi-arid fresh non-floodplain lignum swamps of all substrates and water regimes	<a href="#">Arid and semi-arid non-floodplain lignum swamps</a>	<a href="#">Arid swamps</a> <a href="#">Semi-Arid swamps</a>
Arid and semi-arid fresh non-floodplain grass, sedge, herb swamps of all substrates and water regimes	<a href="#">Arid and semi-arid non-floodplain grass, sedge, herb swamps</a>	<a href="#">Arid swamps</a> <a href="#">Semi-Arid swamps</a>
Arid and semi-arid, non-floodplain swamps - springs of all substrates, water regimes and vegetation communities	Arid and semi-arid spring swamps	<a href="#">Great Artesian Basin spring wetlands</a>
Arid and semi-arid, saline lakes of all substrates, topographic types and water regimes	<a href="#">Arid and semi-arid saline lakes</a>	<a href="#">Arid and semi-arid lakes</a>
Arid and semi-arid, floodplain lakes of all, substrates and water regimes	<a href="#">Arid and semi-arid floodplain lakes</a>	<a href="#">Arid and semi-arid lakes</a>
Arid and semi-arid, non-floodplain Lakes of all substrates and water regimes	<a href="#">Arid and semi-arid non-floodplain lakes</a>	<a href="#">Arid and semi-arid lakes</a>
Arid/ semi-arid, non-floodplain (clay pans) lakes of all substrates and water regimes	<a href="#">Arid and semi-arid fresh non-floodplain lakes (clay pans)</a>	<a href="#">Arid and semi-arid lakes</a>
Arid and semi-arid, Permanent Lakes permanently inundated lakes of all substrates, water types, topographic types and vegetation communities	<a href="#">Arid and semi-arid permanent lakes</a>	<a href="#">Arid and semi-arid lakes</a>



# Queensland Government

## WildNet species list

Search Criteria: Species List for a Specified Point

Species: All

Type: All

Queensland status: All

Records: All

Date: All

Latitude: -19.8329

Longitude: 147.1381

Distance: 20

Email: pascalle.lin@ghd.com

Date submitted: Wednesday 29 Sep 2021 10:22:06

Date extracted: Wednesday 29 Sep 2021 10:30:04

The number of records retrieved = 286

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Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.

The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (<https://www.qld.gov.au/environment/plants-animals/species-information/wildnet>) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to [wildlife.online@des.qld.gov.au](mailto:wildlife.online@des.qld.gov.au).

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufo	<i>Rhinella marina</i>	cane toad	Y			1
animals	birds	Acanthizidae	<i>Smicronis brevirostris</i>	weebill		C		1
animals	birds	Accipitridae	<i>Circus approximans</i>	swamp harrier			C	1
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite			C	4
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite			C	3
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite			C	4
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal			C	1
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck			C	2
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead			C	2
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan			C	1
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck			C	1
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose			C	1
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter			C	3
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	magpie goose			C	1
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret			C	2
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret			C	1
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret			C	1
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron			C	1
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron			C	1
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow			C	3
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird			C	6
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie			C	4
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong			C	1
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew			C	1
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo			C	6
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo			C	2
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike			C	2
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike			C	1
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller			C	1
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller			C	1
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel			C	1
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing			C	5
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork			C	1
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola			C	1
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove			C	1
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove			C	1
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird			C	1
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven			C	1
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow			C	3
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo			C	1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal			C	2
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo			C	3
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin			C	2
animals	birds	Estrildidae	<i>Lonchura punctulata</i>	nutmeg mannikin	Y			1
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch			C	1
animals	birds	Estrildidae	<i>Neochmia phaeton</i>	crimson finch			C	5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		1
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		1
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		4
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		5
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		2
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		1
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		2
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		1
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		1
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		1
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		1
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		2
animals	birds	Megapodiidae	<i>Alectura lathami</i>	Australian brush-turkey		C		1
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		5
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		3
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		2
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		1
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		2
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		2
animals	birds	Meliphagidae	<i>Stomiopera unicolor</i>	white-gaped honeyeater		C		2
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		2
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		6
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		1
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		2
animals	birds	Nectariniidae	<i>Cinnyris jugularis</i>	olive-backed sunbird		C		1
animals	birds	Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian figbird		C		2
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		5
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		2
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		2
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		3
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		3
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		1
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		2
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		1
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		4
animals	birds	Psittacidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		4
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus nuchalis</i>	great bowerbird		C		3
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		1
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		2
animals	birds	Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	red-necked avocet		C		1
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		4
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		4
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		1
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		1
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		SL		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		3

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animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		3
animals	mammals	Macropodidae	<i>Petrogale assimilis</i>	allied rock-wallaby		C		1/1
animals	mammals	Macropodidae	<i>Petrogale inornata</i>	unadorned rock-wallaby		C		3/3
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	1
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				1
animals	ray-finned fishes	Ambassidae	<i>Ambassis species</i>	northwest glassfish				2
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				1
animals	ray-finned fishes	Apogonidae	<i>Glossamia aprion</i>	mouth almighty				2
animals	ray-finned fishes	Ariidae	<i>Neoarius graeffei</i>	blue catfish				2
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				11
animals	ray-finned fishes	Belonidae	<i>Strongylura krefftii</i>	freshwater longtom				1
animals	ray-finned fishes	Centropomidae	<i>Lates calcarifer</i>	barramundi				4
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				25
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				1
animals	ray-finned fishes	Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod				19
animals	ray-finned fishes	Gobiidae	<i>Awaous acritosus</i>	roman-nose goby				1
animals	ray-finned fishes	Hemiramphidae	<i>Arrhamphus sclerolepis</i>	snubnose garfish				5
animals	ray-finned fishes	Megalopidae	<i>Megalops cyprinoides</i>	oxeye herring				1
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				3
animals	ray-finned fishes	Mugilidae	<i>Mugil cephalus</i>	sea mullet				1
animals	ray-finned fishes	Plotosidae	<i>Neosilurus ater</i>	black catfish				1
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtlilii</i>	Hyrtl's catfish				1
animals	ray-finned fishes	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish		Y		1
animals	ray-finned fishes	Scatophagidae	<i>Scatophagus argus</i>	spotted scat				1
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				7
animals	ray-finned fishes	Terapontidae	<i>Hephaestus fuliginosus</i>	sooty grunter				4
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				1
animals	ray-finned fishes	Terapontidae	<i>Scortum parviceps</i>	smallhead grunter				1
animals	ray-finned fishes	Toxotidae	<i>Toxotes chatareus</i>	sevenspot archerfish				1
animals	reptiles	Chelidae	<i>Elseya irwini</i>	Irwin's turtle			C	1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella			C	1/1
plants	land plants	Acanthaceae	<i>Hygrophila angustifolia</i>				C	1/1
plants	land plants	Acanthaceae	<i>Nelsonia campestris</i>				C	1/1
plants	land plants	Alismataceae	<i>Caldesia oligococca</i>				C	1/1
plants	land plants	Amaranthaceae	<i>Alternanthera denticulata var. micrantha</i>				C	3/3
plants	land plants	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed			C	1/1
plants	land plants	Amaranthaceae	<i>Amaranthus spinosus</i>	needle burr		Y		2/2
plants	land plants	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry			C	2/2
plants	land plants	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum			C	1/1
plants	land plants	Apocynaceae	<i>Alyxia spicata</i>				C	1/1
plants	land plants	Apocynaceae	<i>Catharanthus roseus</i>	pink periwinkle		Y		1/1
plants	land plants	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine		Y		2/2
plants	land plants	Apocynaceae	<i>Wrightia saligna</i>				C	1/1
plants	land plants	Asteraceae	<i>Acanthospermum hispidum</i>	star burr		Y		1/1
plants	land plants	Asteraceae	<i>Acmella grandiflora var. brachyglossa</i>				C	1/1
plants	land plants	Asteraceae	<i>Centipeda borealis</i>				C	2/2



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plants	land plants	Asteraceae	<i>Coronidium lanuginosum</i>			C		1/1
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			2/2
plants	land plants	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			1/1
plants	land plants	Asteraceae	<i>Pterocaulon serrulatum</i> var. <i>serrulatum</i>			C		1/1
plants	land plants	Asteraceae	<i>Sphaeranthus indicus</i>			C		1/1
plants	land plants	Bignoniaceae	<i>Dolichandrone alternifolia</i>			C		1/1
plants	land plants	Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine		C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium ovalifolium</i>			C		1/1
plants	land plants	Caesalpiniaceae	<i>Chamaecrista absus</i> var. <i>absus</i>			C		1/1
plants	land plants	Caesalpiniaceae	<i>Parkinsonia aculeata</i>	parkinsonia	Y			1/1
plants	land plants	Campanulaceae	<i>Wahlenbergia caryophylloides</i>			C		1/1
plants	land plants	Caryophyllaceae	<i>Polycarpaea spirostylis</i> subsp. <i>spirostylis</i>			C		1/1
plants	land plants	Casuarinaceae	<i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i>			C		1/1
plants	land plants	Celastraceae	<i>Denhamia cunninghamii</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Chenopodium album</i>	fat-hen	Y			2/2
plants	land plants	Chenopodiaceae	<i>Dysphania glomulifera</i> subsp. <i>glomulifera</i>			C		1/1
plants	land plants	Cleomaceae	<i>Arivela viscosa</i>			C		1/1
plants	land plants	Cleomaceae	<i>Tarenaya aculeata</i>		Y			1/1
plants	land plants	Cochlospermaceae	<i>Cochlospermum gillivraei</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Argyrea nervosa</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Xenostegia tridentata</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Cucumis anguria</i> var. <i>anguria</i>	West Indian gherkin	Y			1/1
plants	land plants	Cyperaceae	<i>Cyperus bulbosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus iria</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus scariosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis bisumbellata</i>			C		1/1
plants	land plants	Ebenaceae	<i>Diospyros geminata</i>	scaly ebony		C		1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia bifida</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Jatropha gossypifolia</i>	bellyache bush	Y			1/1
plants	land plants	Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C		2/2
plants	land plants	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	Y			1/1
plants	land plants	Fabaceae	<i>Abrus precatorius</i> subsp. <i>precatorius</i>			C		1/1
plants	land plants	Fabaceae	<i>Aeschynomene americana</i> var. <i>glandulosa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Aeschynomene indica</i>	budda pea		C		1/1
plants	land plants	Fabaceae	<i>Alysicarpus vaginalis</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria pallida</i> var. <i>obovata</i>		Y			2/2
plants	land plants	Fabaceae	<i>Crotalaria retusa</i> var. <i>retusa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria sessiliflora</i> var. <i>anthylloides</i>			C		1/1
plants	land plants	Fabaceae	<i>Indigofera linifolia</i>			C		1/1
plants	land plants	Fabaceae	<i>Tephrosia brachyodon</i> var. <i>longifolia</i>			C		1/1
plants	land plants	Fabaceae	<i>Tephrosia macrostachya</i>			C		1/1
plants	land plants	Fabaceae	<i>Vigna</i> sp. (Greta Creek R.J.Lawn+ AQ532201)			C		2/2
plants	land plants	Fabaceae	<i>Vigna</i> sp. (Station Creek R.J.Lawn CQ3284)			C		1/1
plants	land plants	Fabaceae	<i>Zornia muriculata</i> subsp. <i>angustata</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Goodenia pilosa</i>			C		1/1
plants	land plants	Helicteraceae	<i>Helicteres semiglabra</i>			C		1/1

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plants	land plants	Hydrocharitaceae	<i>Ottelia ovalifolia</i> subsp. <i>ovalifolia</i>			C		1/1
plants	land plants	Lamiaceae	<i>Basilicum polystachyon</i>			C		1/1
plants	land plants	Lamiaceae	<i>Clerodendrum floribundum</i>			C		4/4
plants	land plants	Lamiaceae	<i>Coleus scutellarioides</i>			C		1/1
plants	land plants	Lamiaceae	<i>Leucas lavandulifolia</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Mesosphaerum suaveolens</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Ocimum americanum</i>		Y			2/2
plants	land plants	Lamiaceae	<i>Premna dallachyana</i>			C		1/1
plants	land plants	Lamiaceae	<i>Teucrium modestum</i>			C		1/1
plants	land plants	Lauraceae	<i>Litsea glutinosa</i>			C		1/1
plants	land plants	Malvaceae	<i>Abutilon auritum</i>	Chinese lantern		C		1/1
plants	land plants	Malvaceae	<i>Urena lobata</i>	urena weed	Y			1/1
plants	land plants	Marsileaceae	<i>Marsilea mutica</i>	shiny nardoo		C		1/1
plants	land plants	Martyniaceae	<i>Martynia annua</i>	small-fruited devil's claw	Y			2/2
plants	land plants	Menispermaceae	<i>Pachygone ovata</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia hemsleyi</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle		C		1/1
plants	land plants	Mimosaceae	<i>Acacia tephрина</i>			C		2/2
plants	land plants	Mimosaceae	<i>Desmanthus leptophyllus</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Leucaena leucocephala</i> subsp. <i>leucocephala</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Neptunia major</i>			C		3/3
plants	land plants	Mimosaceae	<i>Vachellia farnesiana</i>		Y			1/1
plants	land plants	Molluginaceae	<i>Glinus lotoides</i>	hairy carpet weed		C		1/1
plants	land plants	Molluginaceae	<i>Glinus oppositifolius</i>			C		1/1
plants	land plants	Molluginaceae	<i>Mollugo verticillata</i>		Y			2/2
plants	land plants	Myrsinaceae	<i>Lysimachia ovalis</i>			C		1/1
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		2/2
plants	land plants	Myrtaceae	<i>Corymbia dallachiana</i>			C		2/2
plants	land plants	Myrtaceae	<i>Corymbia leichhardtii</i>	rustyjacket		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus drepanophylla</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus raveretiana</i>	black ironbox		C	V	1/1
plants	land plants	Myrtaceae	<i>Eucalyptus xanthoclada</i>	yellow-branched ironbark		C		1/1
plants	land plants	Myrtaceae	<i>Gossia bidwillii</i>			C		3/3
plants	land plants	Myrtaceae	<i>Lophostemon grandiflorus</i> subsp. <i>riparius</i>			C		2/2
plants	land plants	Myrtaceae	<i>Melaleuca bracteata</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca leucadendra</i>	broad-leaved tea-tree		C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca nervosa</i>			C		1/1
plants	land plants	Nyctaginaceae	<i>Pisonia aculeata</i>	thorny pisonia		C		2/2
plants	land plants	Papaveraceae	<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Mexican poppy	Y			1/1
plants	land plants	Passifloraceae	<i>Passiflora suberosa</i> subsp. <i>litoralis</i>		Y			1/1
plants	land plants	Phyllanthaceae	<i>Breynia oblongifolia</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Phyllanthus carpentariae</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>			C		1/1
plants	land plants	Picrodendraceae	<i>Petalostigma banksii</i>			C		1/1

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plants	land plants	Pittosporaceae	<i>Bursaria incana</i>			C		1/1
plants	land plants	Plantaginaceae	<i>Bacopa floribunda</i>			C		1/1
plants	land plants	Plantaginaceae	<i>Mecardonia procumbens</i>		Y			1/1
plants	land plants	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			1/1
plants	land plants	Poaceae	<i>Alloteropsis cimicina</i>			C		1/1
plants	land plants	Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>			C		1/1
plants	land plants	Poaceae	<i>Arundinella setosa</i>			C		1/1
plants	land plants	Poaceae	<i>Bothriochloa decipiens</i> var. <i>cloncurrrens</i>			C		1/1
plants	land plants	Poaceae	<i>Chionachne hubbardiana</i>			C		1/1
plants	land plants	Poaceae	<i>Dactyloctenium radulans</i>	button grass		C		1/1
plants	land plants	Poaceae	<i>Dichanthium annulatum</i>	sheda grass	Y			1/1
plants	land plants	Poaceae	<i>Dichanthium fecundum</i>	curly bluegrass		C		2/2
plants	land plants	Poaceae	<i>Dichanthium sericeum</i> subsp. <i>polystachyum</i>			C		1/1
plants	land plants	Poaceae	<i>Dinebra neesii</i>			C		2/2
plants	land plants	Poaceae	<i>Echinochloa turneriana</i>	channel millet		C		1/1
plants	land plants	Poaceae	<i>Elytrophorus spicatus</i>			C		1/1
plants	land plants	Poaceae	<i>Eriochloa crebra</i>	spring grass		C		1/1
plants	land plants	Poaceae	<i>Eriochloa pseudoacrotricha</i>			C		1/1
plants	land plants	Poaceae	<i>Heteropogon triticeus</i>	giant speargrass		C		1/1
plants	land plants	Poaceae	<i>Leersia hexandra</i>	swamp rice grass		C		1/1
plants	land plants	Poaceae	<i>Melinis repens</i>	red natal grass	Y			1/1
plants	land plants	Poaceae	<i>Oryza meridionalis</i>			C		1/1
plants	land plants	Poaceae	<i>Oxychloris scariosa</i>	winged chloris		C		1/1
plants	land plants	Poaceae	<i>Panicum decompositum</i> var. <i>decompositum</i>			C		1/1
plants	land plants	Poaceae	<i>Sorghum bicolor</i>	forage sorghum	Y			1/1
plants	land plants	Poaceae	<i>Sorghum halepense</i>	Johnson grass	Y			2/2
plants	land plants	Poaceae	<i>Sorghum x almum</i>		Y			2/2
plants	land plants	Poaceae	<i>Sporobolus actinocladus</i>	katoora grass		C		1/1
plants	land plants	Poaceae	<i>Sporobolus australasicus</i>			C		1/1
plants	land plants	Poaceae	<i>Sporobolus caroli</i>	fairy grass		C		1/1
plants	land plants	Poaceae	<i>Sporobolus jacquemontii</i>		Y			1/1
plants	land plants	Poaceae	<i>Urochloa subquadrifida</i>		Y			1/1
plants	land plants	Polygonaceae	<i>Persicaria lapathifolia</i>	pale knotweed		C		2/2
plants	land plants	Polygonaceae	<i>Polygonum plebeium</i>	small knotweed		C		1/1
plants	land plants	Pontederiaceae	<i>Monochoria cyanea</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea glauca</i>	bushy's clothes peg		C		1/1
plants	land plants	Proteaceae	<i>Grevillea parallela</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea striata</i>	beefwood		C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes brownii</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes pumilio</i>			C		1/1
plants	land plants	Putranjivaceae	<i>Drypetes deplanchei</i>	grey boxwood		C		1/1
plants	land plants	Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	Y			1/1
plants	land plants	Rubiaceae	<i>Dentella repens</i>	dentella		C		1/1
plants	land plants	Rubiaceae	<i>Psychotria daphnoides</i> var. <i>daphnoides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Scleromitron galioides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Timonius timon</i> var. <i>timon</i>			C		2/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Rutaceae	<i>Acronychia laevis</i>	glossy acronychia		C		1/1
plants	land plants	Sapindaceae	<i>Cardiospermum halicacabum var. halicacabum</i>		Y			1/1
plants	land plants	Sapindaceae	<i>Harpullia hillii</i>			C		2/2
plants	land plants	Scrophulariaceae	<i>Myoporum acuminatum</i>	coastal boobialla		C		1/1
plants	land plants	Solanaceae	<i>Datura innoxia</i>		Y			1/1
plants	land plants	Solanaceae	<i>Nicotiana glauca</i>	tree tobacco	Y			1/1
plants	land plants	Solanaceae	<i>Solanum torvum</i>	devil's fig	Y			1/1
plants	land plants	Sparrmanniaceae	<i>Grewia australis</i>			C		1/1
plants	land plants	Thymelaeaceae	<i>Pimelea sericostachya</i>			C		1/1
plants	land plants	Turneraceae	<i>Turnera ulmifolia</i>		Y			1/1

#### CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*.

The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.

The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).

This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.



# Queensland Government

## WildNet species list

Search Criteria: Species List for a Specified Point  
Species: All  
Type: All  
Queensland status: All  
Records: All  
Date: All  
Latitude: -19.8329  
Longitude: 147.1381  
Distance: 30  
Email: pascale.lin@ghd.com  
Date submitted: Thursday 30 Sep 2021 12:31:34  
Date extracted: Thursday 30 Sep 2021 12:40:02

The number of records retrieved = 677

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	<i>Rhinella marina</i>	cane toad	Y			12
animals	amphibians	Hylidae	<i>Litoria bicolor</i>	northern sedgefrog		C		1
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		1
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		2
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		2
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes convexiusculus</i>	marbled frog		C		1
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		17
animals	birds	Acanthizidae	<i>Gerygone palpebrosa</i>	fairy gerygone		C		3
animals	birds	Acanthizidae	<i>Smicromis brevirostris</i>	weebill		C		13
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		7
animals	birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk		C		1
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		11
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		8
animals	birds	Accipitridae	<i>Circus approximans</i>	swamp harrier		C		6
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		6
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		7
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		19
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahmny kite		C		3
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		45
animals	birds	Accipitridae	<i>Lophoictinia isura</i>	square-tailed kite		C		3
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		61
animals	birds	Accipitridae	<i>Pandion cristatus</i>	eastern osprey		SL		1
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		7
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owlet-nightjar		C		1
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		4
animals	birds	Alcedinidae	<i>Ceyx pusillus</i>	little kingfisher		C		1
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		8
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		39
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		18
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		6
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		19
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		18
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		17/3
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		C		12
animals	birds	Anatidae	<i>Nettapus pulchellus</i>	green pygmy-goose		C		11
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		45
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	magpie goose		C		42
animals	birds	Apodidae	<i>Aerodramus terraereginae</i>	Australian swiftlet		C		2
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		2
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	1
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		36
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		24
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		14
animals	birds	Ardeidae	<i>Ardea sumatrana</i>	great-billed heron		C		2
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		10

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		9
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		27
animals	birds	Ardeidae	<i>Egretta picata</i>	piebald heron		C		1
animals	birds	Ardeidae	<i>Ixobrychus dubius</i>	Australian little bittern		C		1
animals	birds	Ardeidae	<i>Ixobrychus flavicollis</i>	black bittern		C		4
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		8
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		15
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		49
animals	birds	Artamidae	<i>Artamus minor</i>	little woodswallow		C		1
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		1
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		2
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		45
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		6
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		58
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		13
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		7
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		31
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		51
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		4
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		3
animals	birds	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		48
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		70
animals	birds	Campephagidae	<i>Coracina tenuirostris</i>	cidadabird		C		2
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		6
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		27
animals	birds	Caprimulgidae	<i>Caprimulgus macrurus</i>	large-tailed nightjar		C		1
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		1
animals	birds	Charadriidae	<i>Charadrius ruficapillus</i>	red-capped plover		C		1
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel		C		5
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		35
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		14
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		10
animals	birds	Cisticolidae	<i>Cisticola juncidis laveryi</i>	zitting cisticola		C		2
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			5
animals	birds	Columbidae	<i>Ducula bicolor</i>	piebald imperial-pigeon		C		2
animals	birds	Columbidae	<i>Geopelia cuneata</i>	diamond dove		C		8
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		23
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		88
animals	birds	Columbidae	<i>Geophaps scripta</i>	squatter pigeon		C		11
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	2
animals	birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon		C		4
animals	birds	Columbidae	<i>Macropygia amboinensis</i>	brown cuckoo-dove		C		2
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		39
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		1
animals	birds	Columbidae	<i>Streptopelia chinensis</i>	spotted dove	Y			2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		21
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged cough		C		5
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		17
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		29
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		30
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		6
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		20
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		34/1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		44
animals	birds	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		C		11
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		2
animals	birds	Cuculidae	<i>Chalcites minutillus</i>	little bronze-cuckoo		C		11
animals	birds	Cuculidae	<i>Chalcites minutillus russatus</i>	Gould's bronze-cuckoo		C		4
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		12
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		14
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		45
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		341
animals	birds	Estrildidae	<i>Lonchura punctulata</i>	nutmeg mannikin	Y			8
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		12
animals	birds	Estrildidae	<i>Neochmia phaeton</i>	crimson finch		C		10
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch		C		12
animals	birds	Estrildidae	<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)		E	E	15
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		63
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		7
animals	birds	Eurostopodidae	<i>Eurostopodus argus</i>	spotted nightjar		C		1
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		13
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		10
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		7
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		5
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		1
animals	birds	Gruidae	<i>Antigone rubicunda</i>	broilga		C		13
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		60
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		33
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		60
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		3
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		31
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		14
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		22
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		23
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		26
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		2
animals	birds	Laridae	<i>Gelochelidon nilotica</i>	gull-billed tern		SL		2
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		SL		5
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		75
animals	birds	Megaluridae	<i>Cincloramphus mathewsi</i>	rufous songlark		C		21

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		22
animals	birds	Megapodiidae	<i>Alectura lathami</i>	Australian brush-turkey		C		6
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		1
animals	birds	Meliphagidae	<i>Conopophila rufogularis</i>	rufous-throated honeyeater		C		14
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		52/1
animals	birds	Meliphagidae	<i>Epthianura tricolor</i>	crimson chat		C		1
animals	birds	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater		C		1
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		47
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		25
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		5
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		5
animals	birds	Meliphagidae	<i>Meliphaga notata</i>	yellow-spotted honeyeater		C		3
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		56
animals	birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater		C		10
animals	birds	Meliphagidae	<i>Myzomela obscura</i>	dusky honeyeater		C		5
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		5
animals	birds	Meliphagidae	<i>Philemon buceroides</i>	helmeted friarbird		C		7
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		60
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		23
animals	birds	Meliphagidae	<i>Ramsayornis fasciatus</i>	bar-breasted honeyeater		C		3
animals	birds	Meliphagidae	<i>Ramsayornis modestus</i>	brown-backed honeyeater		C		21
animals	birds	Meliphagidae	<i>Stomiopera flava</i>	yellow honeyeater		C		91
animals	birds	Meliphagidae	<i>Stomiopera unicolor</i>	white-gaped honeyeater		C		6
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		66
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		80
animals	birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch		SL		3
animals	birds	Monarchidae	<i>Myiagra cyanoleuca</i>	satin flycatcher		SL		1
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		12
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		64
animals	birds	Monarchidae	<i>Symposiachrus trivirgatus</i>	spectacled monarch		SL		3
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		5
animals	birds	Nectariniidae	<i>Cinnyris jugularis</i>	olive-backed sunbird		C		32
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		18
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		2
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		23
animals	birds	Oriolidae	<i>Sphecotheres vieillotii</i>	Australasian figbird		C		24
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		10
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		1
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		12
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		1
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		89
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		51
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			6
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		17
animals	birds	Petroicidae	<i>Melanodryas cucullata</i>	hooded robin		C		1
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		10

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animals	birds	Petroicidae	<i>Microeca flavigaster</i>	lemon-bellied flycatcher		C		49
animals	birds	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin		C		2
animals	birds	Petroicidae	<i>Poecilodryas superciliosa</i>	white-browed robin		C		1
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		35
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		12
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		31
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		3
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		11
animals	birds	Pittidae	<i>Pitta versicolor</i>	noisy pitta		C		1
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		5
animals	birds	Podicipedidae	<i>Podiceps cristatus</i>	great crested grebe		C		8
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		20
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		8
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		26
animals	birds	Psittacidae	<i>Melopsittacus undulatus</i>	budgerigar		C		2
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		58
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		25
animals	birds	Psittacidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		43
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	spotted bowerbird		C		1
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus nuchalis</i>	great bowerbird		C		29
animals	birds	Rallidae	<i>Amaurornis cinerea</i>	white-browed crane		C		3
animals	birds	Rallidae	<i>Amaurornis moluccana</i>	pale-vented bush-hen		C		7
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		5
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		5
animals	birds	Rallidae	<i>Gallirallus philippensis</i>	buff-banded rail		C		6
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		2
animals	birds	Rallidae	<i>Porzana fluminea</i>	Australian spotted crane		C		1
animals	birds	Rallidae	<i>Porzana pusilla</i>	Baillon's crane		C		1
animals	birds	Rallidae	<i>Porzana tabuensis</i>	spotless crane		C		1
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		4
animals	birds	Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	red-necked avocet		C		1
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		72
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		76
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		SL		2
animals	birds	Rhipiduridae	<i>Rhipidura rufiventris</i>	northern fantail		C		1
animals	birds	Scelopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		SL		1
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		1
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		8
animals	birds	Strigidae	<i>Ninox rufa queenslandica</i>	rufous owl (southern subspecies)		C		1
animals	birds	Sturnidae	<i>Aplonis metallica</i>	metallic starling		C		1
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		18
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		17
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		SL		4
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		34
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		39
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		2



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animals	birds	Turnicidae	<i>Turnix maculosus</i>	red-backed button-quail		C		4
animals	birds	Turnicidae	<i>Turnix pyrrhоторax</i>	red-chested button-quail		C		2
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		1
animals	birds	Tytonidae	<i>Tyto delicatula</i>	eastern barn owl		C		2
animals	mammals	Cervidae	<i>Axis axis</i>	chital	Y			1
animals	mammals	Dasyuridae	<i>Dasyurus hallucatus</i>	northern quoll		C	E	2
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			1
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		2
animals	mammals	Macropodidae	<i>Notamacropus agilis</i>	agile wallaby		C		2
animals	mammals	Macropodidae	<i>Petrogale assimilis</i>	allied rock-wallaby		C		5/5
animals	mammals	Macropodidae	<i>Petrogale inornata</i>	unadorned rock-wallaby		C		3/3
animals	mammals	Miniopteridae	<i>Miniopterus australis</i>	little bent-wing bat		C		1
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		1
animals	mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot		C		2/2
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	1
animals	mammals	Pteropodidae	<i>Pteropus alecto</i>	black flying-fox		C		2/1
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		1
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			6
animals	mammals	Vespertilionidae	<i>Myotis macropus</i>	large-footed myotis		C		1
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				1
animals	ray-finned fishes	Ambassidae	<i>Ambassis agrammus</i>	sailfin glassfish				11
animals	ray-finned fishes	Ambassidae	<i>Ambassis species</i>	northwest glassfish				2
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				40
animals	ray-finned fishes	Apogonidae	<i>Glossamia aprion</i>	mouth almighty				45
animals	ray-finned fishes	Ariidae	<i>Neoarius graeffei</i>	blue catfish				7
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				400
animals	ray-finned fishes	Belonidae	<i>Strongylura krefftii</i>	freshwater longtom				47
animals	ray-finned fishes	Centropomidae	<i>Lates calcarifer</i>	barramundi				188
animals	ray-finned fishes	Cichlidae	<i>Oreochromis mossambica</i>	Mozambique mouthbrooder	Y			4
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				518
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				67
animals	ray-finned fishes	Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod				218
animals	ray-finned fishes	Gobiidae	<i>Awaous acritosus</i>	roman-nose goby				1
animals	ray-finned fishes	Hemiramphidae	<i>Arrhamphus sclerolepis</i>	snubnose garfish				7
animals	ray-finned fishes	Megalopidae	<i>Megalops cyprinoides</i>	oxeye herring				36
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				84
animals	ray-finned fishes	Mugilidae	<i>Mugil cephalus</i>	sea mullet				1
animals	ray-finned fishes	Osteoglossidae	<i>Scleropages jardinii</i>	northern saratoga				1
animals	ray-finned fishes	Plotosidae	<i>Neosilurus ater</i>	black catfish				35
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtlii</i>	Hyrtl's catfish				1
animals	ray-finned fishes	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish	Y			1
animals	ray-finned fishes	Scatophagidae	<i>Scatophagus argus</i>	spotted scat				2
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				36
animals	ray-finned fishes	Terapontidae	<i>Hephaestus fuliginosus</i>	sooty grunter				22
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				6
animals	ray-finned fishes	Terapontidae	<i>Scortum parviceps</i>	smallhead grunter				3

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animals	ray-finned fishes	Toxotidae	<i>Toxotes chatareus</i>	sevenspot archerfish				20
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		2/1
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python		C		1/1
animals	reptiles	Carphodactylidae	<i>Nephrurus asper</i>	spiny knob-tailed gecko		C		1
animals	reptiles	Chelidae	<i>Chelodina canni</i>	Cann's longneck turtle		C		1
animals	reptiles	Chelidae	<i>Elseya irwini</i>	Irwin's turtle		C		1
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake		C		2
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		1
animals	reptiles	Diplodactylidae	<i>Oedura castelnaui</i>	northern velvet gecko		C		1
animals	reptiles	Elapidae	<i>Antaioserpens albiceps</i>	north-eastern plain-nosed burrowing snake		C		1/1
animals	reptiles	Elapidae	<i>Demansia torquata</i>	collared whipsnake		C		1
animals	reptiles	Elapidae	<i>Furina diadema</i>	red-naped snake		C		1
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		1
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		1/1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		2/1
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		4
animals	reptiles	Pygopodidae	<i>Delma tincta</i>	excitable delma		C		1/1
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		2/2
animals	reptiles	Scincidae	<i>Carlia jarnoldae</i>	lined rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		2
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus adamsi</i>	Adams' snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus sp.</i>			C		1
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		1
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>	fine-spotted mulch-skink		C		4/4
animals	reptiles	Scincidae	<i>Lampropholis delicata</i>	dark-flecked garden sunskink		C		3/3
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		2
animals	reptiles	Scincidae	<i>Pygmaeascincus timlowi</i>	dwarf litter-skink		C		1
animals	reptiles	Typhlopidae	<i>Anilius affinis</i>	small-headed blind snake		C		1
animals	reptiles	Varanidae	<i>Varanus storri</i>	Storr's monitor		C		2
plants	land plants	Acanthaceae	<i>Asystasia gangetica subsp. gangetica</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Hygrophila angustifolia</i>			C		1/1
plants	land plants	Acanthaceae	<i>Hypoestes floribunda var. floribunda</i>			C		1/1
plants	land plants	Acanthaceae	<i>Nelsonia campestris</i>			C		1/1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens subsp. adscendens</i>			C		1/1
plants	land plants	Acanthaceae	<i>Ruellia tuberosa</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Thunbergia fragrans</i>		Y			4/4
plants	land plants	Acanthaceae	<i>Thunbergia grandiflora</i>	sky flower	Y			1/1
plants	land plants	Alismataceae	<i>Caldesia oligococca</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera angustifolia</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera denticulata var. micrantha</i>			C		4/4
plants	land plants	Amaranthaceae	<i>Alternanthera ficoidea</i>		Y			2/2
plants	land plants	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		1/1

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plants	land plants	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed		C		1/1
plants	land plants	Amaranthaceae	<i>Amaranthus spinosus</i>	needle burr	Y			2/2
plants	land plants	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry		C		3/3
plants	land plants	Amaranthaceae	<i>Guilleminea densa</i>	small matweed	Y			1/1
plants	land plants	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum		C		1/1
plants	land plants	Apocynaceae	<i>Alyxia spicata</i>			C		1/1
plants	land plants	Apocynaceae	<i>Catharanthus roseus</i>	pink periwinkle	Y			1/1
plants	land plants	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			7/2
plants	land plants	Apocynaceae	<i>Nerium oleander</i>	oleander	Y			1/1
plants	land plants	Apocynaceae	<i>Parsonsia lanceolata</i>	northern silkpod		C		1/1
plants	land plants	Apocynaceae	<i>Vincetoxicum erectum</i>			C		5/5
plants	land plants	Apocynaceae	<i>Wrightia saligna</i>			C		1/1
plants	land plants	Araceae	<i>Lemna aequinoctialis</i>	common duckweed		C		1/1
plants	land plants	Asteraceae	<i>Acanthospermum hispidum</i>	star burr	Y			1/1
plants	land plants	Asteraceae	<i>Acmella grandiflora</i> var. <i>brachyglossa</i>			C		1/1
plants	land plants	Asteraceae	<i>Blumea saxatilis</i>			C		1/1
plants	land plants	Asteraceae	<i>Camptacra barbata</i>			C		1/1
plants	land plants	Asteraceae	<i>Centipeda borealis</i>			C		2/2
plants	land plants	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons		C		2/2
plants	land plants	Asteraceae	<i>Coronidium lanuginosum</i>			C		1/1
plants	land plants	Asteraceae	<i>Cyanthillium cinereum</i>			C		1/1
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			3/3
plants	land plants	Asteraceae	<i>Gynura drymophila</i> var. <i>drymophila</i>			C		1/1
plants	land plants	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			1/1
plants	land plants	Asteraceae	<i>Peripleura scabra</i>			C		2/2
plants	land plants	Asteraceae	<i>Pseudognaphalium luteoalbum</i>	Jersey cudweed		C		1/1
plants	land plants	Asteraceae	<i>Pterocaulon serrulatum</i> var. <i>serrulatum</i>			C		2/2
plants	land plants	Asteraceae	<i>Sphaeranthus indicus</i>			C		1/1
plants	land plants	Asteraceae	<i>Synedrella nodiflora</i>		Y			1/1
plants	land plants	Asteraceae	<i>Xanthium occidentale</i>		Y			1/1
plants	land plants	Asteraceae	<i>Xerochrysum bracteatum</i>	golden everlasting daisy		C		1/1
plants	land plants	Asteraceae	<i>Xerochrysum bracteatum</i> subsp. ( <i>Mount Elliot A.R.Bean 3593</i> )			C		1/1
plants	land plants	Bignoniaceae	<i>Dolichandrone alternifolia</i>			C		1/1
plants	land plants	Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine		C		1/1
plants	land plants	Bombacaceae	<i>Lagunaria queenslandica</i>			C		2/2
plants	land plants	Boraginaceae	<i>Cordia dichotoma</i>			C		1/1
plants	land plants	Boraginaceae	<i>Ehretia grahamii</i>			C		1/1
plants	land plants	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium ovalifolium</i>			C		2/2
plants	land plants	Byttneriaceae	<i>Hannafordia shanesii</i>			C		1/1
plants	land plants	Caesalpiniaceae	<i>Chamaecrista absus</i> var. <i>absus</i>			C		2/2
plants	land plants	Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C		1/1
plants	land plants	Caesalpiniaceae	<i>Parkinsonia aculeata</i>	parkinsonia	Y			2/2
plants	land plants	Caesalpiniaceae	<i>Senna gaudichaudii</i>			C		1/1
plants	land plants	Campanulaceae	<i>Lobelia quadrangularis</i>			C		1/1

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plants	land plants	Campanulaceae	<i>Wahlenbergia caryophylloides</i>			C		1/1
plants	land plants	Capparaceae	<i>Capparis canescens</i>			C		1/1
plants	land plants	Caryophyllaceae	<i>Polycarpaea spirostylis subsp. spirostylis</i>			C		1/1
plants	land plants	Casuarinaceae	<i>Casuarina cunninghamiana subsp. cunninghamiana</i>			C		1/1
plants	land plants	Celastraceae	<i>Denhamia cunninghamii</i>			C		2/2
plants	land plants	Celastraceae	<i>Denhamia oleaster</i>			C		1/1
plants	land plants	Celastraceae	<i>Elaeodendron melanocarpum</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Chenopodium album</i>	fat-hen	Y			2/2
plants	land plants	Chenopodiaceae	<i>Dysphania glomulifera subsp. glomulifera</i>			C		1/1
plants	land plants	Cleomaceae	<i>Arivela viscosa</i>			C		1/1
plants	land plants	Cleomaceae	<i>Tarenaya aculeata</i>		Y			1/1
plants	land plants	Clusiaceae	<i>Hypericum gramineum</i>			C		1/1
plants	land plants	Cochlospermaceae	<i>Cochlospermum gillivraei</i>			C		2/2
plants	land plants	Combretaceae	<i>Terminalia sericocarpa</i>	damson		C		1/1
plants	land plants	Convolvulaceae	<i>Argyreia nervosa</i>		Y			2/2
plants	land plants	Convolvulaceae	<i>Distimake quinquefolius</i>		Y			2/2
plants	land plants	Convolvulaceae	<i>Evolvulus nummularius</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Ipomoea abrupta</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea aquatica</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea eriocarpa</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea funicularis</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Jacquemontia paniculata</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Operculina turpethum</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Xenostegia tridentata</i>			C		1/1
plants	land plants	Cornaceae	<i>Alangium polyosmoides subsp. tomentosum</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Cucumis anguria var. anguria</i>	West Indian gherkin	Y			1/1
plants	land plants	Cucurbitaceae	<i>Diplocyclos palmatus subsp. affinis</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Luffa aegyptiaca</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus bulbosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus concinnus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus distans</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus iria</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus nervulosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus perangustus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus platystylis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus procerus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus scariosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis geniculata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis bisumbellata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush		C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis littoralis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis sieberiana</i>			C		1/1
plants	land plants	Cyperaceae	<i>Gahnia aspera</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenus falcatus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Scleria sphacelata</i>			C		2/2
plants	land plants	Droseraceae	<i>Drosera finlaysoniana</i>			C		1/1

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plants	land plants	Ebenaceae	<i>Diospyros geminata</i>	scaly ebony		C		1/1
plants	land plants	Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony		C		1/1
plants	land plants	Ebenaceae	<i>Diospyros laurina</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Acalypha eremorum</i>	soft acalypha		C		2/2
plants	land plants	Euphorbiaceae	<i>Claoxylon tenerifolium subsp. tenerifolium</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Croton</i>					1/1
plants	land plants	Euphorbiaceae	<i>Croton arnhemicus</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Croton pheballoides</i>	narrow-leaved croton		C		1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia bifida</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Jatropha gossypifolia</i>	bellyache bush	Y			2/2
plants	land plants	Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C		2/2
plants	land plants	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	Y			5/1
plants	land plants	Fabaceae	<i>Abrus precatorius subsp. precatorius</i>			C		1/1
plants	land plants	Fabaceae	<i>Aeschynomene americana var. glandulosa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Aeschynomene indica</i>	budda pea		C		1/1
plants	land plants	Fabaceae	<i>Aeschynomene villosa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Alysicarpus bupleurifolius</i>	sweet alys	Y			1/1
plants	land plants	Fabaceae	<i>Alysicarpus ovalifolius</i>		Y			1/1
plants	land plants	Fabaceae	<i>Alysicarpus vaginalis</i>		Y			1/1
plants	land plants	Fabaceae	<i>Canavalia papuana</i>	wild jack bean		C		1/1
plants	land plants	Fabaceae	<i>Centrosema molle</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria aridicola subsp. aridicola</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria gorensis</i>	gambia pea	Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria laburnifolia</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria medicaginea var. medicaginea</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria mitchellii subsp. mitchellii</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria montana var. exserta</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria pallida var. obovata</i>		Y			3/3
plants	land plants	Fabaceae	<i>Crotalaria quinquefolia</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria retusa var. retusa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria sessiliflora var. anthylloides</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria verrucosa</i>			C		1/1
plants	land plants	Fabaceae	<i>Cullen badocanum</i>			C		3/3
plants	land plants	Fabaceae	<i>Desmodium scorpiurus</i>		Y			1/1
plants	land plants	Fabaceae	<i>Flemingia lineata</i>			C		1/1
plants	land plants	Fabaceae	<i>Galactia</i>					1/1
plants	land plants	Fabaceae	<i>Galactia tenuiflora var. lucida</i>			C		2/2
plants	land plants	Fabaceae	<i>Glycine</i>					1/1
plants	land plants	Fabaceae	<i>Hovea longipes</i>	brush hovea		C		1/1
plants	land plants	Fabaceae	<i>Indigofera</i>					1/1
plants	land plants	Fabaceae	<i>Indigofera linifolia</i>			C		1/1
plants	land plants	Fabaceae	<i>Indigofera pratensis</i>			C		1/1
plants	land plants	Fabaceae	<i>Indigofera tryonii</i>			C		1/1
plants	land plants	Fabaceae	<i>Macroptilium lathyroides</i>		Y			1/1
plants	land plants	Fabaceae	<i>Millettia pinnata</i>			C		1/1
plants	land plants	Fabaceae	<i>Mucuna gigantea</i>	burny bean		C		1/1



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plants	land plants	Fabaceae	<i>Tephrosia</i>					1/1
plants	land plants	Fabaceae	<i>Tephrosia brachyodon</i> var. <i>longifolia</i>			C		2/2
plants	land plants	Fabaceae	<i>Tephrosia filipes</i> subsp. <i>filipes</i>			C		1/1
plants	land plants	Fabaceae	<i>Tephrosia macrostachya</i>			C		1/1
plants	land plants	Fabaceae	<i>Uraria lagopodioides</i>			C		1/1
plants	land plants	Fabaceae	<i>Vigna radiata</i> var. <i>sublobata</i>			C		1/1
plants	land plants	Fabaceae	<i>Vigna</i> sp. (Greta Creek R.J.Lawn+ AQ532201)			C		3/3
plants	land plants	Fabaceae	<i>Vigna</i> sp. (Station Creek R.J.Lawn CQ3284)			C		2/2
plants	land plants	Fabaceae	<i>Zornia muelleriana</i> subsp. <i>muelleriana</i>			C		1/1
plants	land plants	Fabaceae	<i>Zornia muriculata</i> subsp. <i>angustata</i>			C		3/3
plants	land plants	Goodeniaceae	<i>Goodenia pilosa</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Goodenia rosulata</i>			C		1/1
plants	land plants	Haloragaceae	<i>Gonocarpus acanthocarpus</i>			C		1/1
plants	land plants	Haloragaceae	<i>Myriophyllum verrucosum</i>	water milfoil		C		1/1
plants	land plants	Helicteraceae	<i>Helicteres semiglabra</i>			C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i>			C		2/2
plants	land plants	Hydrocharitaceae	<i>Hydrilla verticillata</i>	hydrilla		C		1/1
plants	land plants	Hydrocharitaceae	<i>Hydrocharis dubia</i>	frogbit	Y			1/1
plants	land plants	Hydrocharitaceae	<i>Ottelia alismoides</i>			C		1/1
plants	land plants	Hydrocharitaceae	<i>Ottelia ovalifolia</i> subsp. <i>ovalifolia</i>			C		1/1
plants	land plants	Lamiaceae	<i>Basilicum polystachyon</i>			C		2/2
plants	land plants	Lamiaceae	<i>Clerodendrum floribundum</i>			C		5/5
plants	land plants	Lamiaceae	<i>Coleus graveolens</i>			C		1/1
plants	land plants	Lamiaceae	<i>Coleus scutellarioides</i>			C		1/1
plants	land plants	Lamiaceae	<i>Leucas decemdentata</i>			C		1/1
plants	land plants	Lamiaceae	<i>Leucas lavandulifolia</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Mesosphaerum suaveolens</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Ocimum americanum</i>		Y			2/2
plants	land plants	Lamiaceae	<i>Pityrodia salviiifolia</i>	pityrodia		C		1/1
plants	land plants	Lamiaceae	<i>Premna dallachyana</i>			C		1/1
plants	land plants	Lamiaceae	<i>Premna serratifolia</i>			C		1/1
plants	land plants	Lamiaceae	<i>Teucrium modestum</i>			C		2/2
plants	land plants	Lauraceae	<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>			C		2/2
plants	land plants	Lauraceae	<i>Litsea glutinosa</i>			C		2/2
plants	land plants	Laxmanniaceae	<i>Lomandra longifolia</i>			C		1/1
plants	land plants	Lentibulariaceae	<i>Utricularia aurea</i>	golden bladderwort		C		1/1
plants	land plants	Lentibulariaceae	<i>Utricularia stellaris</i>			C		1/1
plants	land plants	Loranthaceae	<i>Lysiana subfalcata</i>			C		1/1
plants	land plants	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry		C		1/1
plants	land plants	Malvaceae	<i>Abutilon auritum</i>	Chinese lantern		C		1/1
plants	land plants	Malvaceae	<i>Abutilon guineense</i>		Y			1/1
plants	land plants	Malvaceae	<i>Abutilon micropetalum</i>			C		1/1
plants	land plants	Malvaceae	<i>Hibiscus krichauffianus</i>			C		1/1
plants	land plants	Malvaceae	<i>Hibiscus panduriformis</i>			C		2/2
plants	land plants	Malvaceae	<i>Hibiscus vitifolius</i>			C		1/1
plants	land plants	Malvaceae	<i>Sida acuta</i>	spinyhead sida	Y			1/1

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plants	land plants	Malvaceae	<i>Sida hackettiana</i>			C		1/1
plants	land plants	Malvaceae	<i>Urena lobata</i>	urena weed	Y			1/1
plants	land plants	Marsileaceae	<i>Marsilea mutica</i>	shiny nardoo		C		1/1
plants	land plants	Martyniaceae	<i>Martynia annua</i>	small-fruited devil's claw	Y			2/2
plants	land plants	Menispermaceae	<i>Pachygone ovata</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia hemsleyi</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia jackesiana</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle		C		1/1
plants	land plants	Mimosaceae	<i>Acacia tephрина</i>			C		2/2
plants	land plants	Mimosaceae	<i>Desmanthus leptophyllus</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Leucaena leucocephala</i>		Y			3
plants	land plants	Mimosaceae	<i>Leucaena leucocephala subsp. leucocephala</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Neptunia gracilis forma gracilis</i>			C		1/1
plants	land plants	Mimosaceae	<i>Neptunia major</i>			C		3/3
plants	land plants	Mimosaceae	<i>Neptunia monosperma</i>			C		1/1
plants	land plants	Mimosaceae	<i>Senegalia</i>					1/1
plants	land plants	Mimosaceae	<i>Vachellia farnesiana</i>		Y			1/1
plants	land plants	Molluginaceae	<i>Glinus lotoides</i>	hairy carpet weed		C		1/1
plants	land plants	Molluginaceae	<i>Glinus oppositifolius</i>			C		1/1
plants	land plants	Molluginaceae	<i>Mollugo verticillata</i>		Y			2/2
plants	land plants	Moraceae	<i>Ficus rubiginosa forma rubiginosa</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Lysimachia ovalis</i>			C		2/2
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		2/2
plants	land plants	Myrtaceae	<i>Corymbia dallachiana</i>			C		2/2
plants	land plants	Myrtaceae	<i>Corymbia lamprophylla</i>			C		1/1
plants	land plants	Myrtaceae	<i>Corymbia leichhardtii</i>	rustyjacket		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus brownii</i>	Reid River box		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus drepanophylla</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus persistens</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum		C		2/2
plants	land plants	Myrtaceae	<i>Eucalyptus raveretiana</i>	black ironbox		C	V	1/1
plants	land plants	Myrtaceae	<i>Eucalyptus shirleyi</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus xanthoclada</i>	yellow-branched ironbark		C		2/2
plants	land plants	Myrtaceae	<i>Gossia bidwillii</i>			C		4/4
plants	land plants	Myrtaceae	<i>Leptospermum anfractum</i>			C		1/1
plants	land plants	Myrtaceae	<i>Lophostemon grandiflorus subsp. riparius</i>			C		5/5
plants	land plants	Myrtaceae	<i>Melaleuca bracteata</i>			C		3/3
plants	land plants	Myrtaceae	<i>Melaleuca leucadendra</i>	broad-leaved tea-tree		C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca nervosa</i>			C		4/4
plants	land plants	Myrtaceae	<i>Melaleuca viminalis</i>			C		1/1
plants	land plants	Myrtaceae	<i>Rhodomyrtus trineura subsp. trineura</i>			C		1/1
plants	land plants	Myrtaceae	<i>Syzygium cumini</i>		Y			1/1
plants	land plants	Najadaceae	<i>Najas tenuifolia</i>	water nymph		C		1/1
plants	land plants	Nelumbonaceae	<i>Nelumbo nucifera</i>	pink waterlily		C		2/2
plants	land plants	Nyctaginaceae	<i>Pisonia aculeata</i>	thorny pisonia		C		2/2
plants	land plants	Orchidaceae	<i>Cymbidium canaliculatum</i>			C		1/1

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plants	land plants	Papaveraceae	<i>Argemone ochroleuca subsp. ochroleuca</i>	Mexican poppy	Y			1/1
plants	land plants	Passifloraceae	<i>Passiflora foetida</i>		Y			1/1
plants	land plants	Passifloraceae	<i>Passiflora suberosa subsp. litoralis</i>		Y			1/1
plants	land plants	Phrymaceae	<i>Glossostigma diandrum</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Antidesma parvifolium</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Breynia oblongifolia</i>				C	2/2
plants	land plants	Phyllanthaceae	<i>Bridelia leichhardtii</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Flueggea virosa subsp. melanthesoides</i>				C	3/3
plants	land plants	Phyllanthaceae	<i>Phyllanthus carpentariae</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus reticulatus</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Poranthera microphylla</i>	small poranthera			C	1/1
plants	land plants	Picrodendraceae	<i>Dissiliaria indistincta</i>				C	1/1
plants	land plants	Picrodendraceae	<i>Petalostigma banksii</i>				C	1/1
plants	land plants	Pittosporaceae	<i>Bursaria incana</i>				C	1/1
plants	land plants	Plantaginaceae	<i>Bacopa floribunda</i>				C	2/2
plants	land plants	Plantaginaceae	<i>Mecardonia procumbens</i>		Y			1/1
plants	land plants	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			2/2
plants	land plants	Poaceae	<i>Alloteropsis cimicina</i>				C	1/1
plants	land plants	Poaceae	<i>Alloteropsis semialata</i>	cockatoo grass			C	1/1
plants	land plants	Poaceae	<i>Aristida holathera var. holathera</i>				C	1/1
plants	land plants	Poaceae	<i>Arundinella setosa</i>				C	1/1
plants	land plants	Poaceae	<i>Bothriochloa bladhii subsp. bladhii</i>				C	2/2
plants	land plants	Poaceae	<i>Bothriochloa decipiens var. cloncurransis</i>				C	1/1
plants	land plants	Poaceae	<i>Bothriochloa decipiens var. decipiens</i>				C	2/2
plants	land plants	Poaceae	<i>Cenchrus caliculatus</i>	hillside burrgrass			C	1/1
plants	land plants	Poaceae	<i>Cenchrus purpureus</i>		Y			1/1
plants	land plants	Poaceae	<i>Chionachne cyathopoda</i>	river grass			C	2/2
plants	land plants	Poaceae	<i>Chionachne hubbardiana</i>				C	1/1
plants	land plants	Poaceae	<i>Chloris inflata</i>	purpletop chloris	Y			1/1
plants	land plants	Poaceae	<i>Chloris pectinata</i>	comb chloris			C	1/1
plants	land plants	Poaceae	<i>Dactyloctenium radulans</i>	button grass			C	1/1
plants	land plants	Poaceae	<i>Dichanthium annulatum</i>	sheda grass	Y			1/1
plants	land plants	Poaceae	<i>Dichanthium fecundum</i>	curly bluegrass			C	3/3
plants	land plants	Poaceae	<i>Dichanthium sericeum subsp. polystachyum</i>				C	1/1
plants	land plants	Poaceae	<i>Dinebra ligulata</i>				C	1/1
plants	land plants	Poaceae	<i>Dinebra neesii</i>				C	2/2
plants	land plants	Poaceae	<i>Dinebra panicea var. brachiata</i>		Y			1/1
plants	land plants	Poaceae	<i>Echinochloa frumentacea</i>	Siberian millet	Y			1/1
plants	land plants	Poaceae	<i>Echinochloa turneriana</i>	channel millet			C	1/1
plants	land plants	Poaceae	<i>Elytrophorus spicatus</i>				C	1/1
plants	land plants	Poaceae	<i>Enneapogon lindleyanus</i>				C	1/1
plants	land plants	Poaceae	<i>Eragrostis elongata</i>				C	1/1
plants	land plants	Poaceae	<i>Eriochloa crebra</i>	spring grass			C	1/1
plants	land plants	Poaceae	<i>Eriochloa pseudoacrotricha</i>				C	1/1
plants	land plants	Poaceae	<i>Eulalia aurea</i>	silky browntop			C	1/1

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plants	land plants	Poaceae	<i>Heteropogon triticeus</i>	giant speargrass		C		1/1
plants	land plants	Poaceae	<i>Hymenachne amplexicaulis</i> 'Olive'		Y			2
plants	land plants	Poaceae	<i>Leersia hexandra</i>	swamp rice grass		C		1/1
plants	land plants	Poaceae	<i>Melinis repens</i>	red natal grass	Y			1/1
plants	land plants	Poaceae	<i>Oryza australiensis</i>			C		1/1
plants	land plants	Poaceae	<i>Oryza meridionalis</i>			C		1/1
plants	land plants	Poaceae	<i>Oryza sativa</i>		Y			1/1
plants	land plants	Poaceae	<i>Oxychloris scariosa</i>	winged chloris		C		1/1
plants	land plants	Poaceae	<i>Panicum decompositum</i> var. <i>decompositum</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum laevinode</i>	pepper grass		C		1/1
plants	land plants	Poaceae	<i>Panicum trachyrhachis</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum trichoides</i>			C		1/1
plants	land plants	Poaceae	<i>Rottboellia cochinchinensis</i>		Y			2/2
plants	land plants	Poaceae	<i>Setaria surgens</i>			C		1/1
plants	land plants	Poaceae	<i>Sorghum arundinaceum</i>	Rhodesian Sudan grass	Y			1/1
plants	land plants	Poaceae	<i>Sorghum bicolor</i>	forage sorghum	Y			5/5
plants	land plants	Poaceae	<i>Sorghum halepense</i>	Johnson grass	Y			2/2
plants	land plants	Poaceae	<i>Sorghum nitidum</i> forma <i>aristatum</i>			C		1/1
plants	land plants	Poaceae	<i>Sorghum x alnum</i>		Y			2/2
plants	land plants	Poaceae	<i>Sporobolus actinocladus</i>	katoora grass		C		1/1
plants	land plants	Poaceae	<i>Sporobolus australasicus</i>			C		1/1
plants	land plants	Poaceae	<i>Sporobolus caroli</i>	fairy grass		C		1/1
plants	land plants	Poaceae	<i>Sporobolus jacquemontii</i>		Y			2/2
plants	land plants	Poaceae	<i>Themeda quadrivalvis</i>	grader grass	Y			4/1
plants	land plants	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		1/1
plants	land plants	Poaceae	<i>Urochloa subquadripara</i>		Y			1/1
plants	land plants	Poaceae	<i>Vacoparis laxiflorum</i>			C		1/1
plants	land plants	Polygonaceae	<i>Persicaria barbata</i>			C		1/1
plants	land plants	Polygonaceae	<i>Persicaria decipiens</i>	slender knotweed		C		1/1
plants	land plants	Polygonaceae	<i>Persicaria lapathifolia</i>	pale knotweed		C		2/2
plants	land plants	Polygonaceae	<i>Polygonum plebeium</i>	small knotweed		C		2/2
plants	land plants	Pontederiaceae	<i>Monochoria australasica</i>			C		1/1
plants	land plants	Pontederiaceae	<i>Monochoria cyanea</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea glauca</i>	bushy's clothes peg		C		1/1
plants	land plants	Proteaceae	<i>Grevillea parallela</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea striata</i>	beefwood		C		1/1
plants	land plants	Pteridaceae	<i>Adiantum atroviride</i>			C		1/1
plants	land plants	Pteridaceae	<i>Ceratopteris thalictroides</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes brownii</i>			C		2/2
plants	land plants	Pteridaceae	<i>Cheilanthes nudiuscula</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes pumilio</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			C		1/1
plants	land plants	Putranjivaceae	<i>Drypetes deplanchei</i>	grey boxwood		C		1/1
plants	land plants	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		1/1
plants	land plants	Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	Y			1/1
plants	land plants	Rubiaceae	<i>Dentella repens</i>	dentella		C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Rubiaceae	<i>Larsenaikia ochreata</i>			C		1/1
plants	land plants	Rubiaceae	<i>Nauclea orientalis</i>	Leichhardt tree		C		1/1
plants	land plants	Rubiaceae	<i>Pavetta australiensis</i> var. <i>australiensis</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psychotria daphnoides</i> var. <i>daphnoides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Scleromitron galioides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Spermacoce</i> sp. (Lorim Point A.Morton AM1237)			C		1/1
plants	land plants	Rubiaceae	<i>Timonius timon</i> var. <i>timon</i>			C		4/4
plants	land plants	Rutaceae	<i>Acronychia laevis</i>	glossy acronychia		C		1/1
plants	land plants	Salviniaceae	<i>Azolla pinnata</i>	fern azolla		C		1/1
plants	land plants	Salviniaceae	<i>Azolla rubra</i>			C		1/1
plants	land plants	Salviniaceae	<i>Salvinia molesta</i>	salvinia	Y			1/1
plants	land plants	Santalaceae	<i>Exocarpos latifolius</i>			C		1/1
plants	land plants	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		1/1
plants	land plants	Sapindaceae	<i>Arytera divaricata</i>	coogera		C		1/1
plants	land plants	Sapindaceae	<i>Atalaya multiflora</i>	broad-leaved whitewood		C		1/1
plants	land plants	Sapindaceae	<i>Cardiospermum halicacabum</i> var. <i>halicacabum</i>		Y			1/1
plants	land plants	Sapindaceae	<i>Cupaniopsis anacardioides</i>	tuckeroo		C		2/2
plants	land plants	Sapindaceae	<i>Harpullia hillii</i>			C		2/2
plants	land plants	Sapotaceae	<i>Amorphospermum antilogum</i>			C		1/1
plants	land plants	Sapotaceae	<i>Planchonella cotinifolia</i> var. <i>pubescens</i>			C		1/1
plants	land plants	Scrophulariaceae	<i>Myoporum acuminatum</i>	coastal boobialla		C		1/1
plants	land plants	Solanaceae	<i>Datura innoxia</i>		Y			1/1
plants	land plants	Solanaceae	<i>Nicotiana glauca</i>	tree tobacco	Y			1/1
plants	land plants	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		2/2
plants	land plants	Solanaceae	<i>Solanum sporadotrichum</i>			NT		1/1
plants	land plants	Solanaceae	<i>Solanum torvum</i>	devil's fig	Y			1/1
plants	land plants	Sparrmanniaceae	<i>Corchorus olerorius</i>	jute		C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia australis</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia graniticola</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia savannicola</i>			C		1/1
plants	land plants	Stackhousiaceae	<i>Stackhousia intermedia</i>			C		1/1
plants	land plants	Sterculiaceae	<i>Brachychiton</i>					1/1
plants	land plants	Stylidiaceae	<i>Stylidium rotundifolium</i>			C		1/1
plants	land plants	Thymelaeaceae	<i>Pimelea sericostachya</i>			C		1/1
plants	land plants	Turneraceae	<i>Turnera ulmifolia</i>		Y			3/3
plants	land plants	Vitaceae	<i>Cissus cardiophylla</i>			C		1/1

#### CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*.

The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.

The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).

This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

# **Appendix B**

**Written pre-lodgement advice**



SARA pre-lodgement advice 7 January 2021

SARA pre-lodgement advice 3 March 2021

SARA pre-lodgement advice 13 September 2021



Our reference: 2012-20139 SPL  
 Your reference: 12537606 - Houghton Pipeline Duplication Stage 2

7 January 2021

Townsville City Council  
 C/- GHD Pty Ltd  
 PO Box 930  
 TOWNSVILLE QLD 4810  
 Rebecca.Peardon@ghd.com

Attention: Ms Rebecca Peardon

Dear Ms Peardon

### Pre-lodgement meeting record

This pre-lodgement record provides a summary of the matters discussed at the pre-lodgement meeting in addition to providing further advice prepared subsequent to the meeting. This record provides advice regarding the likely major issues relevant to the development proposal to assist in the timely processing of a development application. While this advice is provided in good faith, if the proposal is changed from that which was discussed with the State Assessment and Referral Agency (SARA) during the pre-application meeting, this advice is not binding.

### Reference information

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SARA role:	Assessment manager
SARA jurisdiction:	<ul style="list-style-type: none"> <li>Schedule 8, Table 4, Item 3 (b) <b>operational works that is the clearing of native vegetation</b> (Planning Regulation 2017)</li> <li>Schedule 10, Part 9, Division 4, Subdivision 2, Table 5, Item 1 <b>operational work within 25m of a State Transport Corridor – Road</b> (Planning Regulation 2017)</li> <li>Schedule 8, Table 4, Item 3 (m) <b>operational work that is constructing or raising waterway barrier works is assessable development</b> (Planning Regulation 2017)</li> </ul>

Pre-lodgement meeting date: 23 December 2020

Meeting attendees:

Name	Position	Organisation
Catherine Hobbs	Principal Planning Officer	SARA
Graeme Kenna	Manager – Planning	SARA

Name	Position	Organisation
Lisa Brooks	Senior Town Planner	Department of Transport and Main Roads (DTMR)
Helena Xu	Town Planner	DTMR
Clint Burgess	A/Principal Engineer (Civil)	DTMR
Inga Kamps	Natural Resource Officer	Department of Regional Development, Manufacturing and Water (DRDMW)
Peter Webley	Natural Resource Management Officer	Department of Resources (DoR)
Laura Sellen	Natural Resource Management Officer	DoR
Merrick Lalor	Manager, Water Management	DRDMW
Deb Eaton	Land Officer	DoR
Paula Thomas	Land Officer	DoR
Shelley Piper		Townsville City Council (TCC)
Tom Hegarty		TCC
Rebecca Peardon		GHD
Kieran Kerr		GHD
Daniel Willis		GHD

#### Location details

Street address:	Ravenswood Road, Woodhouse Road, Ayr Dalbeg Road and Ravenswood Road, Mulgrave and Keith Venables Road, Upper Haughton and Millet Road, Upper Haughton
Real property description:	Lot 15 on CP891307; Lot 308 on GS1041; Lot 22 on GS1042; Lot 170 on GS804007; Lot 257 on GS804007; Lot 258 on GS804007; Lot 259 on GS804008; Lot 260 on GS804008; Lot 261 on GS804009; Lot 301 on SP107466; Lot 302 on SP107469; Lot 4 on SP107479; Lot 5 on SP107479; Lot 33 on SP117630; Lot 71 on SP289517; Lot 2 on SP302825; Lot 3 on SP302825
Local government area:	Burdekin Shire Council

#### Details of proposal

Development type:	Operational work
Development description:	The Haughton Pipeline Duplication Project is a critical part of providing water security for the Townsville region. The water transfer pipeline for Stage 2, includes the extension of the existing DN1800 pipeline from the Stage 1.1b works to a new pump station located between the Tom Fenwick pump station and the Clare Weir.

#### Supporting information

Drawing/report title	Prepared by	Date	Reference no.	Version/issue
Townsville City Council Haughton Pipeline Stage 2 Alignment	GHD	12/11/2020	12537606	A

Drawing/report title	Prepared by	Date	Reference no.	Version/issue
Presentation: Townsville City Council Haughton Pipeline Duplication Stage 2 Initial pre-lodgement meeting 23/12/2020	GHD	23/12/2020	-	-

## Meeting minutes

### 1. General

- a) The Haughton Pipeline Duplication Project is a critical part of providing water security for the Townsville region. The water transfer pipeline for Stage 2, includes the extension of the existing DN1800 pipeline from the Stage 1.1b works to a new pump station located between the Tom Fenwick pump station and the Clare Weir.
- b) The estimated nominal length of the pipeline is approximately 28.5 km with construction to be undertaken within a 50 m wide corridor and installation via open trench excavation. Where the pipeline is required to cross rail crossings, creek crossings and road crossings, the corridor will be reduce to 20 m wide and installation carried out within an envelope.
- c) Permanent clearing will be restricted to a 4 m wide access track along the length of the pipeline.
- d) The preferred pump station design is still being decided with three options currently being considered, including a Low Lift High Lift Pump station, Dry Well Pump station and a Low Lift, Sedimentation Dam Transfer Pump station. Construction activities associated with the pump station and pipeline are expected to commence in May 2021 with construction works to wrap up by the end of 2023.
- e) A relevant purpose application has already been submitted to the Department of Resources for assessment of the pump station and pipeline under section 22A of the VMA.
- f) In relation to power supply, the current preferred option is to construct a new substation from the Powerlink 132 kV lines. As an interim supply to the site for construction power, an 11kV extension and transformer to suit the site location is also being investigated. Development approvals associated with the new substation and power supply works would form part of a separate development application to that of the pump station and water supply pipeline (as these are ultimately being designed and tendered as a separate packages of work). A relevant purpose application is yet to be lodged for the substation and power supply works.

### 2. State Transport Infrastructure

- a) During construction the development will need to ensure that:
  - i. there will be minimal disruption to Woodstock Giru Road and the Flinders Highway during the course of construction;
  - ii. haul vehicle configuration proposed can lawfully and physically perform/achieve haulage on the proposed haul route; and
  - iii. construction can be managed to ensure no adverse safety impacts for road users.
- b) Further information is required on the following:
  - i. Truck movements
  - ii. Impacts
  - iii. Access points including construction access locations (preferably no temporary access of state controlled roads)
- c) Open trenching at Ayr-Dalbeg Road may be considered by DTMR and additional information on how this would be done is required for assessment.
- d) The pipeline will need to be perpendicular where it crosses the state controlled roads.

- e) The access location to the pump station needs to be finalised for assessment by DTMR.

### 3. Clearing of Native Vegetation and Tenure

- a) The affected area consists of 20 lots with the following tenures and Lot/Plans –
- i. Freehold – 2 on SP302825, 22 on GS1042 and 3 on SP302825
  - ii. Leasehold – 101 on SP111327, 170 on GS804007, 289 on SP117630, 301 on SP107466, 302 on SP107469, 308 on GS1041, 4 on SP107479, 5 on SP107479 and 71 on SP289517
  - iii. Reserve – 15 on CP891307 and 33 on SP117630; and
  - iv. State Land – 257 to 261 on GS804007 and 8 on AP13535.
- b) The applicant, for planning purposes, has identified a 200m wide corridor. A construction corridor, 50m wide, will be cleared within the 200m corridor for the construction of the pipeline.
- c) After construction of the pipeline, a 4m wide corridor will be maintained as a cleared corridor and the remainder of the 50m construction corridor will be allowed to regrow.
- d) An above surface pump station is to be located at the Burdekin River end of the pipeline.
- e) Further consideration should be given for the following –
- i. Essential habitat for the estuarine crocodile
  - ii. Of concern Regional Ecosystems
  - iii. Category R

It is considered that the above summary is an accurate record of the matters discussed at the pre-lodgement meeting.

The following information is provided as further advice prepared subsequent to the meeting:

#### 1. Jurisdiction, assessment fees and assessment benchmarks

- a) Based on the submitted information, the proposed development will require submission to the Chief Executive of the *Planning Act 2016* (the Planning Act), through the SARA as the Assessment Manager, under the following jurisdiction of the Planning Regulation 2017 (the Planning Regulation):
- Schedule 8, Table 4, Item 3 (b) operational works that is the clearing of native vegetation
  - Schedule 10, Part 9, Division 4, Subdivision 2, Table 5, Item 1 operational work within 25m of a State Transport Corridor
  - Schedule 8, Table 4, Item 3 (m) operational work that is constructing or raising waterway barrier works is assessable development
- b) The application fees are detailed in the Planning Regulation.
- c) To ensure that SARA can undertake a satisfactory assessment of the proposed development, the proponent is requested to provide a complete response to the applicable codes of the State Development Assessment Provisions (SDAP), current at the time of lodgement, in particular:
- State code 1: Development in a state-controlled road environment
  - State code 16: Native vegetation clearing
  - State code 18: Constructing or raising waterway barrier works

The latest version of SDAP is available at:

<https://planning.dsdmip.qld.gov.au/planning/better-development/the-development-assessment-process/the-states-role/state-development-assessment-provisions>

## 2. Development Application Requirements

- a) A development application is required to provide the following information:
- A completed DA Form 1
  - the documents required under the form to be attached to, or submitted with, the application including relevant plans
  - Owners consent (if required)
- If the proposal necessitates a material change of use application, owner's consent from the Department of Resources is required to lodge a "properly made" development application under the *Planning Act 2016* for any works involving state land. There is no fee for an owner's consent application and owner's consent must be lodged with the development application.
- Further information can be found at: [www.qld.gov.au/environment/land/state/owner-consent/](http://www.qld.gov.au/environment/land/state/owner-consent/).
- The prescribed fee(s) under the Planning Regulation
  - A response to the relevant state codes in the version of the SDAP which is current at the time of lodgement.
- b) To assist the proponent in preparing a development application, SARA has prepared corresponding SDAP response templates.
- c) A development application that complies with all applicable acceptable outcomes is considered to satisfy the corresponding performance outcome. If an application does not comply with one or more of the applicable acceptable outcomes, compliance with the performance outcome should be demonstrated.
- d) This advice is based on the version of SDAP current at the date of this pre-lodgement advice, being SDAP version 2.6.
- e) A development application can be made through SARA's online system MyDAS2.
- f) It is the proponent's responsibility to ensure the correct fees are paid to enable an application to be properly made. Please note that the assessment fees are subject to change. It is recommended to check Schedule 10 of the Planning Regulation to confirm the assessment fees prior to lodgement of the application.

## 3. Advice for State Transport Corridor trigger

- a) When lodging a formal development application, the applicant is required to provide scaled and sufficiently detailed plans and supporting documentation which clearly identify all aspects of the proposed development in relation to the state-controlled road corridor and railway corridor.
- b) Traffic Impact Assessment – State Controlled Roads
- Limited information has been provided in support of the proposal for the department to undertake an assessment. To determine the impact on the state-controlled roads generated by haulage vehicles, further operational details of the proposed development are required to be submitted for the department's assessment, such as transport vehicle numbers, type of vehicles, haulage route, quantity and frequency.
- The process for conducting a Traffic Impact Assessment (TIA) is shown in Figure 4 of Guide to Traffic Impact Assessment 2017 (GTIA). To assist in the preparation of a TIA assessment, checklists associated with the matters that may need to be addressed are included in Section 4.4 of GTIA available at:
- <https://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Guide-to-Traffic-Impact-Assessment>.
- The traffic impact assessment (TIA) must:



- i. be prepared by a Registered Professional Engineer of Queensland (RPEQ) suitably qualified and experienced in traffic engineering;
- ii. The TIA shall be prepared in accordance with Section 4 of GTIA,
- iii. A development profile must be prepared as part of the TIA, in accordance with section 4 of GTIA and as indicated on the RIA process flowchart in Figure 4 of GTIA.

Where analysis undertaken for the TIA identifies the proposed development is likely to have significant impacts pursuant to the relevant thresholds set out by GTIA, the TIA must address **ALL** relevant items listed below.

c) Pavement Impact Assessment

A pavement impact assessment (PIA), prepared by a Registered Professional Engineer of Queensland (RPEQ) suitably qualified and experienced in traffic engineering, is required to provide a pavement impact analysis for the construction, fitting out and operation of the proposed development. The pavement impact assessment shall:

- i. be prepared in accordance with chapter 10 of the GTIA;
- ii. be based on the following development scenarios;
  - with development; and
  - without development;
- iii. identify potential haulage route(s) on the state-controlled road network required for (construction and operational) traffic;
- iv. identify the anticipated number and types and frequency of vehicles to be used during the construction and operational phases as applicable. Information on the type of vehicles shall include axle configuration, gross vehicle mass, tare, and the average payload of the vehicles to be used;
- v. quantify the annual volume of all anticipated freight/minerals or other construction, excavation or fill material, in tonnage, transported on the state-controlled road network during construction and operations, required for the entire development;
- vi. include an assessment of the accelerated reduction of pavement life and accelerated increased maintenance requirements on elements of the state-controlled road network, affected by the proposal;
- vii. identify all road impact amelioration measures, including but not limited to construction of additional pavement or other ameliorative measures, contributions or monetary payments, if applicable.

d) Road Safety Impact Assessment

A road safety review, prepared in accordance with chapter 6 of GTIA and the audit shall be undertaken by a suitably qualified Road Safety Auditor/Team. The road safety review shall:

- i. be carried out for the route(s) identified in the Road Impact i. Assessment where these routes intersect with the state-controlled road network or railways, including railway crossings likely to be impacted; and
- ii. analyse the potential for any increase in accidents due to increased traffic volumes, and the potential economic cost of those accidents.

To assist with preparation of a Road Safety Review, the Department of Transport and Main Roads, (Northern Region) can provide Road Safety data on request. Please email [North.Queensland.IDAS@tmr.qld.gov.au](mailto:North.Queensland.IDAS@tmr.qld.gov.au) for advice on what is required to prepare a Road Safety Review. The Department may also be able to provide existing road safety reviews/audits relevant to the proposal site and any proposed haulage routes.

e) Stormwater, Drainage and flooding Impacts

When lodging a formal development application, the applicant is requested to demonstrate compliance with PO12 - PO14, Table 1.2.1, State Code 2: Development in a State-controlled Road Environment of the State Development Assessment Provisions, for both construction and operational phases.

f) Construction Management Plan

Provide a Construction Management Plan (CMP) including Traffic Guidance System / Traffic Management Plan must be prepared by a Registered Professional Engineer of Queensland (RPEQ) and given to Program Delivery and Operations Unit, North Queensland Region (North.Queensland.IDAS@tmr.qld.gov.au) within the Department of Transport and Main Roads.

The CMP must demonstrate that:

- i. there will be minimal disruption to Woodstock Giru Road and the Flinders Highway during the course of construction;
- ii. haul vehicle configuration proposed can lawfully and physically perform/achieve haulage on the proposed haul route; and
- iii. construction can be managed to ensure no adverse safety impacts for road users.

The construction of the development must be undertaken in accordance with the CMP.

#### 4. Advice for Clearing of Native Vegetation

- a) The development footprint impacts the following features/ vegetation types:
  - Category B area (containing of concern and least concern regional ecosystems)
  - Category R area
  - Category X area
  - Essential habitat for the estuarine crocodile; and
  - The following watercourse features as shown on the Vegetation Management Watercourse and Drainage Feature map –
    - 8 stream order 1 watercourse features
    - 1 stream order 3 watercourse features
    - 2 stream order 4 watercourse features
    - 2 stream order 5 watercourse features
- b) The mapped regional ecosystems on the development footprint are Regional Ecosystems:
  - 11.3.4 (of concern, sparse structure)
  - 11.3.7 (least concern, sparse structure)
  - 11.3.9 (least concern, sparse structure)
  - 11.3.10 (least concern, sparse structure)
  - 11.3.13 (of concern, very sparse structure)
  - 11.3.25 (least concern, sparse structure)
  - 11.3.30 (least concern, sparse structure)
  - 11.3.35 (least concern, sparse structure)
  - 11.12.1 (least concern, sparse structure)
- c) Information on the land is available through:
  - Queensland Globe - <https://qldglobe.information.qld.gov.au/>
  - A vegetation management report online at - [www.qld.gov.au/environment/land/vegetation/map-request/](http://www.qld.gov.au/environment/land/vegetation/map-request/). The report includes relevant property information and a series of maps and supporting information outlining the requirements for clearing vegetation on this land; and
  - The Regional Ecosystem Description Database - <https://apps.des.qld.gov.au/regional-ecosystems/>.
- d) Referral advice

The Department of Resources recommends that the application requires referral for the clearing of native vegetation as the proposal will involve clearing that is Assessable Development under the *Planning Act 2016* or will result in accepted operational work under Schedule 21 of the Planning Regulation 2017.

e) Section 22A – relevant purpose determination

Prior to submitting the development application to clear native vegetation, the proponent must first obtain written confirmation from the Department of Resources that the proposed development is for a relevant purpose under section 22A of the *Vegetation Management Act 1999*.

A request for a relevant purpose determination has been received by the Department of Resources.

If the Department of Resources determines the clearing is for a relevant purpose under section 22A of the *Vegetation Management Act 1999*, the applicant may then lodge a development application with the Assessment Manager, being either the relevant Local Government or the State Assessment and Referral Agency, Department of State Development, Infrastructure, Local Government and Planning for assessment.

f) Development application

The development application will need to address and meet the requirements of the State Development Assessment Provisions - State code 16: Native vegetation clearing, Department of Infrastructure, Local Government and Planning (code), table 16.2.2 – PO1-PO4 and table 16.2.3 – PO7, PO11, PO16, PO20, PO22-PO24, and PO27.

All relevant performance outcomes need to be addressed in State code 16: Native vegetation clearing, however, based on the information provided the performance outcomes listed below will require extra consideration.

- PO1 – Clearing avoids or minimises impacts
- PO11 – Clearing associated with watercourses and drainage features
- PO16 – Maintain connectivity
- PO22 – Salinity
- PO23 – Conserving endangered and of concern regional ecosystems
- PO24 – Essential habitat

Guidance on how to comply with this code is provided in State Development Assessment Provisions Guidance material: State code 16: Native vegetation clearing, Department of Natural Resources, Mines and Energy, 2019. This guideline is available online at: [https://www.dnrme.qld.gov.au/\\_data/assets/pdf\\_file/0010/1258075/state-code-16-veg-clearing-guide.pdf](https://www.dnrme.qld.gov.au/_data/assets/pdf_file/0010/1258075/state-code-16-veg-clearing-guide.pdf).

Appendix 2 of this guideline provides details on the standard application information for all development applications involving the clearing of native vegetation.

Please note, clearing vegetation to the extent the clearing is in any category C areas or category R areas may not for a relevant purpose under the *Vegetation Management Act 1999*. Accordingly clearing of vegetation in these areas cannot be approved under a development approval. If your proposed development includes clearing vegetation in any category C or category R areas, you should ensure the clearing can be undertaken as exempt clearing work or in accordance with an Accepted Development Vegetation Clearing Code (ADVCC).

Information on exempt clearing work or ADVCCs is available online at –

<https://www.qld.gov.au/environment/land/management/vegetation/clearing-codes>

g) General advice

For the Department of Resources to assess the proposed development against the performance outcomes, a detailed development plan should be provided that shows:

- The subject Lot on Plan, development plan title, plan reference number, version number, date and author
- Mapped regulated vegetation over the subject lot
- Accurate location of all the proposed infrastructure including pump stations and pipeline and any temporary or permanent structures or buildings; and,
- Location of any other operational areas associated with the proposed development.

If further information is required in regard to vegetation management matters, please contact the Department of Resources via: [northvegetation@dnrme.qld.gov.au](mailto:northvegetation@dnrme.qld.gov.au).

## 5. Advice for waterway barrier works trigger

- a) Advice provided below is for the pipeline alignment only. Further pre-lodgement is advised when location and designs for the pump station have been finalised.
- b) The proposed pipeline works cross multiple waterways according to the *Queensland waterway for waterway barrier works* spatial data layer.
- c) The proposed works cross over several features mapped as “drains” and “channels” according to the *Watercourse* layer on Queensland Globe. If these features meet the criteria of the Department of Agriculture and Fisheries (DAF) *“What is a waterway?”* factsheet, they are required to be considered as a waterway providing for fish passage.
- d) No detailed information relating to the pipeline installation or how the final design interacts with the features of the waterways was provided. The scope of works will determine whether the proposed development constitutes waterway barrier works.
- e) The applicant should refer to the following factsheets for more information on waterway barrier works:
  - *What is a waterway?*;
  - *What is a waterway barrier work?*;
  - *What is not a waterway barrier work?*
- f) Application material states *“Where the pipeline is required to cross rail crossings, creek crossings and road crossings, the corridor will be reduced to 20 m wide and installation carried out within an envelope”*.
- g) Further consultation with the applicant indicates that the envelope method will now only be used for road and rail crossings. Trenching method is proposed for waterway crossings.
- h) The proposed permanent works will **not** be considered waterway barrier works, if the following can be achieved:
  - The placement of the permanent infrastructure does not raise the natural bed level of each waterway; and
  - The placement of the permanent infrastructure does not reduce the cross-sectional area of each waterway; and
  - Post construction, each waterway is reinstated to pre-existing conditions, using natural substrate of similar composition on the waterway bed with no changes in elevation, banks are reprofiled to pre-existing conditions and stabilised with suitable riparian vegetation.
- i) If any aspect of the permanent works reduces the cross-sectional area of the waterway, or raises the natural bed level of the waterway, a development approval will be required for assessable development that is constructing or raising waterway barrier works.
- j) Under the Planning Regulation 2017, works involving constructing or raising waterway barrier works must be undertaken in accordance with the relevant accepted development

requirements or under a development approval (assessable development). The proposed permanent works cannot comply with the accepted development requirements (ADR) as the proposal to construct a pipeline and substation cannot meet any of the prescribed work types for any waterway.

- k) The placement of temporary waterway barriers to facilitate construction of the pipeline and associated infrastructure may be conducted under Work type 7.2 of DAF's Accepted development requirements for operational work that is constructing or raising waterway barrier works. Note that the requirements for all work state that the development must minimise impacts to waterways and fish passage (e.g. directional drilling instead of trenching through waterways).

If any proposed temporary waterway barrier works cannot meet the accepted development requirements, this aspect of the works will need to be covered under the development approval.

The applicant should note that time limitations apply to all temporary waterway barriers in place under the ADR. If there is any possibility (e.g. due to weather, construction methodology etc) the barriers need to be in place for longer than the prescribed period under the ADR, the applicant is advised to include proposed temporary waterway barrier works in a development application.

Timelines for temporary waterway barrier works differ between mapped waterways. Under work type 7.2, waterways mapped purple and red under the spatial data layer *Queensland waterways for waterway barrier works*, the maximum time allowable for temporary barriers is 180 days. For waterways mapped amber and green under the spatial data layer *Queensland waterways for waterway barrier works*, the maximum time allowable for temporary barriers is 360 days.

For waterways not mapped under the spatial data layer *Queensland waterways for waterway barrier works*, yet meet the definition of a waterway under the DAF factsheet What is a waterway? (e.g. drains mentioned above) it is advised to obtain pre-lodgement advice to obtain a waterway determination which is required to undertake any works in these waterways under the ADR.

- l) If required, in an application for a development approval for operational works involving constructing or raising waterway barrier works, the following will need to be provided:
- Completed copy of DA Form 1 including Template 4 – Waterway barrier works;
  - A full response to the relevant parts of the most up to date version of the SDAP *State Code 18: Constructing or raising waterway barrier works in fish habitats*. Particular attention should be paid to the following PO's:
    - All development - PO1 to PO18 and PO36;
    - Temporary waterway barrier works - PO32 to PO35.
  - Relevant plans as per SARA's DA Forms guide: Relevant plans, including:
    - Detailed plans clearly showing the location of the proposed works in relation to existing mapped waterways;
    - Detailed plans clearly showing a cross section of the proposed waterway barrier works in relation to the existing bed and banks of each impacted waterway;
    - A longitudinal section of the proposed waterway barrier works in relation to the bed of the waterway upstream and downstream of the works;

*Note – all plans should be able to be read to scale at A3 size*
  - Written documentation discussing the following:
    - Details of the purpose of the proposed works (e.g. pipeline, substation, access tracks etc.);

- A description of the waterway proposed to be impacted (e.g. condition, size, connectivity, general hydrology) and nature of the impact;
- A description of the work method (e.g. timing, equipment to be used);
- A detailed description of the alternatives considered to reduce impacts on the waterway, as applicable (e.g. alternative designs, locations, setbacks/buffer distances, etc.);
- Details of on-site mitigation actions, during and after the development;
- The extent of any future maintenance works required for the continued safe operation of the proposed structure or facility; and
- Impacts to fish passage. It must firstly be demonstrated that impacts to waterways providing for fish passage have been avoided. Where avoidance is not reasonably possible, impacts to waterways providing for fish passage must be mitigated. An environmental offset pursuant to the *Environmental Offsets Act 2014* may need to be provided for any significant residual impact.

In accordance with PO36 of the SDAP State Code 18, the department maintains an 'avoid, mitigate, offset' requirement that applies to matters of State environmental significance (MSES). The applicant will need to provide details on how impacts to waterways providing for fish passage will be avoided, and where avoidance is not reasonably possible, how impacts to waterways providing for fish passage have been minimised and mitigated. Notwithstanding measures to avoid and mitigate impacts to waterways providing for fish passage, the works may result in a Significant Residual Impact (SRI) and require an environmental offset. An environmental offset will not be considered until it has been demonstrated that all reasonable measures have been taken to firstly avoid and/or mitigate impacts to waterways providing for fish passage (refer to DSDILGP's Environmental offsets and the planning framework factsheets and guidelines for further details).

## 6. Advice for Possible Environmentally Relevant Activity (ERA) Trigger

If the proposed pipeline is underground it may potentially trigger ERA 16 – Extraction and Screening. This is likely to be dependent on whether spoil is removed from the site and how the project is staged (i.e. the quantities of material removed at any point in time).

The minimum thresholds for ERA 16 are:

- (a) *dredging a total of 1,000t or more of material from the bed of naturally occurring surface waters, in a year; (this may apply depending on the scale of the river crossings)*
- (b) *extracting, other than by dredging, a total of 5,000t or more of material, in a year, from an area; or*
- (c) *screening 5,000t or more of material, in a year.*

The Environmental Protection Regulation 2019 (the Regulation) provides the following exemptions for ERA 16 under Schedule 2, Part 4, Section 16 (2):

- (2) *The relevant activity does not include—*
  - (a) *extracting material under an environmental authority for a resource activity; or*
  - (b) *extracting material from a road reserve if—*
    - (i) *the material is to be used for constructing or maintaining a road; and*
    - (ii) *the surface area from which the material is extracted is less than 10,000m<sup>2</sup>; or*
  - (c) *extracting material from a place for constructing a road or railway at the place; or*  
*Examples—*
    - *cutting and filling land for constructing a road or railway*
    - *extracting material for constructing a tunnel for a road or railway*



- (d) *extracting material from a place, other than by dredging, for constructing the foundations of a building at the place; or*
  - (e) *extracting material for reshaping land if—*
    - (i) *reshaping the land does not involve blasting; and*
    - (ii) *the material is not removed from the site from which it is extracted; or*
- Example —*  
*cutting and filling land for creating building lots*
- (f) *screening material on the site from which it has been extracted in the course of carrying out an activity mentioned in paragraphs (a) to (e).*

You will need to consider whether ERA 16 is triggered based on the advice and proposal.

## 7. Advice for tenure

- a) The project involves a number of tenures, as outlined below:
  - Roads
  - Freehold Lot on Plan: 2 on SP302825, 22 on GS1042 and 3 on SP302825
  - Leasehold Lot on Plan: 101 on SP111327, 170 on GS804007, 289 on SP117630, 301 on SP107466, 302 on SP107469, 308 on GS1041, 4 on SP107479, 5 on SP107479 and 71 on SP289517
  - A reserve for 'camping' purposes with a permit to occupy issued over the reserve, Lot 15 on Plan CP891307
  - A reserve for 'camping and water' purposes with a trustee lease issued over the reserve, Lot 33 on Plan SP1176300; and
  - Unallocated State land (USL) with the State of Queensland (represented by Department of Natural Resources, Mines and Energy) as the registered owner, with a permit to occupy issued over the USL, Lot on Plan: 257 to 261 on GS804007 and 8 on AP13535.

- b) Pipeline – requirements for land administered under the *Land Act 1994*

With the exception of road areas, an easement will be required for the pipeline. Townsville City Council (Council) will be required to negotiate with the landowners, as below:

- An easement over leasehold land, with the registered lessee
- An easement over a reserve or unallocated State land (with registered permit to occupy), with the Department of Resources and suitable notification provided to the permit holder; and
- An easement over a reserve (with a registered trustee lease), with Department of Resources, and consent for lodgement of the plan must be obtained from the trustee lessee.

The Department of Resources advises there are no specific requirements to provide notice to permit to occupy holders. Any negotiations regarding the permittee's ability to use all or part of the permit area should be held directly between Council and the permittee.

- c) Pump station - requirements

Based on the information provided, the pump station is proposed to be located on reserve Lot 33, which is also mapped as part of the stock route network. Council should apply for a priority purchase over the required area to facilitate use of the land for this purpose. The Department of Resources considers freehold to be the most appropriate tenure option for the required land.

Should Council make an application for a priority purchase, the Department of Resources will consider whether (and how) native title issues need to be addressed. Depending on the outcome of this assessment, Council may be required to address native title issues as a

condition of offer. The written views from the Department of Resources' Stock Route Management unit will also be requested as part of the assessment.

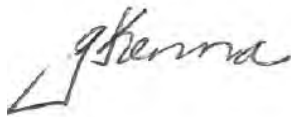
**8. Advice for Water matters – Construction of water supply pipeline, water pumping or transfer station**

In accordance with the *Water Act 2000*, for a feature that has been determined to be a watercourse, works that involve the placement or excavation of fill, or the removal of vegetation, may be undertaken in compliance with the riverine protection permit exemption requirements, available online at: [https://www.dnrm.qld.gov.au/?a=109113:policy\\_registry/riverine-protection-permit-exemption-requirements.pdf](https://www.dnrm.qld.gov.au/?a=109113:policy_registry/riverine-protection-permit-exemption-requirements.pdf). Townsville City Council is considered an approved entity for the purposes of the riverine protection permit exemption requirements. The volumetric restrictions associated with the riverine protection permit exemption requirements do not apply to approved entities/ local government authorities.

Where works are unable to comply with these requirements, a riverine protection permit would be required to be obtained from the Department Regional Development, Manufacturing and Water. Further information is available online at: <https://www.business.qld.gov.au/industries/mining-energy-water/water/authorisations/riverine-protection>

For further information please contact Catherine Hobbs, Principal Planning Officer, on 4758 3412 or via email [NQSARA@dsgmip.qld.gov.au](mailto:NQSARA@dsgmip.qld.gov.au) who will be pleased to assist.

Yours sincerely



Graeme Kenna  
Manager (Planning)



SARA reference: 2012-20139 SPL  
Applicant reference: 12537606 - Houghton Pipeline Duplication Stage 2

13 September 2021

Townsville City Council c/- GHD Pty Ltd  
PO Box 930  
TOWNSVILLE QLD 4810  
Rebecca.Peardon@ghd.com

Attention: Ms Rebecca Peardon

Dear Ms Peardon

## **SARA Pre-lodgement advice – Ravenswood Road, Woodhouse Road, Ayr Dalbeg Road and Ravenswood Road, Mulgrave and Keith Venables Road, Upper Houghton and Millet Road, Upper Houghton**

I refer to the pre-lodgement meeting held on 26 August 2021 in which you sought advice from the State Assessment and Referral Agency (SARA) regarding the proposed development at the above address. This notice provides advice on aspects of the proposal that are of relevance to SARA.

### **SARA's understanding of the project**

The Houghton Pipeline Duplication Project is a critical part of providing water security for the Townsville region. The water transfer pipeline for Stage 2 of this pipeline, includes the extension of the existing DN1800 pipeline from the Stage 1.1b works to a new pump station located between the Tom Fenwick pump station and the Clare Weir.

At the pre-lodgement meeting the following was identified –

- The location of proposed pump station has changed. The new location provides access to an existing irrigation channel managed by Sunwater.
- The proposed location of the pump station is in proximity to the “start of the main channel”.
- Some minor amendments made to the pipeline corridor (including the increase in width of corridor from 20m to 40m) are being proposed. It should be note that even minor changes to width of corridors etc. are likely to require a change to the S22A Relevant Purpose Determination. The process to change the S22A Relevant Purpose Determination can usually be completed in a short time frame when it relates to a minor change.
- It is possible that sections of the pipeline will need to be buried deeper than initially anticipated.

- Negotiations with a number of landowners in relation to accessing their land are continuing (in confidence).
- Haulage will involve the establishment of 6 key locations for delivery of pipe work. The pipe work will then be transported to other locations for installation.
- Development approval may be required for the Pump Station and discussions are occurring with Burdekin Shire Council.

This advice should be read in conjunction with the advice issued by SARA on 7 January 2021 (attached) and 3 March 2021 (attached).

### Supporting information

The advice in this letter is based on the following documentation that was submitted with the pre-lodgement request or tabled at the pre-lodgement meeting.

Drawing/report title	Prepared by	Date
Email titled, 'Haughton Pipeline Stage 2 - presentation and updated plans from the follow-up pre-lodgement meeting last week', with attachments – <ul style="list-style-type: none"> <li>- TOWNSVILLE CITY COUNCIL Haughton Pipeline Duplication Stage 2 Presentation</li> <li>- HPD Stage 2 – Alignments 2021.05.13.kmz</li> <li>- Typical Section, Pipeline Construction Corridor, prepared by GHD, dated 07.05.21, Drawing Number 12537606-PL-G0110, Rev A</li> <li>- Proposed Site Plan, prepared by GHD, dated 13.08.21, Drawing Number 12537606-PS-OPT5-A0010, Rev C</li> <li>- Site Layout, prepared by GHD, dated 13.08.21, Drawing Number 12537606-PS-OPT5-A0015, Rev C</li> <li>- Pump Station Site Sections, prepared by GHD, dated 13.08.21, Drawing Number 12537606-PS-A00020, Rev C</li> <li>- Access and Haulage General Arrangement, prepared by GHD, dated 05.08.21, Drawing Number 12537606-G200, Rev B</li> <li>- Access and Haulage Plan Sheet 1 of 4, prepared by GHD, dated 05.08.21, Drawing Number 12537606-G201, Rev B</li> <li>- Access and Haulage Plan Sheet 2 of 4, prepared by GHD, dated 05.08.21, Drawing Number 12537606-G202, Rev B</li> <li>- Access and Haulage Plan Sheet 4 of 4, prepared by GHD, dated 05.08.21, Drawing Number 12537606-G204, Rev B</li> </ul>	GHD	2 September 2021 (received 7.57am)

### Pre-lodgement meeting record

<b>Meeting date</b>	26 August 2021
<b>Meeting location</b>	Microsoft Teams
<b>Meeting chair</b>	Graeme Kenna
<b>Meeting attendees</b>	Refer to <b>Attachment 1</b>

## Pre-lodgement advice

The following advice outlines the aspects of the proposal that are of relevance to SARA.

<b>SARA's jurisdiction and fees</b>	
1.	<p>The application will require lodgement to SARA under the following provisions of the Planning Regulation 2017:</p> <ul style="list-style-type: none"> <li>• Schedule 8, Table 4, Item 3 (b) operational works that is the clearing of native vegetation (Planning Regulation 2017)</li> <li>• Schedule 10, Part 9, Division 4, Subdivision 2, Table 5, Item 1 operational work within 25m of a State Transport Corridor – Road (Planning Regulation 2017)</li> <li>• Schedule 8, Table 4, Item 3 (m) operational work that is constructing or raising waterway barrier works is assessable development (Planning Regulation 2017)</li> </ul> <p>This will require fees to be paid in accordance with the relevant sections of Schedule 10.</p> <p>SARA would be the assessment manager for the proposed application.</p>
<b>Key matters and action items</b>	
2.	<p><b>Advice for State Transport Corridor trigger</b> Refer to Item 3 of Pre-lodgement meeting record issued by SARA on 7 January 2021.</p>
3.	<p><b>Advice for Clearing of Native Vegetation (including S22A Relevant Purpose Determination requirements)</b> Refer to Item 4 of Pre-lodgement meeting record issued by SARA on 7 January 2021.</p>
4.	<p><b>Advice for waterway barrier works trigger</b></p> <p>a) The proposed works cross 16 waterways that are mapped according to the <i>Queensland waterway for waterway barrier works</i> spatial data layer and are likely to constitute waterway barrier works.</p> <p>b) Guidance as to which waterways in Queensland provide for fish passage is presented in the spatial data layer <i>Queensland waterways for waterway barrier works</i>. However, as per the <a href="#">Guide to determining waterways</a>, this data layer may include mapping anomalies and not all waterways that are present on-ground may be captured by this data layer.</p> <p>The applicant should refer to the following factsheets for more information on waterway barrier works:</p> <ul style="list-style-type: none"> <li>- <a href="#">What is a waterway?;</a></li> <li>- <a href="#">What is a waterway barrier work?;</a></li> <li>- <a href="#">What is not a waterway barrier work?</a></li> </ul> <p>c) Under the Planning Regulation 2017, works involving constructing or raising waterway barrier works must be undertaken in accordance with the relevant <a href="#">accepted development requirements</a> or under a development approval (assessable development).</p> <p>d) The placement of temporary waterway barriers to facilitate construction of the pipe crossings may be conducted under DAF's <a href="#">Accepted development requirements for operational work that is constructing or raising waterway barrier works</a>.</p> <p>Note that in addition to the requirements for the work type selected the proposal must meet the <i>Requirements for all work</i> (Section 4).</p> <p>If any proposed temporary waterway barrier works cannot meet the accepted development requirements, this aspect of the works will need to be covered under the development approval.</p>

	<p>The applicant should note that time limitations apply to all temporary waterway barriers in place under the ADR. If there is any possibility (e.g. due to weather) the barriers need to be in place for longer than the prescribed period under the ADR, the applicant is advised to include proposed temporary waterway barrier works in a development application.</p> <p>e) The proposed water intake is on an artificial canal that is provisioned via screened water pumped from the Burdekin River by a third party. The proposed water intake is not considered to be a waterway barrier works.</p>
5.	<p><b>Advice for Possible Environmentally Relevant Activity (ERA) Trigger</b> Refer to Item 6 of Pre-lodgement meeting record issued by SARA on 7 January 2021.</p>
6.	<p><b>Advice for tenure</b> Refer to Item 7 of Pre-lodgement meeting record issued by SARA on 7 January 2021.</p>
7.	<p><b>Advice for Water matters – Construction of water supply pipeline, water pumping or transfer station</b> Refer to Item 8 of Pre-lodgement meeting record issued by SARA on 7 January 2021.</p>
<b>Lodgement material</b>	
8.	<p>It is recommended that the following information is submitted when lodging the application to SARA:</p> <p>a) DA form 1 and the documents required under the form to be attached to, or submitted with, the application including relevant plans</p> <p>b) Owners consent (if required) If the proposal necessitates a material change of use application, owner's consent from the Department of Resources is required to lodge a "properly made" development application under the <i>Planning Act 2016</i> for any works involving state land. There is no fee for an owner's consent application and owner's consent must be lodged with the development application. Further information can be found at: <a href="http://www.qld.gov.au/environment/land/state/ownerconsent/">www.qld.gov.au/environment/land/state/ownerconsent/</a>.</p> <p>c) The prescribed fee(s) under the Planning Regulation</p> <p>d) A full response to the relevant sections of SDAP State code 1: Development in a state-controlled road environment</p> <p>e) A full response to the relevant sections of SDAP State code 16: Native vegetation clearing</p> <p>f) A full response to the relevant sections of SDAP State code 18: Constructing or raising waterway barrier works</p> <p>g) Relevant plans as per the <a href="#">DA Forms guide</a>.</p>

This advice outlines aspects of the proposed development that are relevant to SARA's jurisdiction.

This advice is provided in good faith and is:

- based on the material and information provided to SARA
- current at the time of issue
- not applicable if the proposal is changed from that which formed the basis of this advice.

The advice in this letter does not constitute an approval or an endorsement that SARA supports the development proposal. Additional information may be required to allow SARA to properly assess the development proposal after a formal application has been lodged.

For further information please contact Catherine Hobbs, Principal Planning Officer, on 4758 3412 or via email [NQSARA@dSDLGP.qld.gov.au](mailto:NQSARA@dSDLGP.qld.gov.au) who will be pleased to assist.

Yours sincerely





Duncan Livingstone  
A/Manager (Planning)

enc Attachment 1 – Pre-lodgement meeting attendance record

Development details	
Proposal:	The Haughton Pipeline Duplication Project is a critical part of providing water security for the Townsville region. The water transfer pipeline for Stage 2, includes the extension of the existing DN1800 pipeline from the Stage 1.1b works to a new pump station located between the Tom Fenwick pump station and the Clare Weir
Street address:	Ravenswood Road, Woodhouse Road, Ayr Dalbeg Road and Ravenswood Road, Mulgrave and Keith Venables Road, Upper Haughton and Millet Road, Upper Haughton
Real property description:	Lot 15 on CP891307; Lot 308 on GS1041; Lot 22 on GS1042; Lot 170 on GS804007; Lot 257 on GS804007; Lot 258 on GS804007; Lot 259 on GS804008; Lot 260 on GS804008; Lot 261 on GS804009; Lot 301 on SP107466; Lot 302 on SP107469; Lot 4 on SP107479; Lot 5 on SP107479; Lot 33 on SP117630; Lot 71 on SP289517; Lot 2 on SP302825; Lot 3 on SP302825
SARA role:	Assessment manager
Assessment Manager:	SARA
Assessment criteria:	State Development Assessment Provisions (SDAP): <ul style="list-style-type: none"> <li>- State code 1: Development in a state-controlled road environment</li> <li>- State code 16: Native vegetation clearing</li> <li>- State code 18: Constructing or raising waterway barrier works</li> </ul>
Existing use:	Burdekin River and properties along the pipeline alignment
Relevant site history:	Burdekin River and properties along the pipeline alignment

## Attachment 1 — Pre-lodgement meeting attendance record

### Meeting attendees:

<b>Name</b>	<b>Position</b>	<b>Organisation</b>
Rebecca Peardon	Senior Planner	GHD
Peter Webley	Natural Resources Officer	Department of Resources (DOR)
Clint Burgess	Engineer	Department of Transport and Main Roads
Adam Blakiston		RPS
Deb Eaton	Senior Land Officer	DOR
Duncan Livingstone	A/Manager – Planning	SARA
Shelley Piper		Townsville City Council
David Lin	Natural Resources Officer	DOR
Daniel Willis		GHD
Robert Kent		TCC
Chris Clague	Fisheries Biologist	Department of Agriculture and Fisheries
Graeme Kenna	Manager – Planning	SARA



SARA reference: 2012-20139 SPL  
 Applicant reference: 12537606 - Haughton Pipeline Duplication Stage 2

3 March 2021

Townsville City Council  
 c/- GHD Pty Ltd  
 PO Box 930  
 TOWNSVILLE QLD 4810  
 Rebecca.Peardon@ghd.com

Attention: Ms Rebecca Peardon

Dear Ms Peardon

## **SARA Pre-lodgement advice - Ravenswood Road, Woodhouse Road, Ayr Dalbeg Road and Ravenswood Road, Mulgrave and Keith Venables Road, Upper Haughton and Millet Road, Upper Haughton**

I refer to your pre-lodgement request received on 24 February 2021 in which you sought pre-lodgement advice from the State Assessment and Referral Agency (SARA) regarding the proposed development at the above address. This notice provides advice on aspects of the proposal that are of relevance to SARA.

### **SARA's understanding of the project**

The Haughton Pipeline Duplication Project is a critical part of providing water security for the Townsville region. The water transfer pipeline for Stage 2, includes the extension of the existing DN1800 pipeline from the Stage 1.1b works to a new pump station located between the Tom Fenwick pump station and the Clare Weir.

This advice relates only to the waterway barrier works for the proposed construction of a pump station within the Burdekin River, adjacent to Lot 33 on SP117630 and must be read in conjunction with the advice issued by SARA on 7 January 2021 (attached).

### **Supporting information**

The advice in this letter is based on the following documentation that was submitted with the pre-lodgement request.

Drawing/report title	Prepared by	Date
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Email titled <i>2012-20139 SPL – Haughton Pipeline Duplication Project Stage 2 – Seeking further advice from DAF on pump station plans</i>	GHD	Received 24/02/2021
Cover Page – 12537606-G001 Rev A	GHD	15/02/2021
General Arrangement Pump Station Site Plan – 12537606-FEED-G002 Rev A	GHD	15/02/2021
3D Views – 12537606-FED-G005 Rev A	GHD	15/02/2021
General Arrangement Pump Station Floor Plan– 12537606-FEED-G0010 Rev A	GHD	15/02/2021
General Arrangement Pump Well Floor Plan – 12537606-FED-G0011 Rev A	GHD	15/02/2021
Pump Station Building Elevations – Sheet 1 – 12537606-FED-G0013 Rev A	GHD	15/02/2021
Pump Station Building Elevations – Sheet 2 – 12537606-FED-G0014 Rev A	GHD	15/02/2021
Pump Station Building Sections – Sheet 1 – 12537606-FED-G0015 Rev A	GHD	15/02/2021
Pump Station Building Sections – Sheet 2 – 12537606-FED-G0016 Rev A	GHD	15/02/2021
General Arrangement Overall Section – 12537606-FED-G0017 Rev A	GHD	15/02/2021

## Pre-lodgement advice

The following advice outlines the aspects of the proposal that are of relevance to SARA.

<b>Key matters and action items</b>	
5.	<p>The proposed works are located on a waterway that is mapped according to the <i>Queensland waterway for waterway barrier works</i> spatial data layer and are likely to constitute waterway barrier works for the following reasons;</p> <ol style="list-style-type: none"> <li>The pump station structure reduces the cross-sectional area of the waterway;</li> <li>The pump station permanently reduces the area of habitat / resources fish can access;</li> <li>The intake structure has the potential to trap fish. If the water level falls below the lower intake wall, fish will not be able to escape / swim back out into the main waterway;</li> <li>The velocity of water entering the intake area has the potential to draw fish into the intake pipes;</li> <li>Pending the amount of water to be extracted from the Burdekin River, the rate which it is to be extracted, and the waterway features (topography of the bed and banks), concerns are raised as to reducing the water levels of the surrounding areas to such an extent that fish and fisheries resources are directly and indirectly negatively impacted. (E.g. create pools which have the potential to trap and strand fish, reduce the window of time where fish passage is provided through shallower sections of the waterway, impact riparian vegetation adjacent to the permanent development footprint);</li> <li>The pump station structure itself may affect hydrological flow conditions around the structure which has the potential to interrupt fish navigating their way past the structure or cause scour of the bed and banks.</li> </ol>
	<p>The applicant should refer to the following factsheets for more information on waterway barrier works:</p> <ol style="list-style-type: none"> <li>What is a waterway?;</li> </ol>

	<p>b) What is a waterway barrier work?;</p> <p>c) What is not a waterway barrier work?</p>
	<p>Under the Planning Regulation 2017, works involving constructing or raising waterway barrier works must be undertaken in accordance with the relevant <a href="#">accepted development requirements</a> or under a development approval (assessable development).</p> <p>The proposed works cannot comply with the <a href="#">Accepted development requirements for operational work that is constructing or raising waterway barrier works</a> (ADR) as the proposal to construct a pump station cannot meet any of the prescribed work types. A development approval is likely to be required for assessable development that is constructing or raising waterway barrier works.</p>
	<p>The placement of temporary waterway barriers to facilitate construction of the pump station may be conducted under DAF's <a href="#">Accepted development requirements for operational work that is constructing or raising waterway barrier works</a>.</p> <p>If any proposed temporary waterway barrier works cannot meet the accepted development requirements, this aspect of the works will need to be covered under the development approval.</p> <p>The applicant should note that time limitations apply to all temporary waterway barriers in place under the ADR. If there is any possibility (e.g. due to weather / construction delays) the barriers need to be in place for longer than the prescribed period under the ADR, the applicant is advised to include proposed temporary waterway barrier works in a development application. The timeline allowable for temporary waterway barriers on waterways mapped purple under the spatial data layer <i>Queensland waterways for waterway barrier works</i> is 180 calendar days – see work type 7.2.</p>
<b>Lodgement material</b>	
6.	<p>It is recommended that the following information is submitted when lodging the component of the application to SARA for operational works involving constructing or raising waterway barrier works, the following will need to be provided</p> <p>a) <a href="#">Completed copy of DA Form 1 including Template 4</a> – Waterway barrier works</p> <p>b) A full response to the relevant sections of State Development Assessment Provisions (SDAP) Code 18: <i>Constructing or raising waterway barrier works in fish habitats</i>. Particular attention should be paid to - PO1 to PO18 and PO36 (All development) and - PO32 to PO35 (Temporary waterway barrier works). Specifically –</p> <p>i. In accordance with PO1 of the SDAP State Code 18, the application must demonstrate the need for the development and justify why alternatives which avoid impacts on fish passage or do not involve the constructing or raising waterway barrier works are not viable.</p> <ul style="list-style-type: none"> <li>- A response to PO1 should include an options analysis outlining alternative designs considered, with discussions relating to each design's impact to fish passage, as well as outline why the chosen design is the least impact option to meet the required need.</li> <li>- An existing pump station is shown on the plans directly adjacent to the proposed works. An application should outline whether the proposed structure is a replacement for the existing pump station, and if so, outline why the original infrastructure cannot be upgraded to meet the required need and/or specify it's removal and restoration of the area.</li> </ul> <p>ii. In accordance with PO2 of the SDAP State Code 18, development has a functional requirement to be located within a waterway with all ancillary elements located</p>

	<p>outside of the waterway.</p> <ul style="list-style-type: none"> <li>- A response to PO2 should include plans detailing all aspects of the proposed works, permanent and temporary, with ancillary elements shown on plans to be located away from the high bank of the waterway and justify why all components are required to be within the waterway.</li> </ul> <p>iii. In accordance with PO3 of the SDAP State Code 18, the number, spatial and temporal extents of the waterway barrier works are minimised to the greatest extent possible.</p> <ul style="list-style-type: none"> <li>- A response to PO3 is required to demonstrate the size and design of the structure has been minimised to the greatest extent possible to meet the required need.</li> <li>- If the proposed works are a replacement for the existing infrastructure, an application is required to discuss removal of the existing infrastructure and bank areas restored / rehabilitated.</li> <li>- The application should discuss the potential for the take of water to impact fish passage through the waterway, in particular the impact of the water take during receding or low flows.</li> <li>- The protrusion of the pump station into the waterway, in relation to low flows during the dry season should be provided.</li> </ul> <p>iv. In accordance with PO4 of the SDAP State Code 18, adequate fish passage is provided and maintained at all times throughout the life of the structure.</p> <ul style="list-style-type: none"> <li>- As stated above, the proposed design of the pump station is considered likely to have negative impacts upon fish passage including, but not limited to: <ul style="list-style-type: none"> <li>• Design of intake structure</li> <li>• Approach velocities at the intake structure</li> <li>• Reduction of the overall cross-sectional area of the waterway</li> <li>• Reduction of fisheries resources and habitat within that section of the waterway</li> <li>• Changes to flow conditions from the pump station size and level of water extraction.</li> </ul> </li> <li>- A response to PO4 is required to demonstrate that the proposed works will provide adequate fish passage past, under and around the proposed structure. The application should discuss impacts caused by the structure itself, its location within the waterway, and its operation for the entirety of its expected timeline. It is advised to consult with a suitably qualified person in the field of fish passage biology to enable a fish friendly design to be created that meets the requirements of the SDAP State Code 18.</li> </ul> <p>v. In accordance with PO5 of the SDAP State Code 18, waterway barrier works are designed, constructed, operated and maintained to provide fish passage for all members of the fish community, regardless of size, swimming ability, species, life stage etc.</p> <ul style="list-style-type: none"> <li>- A response to PO5 should outline how the proposal provides adequate fish passage for the expected fish community within the catchment area. Engaging with a suitably qualified person in the field of fish surveys and fish passage biology is recommended to enable an understanding of the design requirements to provide adequate fish passage for all members of the fish community.</li> </ul> <p>vi. In accordance with PO6 of the SDAP State Code 18, development is designed and</p>
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	<p>operated so that all components of the waterway barrier work, and all pathways of potential fish movement provide safe fish passage.</p> <ul style="list-style-type: none"> <li>- As stated above, fish passage may be impacted via multiple pathways including the intake structure, the size of the structure within the waterway itself and how the structure and its operation impacts upon the hydrology of the waterway. A response to PO6 should include a detailed discussion of the design of structure and its ancillary elements, its operation and how the running of the pump station provides safe fish passage past the structure. This should include but is not limited to appropriate screening and approach velocities to prevent the entrapment of fish within the pumping infrastructure. This should take into consideration the sizes and species of fish requiring movement past the barrier and should be justified.</li> </ul> <p>vii. In accordance with PO8 of the SDAP State Code 18, development does not increase the risk of mortality, disease or injury, or compromise the health, productivity, marketability or suitability for human consumption of fisheries resources having regard to, but not limited to</p> <ul style="list-style-type: none"> <li>- Biotic and abiotic conditions;</li> <li>- Water quality;</li> <li>- Substances that are toxic to plants, toxic to fish or cumulative within fish;</li> <li>- Design of structures;</li> <li>- Impact upon reproductive stress;</li> <li>- Effect on fish energy reserves;</li> <li>- Whether fish may be physically damaged, injured, killed, trapped or stranded;</li> <li>- Fish passage and access to habitat generally;</li> <li>- Impact of pest fish;</li> </ul> <p>A response to PO8 is required to demonstrate that the methods and materials used for the construction and ongoing operation of the pump station will not directly or indirectly impact upon aquatic life and water quality, or cause direct impacts to the fish community being able to undertake their natural life cycles. A discussion of the potential for the entrapment or injury of fish resulting from the pumping must be included, demonstrating how any impacts have been avoided and/or mitigated (e.g. through appropriate screening). An application must discuss any impacts to access to habitat and fish passage resulting from the take of water from the waterway.</p> <p>viii. In accordance with PO9 of the SDAP State Code 18, development avoids</p> <ul style="list-style-type: none"> <li>- non-essential hardening of the main channel,</li> <li>- retains natural fish habitats</li> <li>- avoid channelisation</li> <li>- avoids construction during times of elevated flows.</li> </ul> <p>ix. In accordance with PO10 of the SDAP State Code 18, where waterway barrier works will modify water levels of flow characteristics of the waterway, existing up and downstream structures are upgraded.</p> <ul style="list-style-type: none"> <li>- An application should discuss if the existing pump station is to be taken offline or if the proposed new structure is additional infrastructure that will pump water simultaneously / in conjunction with the existing infrastructure, discussing any impacts to water flows and the provision of fish passage throughout this section of the river.</li> <li>- If the existing pump station is no longer needed, the preferred option for this infrastructure is for it to be removed from the waterway and the waterway</li> </ul>
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	<p>restored.</p> <ul style="list-style-type: none"> <li>- An application should discuss any impacts from the additional take of water on the provision of this passage past the weir located downstream of the proposed works.</li> </ul> <p>x. In accordance with PO11 of the SDAP State Code 18, sufficient water exchange and flow is maintained and provided to sustain the health of fisheries resources, water quality and ecological functions.</p> <ul style="list-style-type: none"> <li>- The pump station is proposed as part of the Haughton Duplication Project whose aim is to provide water security to the Townsville region. The amount of water required to be extracted from the waterway is not known and may modify water levels and flow regimes within the Burdekin, resulting in impacts to water quality, and the ecological function and health of fisheries resources.</li> <li>- An application is required to demonstrate that the operation of the pump station will not cause an unacceptable impact to the ecological functions of the waterway, including, but not limited to, impacts to water levels which can create pools that have the potential to trap and strand fish and impact the availability of habitat. Information relating to the volume, timing and water levels of the expected take of water may assist in providing evidence that pathways and/or sufficient water will always be in place for the purposes of providing fish passage past the pump station.</li> </ul> <p>xi. In accordance with PO13 of the SDAP State Code 18, construction avoids direct and indirect impacts to areas outside of the permanent development footprint, and where avoidance is not possible minimises impacts.</p> <ul style="list-style-type: none"> <li>- A response to PO13 should include plans detailing the permanent and temporary footprints of the proposed works along with detailed discussions how impacts to areas outside the permanent footprint, have been minimised to the greatest extent possible. Discussion should include potential changes in habitat availability and riparian vegetation resulting from the take of water.</li> </ul> <p>xii. In accordance with PO14 of the SDAP State Code 18, after completion of instream works, disturbed areas of the bed and banks of the waterway, outside the permanent development footprint, are returned to their original profile to promote the regeneration of natural fish habitats.</p> <ul style="list-style-type: none"> <li>- A response to PO14 is required to demonstrate how temporarily disturbed areas of the waterway are to be stabilised and restored to pre-existing or better conditions.</li> <li>- If the existing pump station is to be removed, restoration of the waterway banks disturbed from these works is also required.</li> </ul> <p>xiii. Any temporary waterway barrier works required for the construction of the proposed works should be included in a development application and a response to PO's 32 to 35 provided.</p> <p>xiv. In accordance with PO36 of the SDAP State Code 18, the department maintains an 'avoid, mitigate, offset' requirement that applies to matters of State environmental significance (MSES). The applicant will need to provide details on how impacts to waterways providing for fish passage will be avoided, and where avoidance is not reasonably possible, how impacts to waterways providing for fish passage have been minimised and mitigated.</p> <p>Notwithstanding measures to avoid and mitigate impacts to waterways providing for fish passage, the works may result in a <a href="#">Significant Residual Impact</a> (SRI) and require an environmental offset. An environmental offset will not be considered until</p>
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	<p>it has been demonstrated that all reasonable measures have been taken to firstly avoid and/or mitigate impacts to waterways providing for fish passage (see the <a href="#">Queensland Environmental Offsets Policy</a>).</p> <p>c) Landowner's consent.</p> <p>d) Relevant plans as per the <a href="#">DA Forms guide</a>, showing:</p> <p>i. Relevant plans as per SARA's <a href="#">DA Forms guide: Relevant plans</a>, including:</p> <ul style="list-style-type: none"> <li>- Detailed plans clearly showing the location of the proposed works in relation to existing waterways;</li> <li>- Detailed plans clearly showing a cross section of the proposed waterway barrier works in relation to the existing bed and banks of each impacted waterway;</li> <li>- A longitudinal section of the proposed waterway barrier works in relation to the bed of the waterway upstream and downstream of the works;</li> </ul> <p><i>Note – all plans should be able to be read to scale at A3 size</i></p> <p>ii. Written documentation discussing the following:</p> <ul style="list-style-type: none"> <li>- Details of the purpose of the proposed works (e.g., pump intake structure);</li> <li>- A description of the waterway proposed to be impacted (e.g. condition, size, connectivity, general hydrology) and nature of the impact;</li> <li>- A description of the work method (e.g. timing, equipment to be used);</li> <li>- A detailed description of the alternatives considered to reduce impacts on the waterway, as applicable (e.g. alternative designs, locations, setbacks/buffer distances, etc.);</li> <li>- Details of on-site mitigation actions, during and after the development;</li> <li>- The extent of any future maintenance works required for the continued safe operation of the proposed structure or facility; and</li> <li>- Impacts to fish passage. It must firstly be demonstrated that impacts to waterways providing for fish passage have been avoided. Where avoidance is not reasonably possible, impacts to waterways providing for fish passage must be mitigated. An environmental offset pursuant to the <i>Environmental Offsets Act 2014</i> may need to be provided for any significant residual impact.</li> </ul>
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This advice outlines aspects of the proposed development that are relevant from the jurisdiction of SARA. This advice is provided in good faith and is:

- based on the material and information provided to SARA;
- valid for a period of 9 months unless a change in legislation or policy occurs that affects the advice
- not applicable if the proposal is changed from that which formed the basis of this advice.

This advice does not constitute an approval or an endorsement that SARA supports the development proposal. Additional information may be required to allow SARA to properly assess the development proposal when a formal application has been lodged.

If you require further information please contact Catherine Hobbs, Principal Planning Officer, on 47583412 or via email [NQSARA@dsmip.qld.gov.au](mailto:NQSARA@dsmip.qld.gov.au) who will be pleased to assist.

Yours sincerely



Graeme Kenna  
Manager (Planning)

Development details	
Proposal:	The Haughton Pipeline Duplication Project is a critical part of providing water security for the Townsville region. The water transfer pipeline for Stage 2, includes the extension of the existing DN1800 pipeline from the Stage 1.1b works to a new pump station located between the Tom Fenwick pump station and the Clare Weir.
Street address:	Ravenswood Road, Woodhouse Road, Ayr Dalbeg Road and Ravenswood Road, Mulgrave and Keith Venables Road, Upper Haughton and Millet Road, Upper Haughton
Real property description:	Lot 15 on CP891307; Lot 308 on GS1041; Lot 22 on GS1042; Lot 170 on GS804007; Lot 257 on GS804007; Lot 258 on GS804007; Lot 259 on GS804008; Lot 260 on GS804008; Lot 261 on GS804009; Lot 301 on SP107466; Lot 302 on SP107469; Lot 4 on SP107479; Lot 5 on SP107479; Lot 33 on SP117630; Lot 71 on SP289517; Lot 2 on SP302825; Lot 3 on SP302825
SARA role:	Assessment manager
Assessment Manager:	SARA
Assessment criteria:	State Development Assessment Provisions (SDAP): State code 1: Development in a state-controlled road environment State code 16: Native vegetation clearing State code 18: Constructing or raising waterway barrier works
Existing use:	Burdekin River
Relevant site history:	Burdekin River

# **Appendix C**

## **Approvals Register**

Approval type & relevant legislation	Administering authority	Project phase & activities	Approval triggers and relevance to the project	Approval timeframe, application fees and supporting information	Responsibility and required action	Status
Commonwealth						
EPBC Act Referral <i>Environment Protection and Biodiversity Conservation Act 1999</i>	DAWE	Phase 1-2 Corridor / site selection and various aspects of development	An EPBC Act Referral is required to be submitted to DAWE when a project has the potential to significantly impact MNES protected under the EPBC Act.  Townsville City Council as the proponent for the project, have advised that they want to submit an EPBC Act Referral for the Stage 2 works. The EPBC Act Referral online form will be prepared by GHD and submitted to DAWE following completion of the ecology survey as the findings of this survey will inform the assessment against the <i>Significant Impact Guidelines 1.1</i> .	The EPBC Act Referral process takes approximately 2-3 weeks for validation and then 28 days (20 business days) for public notification and a decision to be made on whether the proposed action is a 'controlled action' or not. Depending on the outcome, further documentation and assessment may be required.  The initial referral fee is in the order of <b>\$6,577</b> . Subsequent assessment fees may apply depending on the determination and assessment process should the action be declared a 'controlled action'.	GHD arranged for an ecological field survey of the pipeline corridor and pump station stie (February 2021) with findings reported in an Environmental Assessment Report. The ecological field survey included searches for potential habitat for Threatened, Near Threatened and migratory flora and fauna species including the presence of MNES and MSES.  An ecological field survey of the proposed HV power supply and substation site will be undertaken at a later date, once the design of these components has progressed further. This may require a separate EPBC Act Referral to be prepared and submitted to DAWE or where appropriate, a supplementary self-assessment report may suffice outlining the risk and/or need for a separate Referral to be submitted to DAWE.	An initial EPBC Referral was lodged on 17 December 2021. The final submission was lodged on 18 January 2022. The Referral was published on 19 January 2022.  The Referral Decision was issued by DAWE on 18 February 2022 by way of a Referral Decision. The impacts of HPS2 on MNES was deemed a 'controlled action'. Assessment will be by preliminary documentation. Fees for Stage 1 and Stage 2 assessment by preliminary documentation were <b>\$10,270</b> . An RFI was issued by DAWE on 10 March 2022. Supplementary self-assessment report or separate EPBC Act Referral (depending on proponent preference and project risk) for HV power supply and substation to be prepared at a later date –subject to further design information and a subsequent ecology field survey to confirm potential impacts on MNES.
Native Title and Future Acts <i>Native Title Act 1993 (Commonwealth)</i> <i>Native Title (Queensland) Act 2003</i>	National Native Title Tribunal (NNTT) Registered Native Title Party	Phase 1-2 Corridor / site selection, changes to land tenure and suppression of native title rights.	A Future Act is an act in relation to land or waters which must 'affect' native title. ILUA's are generally required with Native Title parties where Native Title has not been extinguished over the land and development has the potential to impact on or suppress native title rights. Various tenure exists within the proposed project area including State land, Lands lease, Reserve land and Freehold land. One native title claim is registered over the project area to the Bindal People #2 (QC2016/005).	No statutory timeframes apply; however, negotiations could be expected to take between 6-12 months or even longer to resolve complex native title issues.  Costs will depend on the Aboriginal parties involved and any compensation that might be payable for their involvement in the project and any suppression or extinguishment of native title rights.	Townsville City Council to meet with the Department of Resources (DR) and the registered Native Title Party (The Bindal People) to discuss native title implications and requirements with respect to the pipeline, pump station, substation, HV power supply and any proposed easements or changes to land tenure.	Native title matters are currently being investigated by Townsville City Council.
State						
Ministerial Infrastructure Designation (MID) or Local Government Infrastructure Designation (LGID) <i>Planning Act 2016. Part 5 / Planning Regulation 2017,</i> <i>Schedule 5, Part 2, Item 17</i> <i>Minister's Guidelines and Rules</i>	Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) (Infrastructure Designations team)	Phase 1-2 Corridor / site selection and various aspects of development	The establishment of water cycle management infrastructure is listed under Schedule 5, Part 2 of the <i>Planning Regulation 2017</i> .  Development in relation to infrastructure under an MID is accepted development, with no further development approvals required under the <i>Planning Act 2016</i> . However, building works approvals still apply.  Applicants are required to carry out stakeholder engagement activities and consultation before the minister can decide an application for MID. This will likely take longer than 6 months to complete and specific details about the project should be well defined at the initial advice and endorsement stages.	The approval process includes a request for a pre-lodgement meeting/initial advice, preliminary stakeholder engagement, endorsement to seek a MID, lodgement of a MID proposal, consultation (25 bd), consideration of any submissions and the Minister's decision.  It is anticipated that this process could take between 6-9 months to navigate given the public consultation and reporting requirements.  Application fees do not apply.	No further action is required. However, should Townsville City Council want to pursue the MID process GHD can contact the Infrastructure Designations team directly to obtain formal writing advice in relation to if an MID or LGID would be the most appropriate planning assessment pathway for the project (taking into consideration various development aspects and time constraints) and to better understand current assessment timeframes.	A MID is unlikely to be secured within the project milestones – GHD can investigate the assessment timeframes with the ID team further if required.
Regional interest development application (RIDA) <i>Regional Planning Interests Act 2014</i>	DSDILGP (Regional Planning Interests development)	Phase 1-2 Corridor / site selection and development on strategic cropping land	The <i>Planning Act 2016</i> is complemented by the <i>Regional Planning Interests Act 2014</i> which extends the consideration of land use policies contained in regional plans to include resource activities (e.g. mining and petroleum) and other regulated activities (e.g. broadacre cropping and water storage dams) that generally occur outside the jurisdiction of the <i>Planning Act 2016</i> and local planning schemes.	The project is not considered to be a resource activity or regulated activity that would require a RIDA approval.  If an approval was to be required, a pre-application discussion would be required followed by preparation and lodgement of a RIDA application. The RIDA could take 3 to 4	No further action required.  However, GHD can contact the RPI development assessment team directly if Townsville City Council would like to obtain formal written confirmation that a RIDA application will not be triggered or that the project qualifies as public	Not considered to be required.  Any further changes to the proposed design and location of key infrastructure may need to be reassessed to confirm mapping and development triggers under the North



Approval type & relevant legislation	Administering authority	Project phase & activities	Approval triggers and relevance to the project	Approval timeframe, application fees and supporting information	Responsibility and required action	Status
<i>Regional Planning Interests Regulation 2014</i>	assessment team)		<p>The project area is mapped as containing a small portion of strategic cropping land and falls entirely within the priority agricultural area. Non-agricultural development within priority agricultural areas is not supported unless the proposed use demonstrates net benefits for regional agricultural production or is for public infrastructure. The integrity of the stock route network must also not be compromised.</p> <p>The project is not considered to constitute a resource activity or regulated activity that would require a RIDA approval from DSDILGP. The project is also considered to be public infrastructure. Assessment benchmarks may still apply to MCU and RaL applications assessed by Burdekin Shire Council and/or SARA as outlined in Table 5 of the North Qld Regional Plan.</p>	months to be assessed depending on if public notification is required and if any submissions are received.	infrastructure removing the assessment benchmarks under Table 5 of the North Qld Regional Plan.	Queensland Regional Plan and relevant legislation (as required).
Owners consent <i>Planning Act 2016</i> <i>Land Act 1994</i>	DR – SLAM unit	Phase 1-2 Lodgement of MCU and RaL applications	<p><b>Only applicable to MCU and/or RaL applications</b></p> <p>Where the applicant is not the landowner, owner's consent is likely to be required to support an MCU or RAL application and in some instances Op Works development applications. For State land and Reserve land, such as the proposed pump station site, written consent must be obtained from the SLAM unit prior to lodgement of an MCU application. For Freehold land, such as the proposed substation site, written consent must be obtained from the landowner prior to lodgement of an MCU or RAL application.</p>	<p>No statutory timeframes or application fees apply. However, it generally takes up to 2 months to obtain owners consent from the SLAM unit once the necessary forms have been lodged.</p> <p>Application forms that need to be submitted to SLAM include: LA00 - Application form part A LA08 - Application for owner's consent to a development application.</p>	<p>GHD to apply for landowners' consent from the SLAM unit if an MCU application over Reserve land is required to be lodged with Burdekin Shire Council or SARA as the assessment manager for the pump station.</p> <p>Townsville City Council to seek landowners' consent where RAL applications over Freehold land are required to be lodged with Burdekin Shire Council or SARA as the assessment manager for the substation.</p>	<p>Owners consent is not required for Op Works applications.</p> <p>Should the pump station and/or substation trigger a MCU or RaL application, owner's consent will need to be obtained prior to lodgement of the development application.</p>
Relevant purpose determination and development permit for operational work that involves vegetation clearing. <i>Planning Act 2016</i> Schedule 8, Table 4, Item 3 (b) of the <i>Planning Regulation 2017</i> <i>Vegetation Management Act 1999</i>	SARA and DR	Phase 1-2 Corridor / site selection and clearing of native vegetation mapped as Category B remnant vegetation	<p>Op works triggers and relevant purpose determination</p> <p>Operational work that is the clearing of native vegetation on prescribed land.</p> <p>Prior to submitting the development application to clear native vegetation, the proponent must first obtain written confirmation from DR that the proposed development is for a relevant purpose under section 22A of the <i>Vegetation Management Act 1999</i>.</p> <p>Clearing of vegetation in any category C or category R areas, can only be undertaken as exempt clearing work or in accordance with an accepted development vegetation clearing code.</p> <p>The proposed 200 m wide design corridor contains Category R vegetation containing 'least concern' (2.5503 ha) regional ecosystems and Category B vegetation containing 'least concern' (485.6098 ha) and 'of concern' (23.8113 ha) regional ecosystems as well as an area of essential habitat (16.8684 ha) for the estuarine crocodile.</p> <p>The proposed 40 m wide construction corridor would only result in approximately a quarter of these areas being disturbed and/or cleared for construction of the 28.5 km long pipeline. Post construction, a 13 m wide corridor will be maintained as a cleared corridor and the remainder of the 27 m pipeline corridor will be allowed to regrow.</p> <p>Whereas construction of the new pump station could result in up to a 200m wide disturbance area for the full length of the site back to Ayr Dalbeg Road in order to accommodate laydown areas and access to the river.</p> <p>Vegetation clearing associated with the substation and power supply works is awaiting further design information to be able to determine the impact and extent of any vegetation clearing/disturbance.</p>	<p>Applications for relevant purpose determination take around 4 weeks to be processed by DR. No application fees apply.</p> <p>Code assessable Op Works development applications usually take between 3 to 6 months to be assessed. The application fee for assessment of clearing native vegetation that is operational work is <b>\$13,486</b>.</p> <p>As a minimum, a development application for clearing native vegetation will need to include:</p> <p>Relevant purpose determination DA Form 1 Vegetation Management Plan Report Assessment against the State Development Assessment Provisions (SDAP) State Code 16: Native vegetation clearing Significant residual impact assessment Pre-clearance flora and fauna surveys including additional provisions where specific fauna habitat (e.g. crocodile and BTF habitat) is recorded. Construction Environmental Management Plan (CEMP) Concept Erosion and Sediment Control Plan (ESCP) Rehabilitation Management Plan for Essential Habitat (BFT and estuarine crocodile).</p>	<p>GHD submitted a relevant purpose application to DR on the 17/11/20 for the preferred pipeline alignment options. An updated application seeking relevant purpose determination was then submitted for a revised pipeline realignment on 7/12/2020. The relevant purpose determination was approved by DR on 12 January 2021 and is valid for 2 years.</p> <p>On 17 March 2021, a new relevant purpose determination was submitted to DoR. The purpose of this new relevant purpose determination was to address changes to the alternate pipeline duplication and was to replace the previous relevant purpose determination dated 12 January 2021. DoR provided correspondence on 5 May 2021 advising that the proposed development to clear vegetation for the purpose of relevant infrastructure activities met the requirements of section 22A of the <i>Vegetation Management Act 1999</i>.</p> <p>On 7 October 2021, a revised relevant purpose determination application was submitted to DoR. Following ongoing negotiation with the landholders and filed investigations/surveys, some further design changes to the pipeline alignment occurred and temporary construction access tracks and pipe stockpile sites for use during construction were identified. On 21 December 2021, DoR provided correspondence advising that the proposed development to clear vegetation for the purpose of relevant infrastructure activities met the requirements of section 22A of the <i>Vegetation Management Act 1999</i>.</p>	<p>The Op Works application for the HPS2 was lodged with SARA as the Assessment Manger on 17 January 2022. An Action Notice was received on 7 February 2022 relating to fees payable. The Op Works application was considered Properly Made on 15 February 2022 when the Confirmation Notice was received from SARA. A SARA Request for Additional Information (RFI) and SARA advice notice was received on 24 February 2022.</p> <p>The RFI included matters relating to native vegetation clearing.</p> <p>A response to the SARA RFI and advice notice is required to be submitted to SARA on or before 24 May 2022.</p> <p>Vegetation clearing associated with the substation and power supply works is awaiting further design information to be able to determine the impact and extent of any vegetation clearing/disturbance</p>

Approval type & relevant legislation	Administering authority	Project phase & activities	Approval triggers and relevance to the project	Approval timeframe, application fees and supporting information	Responsibility and required action	Status
					<p>GHD to prepare and submit a separate 22A application to DoR for the pump station.</p> <p>GHD to prepare and submit a separate 22A application to DoR for the substation and HV powerlines once a development footprint and preferred alignment are known.</p> <p>The construction contractor will be responsible for compliance with permit conditions and implementation of management measures in accordance with any development approvals issued.</p>	
<p>Development permit for Op Works that involves constructing WWBWs; or Compliance with the accepted development requirements for operational work that is constructing or raising WWBWs</p> <p><i>Planning Act 2016</i> Schedule 8, Table 4, Item 3 (m) of the <i>Planning Regulation 2017</i> <i>Fisheries Act 1994</i></p>	SARA and DAF	Phase 1-4 Corridor / site selection and construction of any waterway barrier works (temporary or permanent) within a mapped waterway	<p>This applies to permanent and temporary waterway barrier works located within the bed and banks of the Burdekin River and other waterways mapped within the project area.</p> <p>The Burdekin River is identified as a major waterway (purple). There are also red, amber and green waterways located along the proposed pipeline corridor where the pipeline will need to be installed across the waterway.</p> <p><b>Op works triggers</b></p> <p>This will apply to permanent and temporary waterway barrier works located within the bed and banks of the Burdekin River and other waterways mapped within the project area.</p> <p>Construction of the pipeline across multiple waterway crossing will not constitute waterway barrier works as long as construction activities do not raise the natural bed level, do not reduce the cross-sectional area of the water and the waterway is reinstated to pre-existing conditions.</p> <p>Construction of the intake structure within the Burdekin River for the pump station (where reducing the cross-sectional area of the waterway or raising the natural bed level of the waterway,) will likely constitute waterway barrier works requiring a development approval.</p> <p>Construction activities resulting in temporary waterway barrier works (e.g. for erosion and sediment control structures) will likely be undertaken at multiple waterway crossings. Where the accepted development requirements cannot be complied with a development approval will be required.</p>	<p>Code assessable Op Works development applications usually take between 3 to 6 months to be assessed. The application fee for assessment of a waterway barrier in a major risk waterway (purple) is <b>\$13,486</b>.</p> <p>As a minimum, the application will need to include:</p> <p>DA Form 1 and Template 4: Waterway Barrier Works</p> <p>Drawings of WWBWs including existing bed and bank profiles</p> <p>Hydraulic modelling</p> <p>Written advice or a statement from a suitably qualified fish passage biologist</p> <p>Assessment against SDAP State Code 18: Constructing or raising waterway barrier works in fish habitats.</p> <p>For accepted development, notification must be made prior to but no more than 20 business days before work commences and within 15 business days post-works. No application fees apply to accepted development.</p>	<p>GHD to provide additional design drawings to DAF of the pump station intake. This will assist in clarifying whether the proposed works constitute WWBWs and the need for a development approval.</p> <p>Once an approval is obtained, the construction contractor will be responsible for compliance with permit conditions and implementation of management measures in accordance with any development approvals issued.</p> <p>The construction contractor will be responsible for completing any temporary waterway barrier works and required notifications for accepted development involving WWBWs in accordance with the accepted development requirements</p>	<p>Pre-lodgement meeting held with SARA on 23 December 2020 and subsequent written advice received on 7 January 2021. Additional prelodgement meeting to be held with SARA mid-April to determine requirements for the pump station intake.</p> <p>Preparation of the MCU and Op Works application for the pump station is expected to commence mid-2022.</p>
<p>Development permit for operational work impacting on and for access to a SCR as well as Road Corridor Permits and third-party agreements for installation of utility assets in the SCR Reserve</p> <p><i>Planning Act 2016</i></p> <p>Schedule 10, Part 9, Division 4, Subdivision 2, Table 5, Item 1 of the <i>Planning Regulation 2017</i> <i>Transport Infrastructure Act 1994</i></p>	SARA and DTMR	Phase 1-4 Corridor / site selection, access to the SCR and use of the SCR during construction	<p><b>RAL triggers</b></p> <p>Creating a new lot within 25m of a State transport corridor and/or requiring access from a SCR.</p> <p>There is the potential for two new lots off Ayr-Dalbeg Road to be created for the substation and pump station.</p> <p><b>Op Works triggers</b></p> <p>Development involving operational work within 25 m of a State transport corridor and the work relates to access to a State transport corridor.</p> <p>The proposed pipeline alignment crosses Ayr-Dalbeg Road and Ayr Ravenswood Road which are both SCRs.</p> <p>The substation and power supply works will likely require additional access points from Ayr-Dalbeg Road. Operational work will also occur within 25m of the SCR and construction related activities will result in traffic using the SCRs and material being transported via the SRC network.</p> <p>DTMR have advised that the project will need to ensure that there will be minimal disruption to state transport corridors, haul vehicle configurations proposed can lawfully and physically perform/achieve haulage and construction works</p>	<p>Code assessable Op Works development applications usually take between 3 to 6 months to be assessed.</p> <p>The application fee payable to SARA for the DTMR triggers are likely to be in the order of <b>\$1,685</b> for each RaL application, <b>\$5,058</b> for the pump station and pipeline op works application and <b>\$3,373</b> for the substation and power supply works. Where multiple development triggers exist and there is likely to be a duplication of DTMR's assessment, a discretionary refund of fees can be requested by the applicant.</p> <p>As a minimum, the application will need to include:</p> <p>DA Form 1</p> <p>Assessment against SDAP State Code 1: Development in a State-controlled road environment and State Code 6: Protection of State transport networks</p> <p>Traffic impact assessment (TIA)</p> <p>Pavement impact assessment (PIA)</p>	<p>GHD to prepare the requested supporting information and provide additional design drawings to DTMR as soon as available to obtain preliminary support for the proposed alignment and construction methodology.</p> <p>DTMR have requested the following information from GHD prior to lodgement of the development application:</p> <p>Truck movements</p> <p>Impacts</p> <p>Access points including construction access locations (preferably no temporary access of SCRs)</p> <p>Additional information on the proposed open trenching at Ayr-Dalbeg Road</p> <p>Whether the pipeline will be perpendicular where it crosses the SCRs</p> <p>The access location to the pump station site.</p>	<p>Pre-lodgement meeting held with SARA on 23 December 2020 and subsequent written advice received on 7 January 2021.</p> <p>GHD have contacted DTMR to discuss specific design details and requirements for the TIA, PIA, RSA and SQMP.</p> <p>The Op Works application for the HPS2 was lodged with SARA as the Assessment Manger on 17 January 2022. An Action Notice was received on 7 February 2022 relating to fees payable. The Op Works application was considered Properly Made on 15 February 2022 when the Confirmation Notice was received from SARA. A SARA Request for Additional Information (RFI) and SARA</p>

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			<p>can be managed to ensure no adverse safety impacts for road users.</p> <p><b>Road Corridor and Traffic Permits</b></p> <p>A Road Corridor Permit will be required for undertaking an activity, conducting works or erecting a structure within the SCR corridor.</p> <p>A Traffic Control Permit will also be required for any lane closures and traffic controls during construction.</p>	<p>Road safety impact assessment (RSA)</p> <p>Stormwater quality management plan (SQMP)</p> <p>Construction Environmental Management Plan</p> <p>Traffic management plan.</p> <p>Allow approximately 4 weeks for obtaining Road Corridor Permits and Traffic Control Permits</p>	<p>Road corridor permits and traffic control permits are to be applied for by the construction contractor prior to or during the construction phase.</p> <p>The construction contractor will be responsible for compliance with permit conditions and implementation of management measures in accordance with any development approvals issued.</p>	<p>advice notice was received on 24 February 2022.</p> <p>Matters relating to State transport networks were included in the RFI and advice notice.</p> <p>A response to the SARA RFI and advice notice is required to be submitted to SARA on or before 24 May 2022.</p> <p>Road corridor and traffic permits to be applied for by the construction contractor in Phase 3 or 4.</p>
<p>Development permit for building works that cannot meet the accepted development requirements</p> <p><i>Building Act 1975</i></p>	<p>Burdekin Shire Council or Private Building Certifier</p>	<p>Phase 2-4</p> <p>Detailed design and construction of structural buildings (i.e. pump station and substation)</p>	<p>This will apply to any buildings and structures associated with the pump station and substation.</p> <p>Schedule 7 of the <i>Planning Regulation 2017</i> identifies development that is identified as accepted development, meaning that a development approval is not required if the development or work complies with the applicable requirements (where listed). Building work, other than building work mentioned in section 1, carried out by or for the State or a public sector entity, to the extent the building work complies with the relevant provisions for the building work is listed as accepted development.</p> <p>However, it is noted that public sector entities have the option to engage a private building certifier or suitably qualified RPEQ to ensure that the construction contractor engaged to complete the building work complies with the relevant provisions for the building work even though a development permit is not legally required to be applied for.</p> <p>At this stage, the proposed design for the pump station may not be able to comply with all of the accepted development provisions (alternative arrangements for fire protection may be required), therefore an independent fire report and building permit may be necessary to demonstrate compliance with the <i>Building Act 1975</i>.</p> <p>A building application and approval from Burdekin Shire Council may also be required to build over or near relevant infrastructure (where applicable)</p>	<p>Where a Building Permit is required, an application will need to be submitted to Burdekin Shire Council or a Private Building Certifier. Application fees will need TBC with Council or the Building Certifier as they will likely depend on the classification and number of inspections required.</p> <p>Timeframes for building work applications vary depending on how long it takes to complete the building work, but generally the building work is expected to be completed within 12 months from issue of the Building Permit.</p> <p>As a minimum, the application will need to include:</p> <p>DA Form 2</p> <p>Site plan</p> <p>Soil Test Report</p> <p>Scaled structural drawing plans</p> <p>Form 15s – Compliance Certificate for Building Design or Specification, if applicable</p> <p>Form 16s - Inspection Certificate/Aspect Certificate, if applicable</p> <p>Q Leave Levy Notification, if applicable</p> <p>Building Application - Additional Information Form (including copy of signed QBCC Licence)</p>	<p>GHD to confirm building requirements with Burdekin Shire Council or a Private Building Certifier around the design and fire protection arrangements for the pump station and/or substation buildings.</p>	<p>Preliminary design plans are currently being developed for the pump station.</p> <p>Discussions with a building certifier will likely follow in the coming weeks or as the detailed design progresses.</p>
<p>Development permit for taking or interfering with water</p> <p><i>Water Act 2000</i></p>	<p>Department of Regional Development, Manufacturing and Water (DRDMW)</p>	<p>Phase 1-4</p> <p>Operational activities associated with the pump station intake and construction activities required access to water</p>	<p>The take of water from the Burdekin River is understood to be under a supply agreement and existing water allocation held by Sunwater. Therefore, a development permit is not required for the take of 364 ML/day of raw water from the Burdekin River.</p> <p>Constructing authorities (as defined in Schedule 2 of the <i>Acquisition of Land Act 1967</i>) can take water without a permit or licence to construct or maintain infrastructure as long as the take of water is done in accordance with the 'Exemption requirements for construction authorities for the taking of water without a water entitlement'. This includes both surface water and underground water.</p>	<p>The project is not considered to require a Development Permit for the take or interference of water.</p> <p>Under the 'Exemption requirements for construction authorities for the taking of water without a water entitlement' notification is required 10 business days prior to the take of water.</p> <p>Details to be provided include the purpose for which water will be taken, name(s) of water source(s) and locations, proposed commencement and completion dates and anticipated volumes to be taken.</p>	<p>Where works can be undertaken using the exemption provisions, notifications will need to be carried out (at least 10 business days before the take of water) by the construction contractor.</p> <p>Details must be recorded of the water taken and records kept for a period of two years.</p>	<p>Construction contractor to confirm compliance with exemption requirements and ongoing management during Phase 3 and 4.</p>
<p>Development Permit for possible ERA's</p> <p><i>Environmental Protection Act 1994</i></p>	<p>Department of Environment and Science (DES)</p>	<p>Phase 3-4</p> <p>Construction activities</p>	<p>The proposed pipeline construction has the potential to trigger ERA 16 – Extraction and Screening if large amounts of spoil are to be removed from the site and depending on how the project is staged (i.e. the quantities of material removed at any point in time).</p> <p>A development permit for an environmental authority will be required where the nominated thresholds for material are exceeded.</p>	<p>If required, an application will likely take between 3 to 6 months to be assessed.</p> <p>Application fees TBC with DES.</p> <p>Eligibility criteria and standard conditions have been developed for ERA 16 along with model operating conditions.</p>	<p>ERA's are to be applied for by the construction contractor prior to or during the construction phase (if required).</p>	<p>To be applied for by the construction contractor in Phase 3 or 4 (if required).</p>

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Development permit for moving quarry material from a watercourse or lake <i>Water Act 2000</i>	DRDMW	Phase 3-4 Construction activities	The removal of quarry material from a watercourse or lake requires a development permit if the quarry material is to be sold or used for a productive purpose, such as for manufacturing, roads, building, or fill.  A quarry material allocation is also required which authorises the extraction of a given volume of material from a specific location in a watercourse or lake.	If required, an application will likely take between 3 to 6 months to be assessed. Application fees TBC with DRDMW The application will need to address State Code 15: Removal of quarry material for a watercourse or lake.	Road works permits from Burdekin Shire Council are to be applied for by the construction contractor prior to or during the construction phase.	To be applied for by the construction contractor in Phase 3 or 4 (if required).
Land tenure changes and public utility easements <i>Land Act 1994</i>	DR (SLAM unit)	Phase 1-2 Corridor / site selection	Formalised access arrangements (by way of public utility easements) for the pipeline and HV power supply corridors and Freehold ownership of land for construction of the pump station and substation is required by Townsville City Council.	Allow approximately 6-12 months to complete tenure changes and to register easements. Fees TBC with DR. DR have advised that the Reserve land should be acquired by applying for a priority purchase. Native title issues and advice on impacts to the stock route network will have to be considered by DR as part of their assessment. Application fees TBC with DR. An application to DR for a public utility easement over State land should include: LA00—Application form part A LA11—Application for an easement over State land Application fee Any additional attachments, as requested (including how native titles have been addressed (if relevant)) Applications also need to be supported by a survey plan and consent of the current trustee (as applicable).	Townsville City Council will need to meet with DoR to discuss the proposed land tenure changes, easements and application requirements with respect to the pipeline, pump station, substation, HV power supply.	Land tenure matters are currently being investigated by Townsville City Council.
Permit for development within the stock route network <i>Stock Route Management Act 2002</i>	DoR and Burdekin Shire Council	Phase 1-2 Corridor / site selection	Queensland Government DA mapping indicates that proposed pump station site is mapped as a Queensland Stock Route Network. The proposed pipeline corridor also intersects a large area mapped as part of the Stock Route Network. Under the <i>Stock Route Management Act 2002</i> , the administration of the Stock Route Network is shared between Local Government and DR.  The local Council manages the stock routes within the shire which usually contain water facilities and reserves. Before any use of the Stock Route is undertaken, a permit must be issued by the local Council.  During construction and upon completion of the pipeline, safe access for travelling stock to utilise the stock route reserves must not be impeded.	Allow approximately 1 month for any advice/feedback or to obtain any required permits to undertake construction works and/or build within the stock route network.	The SLAM unit have advised that Townsville City Council should apply for a priority purchase over the required area for the pump station site to facilitate use of the land for this purpose.	Land tenure changes are currently being managed and investigated by Townsville City Council.
Protected plant clearing permit or exempt clearing notification <i>Nature Conservation Act 1992</i>	DES	Phase 1-2 Corridor / site selection and clearing of protected plants	This applies to clearing in areas identified as being within the high-risk flora survey trigger area for protected plants or where protected plants have been detected.  A search of the Protected Plants Flora Survey Trigger indicates that the project area does not contain any high-risk areas. However, should protected plants be confirmed present during the ecological field survey, further targeted flora surveys may be required to be undertaken in accordance with the guideline and a clearing permit or exemption notice obtained prior to any clearing activities commencing.	The statutory timeframe for a decision on an application for a clearing permit is 40 business days (assuming no information requests or public notification requirements). If the ecological survey does not identify the presence of any protected plants, a copy of the flora survey report and an exempt clearing notification will need to be submitted. Application fees TBC.	GHD have arranged for an ecological field survey of the pipeline corridor and pump station site to confirm the presence of any protected plants.  If no protected plants are identified, a copy of the survey report and exempt clearing notification will need to be submitted prior to undertaking the clearing works.  If protected plants are confirmed present, further targeted flora surveys may be required and a protected plant clearing permit will need to be applied for.  Further ecological surveys will be required for the substation site and HV power supply corridor once design details are known.	

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Species management program (SMP) or damage mitigation permit <i>Nature Conservation Act 1992</i>	DES	Phase 1-2 Corridor / site selection, clearing activities and construction works	When clearing areas that involve or has the potential to result in tampering with a protected animal breeding place. If detected, an application for a low risk or high risk SMP may be required.  The ecological field survey being undertaken in February 2021 for the pipeline corridor and pump station site will assist in confirming the presence of any endangered, vulnerable, near threatened (EVNT), or special least concern animals and breeding habitat in key areas.  The taking of a protected animal is not authorised under an SMP. Therefore, should this be required, a separate wildlife authority such as a damage mitigation permit (for the removal and relocation of wildlife or the culling and dispersal of wildlife) would be required.	The statutory timeframe for a decision on an application for a SMP and or damage mitigation permit is 40 business days.  Application fees TBC.	If protected animal species are confirmed present, further targeted fauna surveys may be required and a SMP may need to be applied for or a damage mitigation permit obtained.  A spotter catcher may be required to be on site during land clearing activities to relocate fauna.	A High Risk Species Management Plan (SMP) has been lodged with DES.  Approval of the High Risk SMP is expected on 6 April 2022.
Riverine protection permit (RPP) <i>Water Act 2000</i>	DRDMW	Phase 3-4 Construction activities	In accordance with the <i>Water Act 2000</i> , for a feature that has been determined to be a watercourse, works that involve the placement or excavation of fill, or the removal of vegetation, may be undertaken in compliance with the riverine protection permit exemption requirements.  Townsville City Council is considered an approved entity for the purposes of the riverine protection permit exemption requirements. The volumetric restrictions associated with the riverine protection permit exemption requirements do not apply to approved entities/ local government authorities.  Where works are unable to comply with the exemption requirements, a RPP would be required to be obtained from DRDMW.	Allow approximately 2 months if a RPP is required to be applied for.  No fees currently apply.  Supporting information needs to include details of the activity, purpose of the activity, construction methods, location of the activity and adjacent landowner approval.	If an RPP is required, an application can be made to DRDMW. The application will need to include the relevant application form, details and a plan denoting the area of disturbance and the adjacent landowner consents.  Where works can be undertaken using the exemption provisions, notification will need to be carried out in accordance with the RPP exemption guideline.	Construction contractor to confirm compliance with exemption requirements and ongoing management during Phase 3 and 4.
Environmental offsets for impacts to MSES and MNES <i>Environmental Offsets Act 2014</i>	SARA / DES / DR	Phase 1-2 Corridor / site selection, clearing activities and construction works	An environmental offset may be required where there are residual impacts following the removal of fauna, flora and habitat that cannot be avoided after applying mitigation and management measures.  An assessment of significant residual impacts in accordance with Queensland Environmental Offsets Policy Significant Residual Impact Guideline is likely to be required for the proposed vegetation clearing.	Allow approximately 3 weeks for the bioconditions assessment to verify offset requirements.  A decision on any environmental offset requirements should be reflected in the development permits and any conditions of approval.	GHD to undertake a biocondition assessment to verify offset requirements.	The biocondition assessment is required to inform the subsequent Offset Strategy.
General Environmental Duty <i>Environmental Protection Act 1994</i>	DES	Phase 3-4 Construction activities	The general environmental duty outlines the duty of care responsibilities of all those undertaking work on the project and the obligation to take all necessary measures to prevent environmental harm.	Demonstration of taking all reasonable and practical steps to prevent or minimise environmental harm (i.e. CEMP, ESCP, work method statements, inspection checklists).	Townsville City Council and the construction contractor will need to keep records of compliance and document what measures have been taken to comply with their General Environmental Duty.  Records should typically consist of a CEMP, ESCP, work method statements and inspection checklists.	Procedures to be identified in tender documentation and ongoing management during the construction phase.
General Biosecurity Obligation <i>Biosecurity Act 2014</i> Commonwealth pest and weed management strategies	Biosecurity Queensland DAF	Phase 3-4 Material transport, mobilisation and demobilisation of people, equipment, and machinery to and from site.	This applies to activities which may contribute to the spread of invasive plant or animal species.  Individual landowners and land managers will also have their own biosecurity plans for their property which will need to be adhered to by those accessing the site for pre-construction activities/investigations and construction work.	Demonstration of taking all reasonable and practical steps to minimise the risks associated with the spread of invasive plants under their control (i.e. CEMP, ESCP, work method statements, inspection checklists).	Townsville City Council and the construction contractor will need to demonstrate that all reasonable and practical steps have been taken to minimise the risks associated with invasive plants under their control.  Records should typically consist of a CEMP, ESCP, work method statements and inspection checklists.	Procedures to be identified in tender documentation and management during the construction phase.  Ecological field survey to include weed surveys and weed reports.
Cultural Heritage Duty of Care <i>Aboriginal Cultural Heritage Act 2003</i> <i>Cultural Heritage Duty of Care Guidelines Torres Strait Islander Cultural Heritage Act 2003</i>	Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP)	Phase 1-4 Corridor / site selection and works involving ground disturbance	Section 23(1) of the <i>Aboriginal Cultural Heritage Act 2003</i> states that a person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage (the "cultural heritage duty of care"). A person who carries out an activity is taken to have complied with the cultural heritage duty of care if the person is acting in compliance with gazetted cultural heritage duty of care guidelines.  A cultural heritage survey of the development footprint may be required to identify any items of significance and to agree on appropriate mitigation measures.	No statutory timeframes exist, however cultural heritage surveys and negotiations with The Bindal People may take approximately 3-6 months to be completed.  Costs will depend on the cultural heritage measures implemented to meet the duty of care guidelines and the Aboriginal party involved as costs might be payable to them for their time and involvement in the project and any cultural heritage surveys or	Townsville City Council to engage a cultural heritage officer or technical advisor to assess the cultural heritage risks and to meet with The Bindal People to discuss any cultural heritage matters/expectations with respect to the pipeline, pump station, substation, and HV power supply including the requirement to undertake cultural heritage survey and enter into a Cultural Heritage Management Agreement.	Currently being investigated by Townsville City Council.

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				monitoring activities required prior to and during construction activities.		
Co-use agreements for impacts on power supply infrastructure (e.g. pole relocations & easement widening). Network connection agreements for temporary and/or permanent power supply. <i>Electricity Act 1994</i>	Powerlink or Ergon Energy (advice only)	Phase 1-2 Corridor / site selection and impacts on or distance from existing electricity infrastructure	The pipeline alignment crosses Powerlink infrastructure 275kV Strathmore to Ross and 132KV Clare South to Kings Creek Tee HV transmission lines and runs within Powerline easements.  The proposed HV works will require co-use agreements, power supply agreements and consultation with Ergon and/or Powerlink on any impacts to their power supply network (e.g. pole relocations, easement expansion).	<b>Ergon</b> Ergon have 10 BD to assess the Safety Advice Request following payment of the application fee. <b>Powerlink</b> Powerlink have 30 BD to assess and decide the Co-use application following receipt of the application.	GHD will confirm PUP requirements with Ergon and Powerlink. <b>Ergon</b> A 66 kV power pole inside landholder owner No. 2's property may require relocation due to the proximity HPS2 access track. A Contract Offer is provided once Ergon have conducted an inspection and undertaken their assessment of the need to relocate the power pole. A Safety Advice Request is also required where proposed works are undertaken within Ergon's exclusion zone. <b>Powerlink</b> A Co-use application is required for works carried out beneath high voltage transmission lines.	<b>Ergon</b> A Contract Offer from Ergon for the relocation of the 66 kV power pole is expected on 31 March 2022. Once the Offer has been accepted, there is 26 week lead time for Ergon to relocate the 66 KV power pole. Approval for the Safety Advice Request is expected towards the end of March 2022. <b>Powerlink</b> Meeting held with Powerlink on 18/12/2020 and non-binding response received on 07/02/2021. The Co-use application was lodged with Powerlink on 31 January 2022. An in Principle approval was provided on 15 March 2022. An enquiry for a network connection is in the process of being made for HV power supply to the pump station site.
Co-use agreements and/or permits for works within the rail corridor	Wilmar	Phase 1-2 Corridor / site selection and impacts on the rail corridor	The project will require construction of the pipeline beneath Wilmar's rail line which runs parallel to the Ayr-Dalberg road. Access to the pump station site may also require construction of a new driveway which will cross Wilmar's rail line.  Approval and/or agreement for works to be undertaken and infrastructure located within the rail corridor.	Wilmar require approximately 2-4 weeks to assess the proposed construction of the pipeline beneath Wilmar's rail line.	GHD to confirm project requirements with Wilmar.	GHD have held one meeting with Wilmar (14/12/2020) and have followed up with an email seeking further advice on any specific requirements.  A request for Approval in Principle as lodged with Wilmar on 3 February 2022. Approval in Principle was provided on 22 February 2022.
Deed to manage supply/allocation requirements, the channel intake structure, pump station and any changes to land tenure	Sunwater	Phase 1-2 Corridor / site selection and impacts or distance from existing electricity infrastructure	The project will require construction of the proposed pipeline beneath Sunwater's Haughton Irrigation Channel and an assumed inground syphon.  A Deed may also be required to manage supply/allocation requirements, any shares access to the pump station site, the channel intake structure and any changes to land tenure.	Timeframes, application forms and fees TBC. However, it is recommended to allow at least 2-3 months to obtain the relevant agreements.	GHD to confirm project requirements with Sunwater.	GHD sent an email to Sunwater on 1 February 2021 requesting information on design and approval requirements.  Awaiting meeting and/or response from Sunwater to understand requirements.
Relocation of telecommunication services	Telstra	Phase 1-2 Corridor / site selection and impacts on telecommunication infrastructure	Cable relocations may be required to accommodate project works.	Telstra require approximately 2-4 weeks to assess and make a decision about impacts on telecommunications infrastructure.	GHD to confirm telecommunication requirements with Telstra.	A Memorandum was submitted to Telstra on 4 February outline the proposed works in relation to telecommunication infrastructure.  Telstra provide a 'No Objections' response to the proposed works on 22 February 2022.
Potential for erosion or flood impacts from construction and/or operation of the project.	Burdekin Shire Rivers Improvement Trust	Phase 1-2 Corridor / site selection and	The Burdekin Shire Rivers Improvement Trust covers part of the project area. The function of the trust is to carry out works designed to improve the flow of water in the rivers and	Timeframes TBC. No application forms or fees are known to apply.	GHD to confirm any project requirements with the Burdekin Shire Rivers Improvement Trust as part of stakeholder consultation activities.	Awaiting further development of the pump station and intake structure as part of the design phase.



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<i>River Improvement Trust Act 1940</i>		impacts on the Burdekin River	tributaries within Part of the Shire of Burdekin to correct erosion and provide flood mitigation. It is recommended that the Trust is contacted before any works are undertaken in the Burdekin River to ensure there is no damage to Trust assets.			
Local						
Development assessable under the existing local planning scheme Burdekin Shire IPA Planning Scheme	Burdekin Shire Council	Phase 1-2 Corridor / site selection and various aspects of development	The project area is in the Rural Zone under the Burdekin Shire IPA Planning scheme. <b>MCU triggers</b> A MCU for a 'Public Purpose' is Code assessable development in the Rural Zone. The requirement for a MCU development application for the pump station and substation will require further consultation with Burdekin Shire Council. <b>RaL triggers</b> An RAL is Code assessable development in the Rural Zone. This will primarily apply to the substation site should it need to be constructed on a new parcel of land (to be subdivided from a Freehold estate). <b>Op works triggers</b> Operational work involving excavation and filling is Exempt development in the Rural Zone meaning no assessment or approvals are required.	Where required, a Code assessable MCU and/or RaL application would be expected to take between 3 to 6 months to be assessed. Should the pump station or substation be deemed to constitute development for a 'Public Purpose' a MCU application would need to be lodged with Burdekin Shire Council as the assessment manager for approval. An assessment would be required against the Rural Zone Code. The cost for a MCU application for a 'Public Purpose' use is \$955 as per the Fees and Charges Schedule for 2020-2021. For RaL applications assessable under the IPA Planning Scheme, the Burdekin Shire Council would be the assessment manager and an assessment would be required against the Reconfiguring a Lot Code. The cost for a RaL application (for a single new lot) is \$900. Additional lots incur additional fees.	GHD to obtain further written advice and confirmation from BSC on MCU and RaL triggers for the pump station and substation sites.	Formal written pre-lodgement advice regarding MCU and RAL triggers for the pump station and substation to be obtained.
Development that could be assessable under the draft planning scheme (yet to be adopted) Draft Burdekin Shire Planning Scheme	Burdekin Shire Council	Phase 1-2 Corridor / site selection and various aspects of development	The project area is in the Rural Zone under the Draft Burdekin Shire Council Planning Scheme. <b>MCU triggers</b> 'Utility installation' for the proposed pump station – which includes supplying or treating water 'Substation' for the proposed substation 'Major electricity infrastructure' for the proposed HV power supply. All three defined uses are Code assessable in the Rural Zone if undertaken by a public sector entity such as Townsville City Council <b>RaL triggers</b> Code assessable development is applicable if the lot size is 30ha or larger in an important agricultural area or agricultural land class A and B area. Should the lot size of each lot being created be less than 30ha an Impact assessable development application would be required. <b>Op works triggers</b> Operation work is identified as accepted development for the project area and not considered to require assessment against any specific codes or provisions.	Code assessable Op Works development applications usually take between 3 to 6 months to be assessed. Impact assessable development application can take between 6-12 months for assessment depending on if any submissions are received during the public notification period. Code assessable MCU applications usually take between 3 to 6 months to be assessed. Should the pump station, substation or HV power supply be deemed to constitute development for a MCU, a development application would be required to be lodged with Burdekin Shire Council for approval. Assessment would be required against the Rural Zone Code and Development Works Code. For a Code assessable RaL application, assessment is required against the Reconfiguring a Lot Code and Development Works Code. Whereas Impact assessable development applications require assessment against the entire scheme, including the strategic framework and any relevant provisions. Application fees are as per the current Fees and Charges Schedule for 2020-2021 which does not include the new planning scheme definitions. As such, fees would have to be confirmed with Burdekin Shire Council should the new planning scheme come into effect before project approvals are applied for and/or construction works commence.	GHD to obtain written confirmation from Burdekin Shire Council on MCU and RaL application triggers for the project under the draft planning scheme should it come into effect before construction works commence. Previous correspondence and meetings undertaken with Burdekin Shire Council at the end of 2020 have indicated that the draft planning scheme is expected to be finalised in 2021 and may come into effect as early as mid-2021, replacing the Burdekin Shire IPA Planning Scheme.	Not applicable at this stage.

Approval type & relevant legislation	Administering authority	Project phase & activities	Approval triggers and relevance to the project	Approval timeframe, application fees and supporting information	Responsibility and required action	Status
<p>Work in a local government road reserve</p> <p><i>Local Government Act 2009</i></p> <p><i>Burdekin Shire Council Local Law and Subordinate Local Law No 12 – Roads 2001</i></p>	Burdekin Shire Council	Phase 3-4 Construction activities in the local government road reserve	<p>Approval is required from Burdekin Shire Council to install infrastructure at or below ground level within a local road reserve and to construct new crossovers or driveways.</p> <p>These types of road works permits will be applied for by the construction contractor prior to or during the construction phase.</p>	<p>Allow approximately 4 weeks for processing.</p> <p>Application fees are price on application.</p> <p>Applications should include:</p> <ul style="list-style-type: none"> <li>The relevant application form and fee</li> <li>A site map showing the location of the proposed infrastructure in relation to property boundaries and any other fixed structures.</li> <li>The pipe must be laid at a right angle to the road direction.</li> <li>A traffic management plan.</li> </ul>	Road Works Permits from Burdekin Shire Council are to be applied for by the construction contractor prior to or during the construction phase.	<p>A Road Works Permit was submitted to Burdekin Shire Council on 18 February 2022.</p> <p>Confirmation of application fees was provided by BSC on 15 March 2022.</p>

# **Appendix D**

**Ecological Assessment Reports**







# Haughton's Pipeline Duplication Stage 2

**Targeted MNES survey and reporting**

Townsville City Council

14 September 2021

➔ **The Power of Commitment**





Your ref: [0000]  
Our ref: 12537606

14 September 2021

Townsville City Council

Haughton's Pipeline Duplication Stage 2

# 1. Introduction and background

The Townsville City Council (TCC) are undertaking the Detailed Design for the proposed Stage 2 of the Haughton's Pipeline (HPS2) Project. The HPS2 Project is required to accommodate for increased water demand due to regional growth. The HPS2 Project includes a new pump station, pipeline and associated ancillary works, connecting to the constructed Stage 1 and Stage 1.1. The HPS2 is proposed provide transfer of 364 ML/day of raw water over a 22-hour period from the Burdekin River Clare Weir Storage to Ross River Dam. The Project is proposed as a 28.5 km pipeline running South from the Upper Haughton Irrigation Channel (Stage 1.1 works) to a new pump station adjacent the Burdekin River between the Tom Fenwick pump station and the Clare Weir. The proposed action, along with the previously constructed Stage 1 and Stage 1.1, are collectively known as the Haughton Pipeline Duplication Project (HPDP), located south-east of Townsville, North Queensland, at the base of the Mount Elliot range.

The HPDP includes the following stages:

- Stage 1 of the Project was completed in 2020 and comprises approximately 33 km of DN1800 pipeline constructed from the Haughton River to Toonpan Creek at the head of Ross River Dam
- Stage 1.1 of the Project is scheduled for completion early 2021 and is an extension of the Stage 1 pipeline works by 3 km from the Haughton River, directed towards the Stage 2 pipeline alignment. The Stage 1.1 works end with an isolation valve pit and is the connection point for Stage 2
- Stage 2 (this Project) comprises construction of new pump station and construction of new 28.5 km water pipeline from the pump station to Stage 1.1 to provide an integrated water transfer system and associated ancillary works. Construction for the pipeline is due to begin construction in mid-2022, with construction for the pump station starting in mid-2023.

The Project is a joint funding arrangement between the Queensland Government (the State) and TCC (the Proponent).



Baseline ecological surveys of the HPS2 Project were undertaken by ecologists from NRA Environmental Consultants over three days in April and May 2021. The surveys concluded that the following MNES protected under the EPBC Act have the potential to occur:

- Black ironbox (*Eucalyptus raveretiana*)
- Southern black-throated finch (*Poephila cincta cincta*)
- Bare-rumped sheath-tail bat (*Saccolaimus saccolaimus nudicluniatus*)
- Southern squatter pigeon (*Geophaps scripta scripta*)

Essential habitat for an additional species, the koala (*Phascolarctos cinereus*) occurs within 2 km of the Project. However, the species was considered by NRA to be unlikely to occur on the basis of the species' general low density in the Townsville mainland area.

GHD is currently supporting TCC to prepare an *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) referral for the Project. Initial assessment of the potential impacts of the Project on MNES indicates that the Project is likely to be determined as not a controlled action. However, based on our experience with the Department of Agriculture, Water and the Environment (DAWE), more information is likely to be requested by DAWE for a number of key MNES to justify the assessment of impact significance. For this reason, GHD have scoped this proposal to target key MNES species and knowledge gaps to support the EPBC referral.

The purpose of this proposal is to detail the scope of works that are recommended to fulfill knowledge gaps for MNES species that have potential to occur within proximity to the Project area. The proposed scope includes:

- Targeted survey for key MNES – the black ironbox, southern black-throated finch, bare-rumped sheath-tail bat and koala
- Preparation of a consolidated MNES report to support the EPBC referral

Additional ecological surveys for the proposed five pipe stockpile sites, access roads and pump station area is included in this proposal. The proposed scope includes:

- Additional survey including – RE verification, habitat assessments, description of vegetation communities, searches for the presence of threatened flora and fauna (MNES and MSES), presence of invasive pest and weed species, description of other environmental matters including watercourses and wetlands
- Preparation of a short memorandum (attached to the MNES report), to include the methodology and summarise results from the additional surveys.

Scope of works and survey methodology are provided below, along with our commercial offer to complete the targeted and additional survey works and associated reports.

## 2. Scope of work

### 2.1 Overview

#### Targeted surveys

Targeted surveys are recommended along the Pipeline alignment for the koala, bare-rumped sheath-tail bat, southern black-throated finch and black ironbox to demonstrate sufficient survey effort has been undertaken and to better define the nature and extent of impact on each species. Species-specific justification for the increase in survey effort is provided below:

- **Koala:** DAWE currently have a focus on assessment of impacts to the koala. The koala was a key species of concern in the assessment of an infrastructure Project, immediately west of the HPS2 Project. The proximity of the HPS2 Project to essential habitat for the koala and the presence of riparian *Eucalypt tereticornis* woodland within the alignment, suggests DAWE will require a level of assessment in accordance with the



*EPBC Act referral guidelines for the vulnerable koala* (DAWE 2014) and *Significant Impact Guidelines 1.1* (DAWE 2013). No targeted survey for koala has been undertaken to date.

- **Bare-rumped sheath-tail bat:** The Project intersects large areas of *Eucalyptus platyphylla* woodland that represents suitable roosting habitat for the bare-rumped sheath-tail bat. Quantification of the impact on potential roosting trees will be required by DAWE. An inventory of roost trees on and adjacent to the Project will define the extent of impact on potential roosting habitat and allow any loss to be assessed in the context of the surrounding landscape. An assessment of hollow-bearing trees will also be required to support a High-Risk Species Management Program for the Project.
- **Southern black-throated finch:** The *Significant impact guidelines for the endangered black-throated finch (southern)* 3.13 (DAWE 2009) suggest that targeted surveys are needed for any areas outside mapped important habitat, as these areas have typically been subject to lower historical survey effort. Targeted black-throated finch surveys are recommended to confirm the species presence and identify areas of potential nesting habitat.
- **Black ironbox:** The assessment by NRA suggested the species had the potential to occur but has not confirmed presence or identified the extent of suitable habitat for the species. A targeted assessment is needed to confirm the species presence and quantify the extent of any impact on the species.

### **Additional survey**

Additional surveys of the proposed five pipe stockpile sites, access roads and pump station area are included within this proposal. For efficiency, this survey will be completed at the same time as the targeted surveys. The additional surveys will include the following:

- Verification of Regional Ecosystem (RE) mapping
- Description of vegetation communities
- Description of fauna habitats
- Searches for and presence of MNES and Matters of State Environmental Significance (MSES) and their habitat including fauna and flora species listed as endangered, vulnerable or near threatened (EVNT), migratory and special least-concern
- Presence of weed and pest species
- Description of other environmental matters such as watercourses and wetlands

## **2.2 Scope**

### **2.2.1 Desktop search**

GHD will undertake a preliminary desktop assessment, including a review of the existing NRA Haughton Pipeline Stage 2 Project Environmental Analysis Report to identify and validate the ecological values within the Project Area. Results from the desktop assessment will be used in the MNES report and to prepare mapping of suitable habitat and historical records for species. Desktop searches will be undertaken using the following sources:

- Queensland Globe, Department of Resources (DoR)
- EPBC Protected Matters Search Tool (PMST), DAWE
- Wildlife Online database, Department of Environment and Science (DES)
- Atlas of Living Australia database
- Regional Ecosystem and remnant map, DES
- Regional Ecosystem description database, SES
- Species profile search, DES
- Essential habitat, DES
- Biomaps database, DES
- Matters of State Environmental Significance report, DES
- Regulated vegetation management reports, DoR
- Koala habitat mapping, DES
- Queensland wetland mapping, DES

- Water Act 2000 mapping, DoR
- Queensland waterways for waterway barrier works mapping (version 2.0), Department of Agriculture and Fisheries (DAF)
- Protected plants flora survey trigger map, DES

## 2.2.2 Targeted surveys

GHD has prepared a streamlined, targeted survey approach that intends to increase certainty around the occurrence and extent of impact on the four MNES species that have potential to occur within proximity of the Project area. It is assumed that TCC will organise land access for the targeted surveys. The target surveys are proposed to be completed by two-ecologists over a survey within the Pipeline alignment. Targeted surveys for the black ironbox will also be conducted at the waterway crossings over a two-day survey for one botanist.

Proposed methodology for each species is outlined below.

### **Koala**

Two ecologists will undertake targeted assessment of koala habitats along the Project alignment. The assessment will target areas of highest potential koala habitat value in riparian Eucalypt woodland, including the four major watercourse crossings. At each of the survey locations, targeted surveys for koala faecal pellets will be undertaken using the Spot Assessment Technique (SAT) (Phillips and Callaghan 2011) together with visual searches for koalas. The method proposed is in accordance with *EPBC Act referral guidelines for the vulnerable koala*. Photographic evidence will be taken to record the value of habitat.

### **Bare-rumped sheathtail bat**

Two ecologists will walk the Project alignment over five days, marking the location of all hollow-bearing trees within the 40 m clearing extent. Hollow-bearing trees will be differentiated into those with hollows sufficiently large to provide roosting sites for the bare-rumped sheathtail bat (i.e. >15 cm diameter) and those that are too small (<15 cm diameter). In areas where large hollow-bearing trees will be impacted, hollow trees will be marked within an adjacent 1 ha area to provide context to the relative loss of potential roosting habitat. Photographic evidence will be taken to record the value of roosting sites for the species.

### **Southern black-throated finch**

The black-throated finch survey guidelines recommend that surveys should be undertaken by ecologists with prior survey experience with the species. To address this, the survey will be undertaken in areas of potential nesting habitat by a senior fauna ecologist with experience in black-throated finch surveys. An ecologist and senior fauna ecologist will undertake vigilant visual and aural surveys for the southern black-throated finch over the five day survey period. For efficiency, surveys will be undertaken in conjunction with the hollow tree survey. Any birds seen or heard calling will be recorded and the local habitat values documented. Daytime waterbody watches will be undertaken at dawn, lunch and dusk throughout the duration of the survey. In addition, photographic evidence will be taken to record the value of any foraging or nesting habitat for the species.

### **Black ironbox**

Targeted surveys for *Eucalyptus raveretiana* will be undertaken over two days at the four major watercourse crossings. The survey will be undertaken by a senior botanist using random meander searches of the riparian zone. Any confirmed records will be recorded, with a detailed plot undertaken using the methodology outlined in the *Flora Survey Guidelines*. Where required, samples will be submitted to the Queensland Herbarium for positive identification.



## 2.2.3 Additional surveys

GHD will undertake additional surveys of the proposed pipe stockpile sites, access roads and pump station area to identify the extent of impact to MNES and MSES species within the proposed footprints. The additional surveys are proposed to be completed by two ecologists over a one-day survey and one botanist over a two-day survey. For efficiency, the additional surveys will be undertaken during the same fieldtrip as the targeted surveys.

The proposed methodology for the additional survey scope is outlined below.

### **Regional Ecosystem verification**

Verification of mapped RE communities will be undertaken using quaternary level assessments in accordance with the methods detailed in Neldner et al. (2017). Data collection will include species and structural composition along with geology and landscape attributes.

### **Searches for threatened fauna species**

Searches for threatened fauna species will be undertaken at the proposed sites using the following methods:

- Spot Assessment Technique (Phillips and Callaghan 2011) together with visual searches for koalas
- Habitat assessments
- Description of vegetation communities
- Opportunistic visual and aural surveys for black-throated finch and other fauna species
- All incidental records of fauna observed during surveys will be recorded including bones, feathers, skulls, sloughed skins, faecal pellets, tracks, burrows, scratches and other indirect wildlife traces.

### **Searches for threatened flora species**

Searches for EPBC and Nature Conservation Act (NC Act) threatened flora species will be undertaken within the proposed pipe stockpile sites, access roads and pump station area using random meander searches. Any confirmed records will be recorded, with a detailed plot undertaken using the methodology outlined in the *Flora Survey Guidelines*. Where required, samples will be submitted to the Queensland Herbarium for positive identification.

### **Invasive species**

Prohibited or restricted invasive species as defined under the *Biosecurity Act 2014* will be recorded where identified. Where relevant, the surveys will densities and extent of presence.

## 2.3 Deliverables

GHD will provide TCC with a draft Word and PDF version of the report for review. One round of consolidated review comments have been allowed for the report, received as track changes in a Word document.

### Targeted surveys

We propose to prepare a standalone MNES report for the targeted surveys that summarises the ecological values and impact on all MNES that have potential to occur within proximity of the Project. Information on each MNES considered likely to occur will include:

- Review of NRA EAR
- Summary of ecological values for the Project area (including Pipeline alignment, stockpiles, access roads and pump station area)
- Summary of ecological information on the species
- Summary and mapping of surrounding historical records
- Description of targeted survey methodology
- Summary and mapping of field records and habitat values for the species including photographic evidence – important to demonstrate low value
- Assessment of the direct and indirect impacts of the Project
- Significance of impact assessment against the *Commonwealth Significant impact guidelines 1.1*

### Additional surveys

The methodology and results from the additional surveys of the stockpiles, access roads and pump station will be summarised in a short memorandum report, attached to the MNES report.

### 3. Resources and timing




Surveys can be undertaken in early-mid October 2021. In total, the survey will be undertaken for six days for two ecologists and four days for one botanist. The proposed survey is summarised below

- **Targeted surveys**
  - Two ecologists (including one senior fauna ecologist) undertaking a five day survey of the Pipeline alignment, marking hollow-bearing trees, SAT searches for koalas and surveying for presence of black-throated finch
  - One senior botanist undertaking a two-day survey targeting black ironbox at the four major watercourse crossings
- **Additional surveys**
  - Two ecologists undertaking a one-day survey, and one botanist undertaking a two-day survey of the proposed pipe stockpile sites, access roads and pump station area to undertake RE verification, description of vegetation communities and fauna habitats, searches for threatened flora and fauna species (MNES and MSES), presence of invasive species, describe other environmental matters including watercourses and wetlands

#### 3.1 Key personnel

We have a dedicated and experienced team of ecologists who will be available to undertake the work (Table 1). Team members have been selected on the basis of being suitably qualified and experienced. Curriculum vitae are provided in Attachment 1. This ecology scope of work will be led by Bec Peardon and managed by the Project Manager and Director, Daniel Willis and Shannon Orr.

Table 1 Key personnel

	<p><b>Dr Simon Hodgkison – Senior Fauna Ecologist</b></p> <p>Simon is an ecologist with more than 18 years’ experience in ecological research and environmental consulting. Areas of special expertise include the survey and monitoring of terrestrial fauna in tropical and subtropical environments. Simon is a suitably qualified ecologist, approved to undertake fauna surveys and fauna habitat condition surveys in the scope of works. Simon will undertake the targeted black-throated finch and koala surveys for the Project and will act as technical reviewer for all fauna deliverables.</p>
	<p><b>Simon Danielsen – Senior Ecologist/Botanist (Astrebla Ecological Services)</b></p> <p>Simon is the Principal Ecologist/Botanist of Astrebla Ecological Services. Simon Danielsen is an ecologist with 20 years’ experience in ecological consultancy, vegetation management policy and decision making, and botanical identification. Simon is a ‘suitably qualified person’ under the Queensland <i>Flora Survey Guidelines – Protected Plants</i> and has extensive experience in vegetation community surveys and mapping, threatened species surveys, BioCondition surveys, ecological monitoring surveys, preparing ecological reports including impact assessments, threatened plant survey reports and advice. Simon has particular experience in the Brigalow Belt and Einasleigh bioregions. Simon will undertake the targeted survey for black ironbox and be responsible for technical delivery of flora reporting.</p>
	<p><b>Pascale Lin – Ecologist</b></p> <p>Pascale is an Ecologist with over four years’ experience in environmental consulting. Pascale has a multi-disciplinary background and broad skill set. Pascale has experience in both terrestrial flora and fauna field surveying and reporting including ecological baseline assessments, targeted species surveys, impact assessments, environmental scoping and assessment reports and species management programs. Pascale has been involved in major dam projects, pipelines, energy and buildings and developments. Pascale will undertake the base assessment for the Project and will assist with the preparation of written deliverables.</p>



## 4. Health and safety

A Job Safety Environmental Analysis (JSEA) will be prepared for the Project to control risks. Our team are committed to practicing safe driving procedures for all vehicles. Safe driving procedures are documented in the JSEA and will include daily vehicle inspections, fit for purpose vehicles, appropriate staff training for operation of vehicles, driving to conditions and engaging four-wheel drive for all travel on unsealed roads as a minimum. Two fit for purpose 4WD vehicles will be utilised for the terrestrial survey. Our field teams are experienced in undertaking field surveys in logistically challenging environments. We understand the importance of appropriate scheduling, fatigue management, contingency planning and communication to manage field risks. All teams will work in pairs and carry sufficient water, supplies and communication. Daily safety checks will be undertaken at intervals agreed within the JSEA prior to survey.

Our team will communicate with TCC to meet compliance with landholder's weed hygiene processes for vehicle access and will uphold biosecurity obligations.

In this unique period, Covid-19 has the potential to impact on the timing of site visits. GHD has a very well delineated Covid-19 safety procedure for site visits, which will be applied to this Project as appropriate to the risks known at that point in time. To minimise risks to the Project we will maintain ongoing communication with you through delivery of the Project. All field visits will comply with GHD's covid management protocols. These include social distancing, daily completion of GHD's Boarding Pass self-health checks and use of masks and hand sanitisers to reduce transmission risks. By following these protocols our field teams have been able to successfully undertake field surveys during past lockdowns. We are however governed by health advice from the World Health Organisation and Queensland government. Any potential Project delays imposed by travel restrictions beyond our control will be identified immediately and alternative solutions discussed.

## 5. Commercial offer

The cost estimate for the ecological assessments and reporting are provided below in Table 2.

Table 2 Proposed costings

Assessment		Estimate (excl GST)
General project	Project management including approvals, invoicing, land access agreement	\$840
Targeted surveys	Targeted surveys for koala, black-throated finch, bare-rumped sheathtail bat and reporting	\$27,902
	Targeted surveys for <i>Eucalyptus raveretiana</i>	\$8,110
	MNES report	\$10,472
Additional surveys	Additional surveys and short memorandum report	\$13,937
<b>Total (excl GST)</b>		<b>\$61,261</b>

We thank Townsville City Council for the opportunity to provide this proposal to provide targeted surveys for the Haughton Pipeline Stage 2 Project. Should you require any clarifications, please contact the undersigned.

Regards

**Natalie Clark**  
 Business Group Leader – Natural Resources  
 +61 7 33163414  
 natalie.clark@ghd.com

# Attachments

# **Attachment 1**

**Curriculum vitae**



# Dr Simon Hodgkison

## Senior Ecologist



### Location

Brisbane, Queensland

### Experience

20 years

### Qualifications/Accreditations

- PhD Ecology, 2005
- MSc Ecology, 1998
- BSc, 1994

### Key technical skills

- Ecological assessment and field surveys
- Impact and risk assessment
- Threatened species monitoring

### Relevant experience summary

Simon is an ecologist with more than 20 years' experience in ecological research and environmental assessment. Areas of expertise include the survey and monitoring of terrestrial fauna including birds, reptiles, mammals and frogs. Simon has led field and reporting teams for water infrastructure projects for Seqwater, Sunwater and Unity Water and linear infrastructure projects for gas, rail, road, power and telecommunications industries. Simon has provided ecological and biocondition assessments for infrastructure projects in Queensland, New South Wales, Victoria, Northern Territory, Western Australia and Papua New Guinea.

### Project experience

#### ***Lead Terrestrial Fauna Ecologist, Mt Crosby Weir Upgrade, Seqwater***

Environmental approvals and baseline ecology for the upgrade of Mt Crosby Weir. Simon acted as the lead terrestrial fauna ecologist undertaking field surveys and reporting for baseline ecological assessments to support environmental approvals for the proposed upgrade of Mt Crosby Weir. This included targeted survey for the koala, collared delma and tusked frog.

#### ***Lead Fauna Ecologist, Leslie Harrison Dam Upgrade, Seqwater***

Environmental approvals and baseline ecology surveys for an upgrade of Leslie Harrison Dam in east Brisbane. Simon acted as lead fauna ecologist on baseline ecology surveys to support the environmental approvals for the proposed upgrade of dam facilities at Leslie Harrison Dam. This include baseline surveys for birds, reptiles, mammals and frogs, targeted surveys for the koala, tusked frog and other conservation significant species and an assessment against Commonwealth significant impact guidelines.

#### ***Project Manager, Advanced Offsets Project, Seqwater***

Assessment of advanced offset opportunities for Seqwater in south-east Queensland. Simon acted as Project Manager and lead fauna ecologist undertaking biocondition assessments and assessments of habitat value for conservation significant fauna species to identify advanced offset opportunities at Ewan Maddock, North Pine, Hinze and Mt Crosby Dams.

#### ***Lead Ecologist, Forgan Cove Boat Launch Upgrade, Seqwater***

Environmental approvals for the upgrade of boat launch facilities at Forgan Cove on North Pine Dam. Simon acted as lead fauna ecologist on ecological assessments to support the environmental approvals for a proposed upgrade of boat launch facilities at Forgan Cove, North Pine Dam. This included an assessment of impacts on the koala and associated offset obligations under Commonwealth and State legislation.

#### ***Lead Fauna Ecologist, Wivenhoe Dam Advanced Offsets Project, Seqwater***

Assessment of advanced offset opportunities at Wivenhoe Dam. Simon acted as Lead fauna ecologist undertaking biocondition assessments and

assessments of habitat value for conservation significant fauna species to identify advanced offset opportunities at Wivenhoe Dam.

### ***Lead Fauna Ecologist, Urannah Water Scheme Project***

Environmental approvals and ecological baseline assessments for a proposed new dam at Urannah, west of Mackay. Simon acted as lead fauna ecologist on baseline ecology surveys, leading field teams and preparation of baseline ecology reports to support the EIS. This included targeted surveys for the koala, greater glider, squatter pigeon and Eungella honeyeater.

### ***Lead Fauna Ecologist, Lower Fitzroy River Infrastructure Project***

Ecological surveys to support environmental approvals for new weir and water infrastructure at Rookwood, Riversleigh and Eden Bann on the Fitzroy River. Simon acted as lead terrestrial fauna ecologist, leading field survey teams and reporting of baseline ecology reports to support the EIS. Simon undertook targeted surveys to develop the offset plans for the ornamental snake, powerful owl, squatter pigeon and greater glider.

### ***Lead Ecologist, Inland Rail C2K, ARTC***

Lead fauna ecologist on baseline ecology surveys for the Calvert to Kagaru section of the Inland Rail project. This involved baseline surveys for terrestrial fauna, habitat assessments and targeted surveys for threatened fauna species. Simon also acted as lead ecologist on subsequent surveys for the Woolooman Tunnel section of the C2K Project.

### ***Lead Ecologist, Alpha Rail Project, Hancock Mining***

Lead ecologist on baseline desktop and field ecology surveys for an EIS for a proposed 400 km coal rail line between Alpha and Bowen in the Galilee Basin. The project received Commonwealth environmental approvals.

### ***Lead Fauna Ecologist, CopperString 2.0***

Lead fauna ecologist on the EIS for a 1,100 km high voltage transmission line between Townsville and Mt Isa. This involved leading field teams in baseline surveys for conservation significant species including the koala, black-throated finch and squatter pigeon.

### ***Lead Fauna Ecologist, MacIntyre Wind Farm, Acciona***

Lead fauna ecologist on baseline surveys for the environmental approvals for a proposed wind farm and associated overhead transmission line at Karara southwest of Warwick. This involved assessment of

impacts on species listed under the EPBC Act and NC Act.

### ***Senior Fauna Ecologist, Bruce Highway Cooroy to Curra Section D, DTMR***

Upgrade of the existing Bruce Highway between Woondum and Curra. Simon acted as senior fauna ecologist on the development of an offset strategy for the koala and black-breasted button quail, baseline biocondition assessments and the provision of advice on the location of glider poles to facilitate movement of the greater glider.

### ***Project Manager, Lead Ecologist, Davenport Downs Bilby Monitoring, APA Group***

Simon has acted as Project Manager and Lead Ecologist on the Davenport Downs Bilby Monitoring Project for over ten years. Simon developed a monitoring plan to assess impacts on a local population of the bilby associated with construction and operation of a new compressor station on the existing Carpentaria Gas Pipeline in western Queensland.

### ***Senior Ecologist, Western Corridor Recycled Water Project, Coordinator General***

Senior ecologist for the EIS. This involved baseline fauna surveys and technical reporting for the EIS for a proposed new recycled water pipeline between Esk and the Port of Brisbane, south-east Queensland. Development of Environmental Management Plans for transfer stations and environmental approvals.

### ***Lead Fauna Ecologist, Sippy Downs Trunk Sewer Upgrade, Unity Water***

Simon was the lead fauna ecologist for a proposed upgrade of the Sippy Downs Trunk Sewer. This involved baseline ecology surveys, preparation of a Species Management Program, targeted surveys for the wallum froglet and wallum sedge frog and preparation of an EPBC referral.

### ***Lead Fauna Ecologist, Australia Pacific LNG Project Phase 1, Origin Energy***

Simon was the Lead Fauna Ecologist on baseline fauna surveys and pre-clearance assessments and preparation of Ecology Assessment Reports for more than 30 properties as part of proposed expansion of gasfields at Roma, Chinchilla, Miles and Dalby.

### ***Project Manager and Lead Ecologist, Narrows Crossing Water Mouse Monitoring, QGC***

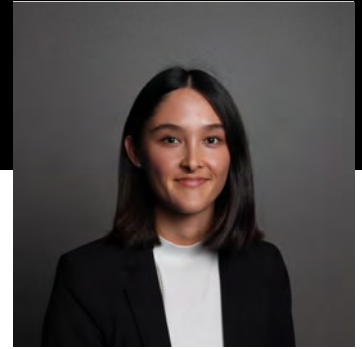
Simon was the Project Manager and Lead Ecologist for the development and implementation of a nine year water mouse monitoring program within the QCLNG Narrows Crossing Project. This involved leading multiple field teams in challenging field environments.





# Pascale Lin BSc

## Environmental scientist



### Location

Brisbane, Queensland, Australia

### Experience

4 years

### Qualifications/Accreditations

- Bachelor of Science, 2014

### Key technical skills

- Ecological assessments
- Terrestrial fieldwork
- Environmental reporting

### Relevant experience summary

Pascale is an Ecologist with over four years' experience in environmental consulting. Pascale has a multi-disciplinary background and broad skill set. Pascale has experience in both terrestrial flora and fauna field surveying and reporting including ecological baseline assessments, targeted species surveys, impact assessments, environmental scoping and assessment reports and species management programs. Pascale has been involved in major dam projects, pipelines, energy and buildings and developments. She understands the approval and environmental constraints associated with a range of development types. Pascale has been part of numerous multi-disciplinary projects and understands the importance of processes relating to environmental approvals. She has experience in completing supporting documentation for environmental applications, liaising with stakeholders and the interpretation of environmental approval condition requirements.

### Project experience – Terrestrial Ecology

#### ***Rookwood Weir Pre-clearance survey and reporting***

**Client:** Sunwater and GAWB  
**Location:** Rookwood Weir on the Fitzroy River QLD, Australia  
**Date(s):** 2020 - ongoing

Pre-clearance surveys and reporting  
Pascale was part of the field team undertaking terrestrial pre-clearance surveys for the inundation footprint of the Rookwood Weir. The surveys targeted MNES species with potential to occur. Pascale assisted in subsequent reporting including a High-Risk Species Management Program.

#### ***Bruce Highway Cooroy to Curra Commonwealth Offset Delivery***

**Client:** Transport and Main Roads  
**Location:** Curra State Forest, QLD, Australia  
**Date(s):** 2021

Flora Survey Stage 2  
Pascale was part of the field team undertaking a targeted flora survey for the highway upgrade from Cooroy to Curra for TMR. The field investigation

involved targeted surveying of two listed flora species present within the project area.

#### ***High Risk Species Management Programs***

**Client:** Confidential client  
**Location:** QLD, Australia  
**Date(s):** 2021

Terrestrial High Risk SMPs  
Pascale assisted in the preparation of two High Risk SMPs for a confidential project in Queensland, Australia. The SMPs applied to ten listed species assessed as having the potential to be directly or indirectly impacted during the Project.

#### ***Detailed Design – Old Gympie Rd, Owanyilla***

**Client:** Fraser Coast Regional Council  
**Location:** Owanyilla, QLD, Australia  
**Date(s):** 2020 – 2021

Environmental Scoping Report  
Pascale prepared an ESR for the Fraser Coast Regional Council for road reconstruction including culvert extension works. Pascale reviewed desktop searches to identify environmental values within the area and incorporated these findings into the ESR.

***Preconstruction Services Esk Crows Nest Road 2020***

**Client:** Somerset Regional Council

**Location:** Esk, QLD, Australia

**Date(s):** 2020 - 2021

Environmental Scoping Report

Pascale assisted in the preparation of an ESR for road upgrades including culvert replacements for Somerset Regional Council. This included desktop searches to identify environmental values within the project area

***North South Arterial Route & Link Strategy***

**Client:** Transport and Main Roads

**Location:** QLD, Australia

**Date(s):** 2019 - 2021

Environmental Scoping Report

Pascale prepared the Environmental Scoping Report for three corridor options for the North South Arterial Route. The ESR identified environmental and cultural values present within the study area and assessed the potential impacts and relevant legislation applicable to the project.

# Simon Danielsen

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Simon Danielsen is an ecologist with 20 years' experience in ecological consultancy, vegetation management policy and decision making, and botanical identification.

He has been involved at a senior level on many of the largest proposed infrastructure projects in Queensland and the Northern Territory in the last 17 years, including:

- Urannah dam project near Eungella in central Queensland,
- Hell's Gate dam project near Charters Towers in north Queensland,
- Project Sea Dragon (Sea Farm Group) in the NT (sites near Kununurra and Darwin),
- Adelaide River Off-stream Storage proposal (NT),
- Carmichael Coal Mine EIS and pre-construction monitoring surveys,
- Lakeland Irrigation Project near Cooktown in north Queensland
- Western Corridor wastewater recycling pipeline project, south east Queensland,
- Western Basin Dredging EIS, Gladstone Harbour, south east Queensland,
- Hancock's proposed rail link from Alpha to Abbot Point, central Queensland,
- Chinalco bauxite proposal (Aurukun, Cape York Peninsula).

Simon is the Principal Ecologist/Botanist of Astrebla Ecological Services, a consulting sole trading operation he started in April 2015. He has extensive experiences in:

- Vegetation community (regional ecosystem) surveys and mapping,
- Threatened species surveys - Simon is a recognised 'suitably qualified person' under the Queensland *Flora Survey Guideline - Protected Plants* and has been recognised as such on previous projects under the Commonwealth EPBC Act,
- BioCondition surveys - Simon has undertaken hundreds of BioCondition surveys since 2008,
- Ecological monitoring surveys,
- Weed surveys, mapping and management plans,
- Preparing ecological reports, ecological impact assessments as part of EIS investigations, threatened plant survey reports and written advice in relation to ecological issues,
- Ecological advice in relation to development and infrastructure projects, and
- Document review.

Simon has particular experience in the Brigalow Belt, Einasleigh Uplands, Central Queensland and South East Queensland bioregions, and the North Kennedy district (Cairns-Cooktown-Atherton Tableland region).

## Regional ecosystem/vegetation community mapping experience

Simon has extensive experience in the field verification of Queensland RE mapping and in the production of rectified RE mapping using GIS programs. His experience includes areas up to 300, 000 ha in size, including the following:

- Simon produced revised RE mapping at a 1:25, 000 scale for the 300, 000 ha Origin Energy Spring Gully gas field, north of Roma (2012).
- Revised RE mapping at 1:50, 000 scale was produced for 116, 000 ha of land for the proposed Hell's Gate dam north of Charters Towers (2021).
- Revised RE mapping at 1:50, 000 scale is being produced for 1742 ha of land for the proposed Lakeland irrigation project and dam (near Cooktown) (2021).
- Revised regional ecosystem (RE) mapping at a 1:25, 000 scale was provided for the entire 50, 000 ha project area for the Carmichael Coal mine project (2012).
- RE ground-truthing and remapping was undertaken over 1000 ha of remote State Forest and private land for the proposed High Road Wind Farm project near Ravenshoe, for Ratch (2017).
- Simon produced the revised RE mapping for the project area for Chinalco (Chalco) near Aurukun in Cape York Peninsula as part of the EIS team (2008).
- Simon produced revised RE mapping for GHD for an EIS for Powerlink for a major 200 km long, greenfield 275 kV transmission line corridor, commencing near Emerald and terminating at the proposed Alpha mine, north of Alpha (2010).
- Simon was the key GHD botanist in investigations for an EIS for Hancock Prospecting into the route for a 500 km railway to connect the proposed Alpha Coal Mine to Abbott Point, near Bowen. Revised RE mapping at 1:25, 000 scale was produced (2010).
- Simon was the key GHD botanist in investigations for the proposed BHP/BMA rail link from North Goonyella (Moranbah) to Abbot Point (approx. 300 km). Revised RE mapping at 1:25, 000 scale was provided (2011).
- As a GHD botanist, Simon provided RE mapping amendments for the Coal Connect alliance in relation to the 70 km long 'Northern Missing Link' between Newlands Mine and Moranbah (2007).

Vegetation community mapping projects undertaken in the Northern Territory include:

- Vegetation community mapping over nearly 100, 000 ha on Legune Station, near Kununurra, for the Project Sea Dragon EIS, and at a smaller site at Gunn Point near Darwin (2015-16).
- Vegetation mapping at 1:10, 000 scale was produced over the proposed Adelaide River Offstream Water Storage (AROWS) site (a survey area of 1945 ha) (2019).

## Threatened plant surveys

Simon has planned and undertaken numerous threatened species surveys for various large projects in Queensland, the NT and New South Wales. He has designed a number of targeted surveys for threatened species in situations where guidelines for the species do not exist, and for species that are relatively cryptic, including:

- Surveys for the threatened cycad *Macrozamia conferta* at the proposed Macintyre Wind Farm site near Warwick for Acciona (EPBC referral 2020/8759). This survey involved hundreds of kilometres of walked transects, and resulted in a significant increase in the known population size of the species. No survey guidelines for this species are available (2021).
- Surveys for threatened plants at Doongmabulla and Mellaluka mound springs for the Carmichael Coal Mine EIS in 2011-12. Seven species of conservation significance were recorded.
- Surveys for the vulnerable black ironbox (*Eucalyptus raveretiana*) in the Broken River catchment for the Urannah dam project in 2020. Simon later used the results from this survey together with those from other surveys conducted recently to lodge an application to have the species delisted under the EPBC Act (currently under consideration).
- A survey to map the endangered geophyte *Typhonium praetermissum* and the cycad *Cycas armstrongii* at Gunn Point, north east of Darwin in 2017. *Typhonium praetermissum* is a cryptic species that was at the time relatively poorly surveyed – the survey Simon designed (in consultation with the Darwin herbarium) found a greater number of these plants than had been found to date, and utilised DNA testing to confirm the identity of individuals.
- Surveys for the threatened *Acacia guymeri* in the proposed Lakeland dam footprint in north Queensland in 2021. These surveys results are being compiled and will form part of an application to have the species de-listed under the *Nature Conservation Act 1992*.
- A survey to map and count the vulnerable cycad *Cycas armstrongii* over the 1945 ha proposed site for the Adelaide River Off-stream Water Storage project in the NT, south of Darwin (2019).

In addition, Simon has undertaken numerous threatened plant surveys for EIS projects since 2006, and has completed 38 surveys under the Queensland *Protected Plant Guidelines* since 2015.

## Tertiary Education

Griffith University

1999 Bachelor of Science (Australian Environmental Studies)

## Main Career Positions Held

Astrebla Ecological Services | Darra, Queensland

Principal Ecologist/Botanist *April 2015 – current*

Bangkok Forestry Herbarium | 61 Prahonyothin Rd, Chatuchak, Bangkok, 10900 Thailand

Volunteer *2014 – 2015*

GHD Pty Ltd | GPO Box 668 Brisbane 4001

Senior/Principal Ecologist *2006 –2015*

Dept. of Natural Resources and Mines (Qld) | 187-209 Stanley St, Townsville 4810

Vegetation Management Officer *2005 –2006*

Skyrail Rainforest Canopy | Captain Cook Highway, Caravonica (Cairns), 4878

Environment Manager *2002 –2005*



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# Haughton Pipeline Stage 2 Project

## MNES Report

Townsville City Council

17 December 2021

→ The Power of Commitment



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# Executive summary

## Overview

The Haughton Pipeline Stage 2 (HPS2) Project, proposed by Townsville City Council (TCC), will include the construction of a pump station, pipeline and associated ancillary works. The HPS2 will transfer 364 ML/day of raw water from the Burdekin River (at the Clare Weir Storage) to Ross River Dam. The Project includes a 28.5 km pipeline running South from the Upper Haughton Irrigation Channel (Stage 1.1 works) to a new pump station that will be constructed adjacent the Burdekin River. The proposed action, along with the previously constructed Stage 1 and Stage 1.1, are collectively known as the Haughton Pipeline Duplication Project (HPDP).

The Project is located approximately 60 km southeast of Townsville, North Queensland, between the Haughton River and Burdekin River and the small townships of Clare and Millaroo in the Burdekin. The Project is a joint funding arrangement between the Queensland Government (the State) and TCC (the Proponent). The Project is proposed over a mixture of freehold, State controlled land and local government owned land.

This report has been prepared to identify and assess matters of national environmental significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) which are likely to be impacted by the proposed action.

## Existing environment

The Project footprint intersects a landscape that has been subject to extensive historical land clearing and decades of cattle grazing. Wherever practicable, the Project footprint has been sited within areas of existing disturbance. Despite this, the Project footprint will impact areas of remnant vegetation providing resources for native flora and fauna. Targeted surveys were undertaken for MNES over two survey events, with surveys undertaken by ecologists from NRA Environmental Consultants on April/May 2021 and GHD in October 2021. Three MNES were confirmed present within the Project area:

- Black-throated finch (southern (*Poephila cincta cincta*) two birds observed at the south of the Project area
- Squatter pigeon (southern) (*Geophaps scripta scripta*) 10 birds observed in three locations
- Black ironbox (*Eucalyptus raveretiana*) 13 adult trees recorded on the lower bank of the Burdekin River at the south of the Project, adjacent to the proposed pump station

Three MNES were considered likely to occur due to the presence of suitable habitat:

- Koala (*Phascolarctos cinereus*)
- Bare-rumped sheath-tail bat (*Saccolaimus saccolaimus nudicluniatatus*)
- White-throated needletail (*Hirundapus caudacutus*)

## Potential impacts and mitigation measures

The construction of the Project will result in the removal of vegetation and ground disturbance to construct and bury the pipeline. A 4 m access track will be permanently cleared and maintained through the operation phase. The remainder of the 40 m wide corridor will be rehabilitated through spreading of topsoil and natural regeneration and planting of tubestock and hydromulching with native food grasses for the black-throated finch (southern) in areas of higher ecological sensitivity adjacent to watercourses. The Project will result in a permanent impact of 12.76 ha and a temporary disturbance to 123.22 ha. The assessment of impacts to MNES determined that the following impacting processes are those most likely to result in a significant impact to a MNES:

- Loss of habitat
- Injury or mortality
- Fragmentation of habitat and loss of connectivity
- Disturbance to habitat from noise, light, and vibration

- Habitat degradation and increased erosion
- Spread of invasive species.

Mitigation and management measures are proposed and will be implemented through a Construction Environmental Management Plan (CEMP), Conceptual Erosion and Sediment Control Plan (CESCP), site and stage specific Erosion and Sediment Control Plans (ESCPs) for the Project.

## Significant impact assessment

The significance of the Project's potential impacts on MNES that have been confirmed present or are considered likely to occur within the Project area was undertaken. The assessment was made against the EPBC Act Significant Impact Guidelines 1.1 (DotE 2013), Significant impact guidelines for the endangered black-throated finch (southern) (DEWHA 2009) and EPBC Act referral guidelines for the vulnerable koala (DotE 2014).

The Project was considered unlikely to have a significant impact on the following species:

- Koala; given the low value of habitats present (i.e. habitats scored only 4 using the Commonwealth koala habitat assessment toolkit and did not represent habitat critical to the survival of the species).
- White-throated needletail; due to the species' aerial nature and absence of roosting habitat.
- Black ironbox; due to the minor impact (maximum loss of four individuals) and abundance in the region

The Project is likely to result in significant impacts on the following MNES species:

- Bare-rumped sheathtail bat – due to the impact on habitat critical to the survival of the species, notably loss of potential roosting trees including loss of 10 large and 27 moderate-sized *E. platyphylla* hollows
- Black-throated finch (southern) – due to the impact on habitat critical to the survival of the species associated with localised indiscriminate loss of trees within 1 km of water

Significant residual impacts were anticipated on the bare-rumped sheathtail bat and black-throated finch (southern). Additional mitigation measures were identified to further reduce the impacts on these species:

- Rehabilitating all nesting habitat for the black-throated finch (southern) impacted within 400 m of a water source through hydromulching with black-throated finch (southern) food grass species and planting with *Eucalyptus platyphylla* tubestock at densities sufficient to reinstate 30 trees per ha
- Salvage and reinstating all large and moderate sized *E. platyphylla* hollows that could represent potential roosting sites for the bare-rumped sheathtail bat
- Planting *E. platyphylla* tubestock to result in the like for like replacement of future potential roosting habitat.

While the rehabilitation measures proposed have substantially reduced the magnitude and severity of impact, the Project is still likely to have a significant residual impact on the black-throated finch (southern) and bare-rumped sheathtail bat. TCC are committed to exploring further opportunities to reduce the impact on habitat through practical mitigation measures that may be deemed suitable or if required an appropriate offset strategy to manage the residual risks in accordance with the requirements of the EPBC Act and the Commonwealth Environmental Offsets Policy.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.3 and the assumptions and qualifications contained throughout the Report.

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# Acronyms

Acronym	Definition
ABLV	Australian Bat Lyssavirus
ALA	Atlas of Living Australia
CESCP	Conceptual Erosion and Sediment Control Plan
CEMP	Construction Environmental Management Plan
DAF	Department of Agriculture and Fisheries
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DES	Queensland Department of Environment and Science
DoR	Department of Resources
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESCP	Site and stage specific Erosion and Sediment Control Plans
MNES	Matters of National Environmental Significance
NC Act	Queensland <i>Nature Conservation Act 1992</i>
PMST	Protected Matters Search Tool
RE	Regional Ecosystem
SAT	Spot Assessment Technique
SPRAT	Species Profile and Threats database
TEC	Threatened Ecological Community

# 1. Introduction and background

Townsville City Council (TCC) are undertaking the Detailed Design for the proposed Stage 2 of the Haughton's Pipeline (HPS2) Project. The HPS2 Project is required to accommodate increased water demand due to regional population growth. The HPS2 Project includes a new pump station, pipeline and associated ancillary works (herein referred to as the 'Project area'), connecting to the constructed Stage 1 and Stage 1.1 Haughton Pipeline Duplication Project (HPDP). The HPS2 will transfer 364 ML/day of raw water over a 22-hour period from the Burdekin River (at the Clare Weir Storage) to Ross River Dam. The Project includes a 28.5 km pipeline running South from the Upper Haughton Irrigation Channel (Stage 1.1 works) to a new pump station that will be constructed adjacent to the Burdekin River between the Tom Fenwick pump station and the Clare Weir. The proposed action, along with the previously constructed Stage 1 and Stage 1.1, are collectively known as HPDP. The Project is located approximately 60 km southeast of Townsville, North Queensland, between the Haughton River and Burdekin River and the small townships of Clare and Millaroo in the Burdekin.

The HPDP includes the following stages:

- Stage 1 of the Project was completed in 2020 and comprises approximately 33 km of DN1800 pipeline constructed from the Haughton River to Toonpan Creek at the head of Ross River Dam
- Stage 1.1 of the Project was completed in 2021 and is an extension of the Stage 1 pipeline works by 4 km from the Haughton River, directed towards the Stage 2 pipeline alignment. The Stage 1.1 works end with an isolation valve pit and is the connection point for Stage 2
- Stage 2 (this Project) comprises construction of new pump station and construction of a new 28.5 km water pipeline from the pump station to Stage 1.1 to provide an integrated water transfer system and associated ancillary works. Construction for the pipeline is due to begin in mid-2022, with completion of the construction phase by the end of 2024.

The Project is a joint funding arrangement between the Queensland Government (the State) and TCC (the Proponent).

The Project location is shown on Figure 1-1.

GHD has been commissioned by TCC to undertake targeted ecological surveys along the pipeline alignment, as well as additional surveys within the proposed pump station site, access roads and stockpile areas, as shown in Figure 1-1.

## 1.1 Purpose of this report

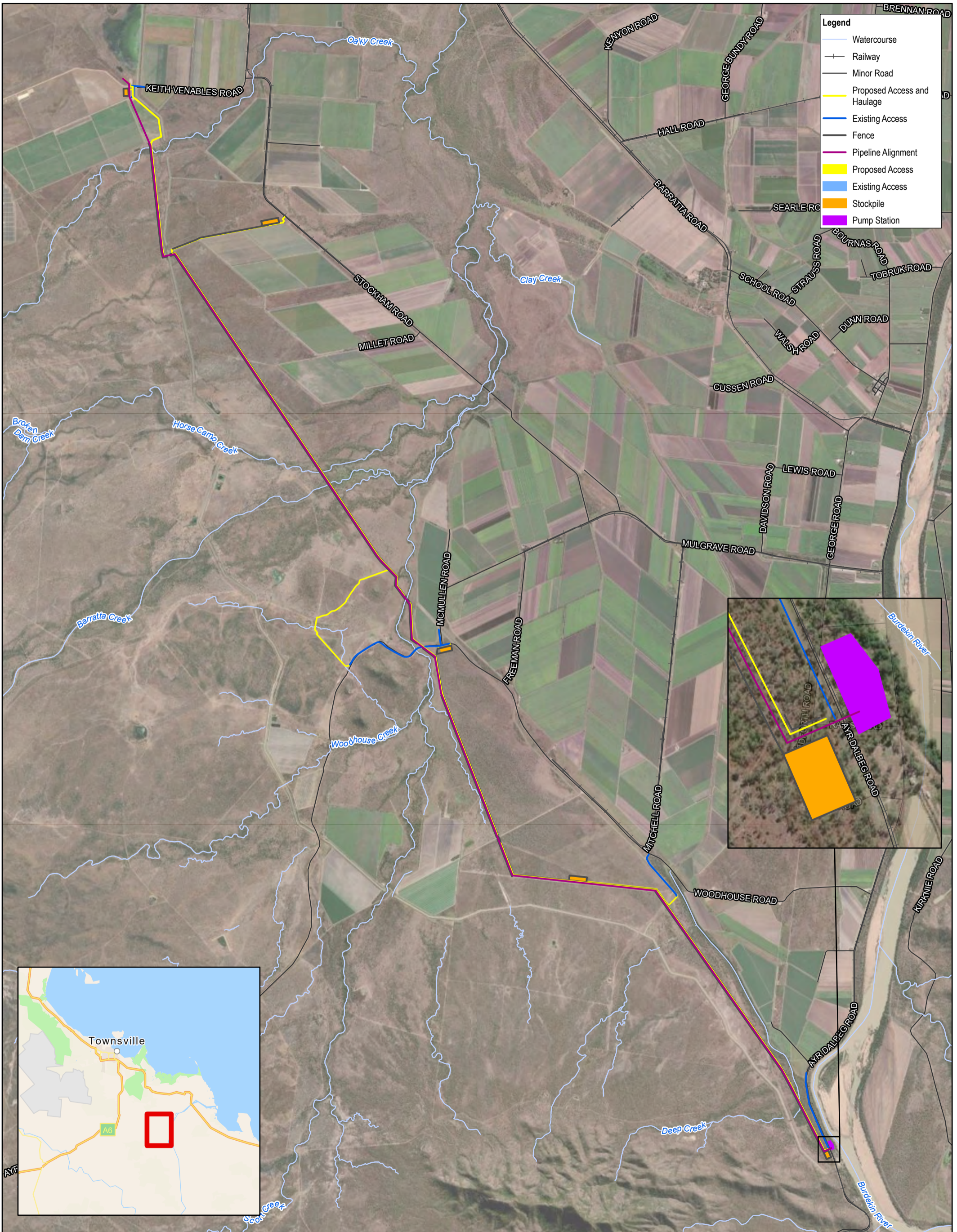
This report has been prepared to identify and assess matters of national environmental significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) which have the potential to be impacted by the Project.

Specifically this report presents the findings of desktop and field-based ecological assessments undertaken to determine whether construction and operation of the Project can avoid, minimise or mitigate impacts on MNES including flora, fauna and threatened ecological communities (TECs) and included:

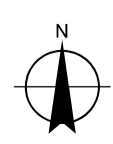
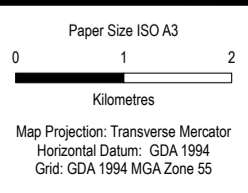
- Identifying the ecological values of the Project area, including vegetation communities and terrestrial flora and fauna through desktop and field-based methods
- Assessing the likelihood of occurrence of EPBC Act listed flora, fauna and TECs
- Assessing the potential impacts of the Project on EPBC Act listed flora, fauna and TECs
- Identifying mitigation and management actions to avoid and minimise impacts on EPBC Act listed flora, fauna and TECs

Where impacts are predicted on MNES a significance of impact assessment was undertaken in accordance with the Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DoE 2013).





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Houghton Pipeline Stage 2 - MNES Assessment

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Revision No. 0  
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Houghton Pipeline Stage 2 project area

FIGURE 1-1



## 1.2 Applicable species

Ecological assessments undertaken for the Project identified that MNES require assessment in accordance with the provisions of the EPBC Act:

- Listed threatened species and ecological communities (sections 18 and 18A)
- Listed migratory species (section 20 and 20A)

The likelihood of occurrence assessment (Section 2.4 and Appendix C) returned the following results:

- Three EPBC Act listed conservation significant species were **confirmed present** in the Project area
- Five EPBC Act listed conservation significant species were considered **likely to occur** in the Project area
- 23 EPBC Act conservation significant species **may occur** in the Project area
- The remaining conservation significant species identified in desktop searches were considered **unlikely to occur** based on the absence of suitable habitat and nearby recent historical records.

The EPBC Act conservation significant species **confirmed present** within the Project area included:

- Black-throated finch (southern) (*Poephila cincta cincta*) (Endangered)
- Squatter pigeon (southern) (*Geophaps scripta scripta*) (Vulnerable)
- Black ironbox (*Eucalyptus raveretiana*) (Vulnerable)

Five other EPBC Act listed conservation significant species were considered **likely to occur** based on the proximity to recent historical records and the presence of suitable habitat. These included:

- Three bird species – white-throated needletail (*Hirundapus caudacutus*) (Vulnerable, Migratory), fork-tailed swift (*Apus pacificus*) (Migratory) and eastern osprey (*Pandion cristatus*) (Migratory)
- Two mammal species – koala (*Phascolarctos cinereus*) (Vulnerable) and bare-rumped sheath-tail bat (*Saccolaimus saccolaimus nudicluniatus*) (Vulnerable).

## 1.3 Scope and limitations

*This report: has been prepared by GHD for Townsville City Council and may only be used and relied on by Townsville City Council for the purpose agreed between GHD and Townsville City Council as set out in section 1.1 of this report.*

*GHD otherwise disclaims responsibility to any person other than Townsville City Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.*

*The opinions, conclusions and any recommendations in this report are based on information obtained from, and monitoring undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.*

*Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of natural features, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.*

*Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.*

*GHD has prepared this report on the basis of information provided by Townsville City Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.*

## 2. Methodology

### 2.1 Approach

The ecological assessment for the Project included a desktop review of environmental databases, mapping layers and a review of previous field survey reports prepared for the Project, and field surveys undertaken for the Project by Natural Resources Assessment (NRA) and GHD. The desktop and field methodologies are detailed in Sections 2.2 and 2.3 respectively.

### 2.2 Desktop assessment

A desktop review was undertaken to identify and collate existing information on the ecological values with the Project area and surrounding landscape. For most database sources, the Haughton Pipeline desktop search extent encompassed areas within a 30 km buffer of the approximate centre of the pipeline, to provide context about potential presence of mobile or cryptic species that are known to occur in similar habitats within the region.

Desktop results are presented in Appendix A.

The desktop assessment used the following information sources:

#### **Protected Matters Search Tool**

The Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) was used to identify TECs and conservation significant flora and fauna, listed under the EPBC Act as MNES that have the potential to occur within the vicinity of the Project area. The search was undertaken within a 30 km radius of the approximate centre of the Project area (- 19.83293,147.13819).

#### **Wildlife Online database**

The Queensland Department of Environment and Science (DES) Wildlife Online database was searched to retrieve historical records of flora and fauna species previously recorded within the vicinity of the Project area. The search was undertaken for a 30 km radius of the approximate centre of the Project area (-19.83293,147.13819 ).

#### **Species Profile Search database**

The DES Species Profile Search was undertaken to obtain spatial data records for conservation significant species responsible for generating high risk trigger areas intersecting the Project area and to identify the location and collection date of any conservation significant flora or fauna recorded in proximity to the Project area.

#### **Atlas of Living Australia database**

The Atlas of Living Australia (ALA) database was searched to retrieve historical records of flora and fauna species previously observed within a 30 km radius of the approximate centre of the Project area.

#### **Biomaps**

This mapping tool was used to review specific locations, collection date and details of records of species of conservation significance within a 30 km radius of the approximate centre of the Project area.

#### **Regulated Vegetation Mapping**

The Queensland Department of Resources (DoR) Vegetation Management Regional Ecosystem and Remnant Map spatial layer (version 11) was viewed to determine the extent and type of Regional Ecosystems (REs) mapped within the Project area.

#### **Essential Habitat Mapping**

The DES Essential Habitat Map spatial layer (version 4.29) was viewed to determine if vegetation within the Project area has been identified as essential habitat for a conservation significant species of wildlife listed under provisions of the *Nature Conservation Act 1992* (NC Act).

## Protected Plants Flora Survey Trigger Map

The DES Protected Plants Flora Survey Trigger Map spatial layer was viewed to identify the location of any high risk trigger areas occur within the Project area, indicating previous records of conservation significant flora species.

## 2.2.1 Previous assessments

An ecological assessment report prepared for the Project by NRA was reviewed. The report presented the results of preliminary field surveys undertaken for the Project, as detailed in Section 2.3.1. The NRA report has been used primarily to provide information on the likelihood of occurrence of conservation significant flora and fauna and seasonality in the local flora and fauna assemblage.

### 2.2.1.1 NRA ecological assessment report

NRA consultants prepared an environmental analysis report (EAR) which included desktop and field assessments within the proposed pipeline alignment and pump station site. The field surveys were undertaken on 21 April 2021 and 25-26 May 2021. Table 2.1 summarises NRA's survey effort.

One conservation significant species was potentially recorded using acoustic bat detectors – several *Saccolaimus* sp. calls were recorded in suitable habitat for the bare-rumped sheath-tail bat, however the recordings were unable to be determined between the bare-rumped sheath-tail bat or the yellow-bellied sheath-tail bat (*Saccolaimus flaviventris*).

NRA concluded five conservation significant species with probable likelihood of occurring (i.e. likely to occur) within the Project area including:

- Fork-tailed swift
- White-throated needletail
- Squatter pigeon (southern)
- Black-throated finch (southern)
- Bare-rumped sheath-tail bat

## 2.3 Field assessment

### 2.3.1 Summary of survey effort

Two field ecology surveys have been undertaken by GHD and NRA for the Project during 2021.

Table 2.1 Summary of ecological survey effort undertaken for the Project

Survey dates	Ecologists	Days	Methodology and survey effort
Baseline surveys – NRA 2021			
21 April 2021 25-26 May 2021	2	3	
Targeted surveys for EPBC listed species – GHD 2021			
25-30 October 2021	3	6	<ul style="list-style-type: none"> <li>– Quaternary RE verification – 8 sites</li> <li>– Targeted flora searches for <i>Eucalyptus raveretiana</i> – 11 sites</li> <li>– Fauna and habitat assessments for black-throated finch (southern) – 35 sites</li> <li>– Koala habitat assessments and targeted koala scat searches using the Spot Assessment Technique (SAT) method – 30 sites</li> <li>– Daytime waterbody watch surveys – 14 sites</li> <li>– Recording location of all hollow-bearing trees including large hollows that represent potential roost sites for bare-rumped sheathtail bat</li> <li>– Driving/flushing surveys for the squatter pigeon (southern)– 464 km (based on two vehicles driving around the Project area over 6 days)</li> <li>– Vigilant bird surveys over 6 x 10 hr days including targeted survey for squatter pigeon (southern) and black-throated finch (southern)</li> </ul>

Flora and fauna survey methods employed by GHD are described further in Section 2.3.3 and Section 2.3.4, respectively. Surveys were undertaken at representative locations across the Project area to provide appropriate survey coverage within each vegetation community, habitat and geographic location present. Areas of high ecological value corresponding with areas of mapped remnant vegetation, waterways and waterbodies were subject to more intensive survey effort.

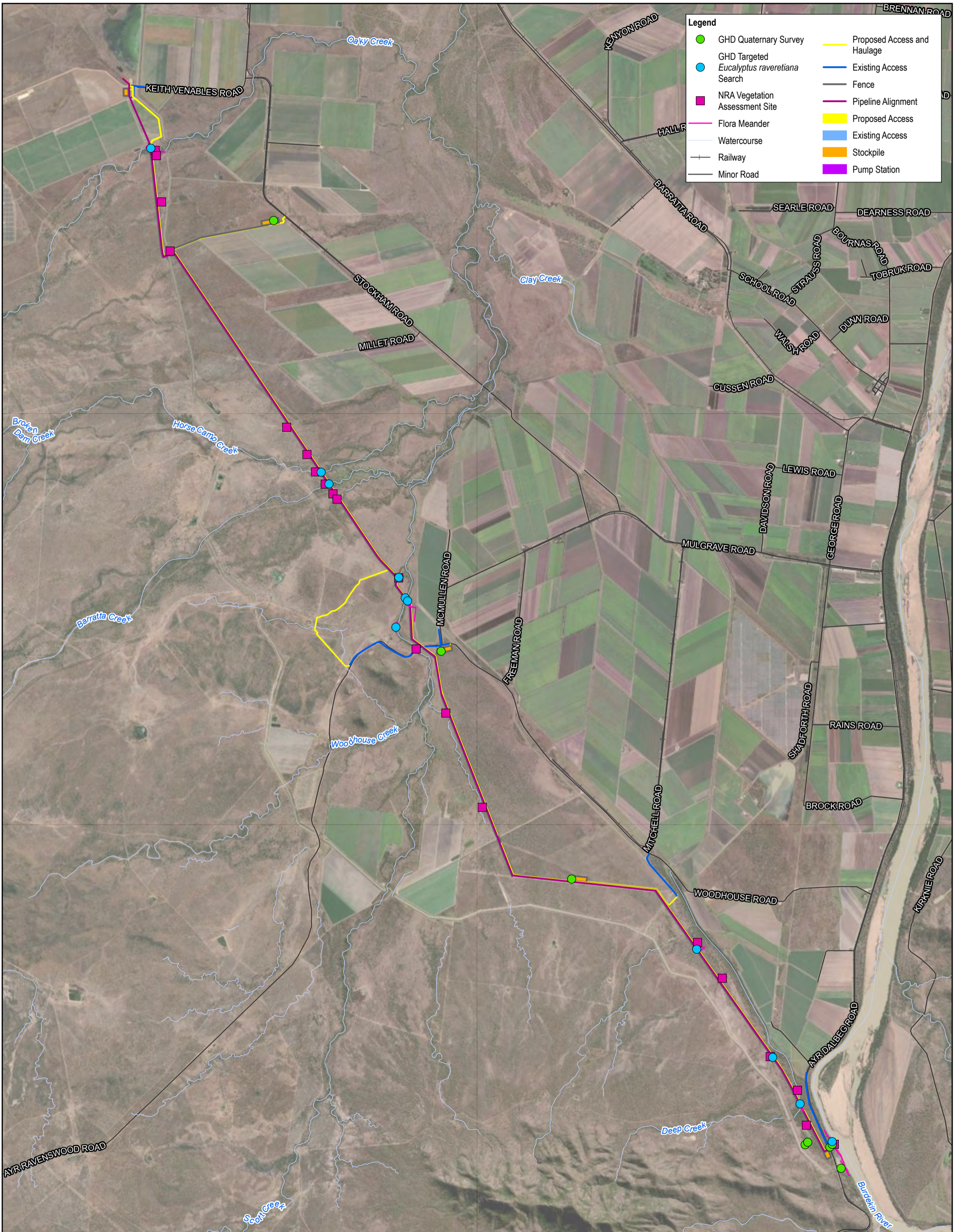
The distribution of flora and fauna survey effort within the Project area is summarised in Figure 2-1 and Figure 2-2, respectively.

### 2.3.2 Survey guidelines

Fauna and flora surveys were designed to meet the survey guidelines for conservation significant species with potential to occur, as detailed in the following guidelines:

- *Significant impact guidelines for the endangered black-throated finch (southern)* 3.13 (DEWHA 2009)
- *EPBC Act referral guidelines for the vulnerable koala* (DoE 2014)
- *Matters of National Environmental Significance – Significant Impact Guidelines 1.1 EPBC Act* (DoE 2013)
- *Flora Survey Guidelines – Protected Plants v 2.01 Nature Conservation Act 1992* (DES 2020)





**Legend**

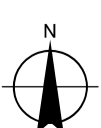
- GHD Quaternary Survey
- GHD Targeted *Eucalyptus raveretiana* Search
- NRA Vegetation Assessment Site
- Flora Meander
- Watercourse
- Railway
- Minor Road
- Proposed Access and Haulage
- Existing Access
- Fence
- Pipeline Alignment
- Proposed Access
- Existing Access
- Stockpile
- Pump Station

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Paper Size ISO A3

0 1 2  
Kilometres

Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 55



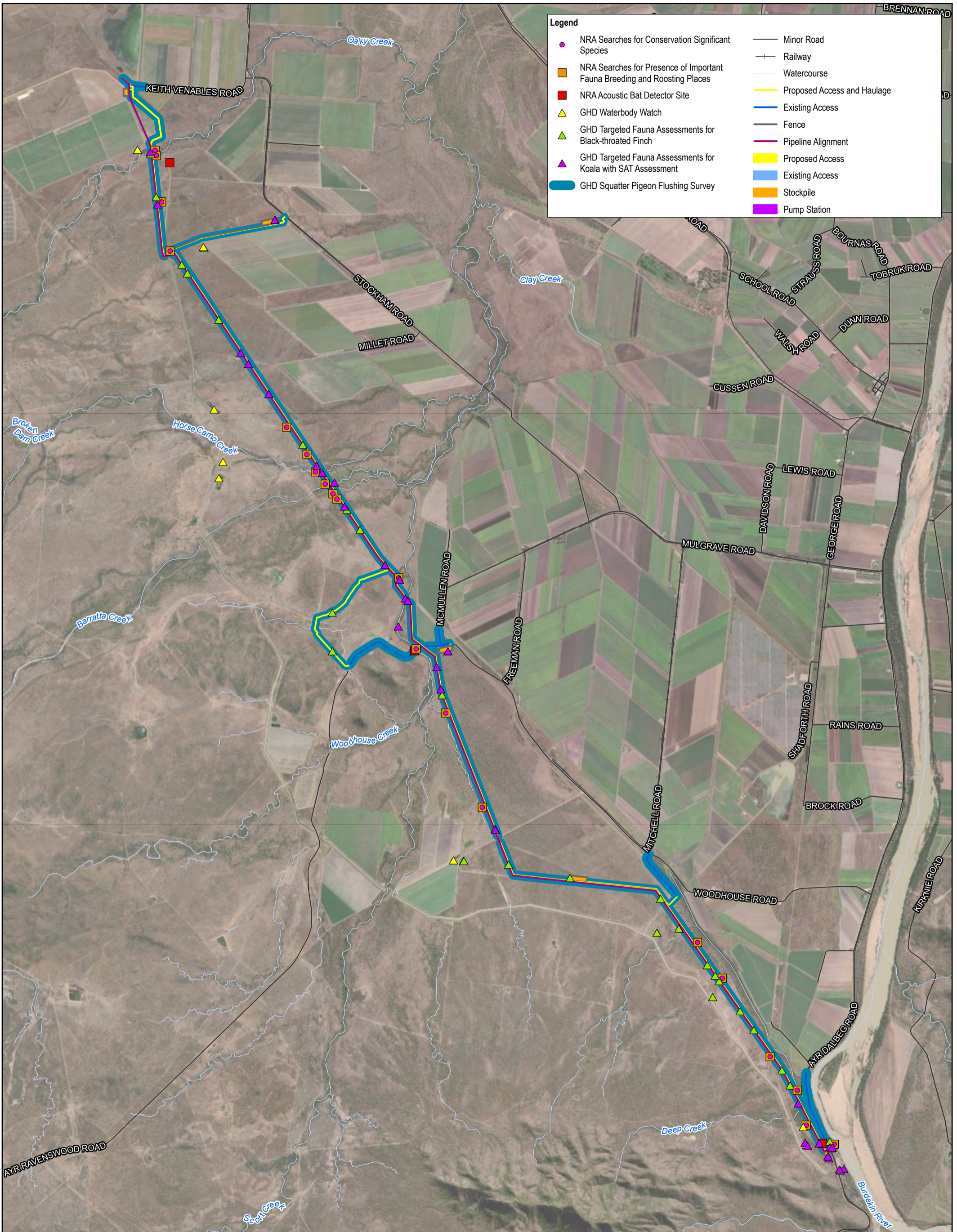
Townsville City Council  
Houghton Pipeline Stage 2 - MNES Assessment

Project No. 12537606  
Revision No. 0  
Date 12/17/2021

Distribution of flora survey effort

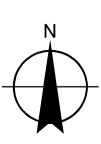
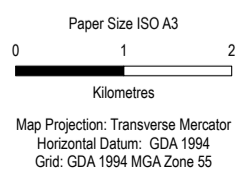
FIGURE 2-1





- Legend**
- NRA Searches for Conservation Significant Species
  - NRA Searches for Presence of Important Fauna Breeding and Roosting Places
  - NRA Acoustic Bat Detector Site
  - ▲ GHD Waterbody Watch
  - ▲ GHD Targeted Fauna Assessments for Black-throated Finch
  - ▲ GHD Targeted Fauna Assessments for Koala with SAT Assessment
  - GHD Squatter Pigeon Flushing Survey
  - Minor Road
  - Railway
  - Watercourse
  - Proposed Access and Haulage
  - Existing Access
  - Fence
  - Pipeline Alignment
  - Proposed Access
  - Existing Access
  - Stockpile
  - Pump Station

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Distribution of fauna survey effort

FIGURE 2-2



### 2.3.3 Description of GHD terrestrial flora survey methods

Flora surveys involved a combination of quaternary vegetation assessments and targeted surveys for conservation significant species. Quaternary vegetation assessments were undertaken at eight sites across the Project area (Figure 2-1). At these sites, one or more of the survey methods described below were applied:

#### RE verification

Verification of mapped RE communities was undertaken using quaternary level assessments in accordance with the methods detailed in Neldner et al. (2017). Verification of RE communities was undertaken within the Project area by NRA. Accordingly, the RE confirmations undertaken by GHD only targeted additional footprint areas (i.e. additional stockpile, pump station areas and access routes added after the NRA survey). Data collection included species and structural composition along with geology and landscape attributes. Verification of REs was used to refine habitat mapping for MNES.

#### Targeted searches for threatened flora species

Searches for EPBC and NC Act threatened flora species, including *Eucalyptus raveretiana* was undertaken within the proposed pipe stockpile sites, access roads and pump station area using random meander searches methodology outlined in the Flora Survey Guidelines (DES 2020).

#### Recording of invasive species

Prohibited or restricted invasive species as defined under the *Biosecurity Act 2014* as well as commonly observed environmental weeds were recorded where identified. Where relevant, the surveys recorded densities and extent of presence (recorded in Appendix B).

### 2.3.4 Description of GHD terrestrial fauna survey methods

Fauna surveys involved a combination of habitat assessments, vigilant bird surveys, recording of hollow-bearing trees and targeted searches for koala faecal pellets. Information on the methods applied is described below.

#### Habitat assessments

The length of the Project area was traversed on foot and the value of habitats was assessed based on the presence and quality of resources at canopy, shrub and ground layers. Targeted habitat assessments were undertaken for the black-throated finch (southern), koala, squatter pigeon (southern) and bare-rumped sheathtail bat as detailed below.

- **Targeted habitat assessments for black-throated finch (southern):** Targeted habitat assessments were undertaken at 35 locations to document the value of habitat for the black-throated finch (southern). At each site, the following was assessed: RE community, grazing intensity, buffel grass intensity, habitat description, grass species richness, native grass cover, abundance of trees within 400 m of waterbodies, whether waterbody watch was undertaken, whether species was recorded present, species usage of site (where present), the presence of nests and description of nesting tree.
- **Targeted habitat assessments for squatter pigeon (southern):** Throughout the surveys, the value of habitat for the squatter pigeon (southern) was assessed, considering the RE community and soil type, grazing intensity, proximity to water and presence of tussocky grasses. In particular, the presence of suitable breeding habitat was assessed against the Commonwealth definition (i.e. breeding habitat occurs on stony rises occurring on sandy or gravelly soils, within 1 km of a suitable, permanent waterbody (Squatter Pigeon Workshop 2011)).
- **Targeted habitat assessment for koalas:** The value of koala habitat was assessed throughout the surveys, with targeted assessments undertaken at 30 locations. At each location the following criteria was assessed: the RE community, presence and diversity of koala food trees, evidence of koalas as detailed in SAT searches, potential barriers to koala movement and potential threats to koalas from dog attacks and vehicle strike.
- **Targeted habitat assessment for bare-rumped sheathtail bat:** Resource availability for the bare-rumped sheathtail bat was assessed along the length of the Project area. This involved marking the location of all hollow-bearing trees within the Project footprint and noting those that are consistent with the dimensions of known roost trees as reported in the National Recovery Plan for the bare-rumped sheathtail bat (Schulz and

Thomson 2007) and Australian bats (Churchill 2008) (i.e. large hollows in *Eucalyptus platyphylla*). The species is known to roost in large *E. platyphylla* hollows ranging between 18 cm and 29 cm diameter (Schulz and Thomson 2007; Churchill 2008). Hollows were categorised by the following dimensions in the field, where large and moderate sized hollows in *E. platyphylla* represent potential roost trees and small hollows in *E. platyphylla* represent future potential roost trees:

- Large hollows: >30 cm diameter
- Moderate hollows 20 – 30 cm diameter
- Small hollows < 20 cm diameter

#### **Vigilant surveys for the black-throated finch (southern) and squatter pigeon (southern)**

Vigilant bird surveys were undertaken whilst traversing the length of the Project area. These were undertaken over six, 10 hour days. All birds seen or heard calling were recorded. Particular attention was paid to flocks of birds in which the black-throated finch (southern) is known to occur including flocks of finches and woodswallows.

#### **Daytime waterbody watch surveys for the black-throated finch (southern) and squatter pigeon (southern)**

Fourteen waterbody watches were undertaken in suitable habitat for the black-throated finch (southern) and/or squatter pigeon (southern). Waterbody watches were undertaken at dawn, midday or dusk, with 30 minutes spent watching each waterbody, recording all birds seen or heard.

#### **Driving/flushing surveys for the squatter pigeon (southern)**

Driving/flushing surveys were undertaken to detect the squatter pigeon (southern) and other small ground-dwelling birds. Flushing surveys were conducted whilst driving, with an estimated length of 464 km assessed within the Project area (based on two vehicles driving around the Project area over 6 days).

#### **Spot assessment technique**

Targeted searches for koala faecal pellets were undertaken at 30 sites within the Project area using the SAT search method (Phillips and Callaghan 2011). SAT searches targeted areas with high potential value along watercourses and in other areas where koala food trees were locally abundant. Based on the results, assessments of habitat quality were undertaken using the koala habitat assessment toolkit detailed in the EPBC Referral guidelines for the vulnerable koala.

#### **Opportunistic surveys for wildlife and traces**

All incidental records of fauna observed during surveys were recorded. All indirect traces of fauna including bones, feathers, skulls, sloughed skins, faecal pellets, tracks, burrows and scratchings were also recorded.

### **2.3.5 Animal ethics and legislative permits**

GHD field surveys were conducted in accordance with the following permits and approvals:

- Department of Employment, Economic Development and Innovation Scientific Users Registration Certificate (Registration Number 132)
- DES Scientific Purposes Permit (permit number WA0021563)
- Animal Researcher Authority issued by the accredited GHD Animal Ethics Committee.

## **2.4 Likelihood of occurrence assessment**

An assessment was conducted to attribute a 'likelihood of occurrence' to TECs and conservation significant species (i.e. species listed under the EPBC Act and/or NC Act) that have been previously recorded or predicted to occur within the desktop search extent. The likelihood of occurrence assessment was based on a review of species distributions and habitat requirements, historical records for the region, and the results of habitat assessments and field surveys conducted within the Project area. The likelihood of occurrence ranking was based on the following framework:

- **Confirmed present:** TECs and/or species recorded during the field survey.

- **Likely to occur:** TECS and/or species has been recorded in the desktop search extent and suitable habitat is present in the Project area.
- **May occur:** TECs and/or species distribution incorporates the Project area but only marginal habitat is present or the species has not been recorded in the desktop extent. This includes transient, vagrant or cryptic species that have a reduced likelihood of occurrence but cannot be entirely discounted. Species within this category were not subject to further impact assessment.
- **Unlikely to occur:** Species has not been previously recorded in the desktop search extent and/or current known distribution does not encompass Project area and/or suitable habitat is generally lacking from the Project area. Species within this category were not subject to further impact assessment.

The likelihood of occurrence assessment for TECs and conservation significant species is provided in Appendix C.

## 2.5 Habitat for conservation significant species

For all species confirmed present or considered likely to occur (with the exception of two migratory bird species), the distribution of predicted habitat was mapped based on criteria detailed in Sections 5 and 6, differentiating areas of habitat into habitat critical to the survival of the species and potential breeding, foraging and drinking/dispersal habitat where relevant. The criteria used for each species is generally consistent with the habitat requirements specified in the Commonwealth listing advice and Species Profile and Threats (SPRAT) database provided by DAWE. Given these descriptions are often necessarily broad to apply at a national scale and use definitions that are generally not spatially defined, further definition of the habitat criteria was required to explain how they have been mapped at a local scale. For most species, predicted habitat mapping was based on essential habitat factors listed for each species in the Queensland essential habitat mapping database, relying on factors including RE vegetation communities, elevation and soil type. Where relevant, these were adapted to reflect variations in on-site conditions identified via field surveys. The relationship between Commonwealth habitat criteria and the criteria used to map habitat for each species has been detailed in the relevant species sections in Sections 5 and 6. Reasons for any minor deviations from the Commonwealth habitat descriptions are explained in the species descriptions below. For each species, habitat critical to the survival of the species has been defined for the Project and compared against the Commonwealth definition in Sections 5 and 6.

Using the RE system as a basis has the additional advantage of allowing for an assessment of the context of habitat loss, by comparing the proportional loss of habitat within the Project area against the area of predicted habitat present within the surrounding landscape. As the RE system has a defined spatial basis, the approach also provides a clear understanding of the spatial resolution at which mapping has been extrapolated. This approach to mapping predicted habitat has been used by GHD in many other Commonwealth impact assessments.

## 2.6 Assessment of potential impacts

Potential impacts associated with the construction and operation of the Project were assessed in relation to the ecological values of the existing environment. During the construction phase the Project is expected to result in localised losses of habitat, predominantly due to clearing for infrastructure: access tracks, stockpiles, pump station, cabling, power supply works, firebreaks etc., and temporary disturbance of wildlife through construction light, noise, vibration and increased vehicle movements, as well as the potential for erosion and sedimentation.

During the operational phase, the Project is unlikely to have any substantial impact for most environmental matters.

For each potential impact identified for the MNES, mitigation measures have been detailed and an assessment of the significance of impact undertaken.

## 2.7 Significance of impacts assessment

A significance of impacts assessment was undertaken of the Project's potential impacts on MNES that have been **confirmed present** or are considered **likely to occur** within the Project area.

The assessment was made against the EPBC Act Significant Impact Guidelines 1.1 (DoE 2013) for the following listed species:

- Threatened flora species
  - *Eucalyptus raveretiana*
- Threatened fauna species
  - Koala
  - Bare-rumped sheath-tail bat
  - Black-throated finch (southern)
  - Squatter pigeon (southern)
  - White-throated needletail
  - Fork-tailed swift
  - Eastern osprey

### 3. Summary of the existing environment

#### 3.1 Existing impacts

The Project area exists in a region which has undergone substantial disturbance and clearing of vegetation within the last 200 years for agricultural and cattle grazing purposes. Large portions of the Project area are impacted by vegetation clearance, cattle grazing, cultivated agriculture and sowing of exotic pasture grasses. Portions of the Project area contain very sparse open woodland with high levels of fragmentation occurring to the east of the Project area. Patches of non-remnant cleared areas are scattered across the Project area, predominantly in the southern and northern sections of the Project area. The Project area is connected to remnant habitat further north and west, providing connectivity for species within the region.

Substantial areas of grass and shrub layers were dominated by weed species, with tree layers dominated by native *Eucalyptus*, *Corymbia*, *Melaleuca* and *Casuarina* species. Thirty-six invasive weed species were identified during the GHD field survey, these are listed in Appendix B and include rubber vine (*Cryptostegia grandiflora*) and chinee apple (*Ziziphus mauritiana*) (Plate 3.1). Three invasive pests were recorded during the field survey, these included cat (*Felis catus*), pig (*Sus scrofa*) and rabbit (*Oryctolagus cuniculus*).



Plate 3.1 Dense chinee apple (left) and rubber vine (right) within the Project area

#### 3.2 Regional ecosystem mapping

Quaternary surveys were completed along the length of the pipeline alignment. REs were verified within the nominated disturbance areas by GHD. NRA field verified mapping was accepted beyond the nominated survey area. Based on the field verified data the 10 REs are present within the Project footprint as shown in Table 3.1 and presented in Figure 3-1.

Table 3.1 Regional Ecosystem mapping

Regional Ecosystem	VM Act Status	Description
11.3.4	Least Concern	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains
11.3.7	Least Concern	<i>Corymbia</i> spp. open woodland on alluvial plains
11.3.9	Least Concern	<i>Eucalyptus platyphylla</i> , <i>Corymbia</i> spp. woodland on alluvial plains
11.3.10	Least Concern	<i>Eucalyptus brownii</i> woodland on alluvial plains
11.3.12	Least Concern	<i>Melaleuca viridiflora</i> , <i>M. argentea</i> +/- <i>M. dealbata</i> woodland on alluvial plains



<b>Regional Ecosystem</b>	<b>VM Act Status</b>	<b>Description</b>
11.3.13	Of Concern	<i>Grevillea striata</i> open woodland on coastal alluvial plains
11.3.25b	Least Concern	<i>Melaleuca leucadendra</i> and/or <i>M. fluviatilis</i> , <i>Nauclea orientalis</i> open forest
11.3.30	Least Concern	<i>Eucalyptus crebra</i> , <i>Corymbia dallachiana</i> woodland on alluvial plains
11.3.35	Least Concern	<i>Eucalyptus platyphylla</i> , <i>Corymbia clarksoniana</i> woodland on alluvial plains
11.3.35a	Least Concern	<i>Corymbia tessellaris</i> , <i>C. clarksoniana</i> and <i>Eucalyptus platyphylla</i> woodland







### 3.3 Likelihood of occurrence assessment results

Based on the results of the likelihood of occurrence assessment, three conservation significant species were **confirmed present** within the Project area, and a further five were considered **likely to occur** within the Project area. Of the remaining 38 conservation significant species identified in desktop searches, 24 **may occur**. The remaining 14 species are unlikely to occur due to the absence of suitable habitat and nearby historical records. The results of the likelihood of occurrence assessment are presented in Appendix C.

Table 3.2 Conservation significant species known or likely to occur

Scientific name	Common name	EPBC Act status	NC Act status
<b>Confirmed present</b>			
<i>Eucalyptus raveretiana</i>	Black ironbox	V	LC
<i>Poephila cincta cincta</i>	Black-throated finch (southern)	E	E
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	V	V
<b>Likely to occur</b>			
<i>Phascolarctos cinereus</i>	Koala	V	V
<i>Saccolaimus saccolaimus nudicluniatus</i>	Bare-rumped sheath-tail bat	V	E
<i>Hirundapus caudacutus</i>	White-throated needletail	V, Mig	V
<i>Apus pacificus</i>	Fork-tailed swift	Mig	SL
<i>Pandion haliaetus</i>	Osprey	Mig	SL

Information on those species confirmed present or considered likely to occur is detailed in the following sections.

## 4. Overview of the Project

This section presents an overview of the Project, summarising the extent of clearing and the general avoidance and mitigations measures that will be undertaken to reduce impact on existing habitats.

### 4.1 Nature of construction

#### 4.1.1 Construction activities

The Project will result in the construction of a 28.5 km long 1800 mm pipeline, buried at a depth of 1.2 – 2.5 m using imported embedment materials. The pipeline will have capacity to transfer 364 ML of water per day. The pipeline route is generally located across open and flat to slightly undulating land, in which most of the construction work should be able to be undertaken via open trench excavation. Where the pipeline crosses rail and road crossings, a stiffer class of pipe and/or restrained joints may be required and installation will likely be carried out within an enveloper. A typical cross section of the pipeline construction corridor is provided in Figure 4-1 to Figure 4-4. Construction is scheduled to take approximately 30 months or 2 and half years, with construction works to commence in mid-2022 and be completed by the end of 2024. Construction will generally be undertaken during daylight hours with the exception of some of the road crossings which may require night works for traffic management reasons.

## 4.1.2 Temporary and permanent impacts

The Project will result in 123.22 ha of temporary disturbance and 12.76 ha of permanent footprint impacts. Temporary disturbance will be associated with parts of the Project footprint that will be cleared for construction and rehabilitated as outlined in Section 4.3. Permanent impacts will be associated with parts of the Project footprint that will be cleared for permanent infrastructure. The temporary and permanent impact areas are defined below.

### Temporary clearance impacts for MNES

- Construction corridor for the 28.5 km long pipeline alignment – typically consisting of a 40 m wide corridor (for clearing activities, trenching works, pipe installation, fencing and stockpiling of excavated material and topsoil are to be accommodated within the pipeline clearance extents) reducing to a 20 m wide corridor at riparian zones and mapped watercourse/waterway crossings.
- Temporary access and haulage roads and five stockpile areas for storing materials and equipment

### Permanent clearance impacts for MNES

- 28.5 km long buried pipeline and a 4 m wide gravel access road along the length of the pipeline
- Pump station – as per the extent of the pump station site (1.63 ha)
- Intake structure – to be determined
- Substation site – to be determined
- Power supply works – to be determined

## 4.2 Operation phase

Operation of the Project will involve the ongoing maintenance of a 21.5 m wide public utility easement, 10 m wide zone influence above the pipeline, 4 m wide permanent gravel access road for the length of the pipeline and operation of the pump station and substation. This will include low levels of vehicle movements along the access corridor approximately one a week. No permanent fencing is proposed, other than surrounding the pump station and substation. The temporary disturbance areas will have been subject to reinstatement and rehabilitation, as detailed in Section 4.3.

## 4.3 Proposed rehabilitation measures

For the bulk of the Projects temporary disturbance footprint, rehabilitation will be undertaken by spreading topsoil and allowing natural regeneration of existing ground covering vegetation. Active rehabilitation will be undertaken in nominated watercourses and associated riparian zones by planting of tubestock, direct seeding and hydromulching. The pipeline corridor will be rehabilitated to its pre-clearance state with the exception of the following:

- 4 m permanent gravel access road for the length of the pipeline
- 10 m zone of influence above the pipeline, where only a ground layer stratum is proposed

Rehabilitation will occur progressively, as areas are no longer required for construction activities, and prior to demobilisation from the site. The primary objective is to return temporary disturbance areas as close as practicable to pre-disturbance conditions.

A commitment to rehabilitation has been outlined for the following areas:

- Areas within 10 m, 25 m and 50 m of vegetated watercourses (where the pipeline intersects these watercourses)
- Areas within 400 m of a water source (excluding Sunwater irrigation channels)
- All other areas within the pipeline alignment disturbed by construction works
- Avoidance of removing large and moderate *E. platyphylla* hollows (where possible) in disturbance areas outside of the 21.5 m wide permanent easement corridor.

### 4.3.1 Rehabilitation measures proposed at vegetated watercourse crossings

For areas within 10 m, 25 m and 50 m of vegetated watercourses, the construction corridor will be reduced to 20 m wide and will be rehabilitated by way of hydromulching with a mixture of black-throated finch food grass species, with the exception of the 4 m gravel access road. *E. platyphylla* tubestock will be planted outside of scour protection areas (bed and banks or watercourses and waterways) within the haulage road (6 m width). Rehabilitation of this area is shown in Figure 4-1.

### 4.3.2 Species-specific rehabilitation measures proposed within 400 m of a water source

Based on the outcomes of a preliminary consideration of anticipated impacts on MNES, additional species-specific rehabilitation commitments were considered necessary and have been proposed by TCC to further avoid and mitigate the impact on habitats for the black-throated finch (southern) and bare-rumped sheathtail bat. The proposed measures and the anticipated outcomes in terms of mitigating the residual impacts on habitat critical to the survival of the species are outlined in Section 7 and below.

In areas within 400 m of a water source, hydromulch will be applied across the extent of the construction corridor for the pipeline alignment, with exception of the 4 m gravel access road. *E. platyphylla* tubestock will be planted within temporary stockpile areas and in the outer edges of the pipeline alignment (basically outside of the 21.5 m wide public utility easement) as shown in Figure 4-2.

#### 4.3.2.1 Rehabilitation

Specific hydromulch and tube stock requirements are detailed in Table 4.1 and suitable plant species for riparian zones are detailed in Table 4.2.

Table 4.1 Hydromulch and tube stock requirements

Hydromulch	Tube stock requirements		
	Tube stock planting rate at the following rates per stratum	Tube-stock species diversity requirements	Plant spacing requirements
<ul style="list-style-type: none"> <li>– Endemic grass species should be used with the goal of surface stabilisation through over-seeding the rehabilitation area with endemic grass species.</li> <li>– Seeding rate should be sufficient for germination and sustainable cover of approximately 1000 plants per hectare, per riparian zone.</li> <li>– A minimum of four different native grass species should be used. Several options are provided in Table 4.2.</li> <li>– Bonded fibre matrix to be provided at watercourse banks as a minimum. 6-month functional longevity, minimum application rate of 5000 kg/ha (500 g/m<sup>2</sup>) and minimum wet thickness of 5 mm.</li> <li>– Apply hydromulching material to rehabilitation areas (100%</li> </ul>	<ul style="list-style-type: none"> <li>– 30 canopy trees per hectare</li> <li>– 50 sub-canopy trees per hectare</li> <li>– 60 shrubs per hectare</li> <li>– 3,000 sedges and forbs per hectare.</li> </ul>	<p>RE11.3.25a</p> <ul style="list-style-type: none"> <li>– A minimum of four different canopy species</li> <li>– A minimum of two different sub-canopy species</li> <li>– A minimum of two different shrub species</li> <li>– A minimum of four different forb or sedge species.</li> </ul> <p>RE11.3.25b</p> <ul style="list-style-type: none"> <li>– A minimum of four different canopy species</li> <li>– A minimum of three different sub-canopy species</li> <li>– A minimum of five different shrub species</li> </ul>	<p>Recommended plant spacing is as follows:</p> <p><i>Below the defining bank</i></p> <ul style="list-style-type: none"> <li>– Forbs and sedges can be planted in clumps of four with a minimum spacing of 1m between clumps</li> <li>– Shrub species with a minimum spacing of 2m (stream order 3 or higher watercourses) or with a minimum spacing of 3m (stream order 1 and 2 watercourses).</li> </ul> <p><i>Beyond the defining bank</i></p> <ul style="list-style-type: none"> <li>– Plant sub-canopy, shrub, and ground strata species with a minimum spacing of 2m</li> <li>– Plant canopy species with a minimum spacing of 3m.</li> </ul>

Hydromulch	Tube stock requirements		
	Tube stock planting rate at the following rates per stratum	Tube-stock species diversity requirements	Plant spacing requirements
cover on entire rehabilitation footprint) at the minimum application rate as per the nominated product requirements		– A minimum of four different forb or sedge species.	

Table 4.2 Suitable plant species for rehabilitation of watercourses/drainage lines

Stratum	Lifeform	Species	Common name	RE 11.3.25a	RE 11.3.25b
Canopy	Tree	<i>Casuarina cunninghamiana</i>	River She-oak	X	X
	Tree	<i>Corymbia tessellaris</i>	Moreton Bay Ash	X	X
	Tree	<i>Eucalyptus camaldulensis</i>	River Red Gum	X	-
	Tree	<i>Eucalyptus platyphylla</i>	Poplar gum	-	X
	Tree	<i>Eucalyptus raveretiana</i>	Black Ironbox	X	-
	Tree	<i>Eucalyptus tereticornis</i>	Forest red gum	-	X
	Tree	<i>Euroschinus falcatus</i>	Cudgerie	-	X
	Tree	<i>Melaleuca fluviatilis</i>	River tea tree	X	X
	Tree	<i>Melaleuca leucadendra</i>	Weeping Paperbark	-	X
	Tree	<i>Nauclea orientalis</i>	Leichhardt Tree	-	X
Subcanopy	Tree	<i>Alphitonia excelsa</i>	Soap bush	-	X
	Tree	<i>Alphitonia excelsa</i>	Soap tree	-	X
	Tree	<i>Ficus racemose</i>	Cluster Fig	-	X
	Tree	<i>Geijera salicifolia</i>	Wilga	-	X
	Tree	<i>Glochidion apodogynum</i>	Buttonwood	X	-
	Tree	<i>Lysiphyllum hookeri</i>	White Bauninia	-	X
	Tree	<i>Mallotus philippensis</i>	Kamala Tree	X	X
	Tree	<i>Melaleuca nervosa</i>	Firebark	-	X
	Tree	<i>Melaleuca viridiflora</i>	Broad-leaved paperbark	X	X
Shrub	Shrub	<i>Acacia holosericea</i>	Silky Wattle	-	X
	Shrub	<i>Alyxia ruscifolia</i>	Native Holly	-	X
	Shrub	<i>Breynia oblongifolia</i>	Coffee Bush	X	X
	Shrub	<i>Ficus opposita</i>	Sandpaper Fig	-	X
	Shrub	<i>Lophostemon grandiflorus</i>	Northern Swampbox	X	-
	Shrub	<i>Macaranga tanarius</i>	Macaranga	-	X
	Shrub	<i>Planchonia careya</i>	Cocky Apple	-	X
Ground	Forb	<i>Commelina diffusa</i>	Scurvy Weed	-	X
	Forb	<i>Commelina ensifolia</i>	Scurvy Grass	X	X
	Forb	<i>Dianella caerulea</i>	Blue Flax Lily	X	X



Stratum	Lifeform	Species	Common name	RE 11.3.25a	RE 11.3.25b
	Forb	<i>Eustrephus latifolius</i>	Wombat Berry	-	X
	Forb	<i>Lomandra longifolia</i>	Spiny-head Mat-rush	X	X
	Grass	<i>Arundinella nepalensis</i>	Reedgrass	X	-
	Grass	<i>Bothriochloa bladhii</i>	Australian Beardgrass	X	X
	Grass	<i>Dichanthium sericeum</i>	Queensland Bluegrass	X	X
	Grass	<i>Eriochloa procera</i>	Slender Cupgrass	-	X
	Grass	<i>Heteropogon contortus</i>	Black Speargrass	X	X
	Grass	<i>Leersia hexandra</i>	Swamp Ricegrass	-	X
	Grass	<i>Sarga plumosum</i>	Plume Sorghum	-	X
	Grass	<i>Setaria surgens</i>	Pigeon Grass	X	X
	Grass	<i>Themeda triandra</i>	Kangaroo Grass	-	X
	Sedge	<i>Cyperus distans</i>	Slender Cyperus	-	X
	Sedge	<i>Cyperus javanicus</i>	Javanese Flatsedge	X	X
	Sedge	<i>Cyperus trinervis</i>	-	-	X
	Sedge	<i>Fimbristylis dichotoma</i>	Common Fringe Sedge	X	X
	Sedge	<i>Fimbristylis littoralis</i>	Lesser Fimbristylis	-	X

### 4.3.3 Rehabilitation measures proposed for all other disturbed areas as part of the pipeline alignment

For all other disturbed areas, rehabilitation will be through the respreading of topsoil to allow natural regeneration of the existing ground covering vegetation. This will apply across the extent of the pipeline alignment. No *E. platyphylla* tubestock will be specifically planted within this zone. Rehabilitation of this area is shown in Figure 4-3.

### 4.3.4 Avoidance of large and moderate sized *E. platyphylla* hollows within the pipeline alignment

For disturbance areas containing *E. platyphylla* trees with large and moderate sized hollows, the construction Contractor will try and avoid clearing these trees wherever possible. However, no *E. platyphylla* trees will be able to be retained within the 21.5 m wide permanent easement corridor as this will involve the excavation and trenching works, pipe installation, construction vehicle movements and will generally require the entire extent to be cleared of all woody vegetation. Where *E. platyphylla* trees containing large and moderate sized hollows have to be removed, the construction Contractor is to salvage and reinstate the hollows on mature *E. platyphylla* trees adjacent to the pipeline. Planting of *E. platyphylla* tubestock will then be undertaken in specific areas within the outer edges of the pipeline alignment (basically outside of the 21.5 m wide public utility easement corridor) to achieve like for like replacement of potential roosting habitat. The proposed avoidance areas are shown in Figure 4-4.

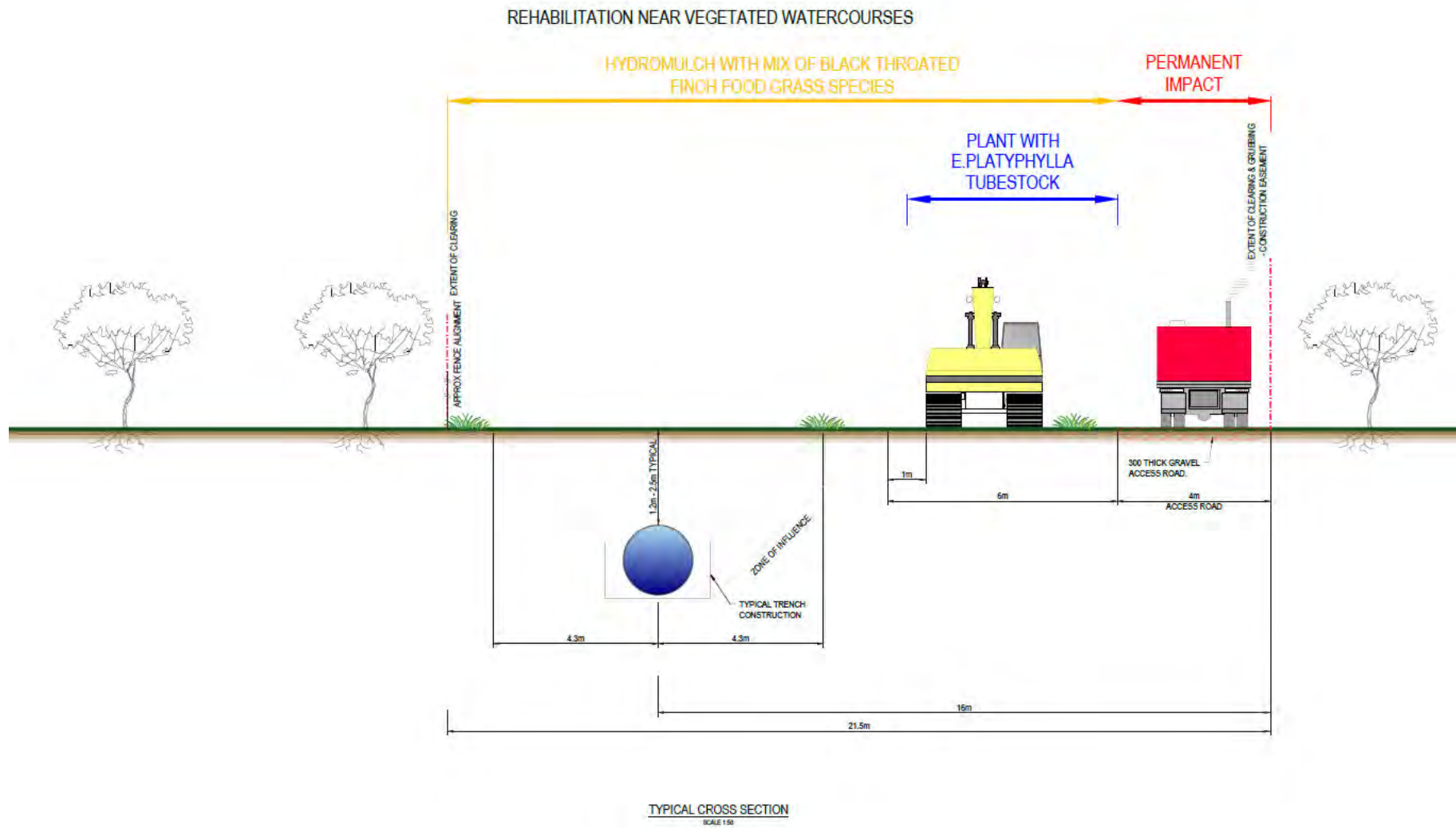


Figure 4-1 Rehabilitation within 10 m, 25 m and 50 m of vegetated watercourses

REHABILITATION WITHIN 400m OF WATER

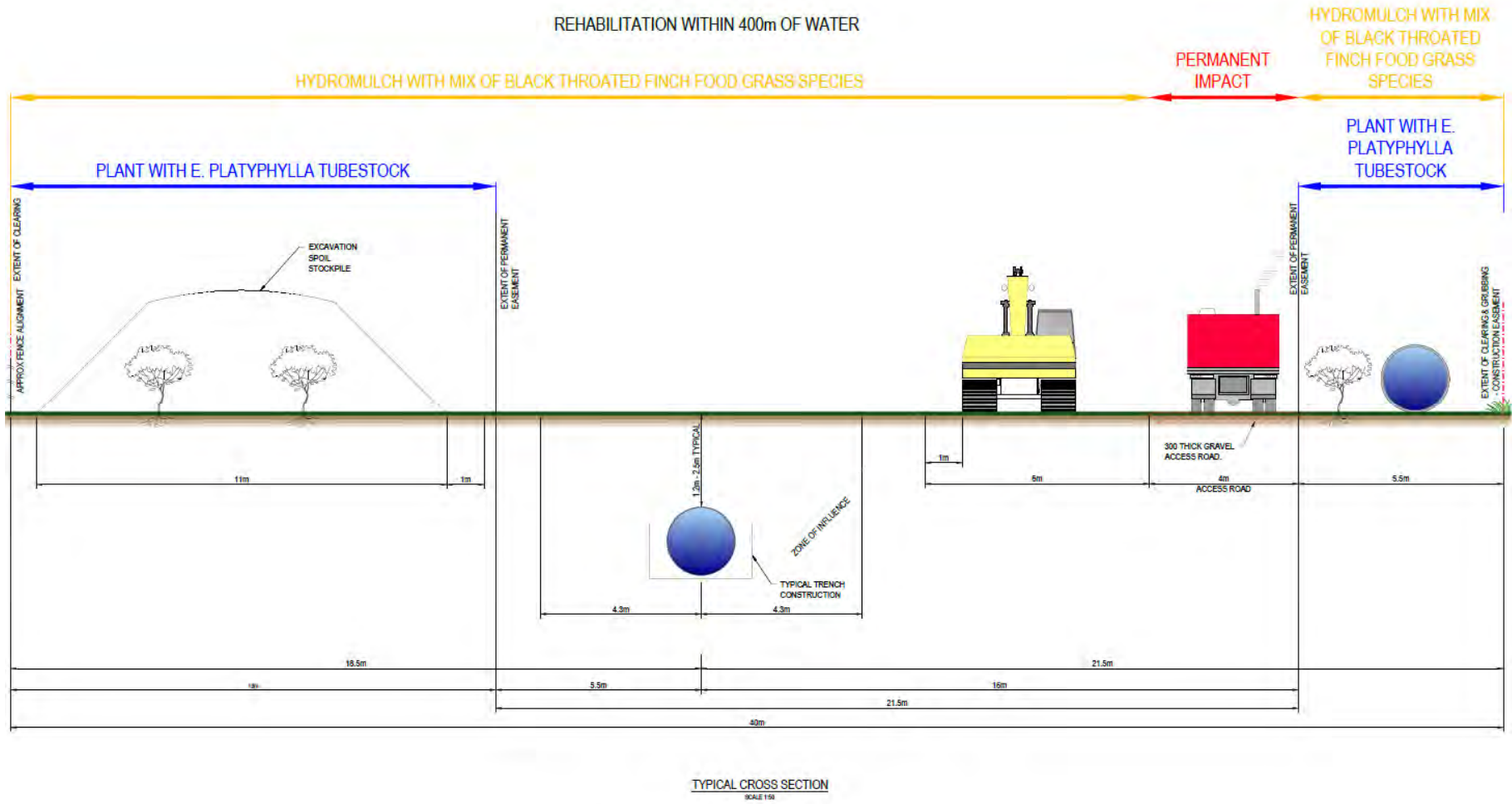
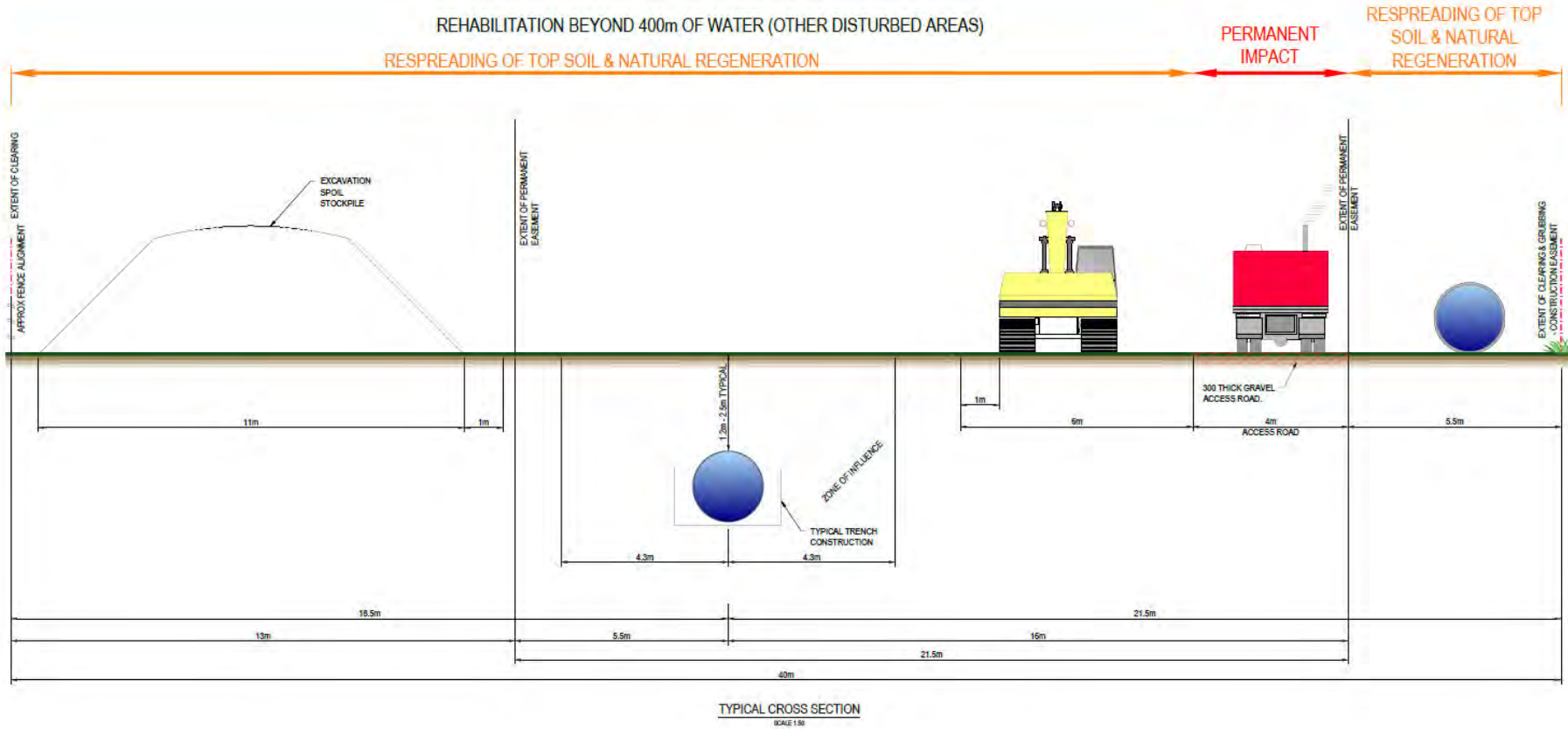


Figure 4-2 Species-specific rehabilitation within 400 m of a water source



**Figure 4-3** Rehabilitation of all other disturbed areas within the pipeline alignment

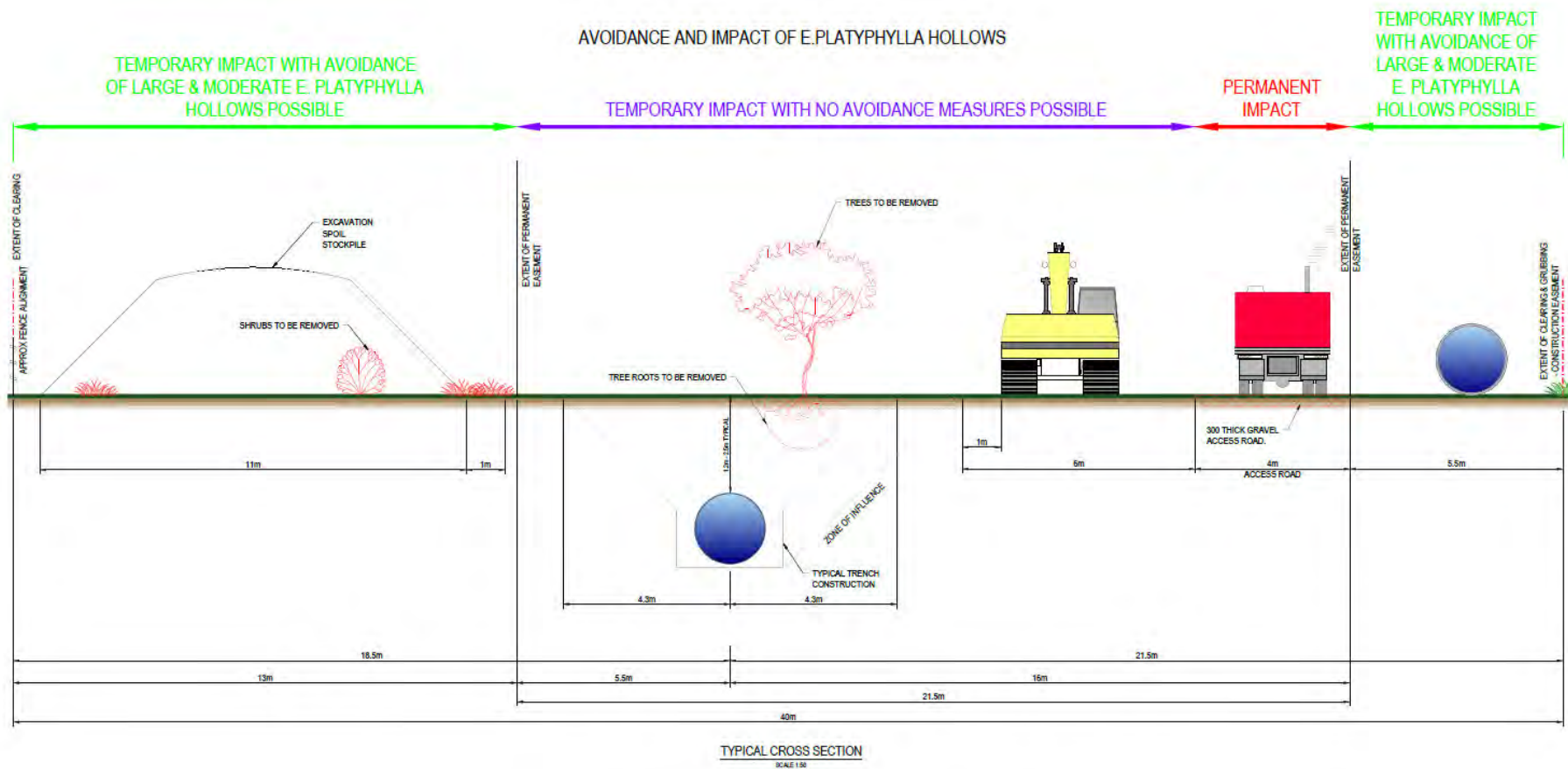


Figure 4-4 Avoidance of large and moderate *E. platyphylla* hollows within the pipeline alignment

## 4.4 Summary of permanent and temporary impacts

The Project has the potential to result in a number of impacts during construction and operation phases. Potential impacting processes and relevant mitigation measures are summarised in Table 4.3.

Table 4.3 Summary of impacts and mitigation measures

Impacting process	Mitigation and management measures
Loss of habitat	Clearing restricted to minimum area required for Project footprint Clearing areas to be clearly identified during construction Existing disturbed areas to be utilised (where possible) Rehabilitation of temporary disturbance areas Implementation of a CEMP, CЕССР and ESCP Environmental awareness training for construction personnel
Injury or mortality	Pre-clearance surveys and clearing activities to be supervised by a qualified fauna spotter catcher Adverse incident response procedures implemented CEMP to include protocols on fauna injury and mortality
Fragmentation of habitat and loss of connectivity	Activities to be undertaken in existing disturbed areas (where possible) Reinstatement and rehabilitation of temporarily disturbed areas as soon as practicable
Disturbance to habitat from noise, light, and vibration	Lighting to be kept to a minimum (unless required for safety reasons) Construction activities to typically occur in daylight hours (unless night works are required for road crossings) Implementation of a Traffic Management Plan Maintenance schedule for construction vehicles
Habitat degradation and increased erosion	CESCP and ESCPs to include appropriate erosion and sediment controls Vehicle movements to remain on dedicated tracks
Spread of invasive species	Waste management plan, as part of the CEMP Weed management plan and weed hygiene protocols, as part of the CEMP Vehicle movements to remain on dedicated tracks

The construction and operation of the Project will result in the following impacts:

- **Temporary impacts** – 123.22 ha
- **Permanent impacts** – 12.76 ha



## 5. Threatened flora species

### 5.1 *Eucalyptus raveretiana* (black ironbox)

#### 5.1.1 Conservation status and documentation

*Eucalyptus raveretiana* is listed as Vulnerable under the EPBC Act.

This species is a tree growing to 25 m tall and distinguished from other eucalypts by having the smallest fruit of the genus (less than 2 mm wide). It is generally restricted to the riparian zone of watercourses (i.e. below the high bank), growing in loams and clay soils between altitudes of 0 – 300 m. It is found in the region between Ayr in the north to Rockhampton in the south, and inland to Nebo (DAWE 2021a; TSSC 2010). Within this range it is locally common on certain permanent streams but absent from many others. *Eucalyptus raveretiana* is usually co-dominant or sub-dominant with species such as *Melaleuca leucadendra*, *Melaleuca fluviatilis*, *Eucalyptus tereticornis* and *Corymbia tessellaris* (DEWHA, 2008).

#### 5.1.2 Criteria used to map *Eucalyptus raveretiana* habitat

The Commonwealth conservation advice identified that *E. raveretiana* occurs on banks of rivers, creeks and other watercourses on clayey or loamy soil, codominant with the above listed species (Queensland Herbarium 2009; cited TSSC 2010). Potentially suitable sites for *E. raveretiana* intersecting the Project area were surveyed for presence by three ecologists. Flora survey effort is shown in Figure 2-1. Confirmed records from the field survey and historical records within the desktop search extent were mapped for *E. raveretiana* (Figure 5-1).

#### 5.1.3 Desktop results

*Eucalyptus raveretiana* was identified within the PMST (Appendix A) as having potential to occur within a 30 km radius from a central point within the Project area. A search of WildNet (Appendix A) reported one historical record within 30 km of the search coordinates. Biomaps was used to determine the historical location, the species was recorded downstream of the Project area along the Burdekin River, approximately 11 km east from the pipeline alignment in RE11.3.25f/11.3.25b.

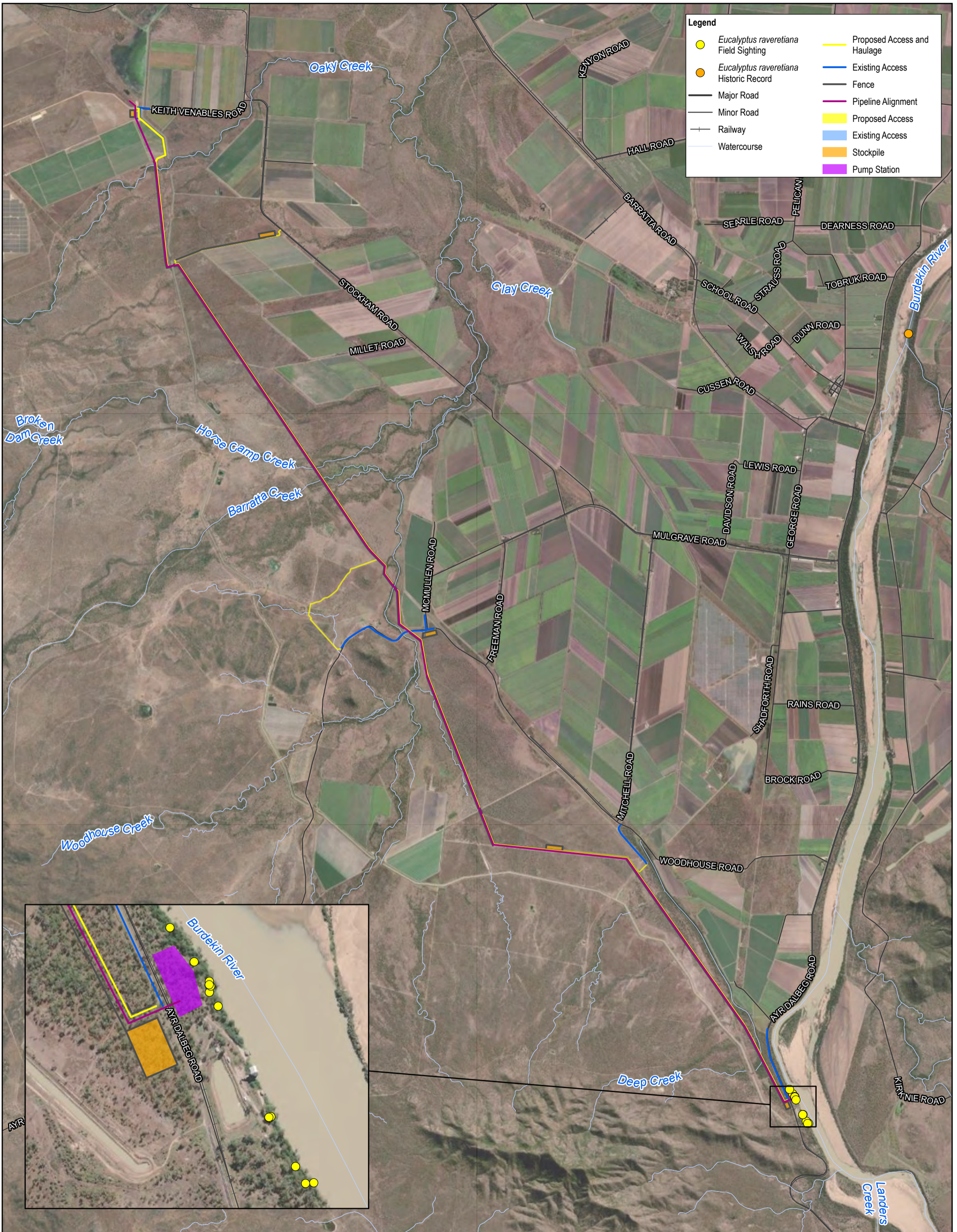
#### 5.1.4 Survey results

Thirteen adult *E. raveretiana* individuals were recorded during the field surveys. All individuals were recorded along the lower terrace and lower bank of the Burdekin River. Individuals were recorded in loose pale-yellow sands dominated by *E. tereticornis* with associated *Nauclea orientalis* over a lower mid-dense lower tree layer of *Ficus racemosa*, *F. opposita* and *Melaleuca leucadendra*. The species is known from 23 locations from Townsville to Nebo, Queensland, and historical records 11 km from the Project area indicates the species is present in areas outside of the Project footprint. Land use in the Project area and surrounding vicinity is primarily used for cattle grazing and agriculture. In potentially suitable habitat for *E. raveretiana* within the Project area, land clearing has impacted vegetation surrounding rivers, creeks and other watercourses. Depending on the construction methodology of the intake structure, the Project may result in the direct impact and removal of up to a maximum of four *E. raveretiana* individuals

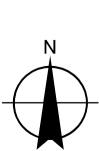
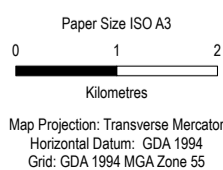


**Plate 5.1** *Eucalyptus raveretiana* recorded during the field survey





Based on or contains data provided by the State of QLD 2021. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.



Townsville City Council  
Haughton Pipeline Stage 2 - MNES Assessment

Distribution of black ironbox  
surrounding the Project area

Project No. 12537606  
Revision No. 0  
Date 12/17/2021

FIGURE 5-1



## 5.1.5 Significance of project footprint

This section assesses the significance of *E. raveretiana* habitats within the Project area, whether they constitute habitat critical to the survival of the species, their importance in the context of the local population and whether the local population is important at a national level.

### 5.1.5.1 Status as an important population

An 'Important population' for *E. raveretiana* has not been formally defined in the Commonwealth listing advice for the species. In the absence of a formal definition, the definition outlined in the Significant Impact Guidelines 1.1 applies. An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are key source populations either for breeding or dispersal; populations that are necessary for maintaining genetic diversity, and/or; populations that are near the limit of the species range.

The Project area is within the northern limits of the species distribution and known range. The local population is therefore considered an important population under the definition outlined in the EPBC Act.

### 5.1.5.2 Status as habitat critical to the survival of *Eucalyptus raveretiana*

Habitat critical to the survival of the species has not been formally defined in the Commonwealth listing advice for the species. In the absence of a formal definition, the definition outlined in the Significant Impact Guidelines 1.1 applies. 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: for activities such as foraging, breeding, roosting, or dispersal; for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators); to maintain genetic diversity and long term evolutionary development, or; for the reintroduction of populations or recovery of the species or ecological community.

The Project area is not considered to be habitat critical to the survival of the species. The distribution of current and historical records along the Burdekin suggests the species persists in areas outside of the Project area. Therefore the suitable habitat recorded along the Burdekin River is not considered to be critical to the long-term maintenance of the species.

## 5.1.6 Threatening processes

Threats to *Eucalyptus raveretiana* include (DAWE 2021a; TSSC 2010):

- Invasive weeds including rubber vine
- Water resource development
- Loss and damage through timber harvesting

## 5.1.7 Potential impacts

Thirteen *Eucalyptus raveretiana* individuals are located within the Project area. Depending on the construction methodology of the intake structure, the Project may result in the maximum removal of four *E. raveretiana* individuals. The nearest record is 11 km from the Project footprint, therefore the species is known to occur within the local area.

Potential impacts include:

- Loss of habitat and individuals
- Habitat degradation by increased dust, runoff and sedimentation
- Introduction and spread of weed species

### 5.1.7.1 Loss of habitat and individuals

The Preliminary design of the Project footprint has been sited to avoid the majority of the *E. raveretiana* individuals. However, dependent on the construction methodology of the intake structure, construction may result in removal of four *E. raveretiana* individuals.

### 5.1.7.2 Habitat degradation by increased dust, runoff and sedimentation

Construction activities have the potential to generate localised dust, erosion, run-off and sedimentation through increased vehicle movements, clearance of vegetation and earthworks. This can reduce the abundance and diversity of adjacent terrestrial and aquatic habitats by physically smothering vegetation, changing nutrient levels, impeding the growth and germination of plant species, encouraging weed incursions and altering the movement and behaviour of fauna species.

The receiving environment has already been subject to high levels of erosion and sedimentation as a result of existing land-clearing and grazing activities. Nevertheless, sensitive ecological receptors (e.g. larger open woodland remnants and aquatic habitats) are particularly susceptible to adverse impacts associated with dust, run-off, erosion and sedimentation. These areas require protection through the implementation of sediment and erosion control measures during construction.

Adverse weather conditions during construction can exacerbate the potential impact of erosion and sedimentation. High rainfall has the potential to remove exposed topsoil, destabilise creek beds and distribute sediment through creek lines. Strong winds have the potential to spread exposed topsoil, decreasing the likelihood of recolonisation by vegetation and potentially distributing dust into nearby sensitive environments.

### 5.1.7.3 Introduction and spread of weed species

The Project has the potential to adversely impact *E. raveretiana* by introducing or spreading exotic weed species. Invasive weeds including rubber vine are listed as a key threat to the species. As such, the introduction and spread of weeds can substantially reduce the ability for recruitment, longevity and growth *E. raveretiana*. The Project area is already highly degraded by weeds, including rubber vine. The Project has the potential to exacerbate the loss through introduction and spread of weeds. Clearing native vegetation creates areas of disturbance that are naturally susceptible to colonisation by invasive weed species. These can form a local source of future weed infestations within the surrounding landscape.

## 5.1.8 Measures to avoid, reduce or mitigate impacts

### 5.1.8.1 Loss of habitat and individuals

Planning phase measures that have been employed to avoid and reduce the direct loss of habitat and individuals including:

- Locating the Project footprint in open areas that have been subject to historical land clearing and cattle grazing
- Minimising impacts to watercourses
- Utilising existing tracks and locating proposed tracks within previously disturbed areas

During the construction phase of the Project, the following mitigation measures will be employed:

- Land clearing will be restricted to the minimal amount necessary for the construction of the Project and will not extend outside of the Project footprint
- The extent of vegetation clearing (and any no-go areas) will be clearly identified on construction plans and in the field using high visibility fencing or flagging in the vicinity of high conservation significant areas. Clearing extents will be communicated to construction supervisors
- Where infrastructure crosses waterways, the Project footprint has been minimised to a 20 m wide construction corridor
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed
- A CEMP will be prepared to inform actions with regards to managing weed hygiene, erosion, fuels and hazardous substances, fire, etc. and includes erosion and sediment control measures
- All construction personnel will attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vegetation clearing protocols. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions

### 5.1.8.2 Habitat degradation by increased dust, runoff and sedimentation

The following mitigation measures will be used to minimise the impacts of dust, run off and sedimentation during construction of the Project:

- Erosion and sediment controls have been developed as part of the CЕССP and will be expanded on by the construction Contractor as part of their ESCPs.
- Routine dust suppression and monitoring will be undertaken throughout construction and operation.
- Duration of in-stream works will be minimised wherever practicable to reduce the potential for sedimentation.
- Erosion and sediment control measures will be installed where in-stream disturbance must be undertaken during flow conditions.
- Areas subject to clearing will be stabilised as soon as practicable.
- All vehicle movement will be restricted to designated tracks located within the Project footprint.
- Weather conditions will be monitored during the construction stage and temporary controls will be established during extreme weather events.
- Construction activities during adverse weather conditions will be managed in accordance with the CEMP
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed.

### 5.1.8.3 Introduction and spread of weed species

The following measures will be implemented to minimise the introduction and spread of weeds:

- Weed management actions are included in the CEMP and include:
  - Hygiene protocols restricting the movement of vegetation and soil between impacted areas and areas of significantly lower weed infestation.
  - Protocols for monitoring and management of weeds to identify and appropriately respond to significant changes in weed distribution and density
- All vehicles / equipment travelling from a declared restricted place or quarantine area will be required to wash down and possess a current weed hygiene inspection certificate before moving to a weed free area or commencing construction works onsite. The weed hygiene inspection certificate is to be obtained from an inspector who is deemed competent and is certified in line with Department of Agriculture and Fisheries (DAF) requirements.
- Vehicle access will be restricted to within the Project footprint and existing roads and tracks

## 5.1.9 Summary of residual impacts on *Eucalyptus raveretiana*

A summary of the Project's potential impacts on the *Eucalyptus raveretiana* and mitigation measures is presented in Table 5.1. The risk rating criteria are outlined in Appendix D.

Table 5.1 Residual impact assessment for the *Eucalyptus raveretiana*

Impact	Initial impact rating	Mitigation measures	Residual impact
Loss of habitat and individuals	High	Revegetate temporarily cleared areas (e.g. laydown areas) with native species.	Moderate
Habitat degradation through increased dust, run-off and sedimentation.	Low	Reduce duration of works in watercourses and drainage lines. Monitor weather events when working within watercourses. Reduce speed limits during dry conditions or employ and water truck to reduce dust rates.	Negligible



Impact	Initial impact rating	Mitigation measures	Residual impact
Introduction and spread of invasive weed species	Moderate	<p>Implement measures for introduced flora (to be outlined in the CEMP).</p> <p>Require construction vehicles to hold valid weed free declarations prior to the commencement of construction works.</p> <p>Educate staff on the impacts of weeds and their general environmental obligation.</p> <p>Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area.</p>	Low

## 5.1.10 Significance of impact assessment

An assessment against the Significant Impact Guidelines 1.1 (DoE 2013) for *E. raveretiana* was undertaken and is provided in Table 5.2.

Table 5.2 Significance of impacts on *Eucalyptus raveretiana*

Impact criteria	Potential to occur
Lead to a long-term decrease in the size of an important population of the species.	<p><b>Unlikely</b></p> <p>The local individuals are classified as an important population under the definition outlined in the EPBC Act. Vegetation clearing in the Project footprint has the potential to increase the risk of introduction and spread of invasive weed species, listed as a key threat to <i>E. raveretiana</i>, however this will be managed through implementing weed management actions.</p> <p>Depending on the construction methodology of the intake structure, the project will result in the maximum direct loss of four individuals of the 13 recorded along the bank. With 23 known populations of the species located between Townsville and Nebo, the loss of four individuals is not expected to lead to a long-term decrease in the size of an important population of the species. The Project is unlikely to have any substantial operational impacts on this species. As such, the Project is therefore unlikely to lead to a long-term decrease in the size of an important population of a species.</p>
Reduce the area of occupancy of an important population.	<p><b>Unlikely</b></p> <p>Depending on the construction methodology of the intake structure, the Project may result in the direct loss of four individuals of the 13 recorded along the bank. Although the recorded population is considered an important population, an individual has historically been recorded 11 km from the Project footprint along the Burdekin River. With 23 known populations of the species located between Townsville and Nebo, the loss of four individuals is not expected to reduce the area of occupancy of the species. Given the Project is unlikely to have any substantial impact on the species in the operational phase, and the continued presence of suitable habitat within the local area, the Project is therefore unlikely to reduce the area of occupancy of an important population.</p>
Fragment an existing important population into two or more populations.	<p><b>Unlikely</b></p> <p>Depending on the construction methodology of the intake structure, the Project may result in the direct loss of four individuals of the 13 recorded along the bank. Suitable habitat is present within the local context, the Project will not directly impact the majority of individuals recorded during the field survey. Given the Project is unlikely to have any substantial impact on the species in the operational phase, the Project is therefore unlikely to fragment an existing important population into two or more populations.</p>
Adversely affect habitat critical to the survival of a species.	<p><b>Unlikely</b></p> <p>The Project may result in the direct loss of four <i>E. raveretiana</i> individuals of the 13 recorded along the bank. The Project area is not considered habitat critical to the survival of the species as the distribution of current and historical records along the Burdekin River suggests the species persists in areas outside of the Project area. As suitable habitat is present within the local and regional context and habitat is not considered to be critical habitat, the Project is unlikely to adversely affect habitat critical to the survival of the species.</p>

Impact criteria	Potential to occur
Disrupt the breeding cycle of an important population.	<p><b>Unlikely</b></p> <p>The Project may result in the direct loss of four individuals of the 13 recorded along the bank. Suitable habitat is present within the local context, the species has potential to recruit <i>E. raveretiana</i> seedlings. Insects are presumed the primary pollinators for the species, no impacts on insect presence or movement in the local landscape are anticipated to occur as a result of the project (DAWE 2021). The Project will not directly impact the majority of individuals recorded during the field survey. Therefore the Project is considered unlikely to disrupt the breeding cycle of an important population.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	<p><b>Unlikely</b></p> <p>The Project has the potential to result in the removal of four <i>E. raveretiana</i> individuals. Without the implementation of mitigation measures, the construction phase has the potential to indirectly impact habitat through increased runoff, dust and sedimentation, introduction and spread of invasive weed species. The implementation of erosion and sediment controls, weed management actions and other mitigation measures are likely to avoid impacting the quality of habitat for the species. Given the Project is unlikely to have any substantial impact on the species in the operational phase, the Project is therefore unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species habitat.	<p><b>Unlikely</b></p> <p>The Commonwealth listing advice lists smothering by rubber vine as a key threat to <i>E. raveretiana</i>. Rubber vine was recorded extensively throughout the Project footprint. Without the implementation of mitigation measures, the construction and operation of the Project has the potential to result in the further spread of rubber vine. The implementation of weed management actions is likely to reduce the extent of rubber vine and other invasive weed species impact across the Project area. As such, the Project is unlikely to result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species habitat</p>
Introduce disease that may cause the species to decline.	<p><b>Unlikely</b></p> <p>The Commonwealth listing advice does not list disease as a key threat to the species (TSSC 2010). Nevertheless, hygiene management measures will be utilised during the construction phase to avoid introduction of any diseases. The construction and operation phase of the Project is unlikely to introduce disease that may cause the species to decline.</p>
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>The Project may result in the direct loss of four <i>E. raveretiana</i> individuals of the 13 recorded along the bank. Suitable habitat is present within the local context, the individuals have potential to recruit <i>E. raveretiana</i> seedlings. The Project will not directly impact the majority of individuals recorded during the field survey. Therefore the Project is considered unlikely to interfere substantially with the recovery of the species.</p>

## 5.1.11 Conclusion

The Project is **unlikely** to have a significant impact on *E. raveretiana*.

## 6. Threatened fauna species

### 6.1 Koala

#### 6.1.1 Conservation status and documentation

The koala is listed as Vulnerable under the EPBC Act.

The koala is known to occur from Cairns to the New South Wales-Victoria border at altitudes less than 800 m, the species distribution is not continuous across this range (DSEWPC 2012). The species is known to occur from north-eastern Queensland to the south-east corner of South Australia and is widespread in coastal and inland areas (DSEWPC 2012). The species has a specialist diet, feeding on the leaves of select species of *Eucalyptus*, *Lophostemon*, *Corymbia*, *Angophora* and occasionally *Melaleuca* and *Leptospermum* (Martin and Handasyde 1999; Moore and Foley 2000). Consequently, koalas are reliant on access to stands of forest and woodland that support those key food-tree species. Shelter (non-food) tree species are also used to rest and assist in thermoregulation (Crowther et al. 2013; Briscoe et al 2015).

In the coastal context (applicable to the Project area), the referral guidelines describes koalas habitat as forest and woodland mostly dominated by *Eucalyptus* species (or those of related genera) and also those dominated by *Melaleuca* or *Casuarina* species (with emergent food trees) (DoE 2014). Coastal koala habitat also includes small, isolated patches of native vegetation in rural, urban or peri-urban areas, narrow areas of native vegetation along riparian areas or linear infrastructure and isolated food and/or shelter trees (DoE 2014). Utilisation of koala habitat is determined largely by food quality, which is heavily reliant on rainfall, soil moisture and fertility levels, with koalas typically occurring in highest densities in nutrient-rich alluvial clay soils (DAWE 2021a).

The way in which koalas move through the landscape also influences their use of habitat. In general, koalas are relatively sedentary, typically changing trees only a few times each day (DAWE 2021a). Koala movement increases in spring when young dispersing males move distances of up to 10 km in urban south-east Queensland (Dique et al. 2003) and 16 km in rural south-east Queensland (White 1999). For the rest of the year koalas move relatively slowly within home ranges that vary between 8 ha and 135 ha (Ellis et al. 2002; Goldingay and Dobner 2014). Home range size generally increases with distance from the coast, as inland koalas need to move more widely to encounter sufficient sources of food and water (Davies et al 2013).

In the assessment of habitat quantity and quality, the Draft National Recovery Plan for the koala (DAWE 2021b) highlights the importance of considering landscape patch size, form and spatial configuration within the context of the wider landscape, which can vary among landscapes and varies regionally (DAWE 2021b). Research has shown that koalas move very differently through different landscapes, depending on the level of habitat connectivity that has been retained (Rus et al 2020). In contiguous landscapes with high connectivity, koalas follow tortuous pathways, moving slowly between koala habitat trees along vegetated watercourses, roadsides and other areas of functional connectivity. This increases their energetic efficiency and reduces their susceptibility to predation (Rus et al 2020). In more fragmented landscapes, koalas follow more direct movement pathways and demonstrate an increased willingness to cross open areas at ground level to move between isolated patches of vegetation (Rus et al 2020) albeit their safety is at risk and the open and exposed landscape proves to be a hostile environment (DAWE 2021b). In the context of a contiguous landscape, where high levels of linear habitat connectivity are retained along watercourses, vegetated roadsides and fence lines and where dog attacks on livestock have been reported by local landholders, large open paddocks are expected to receive low levels of utilisation by koalas. While the Referral guidelines for the vulnerable koala state that koalas can move through treeless areas to a distance of up to 2 km (DoE 2014), in the current context, open areas would experience significantly lower levels of koala movement than areas of functional connectivity.

#### 6.1.2 Survey effort

Surveys for the koala were undertaken using methods recommended in Section 5 of the Referral guidelines for the vulnerable koala (DoE 2014). A summary of ecological survey effort is provided in Table 2.1 and shown in Figure 2-2.

Targeted surveys for the koala were based on:

- Targeted searches for faecal pellets using the SAT technique (Phillips and Callaghan 2011). This was undertaken by two ecologists at 30 locations across the Project area over a 6-day survey
- Assessments of koala habitat value undertaken at eight RE confirmation sites within the Project area.

No evidence of the koala was observed.

## 6.1.3 Criteria used to map koala habitat

### 6.1.3.1 Commonwealth habitat definition

#### ***Referral guidelines for the vulnerable koala (DoE 2014)***

Habitat for the koala has been mapped for the Project area using criteria outlined within the Referral guidelines for the vulnerable koala (DoE 2014). As the Project area is located in a contiguous landscape (i.e. < 500 ha but > 300 ha) within the coastal context (i.e. > 800 mm annual rainfall), the definition of coastal koala habitat has been used.

The coastal koala habitat definition in the Referral guidelines for the vulnerable koala (DoE 2014) includes '*Any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. In the coastal context, this can include small, isolated patches of native vegetation in rural, urban or peri-urban areas, narrow areas of native vegetation along riparian areas or linear infrastructure and isolated food and/or shelter trees.*' (DoE 2014). This relies on the Specht (1970) definitions of forest, woodland, shrubland and sparsely distributed woodland.

#### ***National Recovery Plan for the vulnerable koala (DAWE 2021b)***

In assessing the habitat values, consideration has also been given to the description of koala habitat currently presented within the Draft National Recovery Plan for the koala (DAWE 2021b), which was released for public comment in June 2021 and may therefore be subject to change.


The definition of koala habitat presented in the Recovery Plan for the vulnerable koala (DAWE 2021b) includes: '*Forests or woodlands; roadside and railway vegetation and paddock trees; safe intervening ground matrix for travelling between trees and patches to forage and shelter and reproduce; and access to vegetated corridors or paddock trees to facilitate movement between patches*'.



### 6.1.3.2 Criteria used to map koala habitat within the Project area

Consistent with the coastal koala habitat definition outlined in the Referral guidelines for the vulnerable koala (DoE 2014), habitat was mapped according to the following habitat types, as detailed in Table 6.1:

- Large connected areas of forest or woodland
- Shrubland with emergent trees
- Small, patchy and sparsely distributed woodlands and isolated trees.

Table 6.1 Criteria used to map koala habitat

Habitat type	Definition and mapping criteria	Representative vegetation
<p>Large connected areas of forest or woodland</p>	<p>All vegetation meeting the Specht (1970) definition of forest, woodland or open woodland that contains koala food trees including <i>Eucalyptus platyphylla</i>, <i>Eucalyptus camaldulensis</i>, <i>Eucalyptus crebra</i>, <i>Eucalyptus brownii</i>, <i>Eucalyptus drepanophylla</i>, <i>Eucalyptus tereticornis</i>, <i>Corymbia clarksoniana</i>, <i>Corymbia dallachiana</i>, <i>Corymbia erythrophloia</i>, <i>Corymbia intermedia</i>, <i>Corymbia tessellaris</i></p> <p>Mapping was based on field verified RE mapping, verified at 40 locations, mapping all remnant and high-value regrowth for the following RE communities which contain the koala food trees listed by DoR as essential habitat factors within 10 km of the Project area include:</p> <ul style="list-style-type: none"> <li>– 9.12.1 <i>Eucalyptus crebra</i> and/or <i>E. xanthoclada</i> and/or <i>E. drepanophylla</i> low open woodland on igneous rocks</li> <li>– 9.12.4 <i>Eucalyptus shirleyi</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia peltata</i> and/or <i>Callitris intratropica</i> low open woodland on igneous rocks</li> <li>– 9.12.19 <i>Eucalyptus crebra</i> or <i>E. granitica</i> +/- <i>Corymbia citriodora</i> subsp. <i>citriodora</i> +/- <i>E. portuensis</i> mixed woodland on igneous hills</li> <li>– 9.12.22 <i>Eucalyptus drepanophylla</i>, <i>Corymbia clarksoniana</i> or <i>C. intermedia</i> and <i>C. dallachiana</i> woodland on steep rugged igneous ranges</li> <li>– 9.12.24 <i>Eucalyptus drepanophylla</i> or <i>E. crebra</i> and/or <i>E. xanthoclada</i> and <i>Corymbia peltata</i> woodland on igneous rocks</li> <li>– 11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> woodland on alluvial plains</li> <li>– 11.3.7 <i>Corymbia spp.</i> open woodland on alluvial plains</li> <li>– 11.3.9 <i>Eucalyptus platyphylla</i>, <i>Corymbia spp.</i> woodland on alluvial plains</li> <li>– 11.3.10 <i>Eucalyptus brownii</i> woodland on alluvial plains</li> <li>– 11.3.12 <i>Melaleuca viridiflora</i>, <i>M. argentea</i> +/- <i>M. dealbata</i> woodland on alluvial plains</li> <li>– 11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines</li> <li>– 11.3.30 <i>Eucalyptus crebra</i>, <i>Corymbia dallachiana</i> woodland on alluvial plains</li> <li>– 11.3.35 <i>Eucalyptus platyphylla</i>, <i>Corymbia clarksoniana</i> woodland on alluvial plains</li> <li>– 11.11.1 <i>Eucalyptus crebra</i> +/- <i>Acacia rhodoxylon</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding</li> <li>– 11.11.15 <i>Eucalyptus crebra</i> woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics</li> <li>– 11.12.1 <i>Eucalyptus crebra</i> woodland on igneous rocks</li> <li>– 11.12.9 <i>Eucalyptus platyphylla</i> woodland on igneous rocks</li> </ul>	

Habitat type	Definition and mapping criteria	Representative vegetation
Shrubland with emergent trees	<p>Any regrowth or remnant RE of Acacia or Grevillea dominated woodland – map any remnant or regrowth Acacia shrubland RE communities with emergent koala food trees.</p> <p>Mapping was based on field verified RE mapping – including</p> <ul style="list-style-type: none"> <li>– 11.3.13 <i>Grevillea striata</i> open woodland on coastal alluvial plains</li> <li>– 11.3.33 <i>Eremophila mitchellii</i> open woodland on alluvial plains</li> </ul>	
Small, patchy and sparsely distributed woodlands and isolated trees	Any patches of non-remnant trees that aren't mapped – buffered individual trees by 20 m	



## 6.1.4 Desktop results

The koala was identified within the PMST (Appendix A) as known to occur within a 30 km radius from a central point within the Project area. One historical koala record occurs within a 30 km radius, located approximately 2 km west of the southern portion of the Project alignment. This record is not recent, recorded in 1987 on remnant RE 11.3.35/11.3.30/11.3.7. The distribution of historical koala records and DoR mapped essential habitat for the koala on and adjacent to the Project area is mapped in Figure 6-1. One polygon of essential habitat for the koala is mapped southwest of the Project area. Essential habitat is buffered around the historical koala record. There are very few records of the koala on the Townsville/Ayr floodplain. There are no published estimates of population size or density for north Queensland, however anecdotal information is suggestive of low densities (DAWE 2021a).

## 6.1.5 Survey results

No koalas or koala faecal pellets were observed during field surveys in the Project area. However, koalas were considered likely to occur, with transient individuals likely to occur at very low densities within the Project area from time to time. The quality of koala habitat was considered low, with koala food trees generally occurring in low densities. At watercourses, known to be important for koala movement in the region, koala food trees (i.e. *E. platyphylla*, *E. dallachiana* and *Corymbia clarksoniana*) occurred in low densities and were interspersed with high local densities of non-food trees such as *Melaleuca leucadendra*. Dense rubber vine (*Cryptostegia grandiflora*) and chinee apple (*Ziziphus mauritiana*) would also tend to restrict koala mobility along the watercourses. There are very few records of the koala on the Townsville/Ayr floodplain. While the species has been historically recorded, with one record from approximately 2 km south-west of the Project area's southern extent, this record is not recent. The value of koala habitat as habitat critical to the survival of the species has been assessed in detail in Section 6.1.6 and did not qualify as habitat critical to the survival of the species.

Suitable koala habitat is broadly mapped across the Project area. Areas of forest or woodland, shrubland with emergent trees and small, patchy and sparsely distributed woodlands and isolated trees occur across the Project area. Generally, the Project area is part of a contiguous landscape which provides north-south habitat connectivity through forest, woodland or shrubland with mature to emergent growth. Patches of non-remnant historically cleared grazing pastures are present in sparse patches across the Project area, predominantly in the southern and northern sections of the Project area. The Project area is connected to remnant habitat further west and north providing connectivity to larger areas for dispersal and movement. Non-remnant agricultural land restricts connectivity to the east, with the Burdekin River to the south-east of the Project area. Irrigation channels that run north-south along much of the Project area would restrict local koala movement in places, limiting connectivity.

Although portions of the Project area have been historically cleared for grazing pastures, substantial connectivity is present in woodland and open woodland, especially in the southern portion of the Project area. The central and northern portion of the Project area contain areas existing as immature woodland to open woodland with grassy understorey, in these areas riparian fringes are also important for facilitating koala movement for transient visitors.



Plate 6.1 Remnant koala open woodland and woodland habitat





**Plate 6.2** *Very sparse open woodland habitat*



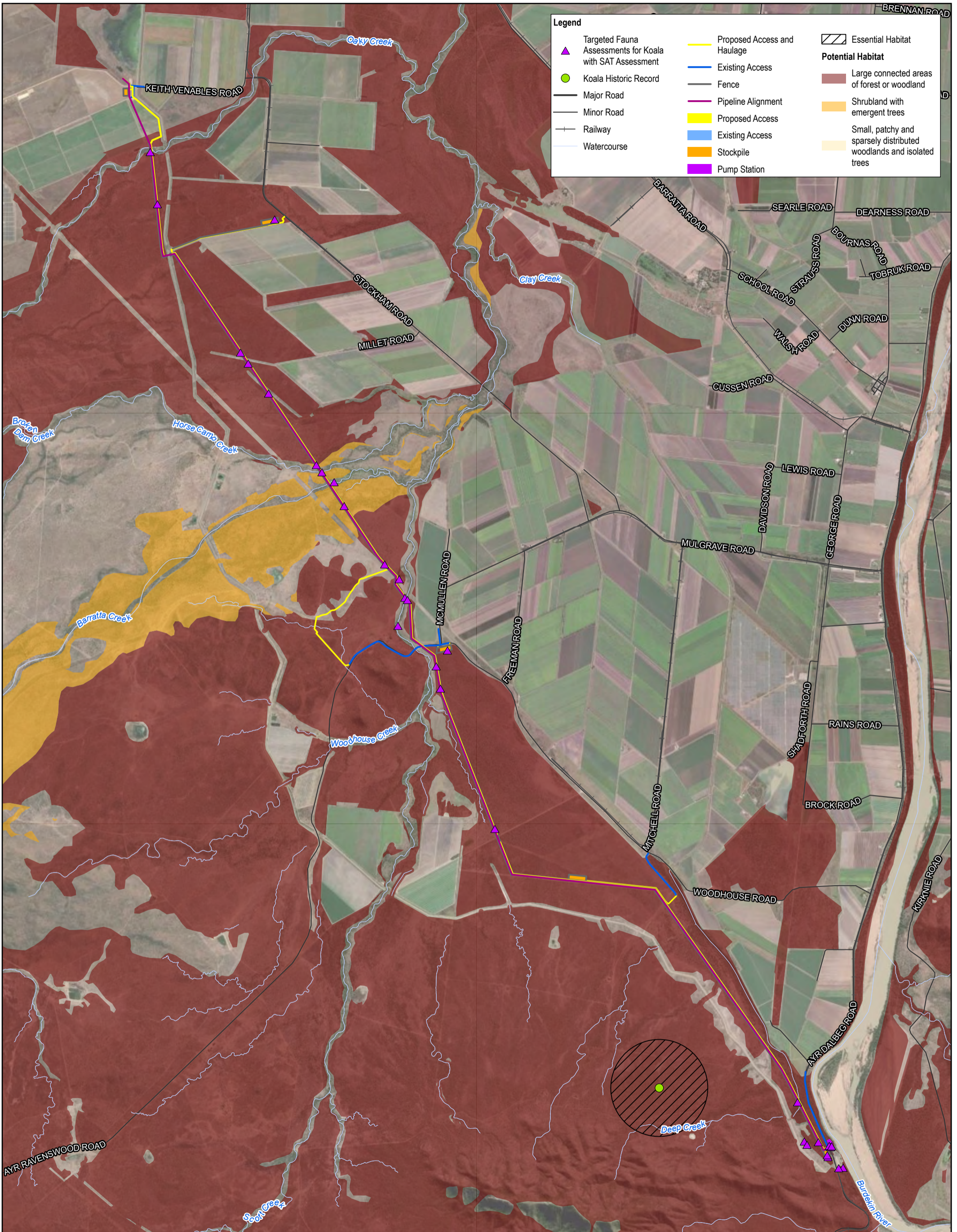
**Plate 6.3** *Riparian habitat*



**Plate 6.4** *Chinese apple and dense rubber vine areas*

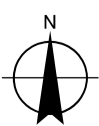






Based on or contains data provided by the State of QLD 2021. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.

Paper Size ISO A3  
 0 1 2  
 Kilometres  
 Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 55



Townsville City Council  
 Houghton Pipeline Stage 2 - MNES Assessment

Distribution of potential koala habitat within and surrounding the Project area

Project No. 12537606  
 Revision No. 0  
 Date 12/17/2021

FIGURE 6-1



## 6.1.6 Significance of project footprint

This section assesses the significance of koala habitats within the Project area, whether they constitute habitat critical to the survival of the species, their importance in the context of the local population and whether the local population is important at a national level.

### 6.1.6.1 Status as an important population

The concept of 'important populations' has not been applied to the koala, given the lack of sufficient information on regional population status throughout its national range (DoE 2014). Nevertheless, the low densities of koalas and low value koala habitat within the Project area would suggest the local population is not likely to be classified as an important population.

### 6.1.6.2 Status as habitat critical to the survival of the species

The definition of habitat critical to the survival of the koala is formally defined in the Referral guidelines for the vulnerable koala (DoE 2014) as habitat scoring five or more using the habitat assessment toolkit.

Koala habitat mapped within the Project area scored four and therefore under the Referral guidelines for the vulnerable koala (DoE 2014) does not represent habitat critical to the survival of the koala based on the following assessment as shown in Table 6.2.

Table 6.2 Koala habitat assessment score

Criteria	Score	Description
Koala occurrence	0	No evidence of koalas within 2 km of the edge of the impact area within the last 5 years
Vegetation composition	2	Has forest or woodland with 2 or more known koala food tree species
Habitat connectivity	1	Area is part of a contiguous landscape < 500 ha but > 300 ha
Key existing threats	1	Areas which score 0 for koala occurrence and are likely to have some degree of dog or vehicle threat present
Recovery value	0	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1 of the Referral guidelines for the vulnerable koala. This is made on the basis that the species is typically found in very low densities in the region. While the species can occur the local area is not a source population for dispersal or breeding
Total	4	Habitat in the Project area is not considered to be habitat critical to the survival of the koala

Under the definition of habitat critical for the survival of the koala, no habitat critical to the survival of the species will be impacted by the Project.

## 6.1.7 Threatening processes

Koala populations within eastern Australia have declined due to a number of threats, these include (DSEWPC 2012):

- Habitat loss, fragmentation and degradation
- Mortality from vehicles strikes and dog attacks
- Spread of disease
- Drought impacts.

## 6.1.8 Potential impacts

Potential impacts on koala populations and habitat within the Project area include:

- Loss of habitat

- Barrier effects and restriction of koala movement
- Injury and mortality
- Habitat degradation by increased dust run-off and sedimentation
- Introduction and spread of pest fauna species

These are discussed below. Mitigation and management control measures are provided in Section 6.1.9.

### **6.1.8.1 Loss of habitat**

The Project is anticipated to result in the loss of 121.08 ha of low value koala habitat, which represents a loss of 2.6 percent of habitat within a 1 km radius of the Project area and comprises:

- 116.81 ha of low value forest or woodland habitat representing 96.4 percent of that in the Project area
- 4.26 ha of low value shrubland with emergent trees habitat representing 3.7 percent of that in the Project area
- No low value small, patchy and sparsely distributed woodlands and isolated trees habitat is anticipated to be lost.

### **6.1.8.2 Barrier effects and restriction of koala movement**

Habitat loss within the Project area is not expected to impact connectivity with surrounding koala habitat as the habitat losses will be localised and from a dispersed area and will not create new large gaps that present new barriers to koala movement. The pipeline vegetation clearance will be 40 m wide footprint, and is situated perpendicular to existing areas of unimpacted vegetation. The Project area is located within a contiguous landscape which despite having high levels of existing land-clearing for agriculture and grazing pastures and extensive irrigation channels that would present barriers to koala movement, maintains functional connectivity along woodland, open woodland, vegetated watercourses and fence lines. Habitat loss as a result of the clearance footprint will be temporary in nature as the footprint will be reinstated and rehabilitated with native grasses and tree species. The Project alignment runs perpendicular to watercourses and other key areas likely to be important for local koala movement. The clearing of a 40 m wide corridor for the Project is therefore unlikely to restrict koala movement along watercourses. The Project area connects to areas of habitat to the west and south providing connectivity for koala dispersal and movement for the local population. These large areas of habitat will not be impacted by the Project. Impacts from increased levels of dust, runoff or sedimentation are likely to be localised at the Project footprint and will be managed through routine mitigation measures. Access tracks have as far as possible been located within existing cleared areas or in alignment with existing tracks. New and augmented access will be functionally similar in nature to farm tracks that traverse the landscape and do not impede koala movement.

### **6.1.8.3 Injury and mortality**

Vegetation clearance during construction of the Project has the potential to cause injury and mortality to koalas. The koala has a heightened risk of injury or mortality as a result of the species' relatively slow movement. Entrapment within excavations poses an additional threat to the koala. These risks can be effectively mitigated by implementing strict controls during construction.

Construction related activities have the potential to attract dogs (and other pests) (Section 6.1.8.5). Construction of new access tracks may provide pathways for movement for dogs in particular within and across the Project area. However, the presence of farm tracks and cleared areas are already extensive within the Project area. Loss of habitat could increase exposure to mortality by increasing gaps (albeit narrow) between patches of koala habitat. In the Project area, the local population of koalas would face a low threat of dog attack when moving through cleared grazing land areas due to the distance to refugial habitat. Proposed predator controls have the potential to reduce the incidence of dog attacks on koalas.

Increased traffic movements during construction have the potential to impact on koala through injury and mortality. Appropriate practices and controls are proposed. The Project is unlikely to cause any substantial injury or mortality of koalas during the operation phase or restrict koala movement between habitat patches in and adjacent to the Project area given the minimal vehicle movements required during the operational phase of the project (i.e. estimated average of one to two vehicle movements on any given access track once per week). For areas in the



contiguous landscape, impacts attributed to permanent and temporary infrastructure have been assessed together due to similarity in the responses.

#### **6.1.8.4 Habitat degradation by increased dust run-off and sedimentation**

Construction activities have the potential to generate localised dust, erosion, run-off and sedimentation through increased vehicle movements, clearance of vegetation and earthworks. This can reduce the abundance and diversity of adjacent terrestrial and aquatic habitats by physically smothering vegetation, changing nutrient levels, impeding the growth and germination of plant species, encouraging weed incursions and altering the movement and behaviour of fauna species. Impacts from increased levels of dust, runoff, or sedimentation are likely to be localised at the Project footprint and can be managed through the proposed mitigation and management measures.

The Project will have no substantial impact on hydrology that could degrade the quality of koala habitat. The Project footprint intersects a number of ephemeral watercourses and drainage lines, and will require minor loss of riparian vegetation. Watercourse crossings for access tracks will utilise existing tracks wherever possible to minimise impact to watercourses. With exception to Scotts Creek, all watercourses are ephemeral and only experience flow following rain events. All works within the vicinity of watercourses or in areas with potential for run-off will be subject to routine erosion and sediment control measures.

#### **6.1.8.5 Introduction and spread of pest fauna species**

Injury and mortality from wild dog attacks is a key threat to the koala (DoE 2014). While construction activities can facilitate an increase in wild dog numbers through inappropriate waste disposal and the construction of new tracks which can facilitate increased dog movements, the risks can be mitigated through routine control measures. As part of CEMP, the Project will implement ongoing feral pest control measures.

### **6.1.9 Measures to avoid, reduce or mitigate impacts**

#### **6.1.9.1 Loss of habitat**

During the planning stage, a number of measures were employed to avoid and reduce the direct loss of habitat. The following measures will be implemented during construction to reduce the loss of vegetation and koala habitat:

- Utilising existing tracks wherever possible and locating proposed new access tracks within previously disturbed areas wherever possible to avoid or minimise disturbance to vegetation and habitat.
- Land clearing will be restricted to the minimal amount necessary for the construction of the Project and will not extend outside of the Project footprint.
- The extent of vegetation clearing (and any no-go areas) will be clearly identified on construction plans and in the field using high visibility fencing or flagging in the vicinity of high conservation significant areas. Clearing extents will be communicated to construction supervisors.
- Construction stockpiles and laydown/storage areas have been located within existing cleared or disturbed areas where possible.
- Where infrastructure crosses waterways, the Project footprint has been minimised to a 20 m wide construction corridor
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed
- A CEMP will be prepared to inform actions with regards to managing weed hygiene, erosion, fuels and hazardous substances, fire, etc. and the CEMCP and ESCPs will include additional erosion and sediment control measures.
- All construction personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vegetation clearing protocols. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions.

### **6.1.9.2 Barrier effects and restriction of koala movement**

The following measures will be implemented to minimise barrier effect and restriction of koala movement during construction of the Project:

- Weed management actions will be included in the CEMP and will include:
  - Hygiene protocols restricting the movement of vegetation and soil between impacted areas and areas of significantly lower weed infestation.
  - Protocols for monitoring and management of weeds to identify and appropriately respond to significant changes in weed distribution and density
- All construction vehicles / equipment travelling from a declared restricted place or quarantine area will be required to wash down and possess a current weed hygiene inspection certificate before moving to a weed free area or commencing construction works onsite. The weed hygiene inspection certificate is to be obtained from an inspector who is deemed competent and is certified in line with DAF requirements.
- Land clearing will be restricted to the minimal amount necessary for the construction of the Project and will not extent outside of the Project footprint.
- Removal of all temporary fencing after the completion of construction works and / or the establishment phase for any revegetation works (which ever finishes last)
- Location of temporary infrastructure located outside areas of linear connectivity where koalas are likely to move to avoid any barrier effects
- Construction laydown areas and stockpiles are limited to areas that have previously been cleared to minimise unnecessary clearing
- Temporary disturbance areas will be rehabilitated as soon as practicable after the completion of construction works to reconnect fragmented habitats.

Impacts on koala during operations are negligible. Access tracks and other linear infrastructure will not preclude movement. Operational activities are expected to be limited to one to two utility movements once per week; consistent with current farming activities undertaken within the Project area.

Management of pest fauna is discussed in Section 6.1.8.5 below.

### **6.1.9.3 Injury and mortality**

The following measures will be implemented to minimise injury and mortality during construction:

- All clearing will be supervised by suitably qualified and experienced fauna spotter-catchers. This will involve searching trees prior to clearing and relocating any resident koalas to the nearest suitable, safe habitat outside the clearing footprint.
- Where deemed necessary by the fauna spotter-catcher, temporary exclusion fencing may be required in specific areas of high ecological sensitivity to prevent wildlife from returning to work areas
- Employment of sequential clearing practices and use of suitably qualified koala spotters in accordance with the Queensland Nature Conservation (Koala) Conservation Plan 2017 for reducing impact on koalas, including:
  - Clearing of koala habitat trees is carried out in a way that ensures koalas in the area being cleared have enough time to move out of the clearing site without human intervention, including, in particular, for clearing sites with an area of more than 3 ha, by carrying out the clearing in stages; and ensuring not more than the following is cleared in any one stage:
    - For a clearing site with an area of 6 ha or less – 50 percent of the site’s area
    - For a clearing site with an area of more than 6 ha – 3 ha or three percent of the site’s area, whichever is the greater
    - Ensuring that between each stage and the next there is at least one period of 12 hours starting at 6 p.m. on a day and ending at 6 a.m. on the following day during which no trees are cleared on the site

- Clearing of the koala habitat trees is carried out in a way that ensures, while the clearing is carried out, appropriate habitat links are maintained within the clearing site and between the site and its adjacent area, to allow koalas living on the site to move out of the site
- No koala habitat tree in which a koala is present, and no koala habitat tree with a crown overlapping a tree in which a koala is present, is cleared.
- Restricting clearing to daylight hours only during the koala breeding season (September – November)
- Establishing no-go areas
- Restricting vehicle movements to designated areas within the Project footprint
- Establishing and enforcing speed limits. Vehicles to be restricted to 40 km/hr along access tracks.
- Signage in koala habitat areas
- Adverse incident response procedures will be developed to detail actions to be taken in the event of wildlife injury or mortality during clearing.
- A Traffic Management Plan will be developed for the Project with designated access routes, speed limits and identified sensitive ecological areas
- The CEMP will include protocols to limit injury and mortality to the koala, including management of risks associated with open excavations, trenching, waterbodies and responses and reporting for roadkill and adverse incident protocols.

#### **6.1.9.4 Habitat degradation by dust, run-off and sedimentation**

The following mitigation measures will be used to minimise the impacts of dust, run off and sedimentation for the Project:

- Erosion and sediment controls will be developed as part of the CESC and ESCP.
- Routine dust suppression and monitoring will be undertaken throughout construction and operation.
- Erosion and sediment control measures will be installed where in-stream disturbance must be undertaken during flow conditions.
- Areas subject to clearing will be stabilised as soon as practicable.
- All vehicle movement will be restricted to designated tracks located within the Project footprint.
- Weather conditions will be monitored during the construction stage and temporary controls will be established during extreme weather events.
- Construction activities during adverse weather conditions will be managed in accordance with construction measures to be outlined in the CEMP
- Duration of in-stream works will be minimised wherever practicable to reduce the potential for sedimentation.
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed.

#### **6.1.9.5 Introduction and spread of pest fauna species**

The following mitigation measures will be used to minimise the introduction and spread of pest fauna species for the Project:

- Responsible waste management practices (e.g. not leaving out food waste and not feeding wildlife) will be implemented and followed by all construction personnel. All waste will be stored in secure temporary holding containers and transported off site.
- Waste management actions will be included in the CEMP and will include:
  - Requirements for details on the location and specifications for disposal and removal of waste from the construction site.
  - All putrescible waste to be stored in secure temporary holding containers and transported off site.
- Sightings or evidence of pest animals will be recorded during construction within a pest register. If increased densities of pest animals are observed, or new pest animals are identified, humane pest controls will be implemented to manage numbers.

- As part of CEMP, the Project will implement feral pest control measures
- Construction staff will not bring domestic animals into the Project area.
- All construction personnel shall attend environmental training as part of site inductions. As part of this training, all personnel will be instructed on their responsibilities related to avoiding and minimising the introduction/attraction to the construction site of feral animals.

### 6.1.10 Residual impacts on koalas and koala habitat

This section presents a summary of the residual impacts on the koala and koala habitats once mitigation measures are considered. A summary of the Project’s residual impacts on the koala is detailed in Table 6.3. Most Project impacts will be effectively mitigated to low or negligible levels for all habitat types. The risk ratings are presented in Appendix D. A residual impact remains for the clearance of 121.08 ha of vegetation (representing 2.6 percent of habitat within the Project area) within the following habitat types:

- 116.81 ha of low value remnant and non-remnant woodland and open woodland habitat representing 96.4 percent of that in the Project area
- 4.26 ha of low value riparian and fringing habitat representing 3.6 percent of that in the Project area
- No loss of small, patchy and sparsely distributed woodlands and isolated trees

Despite the magnitude of loss, the nature of the Project and the dispersed distribution of low value habitat loss means that substantial consequences for the koala population on and adjacent to the Project area are largely avoided.

Direct impacts on woodland, open woodland and riparian and fringe habitat areas within the contiguous landscape will not adversely impact the ecological function of those areas for koalas, as they will not present a physical barrier to koala movement or increase risks to koalas during operation of the Project. Based on the low levels of noise and light and other potential sources of disturbance, the proposed infrastructure is unlikely to present an indirect deterrent to koala movement through the contiguous landscape. Temporary infrastructure will be located in open areas as far as practicable. Localised infrastructure will be predominantly located outside of linear habitat areas to avoid any barrier effects.

**Table 6.3** Residual impact assessment for the koala

Potential impacts	Risk rating	Mitigation measure	Residual impact	Residual risk rating
Loss of habitat: Permanent loss of 11.93 ha Temporary loss of 109.15 ha	High	Utilise existing tracks where possible Land clearing restricted to minimal amount necessary and will not extend outside of the Project footprint Establishing no-go areas Where infrastructure crosses waterways existing disturbed areas to be selected where possible Rehabilitation of temporary disturbance areas undertaken as soon as practicable with native species Reinstatement and rehabilitation of pipeline with native species Preparation of a CEMP, CЕССР and ESCPs	Low residual impact – loss of habitat expected to be localised. Habitat not considered habitat critical to the survival of the koala	Low
Injury/mortality during construction: – Construction vehicle movements	High	Clearing supervised by spotter-catchers – at-risk koalas relocated before clearing Sequential clearing	Low residual impact – injury/mortality of individual koalas expected to be	Low

Potential impacts	Risk rating	Mitigation measure	Residual impact	Residual risk rating
<ul style="list-style-type: none"> <li>– Vegetation clearing</li> <li>– Entrapment/entanglement</li> <li>– Increase in dog attacks</li> </ul>		Restricting clearing to daylight hours only during the koala breeding season (September – November) Establishing no-go areas Restricting vehicle movements to designated areas Establishing and enforcing speed limits Signage in koala habitat areas Construct access/haulage roads in existing tracks wherever possible Pest control measures as part of the CEMP Waste management plan	avoided entirely or very rare	
Injury/mortality during operation: <ul style="list-style-type: none"> <li>– Vehicle movements (on average 1-2 per week)</li> <li>– Entrapment in infrastructure</li> <li>– Increase in dog attacks</li> </ul>	Moderate	Establishing no-go areas and temporary exclusion fencing (where required) Establishing and enforcing speed limits Pest control measures as part of the CEMP Waste management plan	Low residual impact – injury/mortality of individual koalas expected to be very rare	Low
Habitat degradation by increased dust run-off and sedimentation	Low	Reduce duration of works in watercourses and drainage lines. Monitor weather events when working within watercourses. Reduce speed limits during dry conditions or employ and water truck to reduce dust rates.	Negligible	Negligible
Barrier effects – localised restriction of koala movement	Low	Fencing installed during construction to remain temporarily during the construction phase Limiting permanent fencing to small areas of operation and maintenance infrastructure Revegetate temporarily cleared areas (e.g. laydown areas) with native species	Limited restriction on koala movement	Negligible
Introduction and spread of disease: The Project is unlikely to cause an increase in the incidence or transmission of Phytophthora that can degrade koala habitat in some regions. The Project is unlikely to result in any increase in Chlamydia among koalas	Low	Vehicle hygiene protocols implemented during construction	Negligible impact due to disease transmission	Negligible
Introduction and spread of invasive	Moderate	Implement measures for introduced flora and fauna (to be outlined in the CEMP).	Low residual risk introduction and spread of	Low



Potential impacts	Risk rating	Mitigation measure	Residual impact	Residual risk rating
fauna and weed species		<p>Require construction vehicles to hold valid weed free declarations prior to the commencement of construction works.</p> <p>Educate staff on the impacts of weeds and their general environmental obligation.</p> <p>Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area.</p>	invasive weed and fauna species	

### 6.1.11 Significance of impact assessment

The significance of the Project’s impacts on the koala has been assessed against the Significant Impact Guidelines 1.1 (DoE 2013), using the framework detailed in the Referral guidelines to the vulnerable koala (DoE 2014). The Project is unlikely to have a significant impact on the koala. Justification of this assessment is presented in Table 6.4.

Table 6.4 Significance of impact on koalas

Impact criteria	Potential to occur
Lead to a long-term decrease in the size of an important population of the species.	<p><b>Unlikely</b></p> <p>The concept of ‘important populations’ has not been applied to the koala, given the lack of sufficient information on regional population status throughout its national range (DoE 2014). Nevertheless, the low densities at which koalas occur in the region suggest the local population is not likely to be classified as an important population. The Project will result in loss of 121.08 ha of low value koala habitat, representing 2.6 % of habitat within 1 km of the Project area. The habitat losses will be localised and across a dispersed area. The local habitat loss is small in the context of the local and regional landscape. The loss of habitat alone is therefore unlikely to lead to a long-term decrease in the size of the local population. Vegetation clearing for the Project carries the risks of koala injury and mortality. However, these risks will be mitigated through the use of sequential clearing under the supervision of suitably trained and qualified fauna spotter-catchers. Risks of mortality and injury due to collision with construction vehicles will be mitigated through the implementation of a Traffic Management Plan. The Project is otherwise unlikely to have any substantial impact in terms of its expected impact on koalas, with no anticipated increase in dog attacks or vehicle collision risks. Based on the low risks and the mitigation measures proposed, the Project is unlikely to lead to a long-term decrease in the size of the local koala population.</p>
Reduce the area of occupancy of an important population.	<p><b>Unlikely</b></p> <p>As detailed above, the concept of ‘important populations’ has not been applied to the koala (DoE 2014). The low densities of koalas and low value koala habitat within the Project area would suggest the local population is not likely to be classified as an important population.</p> <p>Habitat losses within the Project footprint are not expected to result in the displacement or disappearance of koalas from any individual area at a spatial scale that relates directly to the scale at which area of occupancy is measured (i.e. 2 km x 2 km) (IUCN 2013). While the Project will result in a loss of 121.08 ha of koala habitat, this will occur in small areas across a relatively broad geographic distribution and will not result in the complete loss of habitat within any given area. Given the ongoing risks to koalas are also relatively minor, the Project is not expected to reduce the area of occupancy of the species or of an important population.</p>

Impact criteria	Potential to occur
Fragment an existing important population into two or more populations.	<p><b>Unlikely</b></p> <p>As detailed above, the concept of 'important populations' has not been applied to the koala (DoE 2014). The low densities of koalas and low value koala habitat within the Project area would suggest the local population is not likely to be classified as an important population. The majority of proposed infrastructure is located within woodland and open woodland in land where fragmentation impacts already exist from agriculture and grazing pastures. The pipeline alignment will result in temporary habitat loss and will be reinstated and rehabilitated with native flora species. The Project will result in a loss of 121.08 ha of koala habitat. Habitat loss will be small in the context of the local and regional landscape and will not create large gaps that present barriers to koala movement. Large areas of habitat west and south of the Project connect the Project area for koala dispersal and movement, these areas will not be impacted. As such, the Project will not fragment an existing important population into two or more populations.</p>
Adversely affect habitat critical to the survival of a species.	<p><b>Unlikely</b></p> <p>The Project area does not contain habitat critical to the survival of the koala, based on the definition outlined in the Referral guidelines for the vulnerable koala (DoE 2014). While the Project will result in the loss of 121.08 ha of low-value koala habitat, there will be no adverse impact on habitat critical to the survival of the koala.</p>
Disrupt the breeding cycle of an important population.	<p><b>Unlikely</b></p> <p>As detailed above, the concept of 'important populations' has not been applied to the koala (DoE 2014). The koala mating season is generally between September and March, with females giving birth to a single young between October and May. Based on the low density at which koalas occur in the region, the Project is at worst, likely to impact the breeding movements of a very small number of individual koalas. Measures will be implemented to further reduce the potential impacts to breeding individuals by managing the risks of vehicle strike, limiting the duration of works at watercourses, maintaining opportunities for longitudinal movement of koalas, and other fauna along watercourses, minimising works during the breeding season, implementing on-site speed limits, signage in higher-value koala habitat areas, and standard best practice sequential clearing using koala spotters. Clearing within koala habitat areas will be limited to daylight hours only during the peak breeding season (September – November). Once operational, the Project will cause negligible disruption to koala movement. Based on the low densities at which koalas will occur and the mitigation measures proposed, the project is unlikely to disrupt the breeding cycle of the local koala population.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	<p><b>Unlikely</b></p> <p>The Project will result in a loss of 121.08 ha of low-value koala habitat. This accounts for only a small proportion of suitable habitat in the broader landscape, i.e. 2.6 percent of habitat within 1 km of the Project area. Although clearing will cause minor temporary fragmentation of habitat and reduce the area of available habitat, that Project footprint will be reinstated and rehabilitated with native flora species, reconnecting temporarily fragmented areas for dispersal by the koala. The extent of temporary habitat disturbance is not likely to decrease the availability or quality of habitat available to the local population to the extent that the species will decline.</p>
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species habitat.	<p><b>Unlikely</b></p> <p>Wild dogs represent a key threat to koalas as a species. Within the Project area the threat to koalas from wild dogs is perceived to be low. Creation of new tracks can facilitate dog movements into new areas. However, as the existing environment already has an extensive network of farm tracks, the Project is unlikely to exacerbate the threat of wild dog attacks on koalas.</p> <p>Unmitigated, the Project has the potential to introduce or spread weeds, some of which (e.g. Chinese apple and rubber vine) could inhibit local koala movement. This potential will be mitigated by the implementation of a Weed Management Plan governing construction and operation of the Project. The Project therefore poses low risks to the local koala population via introduction and spread of invasive species.</p>
Introduce disease that may cause the species to decline.	<p><b>Unlikely</b></p> <p>The Project is not anticipated to introduce new diseases that may cause the species to decline. Stress may lead to an increase in the expression of chlamydia in koalas, however the implementation of mitigation measures such as sequential clearing will reduce disturbance-related stress and risk of disease.</p>

Impact criteria	Potential to occur
Interfere substantially with the recovery of the species	<p><b>Unlikely</b></p> <p>As detailed above, the Project is unlikely to substantially interfere with the recovery of the species. Localised loss of habitat will be experienced over a broad geographic area, representing a small proportion of the habitat present locally. The Project is unlikely to have any substantial impact in the operation phase, with no substantial long-term increase in mortality or any substantial barrier effects due to loss of habitat connectivity. All impacts are expected to be localised. Accordingly, the Project is unlikely to substantially interfere with the recovery of the species.</p>

## 6.1.12 Conclusion

The Project is **unlikely** to have a significant impact on the koala as the Project results in the clearance of 121.08 ha of low value habitat not considered habitat critical to the survival of the koala. Based on the Referral guidelines for the vulnerable koala (DoE 2014), the Project area habitat score does not represent habitat critical to the survival of the species and therefore does not constitute a significant impact to the survival of the species.

## 6.2 Bare-rumped sheathtail bat

### 6.2.1 Conservation status and documentation

The bare-rumped sheathtail bat is listed as Vulnerable under the EPBC Act.

In Queensland, the species is known to occur from Ayr to the Iron Ranges (TSSC 2016). Most historical records have been near-coastal locations. In Queensland, the species is known to be associated with coastal lowland rainforests, as well as open forests dominated by *Eucalyptus* or *Corymbia* species intermingled with coastal lowland rainforest (TSSC 2016). The species has been suggested to forage over habitat edges such as the edge of rainforest and in forest clearings. There is no information available on foraging habitat shifts between the dry and wet seasons (DAWE 2021a). The species has been recorded using large, deep hollows for roosting and breeding in species *E. platyphylla*, *E. miniata*, *E. tetradonta* and *Melaleuca leucadendra* syn. *leucodendron* (TSSC 2016). Information on the dimensions of known roosting hollows is presented in the National Recovery Plan for the bare-rumped sheathtail bat (Schulz and Thomson 2007) and Australian bats (Churchill 2008), with all hollows ranging in size between 18 cm and 29 cm diameter. There are only two records in the last two decades, both from north-eastern Queensland (DAWE 2021a).

### 6.2.2 Criteria used to map bare-rumped sheathtail bat habitat

**Commonwealth habitat definition:** The bare-rumped sheathtail bat occurs mostly in lowland areas, typically in a range of woodland, forest and open environments (Schulz & Thomson 2007; Reardon et al. 2010; Dennis 2012).

Table 6.5 Criteria used to map bare-rumped sheathtail bat habitat

Habitat	Commonwealth definition	Criteria used to map habitat
Roosting	In Australia, all confirmed roosting records are from deep tree hollows in the Poplar Gum, Darwin Woollybutt ( <i>Eucalyptus miniata</i> ) and Darwin Stringybark (Churchill 1998; Compton & Johnson 1983; McKean et al. 1981; Murphy 2002). Hollows in these tree species have also been used as maternity roosts. All recorded roosts are in large hollows ranging between 18 cm and 29 cm diameter (Schulz and Thomson 2007; Churchill 2008).	Moderate and large hollows in <i>E. platyphylla</i> were mapped as potential roost trees and small hollow-bearing <i>E. platyphylla</i> were mapped as future potential roost trees. All areas within 200 m of moderate and large roost trees ( <i>E. platyphylla</i> only) were also mapped as potential roosting habitat.
Foraging	Only anecdotal information is available, based on habitat around roosts or from shot specimens. No information is available on foraging habitat shifts between the dry and wet seasons (Schulz & Thomson 2007). The Bare-rumped Sheathtail Bat has been suggested to forage over habitat edges such as the edges of rainforest and forest clearings (Churchill 1998).	All remnant and regrowth REs that are listed as essential habitat factors for the species by DoR that occur within 10 km of the Project area were mapped as potential foraging habitat: <ul style="list-style-type: none"> <li>- 11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> woodland on alluvial plains</li> <li>- 11.3.9 <i>Eucalyptus platyphylla</i>, <i>Corymbia spp.</i> woodland on alluvial plains</li> <li>- 11.3.10 <i>Eucalyptus brownii</i> woodland on alluvial plains</li> <li>- 11.3.12 <i>Melaleuca viridiflora</i>, <i>M. argentea</i> +/- <i>M. dealbata</i> woodland on alluvial plains</li> <li>- 11.3.13 <i>Grevillea striata</i> open woodland on coastal alluvial plains</li> <li>- 11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines</li> <li>- 11.3.27 Freshwater wetlands</li> <li>- 11.3.30 <i>Eucalyptus crebra</i>, <i>Corymbia dallachiana</i> woodland on alluvial plains</li> <li>- 11.3.33 <i>Eremophila mitchellii</i> open woodland on alluvial plains</li> <li>- 11.3.35 <i>Eucalyptus platyphylla</i>, <i>Corymbia clarksoniana</i> woodland on alluvial plains</li> </ul>

Habitat	Commonwealth definition	Criteria used to map habitat
		<ul style="list-style-type: none"> <li>– 11.11.1 <i>Eucalyptus crebra</i> +/- <i>Acacia rhodoxylon</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding</li> <li>– 11.11.15 <i>Eucalyptus crebra</i> woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics</li> <li>– 11.12.1 <i>Eucalyptus crebra</i> woodland on igneous rocks</li> <li>– 11.12.9 <i>Eucalyptus platyphylla</i> woodland on igneous rocks</li> </ul>

### 6.2.3 Desktop results

The bare-rumped sheath-tail bat was identified within the PMST (Appendix A) as having potential to occur within a 30 km radius from a central point within the Project area. Essential habitat for the species is mapped north-west of the Project area (Figure 6-2).

### 6.2.4 Survey results

The bare-rumped sheath-tail bat was not confirmed during any of the field surveys undertaken for the Project. NRA potentially recorded the species using acoustic bat detectors – several *Saccolaimus* sp. calls were recorded in suitable habitat for the bare-rumped sheath-tail bat, however the recordings were unable to be differentiated between the bare-rumped sheath-tail bat or the yellow-bellied sheath-tail bat (*Saccolaimus flaviventris*) (NRA 2021).

The GHD field survey recorded 10 large and 27 moderate hollow-bearing *Eucalyptus platyphylla* trees in the Project area that would represent potential roosting sites for the species. The survey also recorded 325 small hollow-bearing trees, representing potential future roosting sites. Suitable foraging habitat is broadly mapped across the Project area. Suitable foraging habitat in the Project footprint connects to suitable foraging habitat further north, west and south. Large areas of historically cleared land persists to the east of the Project area for agriculture, where no suitable foraging habitat is present. Roosting habitat was only mapped within the Project area, where the presence and size of hollow-bearing trees were recorded. Potential roosting habitat is scattered across the Project area, however a cluster of potential roosting habitat is present in the southern section of the Project area.

Potential foraging and roosting habitat and locations of large, moderate and small hollow-bearing trees for the bare-rumped sheath-tail bat are shown in Figure 6-2.

### 6.2.5 Significance of project footprint

This section assesses the significance of bare-rumped sheath-tail bat habitats within the Project area, their importance in the context of the local population and whether the local population is important at a national level.

#### 6.2.5.1 Status as an important population

'Important population' for the bare-rumped sheath-tail bat has not been formally defined in the Commonwealth listing advice for the species. In the absence of a formal definition, the definition outlined in the Significant Impact Guidelines 1.1 applies. An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are key source populations either for breeding or dispersal; populations that are necessary for maintaining genetic diversity, and/or; populations that are near the limit of the species range.

The population size of the species is poorly known, anecdotal information suggests the species occurs in low densities (DAWE 2021a). The Project area is near the limit of the species range which extends coastally down to Ayr in north-east Queensland. The species is considered an important population under the Significant Impact Guidelines 1.1 definition for important populations.



### **6.2.5.2 Status as habitat critical to the survival of the bare-rumped sheath-tail bat**

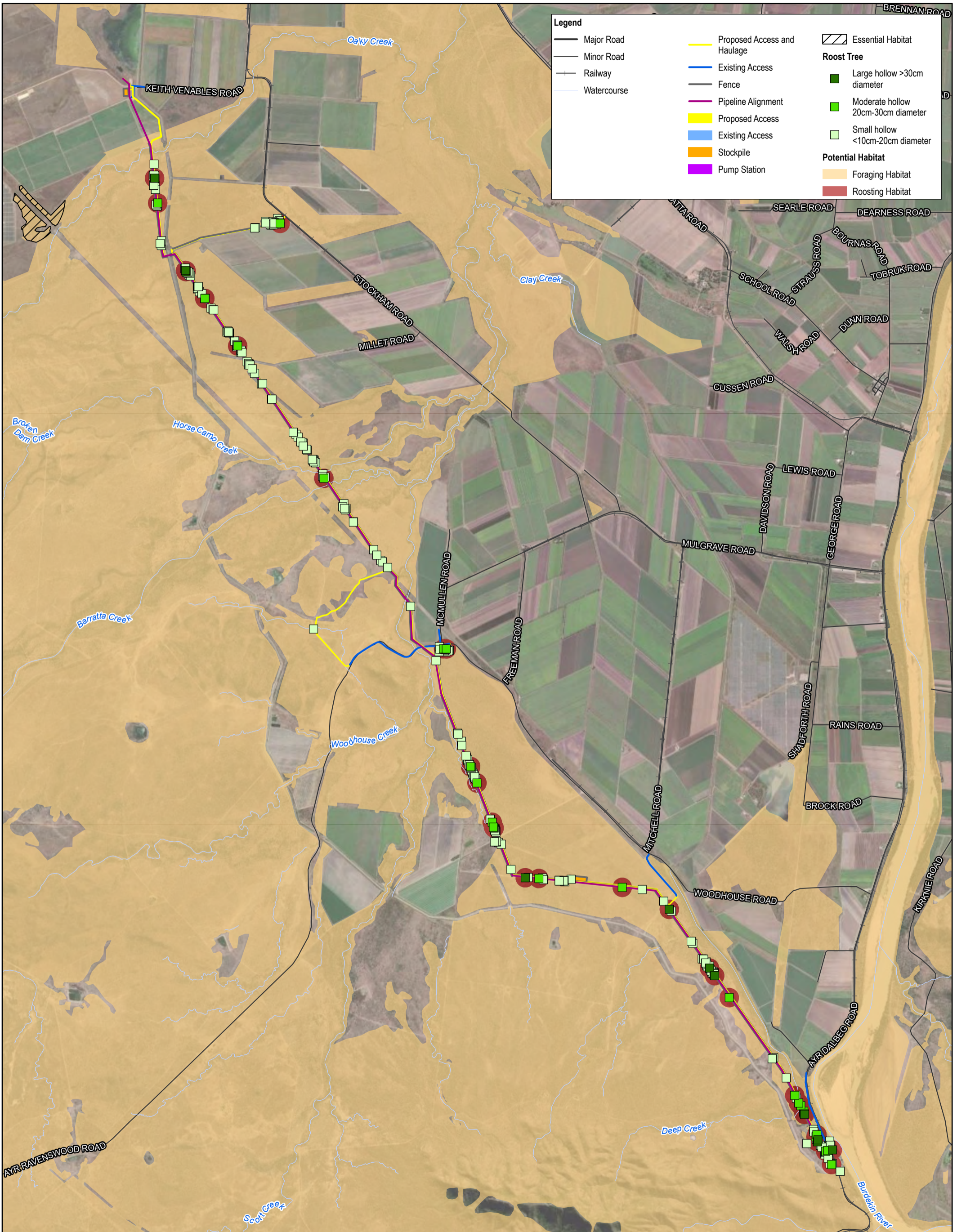
Habitat critical to the survival of the bare-rumped sheath-tail bat has not been formally defined in the Commonwealth listing advice for the species. In the absence of a formal definition, the definition outlined in the Significant impact guidelines 1.1 applies:

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

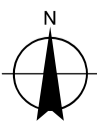
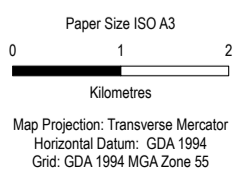
- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long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

The bare-rumped sheath-tail bat has specific roosting habitat requirements, only roosting in large hollows of select tree species (McKean et al. 1981; Compton & Johnson 1983; Churchill 1998; Murphy 2002), but demonstrates an ability to forage a relatively broad range of habitats. In this context, roosting habitat and roosting resources (as defined in Section 6.2.2) was considered habitat critical to the survival of the species.





Based on or contains data provided by the State of QLD 2021. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.



Townsville City Council  
Haughton Pipeline Stage 2 - MNES Assessment

**Distribution of potential bare-rumped sheathtail bat habitat within and surrounding the Project area**

Project No. 12537606  
Revision No. 0  
Date 12/17/2021

**FIGURE 6-2**



## 6.2.6 Threatening processes

Threats to the bare-rumped sheath-tail bat include (TSSC 2016):

- Habitat loss and fragmentation
- Competition for tree hollows
- Too frequent burning

## 6.2.7 Potential impacts

Potential impacts on bare-rumped sheath-tail bat populations and habitat within the Project area include:

- Loss of habitat and fragmentation
- Disturbance from increased light, noise and vibration
- Habitat degradation by increased dust, runoff and sedimentation
- Introduction and spread of weed species

These are discussed below.

### 6.2.7.1 Loss of habitat and fragmentation

The Project is anticipated to result in permanent impact to 12.19 ha and temporary impact to 111.44 ha. In total, these habitats comprise of 39.09 ha of potential roost habitat and 84.54 ha of potential foraging habitat, representing 1.77 percent of potential habitat within 1 km of the Project footprint. A total of 123.63 ha of bare-rumped sheath-tail bat habitat is anticipated to be impacted by the Project.

Vegetation loss will be localised along a narrow linear alignment for the pipeline, with trees retained on both sides of the impact area. Indiscriminate clearing in areas for the pump station, stockpiles and other ancillary infrastructure will also result in the loss of potential habitat for the species, however potentially suitable habitat adjacent to the Project footprint will persist in adjacent areas and will not be impacted by the Project. The Project is not anticipated to result in fragmentation of habitat for the species. Although portions of the Project area have been historically cleared for grazing pastures, with agriculture persisting to the east, substantial connectivity is present in woodland and open woodland, especially in the southern portion of the Project area. The central and northern portion of the Project area contain areas existing as immature woodland to open woodland with grassy understorey. The Project area is connected to large areas of potentially suitable foraging habitat for the species to the north, west and south.

The Project is anticipated to result in the loss of 10 large hollow-bearing trees and 27 moderate *E. platyphylla* hollow-bearing trees which represent potential roosting habitat for the bare-rumped sheath-tail bat. The loss of 325 small hollow-bearing *E. platyphylla* trees represents a loss of future potential roosting trees for the species. The presence of large and moderate hollow-bearing trees are scattered across the Project area, however a cluster of potential roosting habitat for the species is present in the southern section of the Project footprint (Figure 6-2). Although the loss of hollows within the footprint is anticipated to be significant for the species, potentially suitable roosting hollows in *E. platyphylla* will persist in similar densities outside of the Project footprint. Hollow formation is dependent on a tree's history, its species and location. Small hollows with narrow entrances take approximately 100 years to form. Hollows of a medium size will take around 200 years to form, and larger and deeper hollows can take a lot longer (Mackowski 1984; Menkorst 1984; and Scotts 1991). The anticipated loss of hollow-bearing trees, particularly large and moderate hollows that represent potential roosting trees for the bare-rumped sheath-tail bat is expected to be significant for the species.

### 6.2.7.2 Injury and mortality

Vegetation clearance during construction of the Project has the potential to cause injury and/or mortality to bare-rumped sheath-tail bats roosting in hollow-bearing trees within the Project footprint.

### 6.2.7.3 Disturbance from increased light, noise and vibration

Construction will result in a substantial, localised increase in vehicle movements in the short-term, which will increase light, noise and vibration disturbance to local wildlife. Increased light, noise and vibration can alter

individual species' behaviours, and disrupt the balance of inter-species interactions. Such disruptions typically favour feral predators and generalist species that owe their success to broad ecological tolerances and possess the ability to tolerate or actively exploit disturbed environments (Hero et al. 2004). The bare-rumped sheath-tail bat is a relatively high-flying species, with a capacity to fly large distances and cross open areas (TSSC 2016). As such, this species may be less susceptible to indirect disturbance than some lower-flying microbat species.

#### **6.2.7.4 Habitat degradation by increased dust, runoff and sedimentation**

Construction activities have the potential to generate localised dust, erosion, run-off and sedimentation through increased vehicle movements, clearance of vegetation and earthworks. This can reduce the abundance and diversity of adjacent terrestrial and aquatic habitats by physically smothering vegetation, changing nutrient levels, impeding the growth and germination of plant species, encouraging weed incursions and altering the movement and behaviour of fauna species.

The receiving environment has already been subject to high levels of erosion and sedimentation as a result of existing land-clearing and grazing activities. Nevertheless, sensitive ecological receptors (e.g. larger open woodland remnants and aquatic habitats) are particularly susceptible to adverse impacts associated with dust, run-off, erosion and sedimentation. These areas require protection through the implementation of sediment and erosion control measures during construction.

Adverse weather conditions during construction can exacerbate the potential impact of erosion and sedimentation. High rainfall has the potential to remove exposed topsoil, destabilise creek beds and distribute sediment through creek lines. Strong winds have the potential to spread exposed topsoil, decreasing the likelihood of recolonisation by vegetation and potentially distributing dust into nearby sensitive environments.

#### **6.2.7.5 Introduction and spread of weed species**

The Project has the potential to adversely impact habitat for the bare-rumped sheath-tail bat by introducing or spreading exotic weed species. The species is reliant on roosting habitat within mature hollow-bearing trees. As such, the introduction and spread of weeds can substantially reduce the ability for recruitment, longevity and growth of roost trees such as *E. platyphylla* and other tree species utilised by the bare-rumped sheath-tail bat. Foraging habitat within the Project area is already highly degraded by weeds. The Project has the potential to exacerbate the loss through introduction and spread of weeds. Clearing native vegetation creates areas of disturbance that are naturally susceptible to colonisation by invasive weed species. These can form a local source of future weed infestations within the surrounding landscape.

#### **6.2.7.6 Disturbance of surface waterways and waterbodies**

Construction activities within and/or in the vicinity of watercourses have the potential to cause degradation of riparian habitats through:

- Removal of riparian vegetation
- Run-off, sedimentation and erosion
- Point-source pollution (chemical and fuel spills)
- Disturbance associated with noise, vibration and/or artificial lighting.

The pipeline and associated haulage and access tracks intersect a number of ephemeral watercourses and drainage lines. The pump station, power supply works, and stockpile areas have been sited to minimise the number of water crossings; however, mapped watercourses and ephemeral creek lines are still located in close proximity to some of these project components. These areas are ecologically important for movement of wildlife, as habitat and drinking sites and are potentially susceptible to construction-related disturbance.

### **6.2.8 Measures to avoid, reduce or mitigate impacts**

#### **6.2.8.1 Loss of habitat**

Planning phase measures that have been employed to avoid and reduce the direct loss of habitat include:

- Minimising impacts to remnant woodland by locating laydown areas in open areas that have been subject to historical land clearing and cattle grazing
- Minimising impacts to watercourses
- Utilising existing tracks and locating proposed tracks within previously disturbed areas

During the construction phase of the Project, the following mitigation measures will be employed:

- Land clearing will be restricted to the minimal amount necessary for the construction of the Project and will not extend outside of the Project footprint
- The extent of vegetation clearing (and any no-go areas) will be clearly identified on construction plans and in the field using high visibility fencing or flagging in the vicinity of high conservation significant areas. Clearing extents will be communicated to construction supervisors
- Where infrastructure crosses waterways, the Project footprint has been minimised to a 20 m wide construction corridor
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed
- A CEMP will be prepared to inform actions with regards to managing weed hygiene, erosion, fuels and hazardous substances, fire, etc. and the CEMPs and ESCPs will include additional erosion and sediment control measures
- All construction personnel will attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vegetation clearing protocols. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions
- Salvage and reinstatement of large and moderate-sized *E. platyphylla* hollows that are subject to clearing will be salvaged, capped and reinstated on mature *E. platyphylla* trees adjacent to the pipeline
- There will be a commitment to rehabilitated disturbed areas by planting *E. platyphylla* tubestock within 400 m of water sources. These areas will retain future roosting habitat values for the bare-rumped sheath-tail bat.

### 6.2.8.2 Injury and mortality

While the bare-rumped sheath-tail bat may be susceptible to injury and mortality during clearing, the risks can be effectively managed using routine management measures targeted at the species. The following measures will be implemented to avoid/minimise injury and/or mortality to the bare-rumped sheath-tail bat during construction of the Project:

- Pre-clearance surveys will specifically target areas of habitat identified within the clearing footprint. Pre-clearance surveys will be undertaken to mark the locations of potential roosting hollows
- Vehicles to be restricted to 40 km/hr along access tracks
- All large and moderate-sized hollows in *E. platyphylla* that are subject to clearing will be inspected prior to works to confirm the species' presence, document roost dimensions and plan for their safe relocation out of the clearing zone
- Clearing of all hollows, particularly all moderate and large hollows will be supervised by suitably qualified and experienced fauna spotter-catchers. This will involve relocating any resident fauna to the nearest suitable, safe habitat outside the clearing footprint
- Where deemed necessary by the fauna spotter-catcher, temporary exclusion fencing may be required in specific areas of high ecological sensitivity to prevent wildlife from returning to work areas
- Adverse incident response procedures will be developed to detail actions to be taken in the event of wildlife injury or mortality during clearing
- A Traffic Management Plan will be developed for the Project with designated access routes, speed limits and identified sensitive ecological areas (particularly areas where bare-rumped sheath-tail bat have the potential to roost and forage)
- The CEMP will comprise protocols to limit injury and mortality to fauna including management of risks associated with vegetation clearing, waterbodies and responses and reporting for adverse incident protocols



- A high risk SMP will be prepared in accordance with the requirements of Section 335 of the Nature Conservation (Animals) Regulation 2020.

### **6.2.8.3 Disturbance from increased light, noise and vibration**

Routine mitigation measures will be undertaken to minimise the impact that noise, light, vibration and disturbance have on local wildlife populations. This is particularly important within the vicinity of habitat for conservation significant fauna species, including the bare-rumped sheath-tail bat. The following measures will be used to minimise the impacts of light, noise and vibration during construction:

- Site lighting will be kept to the minimum (security) required for safety. Placement and orientation of lighting to be directed away from sensitive fauna habitat. Direction of lighting beam downwards or use of shields and baffles to limit light spill beyond site boundary.
- Wherever practicable, construction activities will be limited to daylight hours to reduce the need for lighting and resultant light spill into adjacent habitat. However, it is noted that some of the road crossings may require night works for traffic management reasons.
- A Traffic Management Plan will be developed for the construction site to control vehicle movements and reduce the unnecessary generation of vehicular noise.
- All construction vehicles will comply with maintenance schedules and operational restrictions designed to limit noise impacts during construction.

### **6.2.8.4 Habitat degradation by increased dust, run-off and sedimentation**

The following mitigation measures will be used to minimise the impacts of dust, run off and sedimentation during construction of the Project:

- Erosion and sediment controls have been developed as part of the CESCOP and will be expanded on by the construction Contractor as part of their ESCPs.
- Routine dust suppression and monitoring will be undertaken throughout construction and operation.
- Duration of in-stream works will be minimised wherever practicable to reduce the potential for sedimentation.
- Erosion and sediment control measures will be installed where in-stream disturbance must be undertaken during flow conditions.
- Areas subject to clearing will be stabilised as soon as practicable.
- All vehicle movement will be restricted to designated tracks located within the Project footprint.
- Weather conditions will be monitored during the construction stage and temporary controls will be established during extreme weather events.
- Construction activities during adverse weather conditions will be managed in accordance with the CEMP
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed.

### **6.2.8.5 Introduction and spread of weed species**

The following measures will be implemented to minimise the introduction and spread of weeds:

- Weed management actions are included in the CEMP and include:
  - Hygiene protocols restricting the movement of vegetation and soil between impacted areas and areas of significantly lower weed infestation.
  - Protocols for monitoring and management of weeds to identify and appropriately respond to significant changes in weed distribution and density
- All vehicles / equipment travelling from a declared restricted place or quarantine area will be required to wash down and possess a current weed hygiene inspection certificate before moving to a weed free area or commencing construction works onsite. The weed hygiene inspection certificate is to be obtained from an inspector who is deemed competent and is certified in line with DAF requirements.
- Vehicle access will be restricted to within the Project footprint and existing roads and tracks

### **6.2.8.6 Disturbance of surface waterways and waterbodies**

The following mitigation measures will be used to minimise the disturbance of waterways and waterbodies during construction of the Project:

- Wherever practicable, watercourse crossings have been located at established crossing points on existing access tracks. Where this is not practicable, the disturbance area is restricted to within the Project footprint.
- Erosion and sediment controls will be developed as part of the CЕСP and ESCPs.
- Dust suppression activities will be undertaken where appropriate. Stabilisation of disturbed areas will be undertaken as soon as practicable after disturbance.
- Rehabilitation of cleared areas adjacent to waterways will be undertaken as soon as practicable after completion of the pipe installation works.
- Refuelling will be undertaken away from waterways.
- Storage of fuels, chemicals, wastes and other potentially environmentally hazardous substances will be bunded or otherwise contained areas away from waterways.
- Emergency response protocols and procedures will be developed as part of the CEMP for implementation in the event of a contaminant spill or leak and provision of spill response equipment.

## 6.2.9 Residual impacts on bare-rumped sheathtail bat and bare-rumped sheathtail bat habitat

A summary of the Project's potential impacts on the bare-rumped sheathtail bat and mitigation measures is presented in Table 6.6. The risk ratings are presented in Appendix D.

Table 6.6 Residual impact assessment for the bare-rumped sheathtail bat

Impact	Initial impact rating	Mitigation measures	Residual impact
Habitat loss The Project will involve permanent and temporary loss of habitat. This is further detailed in Section 4 Permanent loss – 12.19 ha Temporary loss – 111.44 ha	Severe	Utilise existing tracks where possible Land clearing restricted to minimal amount necessary and will not extend outside of the Project footprint Establishing no-go areas Where infrastructure crosses waterways existing disturbed areas to be selected where possible Rehabilitation of temporary disturbance areas undertaken as soon as practicable with native species Reinstatement and rehabilitation of pipeline with native species Preparation of a CEMP	High
Loss of roost trees including 10 large and 27 medium sized <i>E.platyphylla</i> hollows	Severe	Salvage and reinstatement of all large and medium sized <i>E. platyphylla</i> hollows	Moderate
Loss of future potential roost trees including 325 small sized <i>E. platyphylla</i> hollows	Severe	Plant <i>E. platyphylla</i> tubestock to provide future potential roosting habitat within 400 of water sources.	Moderate
Injury or mortality due to vegetation clearing	High	Employ a fauna spotter catcher during clearing. Allow a fauna spotter catcher to check moderate to large hollow-bearing trees within the clearing footprints prior to clearing. Identify areas of potential habitat with signage and flagging tape.	Low
Habitat fragmentation and reduced connectivity	Moderate	Revegetate temporarily cleared areas (e.g. laydown areas) with native eucalypt species ( <i>E. platyphylla</i> ).	Low
Disturbance from increased light, noise and vibration	Moderate	Restricted sources of artificial lighting. Direct lighting away from sensitive areas for the species	Low
Habitat degradation through increased dust, run-off and sedimentation.	Low	Reduce duration of works in watercourses and drainage lines. Monitor weather events when working within watercourses.	Negligible

Impact	Initial impact rating	Mitigation measures	Residual impact
		Reduce speed limits during dry conditions or employ and water truck to reduce dust rates.	
Introduction and spread of invasive weed species	Moderate	<p>Implement measures for introduced flora and fauna (to be outlined in the CEMP).</p> <p>Require construction vehicles to hold valid weed free declarations prior to the commencement of construction works.</p> <p>Educate staff on the impacts of weeds and their general environmental obligation.</p> <p>Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area.</p>	Low
Disturbance of surface waterways and waterbodies.	High	<p>Reduce duration of works in watercourses and drainage lines.</p> <p>Monitor weather events when working within watercourses.</p> <p>Reduce speed limits during dry conditions to reduce dust generation and potential sedimentation.</p>	Low

## 6.2.10 Significance of impact assessment

An assessment of the significance of the Project's impacts on the bare-rumped sheath-tail bat was undertaken against the Significant Impact Guidelines 1.1 (DoE 2013). The Project is likely to have a significant impact on the bare-rumped sheath-tail bat. Justification for this assessment is presented in Table 6.7.

Table 6.7 Significance of impact on the bare-rumped sheath-tail bat

Impact criteria	Potential to occur
<p>Lead to a long-term decrease in the size of an important population of a species.</p>	<p><b>Unlikely</b></p> <p>The local bare-rumped sheath-tail bat population could be considered an important population under the definition outlined in the Significant impact guidelines 1.1. The Project will result in the loss of 10 large, 27 moderate and 325 small hollow-bearing <i>E. platyphylla</i> trees, with the large and moderate hollows representing potential roosting trees and small hollows representing future potential roosting trees. All large and moderate <i>E. platyphylla</i> hollows will be salvaged, capped and reinstated on mature <i>E. platyphylla</i> trees adjacent to the pipeline, retaining potential roosting resources for the species. Additionally, 43.61 ha <i>E. platyphylla</i> tubestock will be planted in areas defined in Section 4.3. These areas will retain future roosting habitat values for the bare-rumped sheath-tail bat.</p> <p>The Project will result in a temporary loss of 111.44 ha of habitat (77.04 ha foraging habitat and 34.4 ha roosting habitat) and the permanent loss of 12.19 ha (7.5 ha foraging habitat and 4.69 ha of roosting habitat) for the bare-rumped sheath-tail bat.</p> <p>The loss of habitat is small in the context of the local and regional landscape, which is localised along the pipeline with similar habitat persisting immediately adjacent to the impacted areas. Clearing of large hollow-bearing <i>E. platyphylla</i> has the potential to cause injury and mortality of bare-rumped sheath-tail bats, however this risk will be managed through employing the use of a fauna spotter catcher to undertake pre-clearance checks of large hollows. The Project is unlikely to have any substantial operational impacts on this species, with negligible vehicular movements and no restriction of movement or access to habitat. As such, the Project is therefore unlikely to lead to a long-term decrease in the size of an important population of a species.</p>
<p>Reduce the area of occupancy of an important population.</p>	<p><b>Unlikely</b></p> <p>The construction phase of the Project will result in permanent impact to 12.19 ha of potential foraging and roosting habitat, and temporary impact to 111.44 ha of foraging and roosting habitat. The Project will result in the impact to 10 large, 27 moderate and 325 small hollow-bearing <i>E. platyphylla</i> representing potential roosting or potential future roosting sites for the species. The moderate and large <i>E. platyphylla</i> hollow-bearing trees will be salvaged, capped and reinstated on mature <i>E. platyphylla</i> species adjacent to the pipeline alignment, retaining roosting habitat for the species. However the Project will result in the loss of 325 small hollow-bearing trees. Planting of 43.61 ha <i>E. platyphylla</i> tubestock across the Project footprint (Section 4.3) will be undertaken to offset the loss of future potential roosting habitat for the species. Given potential roosts are also dispersed along the length of the pipeline, with similar roosting resources present adjacent to the pipeline along its' length, the permanent loss of 4.69 ha of potential roosting habitat is unlikely to result in a localised disappearance of the species from a 2 km x 2 km area, such that there would be a reduction in the area of occupancy of an important population.</p>



Impact criteria	Potential to occur
Fragment an existing important population into two or more populations.	<p><b>Unlikely</b></p> <p>Within the Project area, bare-rumped sheath-tail bat habitat has already been subjected to a high level of fragmentation, occurring in sparse, modified grassland and open woodland habitats, where connectivity is loosely maintained to larger open woodland remnants and water sources. The Project will have minimal direct impact on habitat for the bare-rumped sheath-tail bat, resulting in the temporary loss of 77.04 ha of foraging habitat and 34.4 ha of roosting habitat) and permanent loss of 12.19 ha (representing 7.5 ha foraging habitat and 4.69 ha roosting habitat) from a relatively dispersed area. The Project footprint generally supports hollows smaller than typically required by the species, with habitat localised along the Project footprint and similar habitat persisting immediately adjacent. Along the length of the Project alignment only 10 large and 27 medium sized hollows representing potentially suitable roosting habitat for the species will be subject to clearing. An additional 325 small hollows representing future roosting habitat will also be cleared. The moderate and large <i>E. platyphylla</i> hollow-bearing trees will be salvaged, capped and reinstated on mature <i>E. platyphylla</i> species adjacent to the pipeline alignment, retaining roosting habitat for the species. Planting of 43.61 ha <i>E. platyphylla</i> tubestock across the Project footprint (Section 4.3) will be undertaken to offset the loss of future potential roosting habitat for the species. The bare-rumped sheath-tail bat can fly large distances and can cross open ground (TSSC 2016). As such, the species' habitat is unlikely to be fragmented by the small-scale clearing required for the Project. Accordingly, the Project is unlikely to fragment the important population into two or more populations.</p>
Adversely affect habitat critical to the survival of a species.	<p><b>Likely</b></p> <p>The Project will result in the permanent loss of 4.69 ha and temporary loss of 34.4 ha of potential roosting habitat critical to the survival of the species, as well as the translocation of 10 large and 27 moderate <i>E. platyphylla</i> hollows, representing potential roosting habitat that would be considered habitat critical to the survival of the species. The formation of hollows suitable for roosting habitat for the species can take up to 200 years to form. To reduce the impact of the Project on the species, moderate and large <i>E. platyphylla</i> hollow-bearing trees will be salvaged, capped and reinstated on mature <i>E. platyphylla</i> species adjacent to the pipeline alignment, retaining roosting habitat for the species. Planting of 43.61 ha <i>E. platyphylla</i> tubestock across the Project footprint (Section 4.3) will be undertaken to offset the loss of future potential roosting habitat for the species. The Project has the capacity to adversely impact habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of an important population.	<p><b>Possible</b></p> <p>The Project will result in the permanent loss of 4.69 ha and temporary loss of 34.4 ha of potential roosting habitat critical to the survival of the species, as well as the direct loss of 10 large, 27 medium sized and 325 small sized <i>E. platyphylla</i> hollows representing potential roosting habitat for the species. While the large and moderate hollows will be salvaged, capped and reinstated on mature <i>E. platyphylla</i> trees adjacent to the pipeline, the Project will result in the loss of the 325 small sized <i>E. platyphylla</i> hollows. While 43.61 ha <i>E. platyphylla</i> tubestock will be planted across the Project footprint (Section 4.3) to offset the loss of future potential roosting habitat for the species, it is acknowledged that small hollows with narrow entrances take approximately 100 years to form. Hollows of a medium size will take around 200 years to form, and larger and deeper hollows can take a lot longer (Mackowski 1984; Menkorst 1984; and Scotts 1991). While an abundance of potential roosting habitat occurs adjacent to the Project area, the cryptic nature of the species means it is difficult to predict the implications resulting from the loss of potential roosting sites on the local breeding population. It is possible that the loss of future potential roosting habitat could disrupt the breeding cycle of the local bare-rumped sheath-tail bat population.</p>

Impact criteria	Potential to occur
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p><b>Unlikely</b></p> <p>The local environment is subject to high levels of existing disturbance from weed infestation and habitat fragmentation. The Project will result in localised losses of habitat. However, the Project is unlikely to cause any indirect degradation of habitat over time. Routine weed and pest management measures will be implemented as part of construction controls. As such, other than the loss of habitat, the Project is not expected to result in any indirect impact on habitat. Despite this, the loss of potential roosting resources has the potential to cause the species to decline.</p> <p>Construction of the Project will result in the permanent loss of 4.69 ha and temporary loss of 34.4 ha of potential roosting habitat critical to the survival of the species, as well as the loss of 10 large and 27 moderate <i>E. platyphylla</i> hollows, representing potential roosts, and 325 small <i>E. platyphylla</i> hollows, representing potential future roosts. To reduce the Project's impact to the species roosting habitat, large and moderate hollows will be salvaged and reinstated on mature <i>E. platyphylla</i> trees adjacent to the pipeline and 43.61 ha <i>E. platyphylla</i> tubestock will be planted in select areas across the Project footprint. As the potential roosting trees are localised along the Project footprint and dispersed over a large area, with similar roosting resources persisting immediately adjacent to the pipeline, the localised loss of roosting habitat for the species is unlikely to decrease the availability and quality of habitat to the extent the species will decline.</p>
<p>Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat</p>	<p><b>Unlikely</b></p> <p>Competition for hollows by feral species is listed as a likely or future threat to the bare-rumped sheath-tail bat. Feral species such as the common myna (<i>Acridotheres tristis</i>) and the Asian honey bee (<i>Apis cerana</i>) have the potential to directly compete with bare-rumped sheath-tail bat for hollow-bearing trees. The Project area is currently subject to high levels of weed infestation. Unmitigated, the Project has the potential to increase local weed densities and thereby threaten the potential the recruitment, longevity and growth of roost trees such as <i>E. platyphylla</i>. Implementation of standard weed management protocols during construction and operation is expected to mitigate this risk to high levels. The Project is unlikely to result in invasive species that are harmful to the bare-rumped sheath-tail bat becoming established in the species habitat.</p>
<p>Introduce disease that may cause the species to decline, or</p>	<p><b>Unlikely</b></p> <p>No diseases or pathogens are identified among current known threats to the bare-rumped sheath-tail bat, however it is listed as a likely or future threat. Diseases such as Australian Bat Lyssavirus (ABLV) have not been recorded for the species, but this may be a function of the lack of specimens presented for examination. The impact of diseases on the bare-rumped sheath-tail bat is unknown (DAWE 2021a). The Project construction and operation is not expected to increase the risk of disease transmission for bare-rumped sheath-tail bats, and introduced disease that may cause the species to decline is therefore considered negligible.</p>
<p>Interfere substantially with the recovery of the species.</p>	<p><b>Possible</b></p> <p>Construction of the Project will result in the permanent loss of 4.69 ha and temporary loss of 34.4 ha of potential roosting habitat critical to the survival of the species, as well as the loss of 10 large and 27 moderate-sized <i>E. platyphylla</i> hollows that represent potential roosts and 325 small <i>E. platyphylla</i> hollows that represent future potential roosts for the bare-rumped sheath-tail bat. While the loss of roosting resources is small in the context of the local and regional landscape and habitat is localised along the Project footprint with similar habitat persisting immediately adjacent, habitat loss and competition for tree hollows are listed as key threats for the species (DAWE 2021a). Hollows may take up to 200 years to form suitable roost habitats for the species. To reduce the Project's impact to the species roosting habitat, large and moderate hollows will be salvaged and reinstated on mature <i>E. platyphylla</i> trees adjacent to the pipeline and 43.61 ha of <i>E. platyphylla</i> tubestock will be planted in select areas across the Project footprint. However, the loss 325 small hollows may interfere with the recovery of the species in the long-term.</p> <p>Despite the impacts on foraging and roosting habitat, the project is unlikely to have any substantial impact in terms of its impact during the operational phase. Operation of the project is unlikely to have any impact on the behaviour or use of habitats for the bare-rumped sheath-tail bat. Implementation of a Weed Management Plan for the project has the potential to increase the value of future habitat. Local noise disturbance and mortality threats associated with the project are also expected to be low.</p> <p>The Project may possibly interfere substantially with the recovery of the species.</p>

## 6.2.11 Conclusion

The mitigation measures have substantially reduced the impact to the bare-rumped sheath-tail bat through rehabilitation measures outlined in Section 4.3. Although the rehabilitation measures will reduce the impact to roosting habitat critical to the survival of the species, low-level residual impacts on habitat critical to survival of the species will persist, with a permanent loss of 4.69 ha of roosting habitat and the relocation of 10 large and 27 moderate-sized *E. platyphylla* hollows that represent potential roosting sites. On this basis, the Project is considered **likely** to have a significant impact on the bare-rumped sheath-tail bat.

## 6.3 Black-throated finch (southern)

### 6.3.1 Conservation status and documentation

The black-throated finch (southern) is listed as Endangered under the EPBC Act.

The southern subspecies is known to occur in the Townsville-Charters Towers region and in scattered sites in central Queensland including Ingham (DAWE 2021a). It remains locally common at only a few sites near Townsville and Charters Towers (NSW and Queensland Governments 2004). The black-throated finch (southern) occurs mainly in grassy, open woodlands and forests, typically dominated by *Eucalyptus*, *Corymbia* and *Melaleuca*, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water. The subspecies is thought to require a mosaic of different habitats in which it can find seed during the wet season (DAWE 2021a). The species has occasionally been recorded in other habitats, including in heavily grazed paddocks. It is likely that permanent sources of water (and the habitat surrounding these) provide refuge for the species during the dry season, especially during drought years (DAWE 2021a).

### 6.3.2 Criteria used to map black-throated finch (southern) habitat

**Commonwealth habitat definition:** Black throated finch (southern) habitat is broadly defined as grassy open woodlands and forests, typically dominated by Eucalyptus, Acacia and Melaleuca. Within this habitat, the black throated finch (southern) requires access to three key resources:

- Water sources
- Grass seeds, and
- Trees providing suitable nesting habitat.

The species has been recorded in 21 regional ecosystems (REs) (all of which occur in Queensland) since 1994 (DAWE 2021).

**Table 6.8** Criteria used to map black-throated finch (southern) habitat

Habitat	Commonwealth definition	Criteria used to map habitat
Important area	At sites around Townsville and Charters Towers, the Black-throated Finch (southern) is still considered locally common (BTF Recovery Team 2007). However, given that a reliable estimate of population size is currently not available, and that sightings have been infrequent in recent years (Barrett et al. 2003), recovery efforts should aim to conserve all existing populations of the Black-throated Finch (southern).	Areas within 5 km of a post-1995 record of the species. As extensive surveys haven't been undertaken to the guidelines in multiple seasons a precautionary approach will be taken, the entire area is mapped as an important area, assuming that the species will occur.
Nesting habitat	In the Townsville region the subspecies typically nest within 400 m of a water source and is rarely seen more than 1 km from permanent water during the breeding season (NRA 2005). Nesting sites also need to be near foraging	All remnant REs listed as essential habitat factors by DoR that occur within 1 km of permanent and seasonal water sources including watercourses, stock dams and wetlands. (Irrigation channels were not used as these are steep-sided channels with flowing water that do not present suitable drinking sites for the

Habitat	Commonwealth definition	Criteria used to map habitat
	<p>habitat as observations suggest that during the breeding season the subspecies travels smaller distances than it does during the dry season (Mitchell 1996; NRA 2006; NRA 2007). During the breeding season black-throated finches (southern) typically nest in trees located within 400 m of seasonal water sources (NRA 2007), therefore the presence of suitable trees close to seasonal water sources is critical for the black-throated finch (southern).</p>	<p>black-throated finch (southern). REs within a 10 km buffer relevant to the species include:</p> <ul style="list-style-type: none"> <li>– 9.12.1 <i>Eucalyptus crebra</i> and/or <i>E. xanthoclada</i> and/or <i>E. drepanophylla</i> low open woodland on igneous rocks</li> <li>– 9.12.4 <i>Eucalyptus shirleyi</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia peltata</i> and/or <i>Callitris intratropica</i> low open woodland on igneous rocks</li> <li>– 9.12.19 <i>Eucalyptus crebra</i> or <i>E. granitica</i> +/- <i>Corymbia citriodora</i> subsp. <i>citriodora</i> +/- <i>E. portuensis</i> mixed woodland on igneous hills</li> <li>– 9.12.22 <i>Eucalyptus drepanophylla</i>, <i>Corymbia clarksoniana</i> or <i>C. intermedia</i> and <i>C. dallachiana</i> woodland on steep rugged igneous ranges</li> <li>– 9.12.24 <i>Eucalyptus drepanophylla</i> or <i>E. crebra</i> and/or <i>E. xanthoclada</i> and <i>Corymbia peltata</i> woodland on igneous rocks</li> <li>– 11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> woodland on alluvial plains</li> <li>– 11.3.9 <i>Eucalyptus platyphylla</i>, <i>Corymbia spp.</i> woodland on alluvial plains</li> <li>– 11.3.10 <i>Eucalyptus brownii</i> woodland on alluvial plains</li> <li>– 11.3.12 <i>Melaleuca viridiflora</i>, <i>M. argentea</i> +/- <i>M. dealbata</i> woodland on alluvial plains</li> <li>– 11.3.13 <i>Grevillea striata</i> open woodland on coastal alluvial plains</li> <li>– 11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines</li> <li>– 11.3.27 Freshwater wetlands</li> <li>– 11.3.30 <i>Eucalyptus crebra</i>, <i>Corymbia dallachiana</i> woodland on alluvial plains</li> <li>– 11.3.33 <i>Eremophila mitchellii</i> open woodland on alluvial plains</li> <li>– 11.3.35 <i>Eucalyptus platyphylla</i>, <i>Corymbia clarksoniana</i> woodland on alluvial plains</li> <li>– 11.11.1 <i>Eucalyptus crebra</i> +/- <i>Acacia rhodoxylon</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding</li> <li>– 11.11.15 <i>Eucalyptus crebra</i> woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics</li> <li>– 11.12.1 <i>Eucalyptus crebra</i> woodland on igneous rocks</li> <li>– 11.12.9 <i>Eucalyptus platyphylla</i> woodland on igneous rocks</li> </ul>
Foraging habitat	<p>All remnant REs listed as essential habitat factors by DoR that occur within 3 km of permanent water sources including watercourses and stock dams.</p>	<p>All remnant REs with a native grassy understorey within 3 km of permanent water including watercourses and stock dams. REs within a 10 km buffer relevant to the species include:</p> <ul style="list-style-type: none"> <li>– 9.12.1 <i>Eucalyptus crebra</i> and/or <i>E. xanthoclada</i> and/or <i>E. drepanophylla</i> low open woodland on igneous rocks</li> <li>– 9.12.4 <i>Eucalyptus shirleyi</i> and/or <i>E. melanophloia</i> and/or <i>Corymbia peltata</i> and/or <i>Callitris intratropica</i> low open woodland on igneous rocks</li> <li>– 9.12.19 <i>Eucalyptus crebra</i> or <i>E. granitica</i> +/- <i>Corymbia citriodora</i> subsp. <i>citriodora</i> +/- <i>E. portuensis</i> mixed woodland on igneous hills</li> <li>– 9.12.22 <i>Eucalyptus drepanophylla</i>, <i>Corymbia clarksoniana</i> or <i>C. intermedia</i> and <i>C. dallachiana</i> woodland on steep rugged igneous ranges</li> <li>– 9.12.24 <i>Eucalyptus drepanophylla</i> or <i>E. crebra</i> and/or <i>E. xanthoclada</i> and <i>Corymbia peltata</i> woodland on igneous rocks</li> <li>– 11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> woodland on alluvial plains</li> </ul>

Habitat	Commonwealth definition	Criteria used to map habitat
		<ul style="list-style-type: none"> <li>– 11.3.9 <i>Eucalyptus platyphylla</i>, <i>Corymbia spp.</i> woodland on alluvial plains</li> <li>– 11.3.10 <i>Eucalyptus brownii</i> woodland on alluvial plains</li> <li>– 11.3.12 <i>Melaleuca viridiflora</i>, <i>M. argentea</i> +/- <i>M. dealbata</i> woodland on alluvial plains</li> <li>– 11.3.13 <i>Grevillea striata</i> open woodland on coastal alluvial plains</li> <li>– 11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines</li> <li>– 11.3.27 Freshwater wetlands</li> <li>– 11.3.30 <i>Eucalyptus crebra</i>, <i>Corymbia dallachiana</i> woodland on alluvial plains</li> <li>– 11.3.33 <i>Eremophila mitchellii</i> open woodland on alluvial plains</li> <li>– 11.3.35 <i>Eucalyptus platyphylla</i>, <i>Corymbia clarksoniana</i> woodland on alluvial plains</li> <li>– 11.11.1 <i>Eucalyptus crebra</i> +/- <i>Acacia rhodoxylon</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding</li> <li>– 11.11.15 <i>Eucalyptus crebra</i> woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics</li> <li>– 11.12.1 <i>Eucalyptus crebra</i> woodland on igneous rocks</li> <li>– 11.12.9 <i>Eucalyptus platyphylla</i> woodland on igneous rocks</li> </ul>

### 6.3.3 Desktop results

The black-throated finch (southern) was identified within the PMST (Appendix A) as having potential to occur within a 30 km radius from a central point within the Project area. Essential habitat for the species is mapped south-east, west, north and north-east of the Project area (Figure 6-3). A search of WildNet (Appendix A) reported 15 historical records within 30 km of the search coordinates.

### 6.3.4 Survey results

Two black-throated finch (southern) were confirmed present in the southern extent of Project area in very sparse open woodland with *Corymbia dallachiana* and *Corymbia tessellaris* present in low densities and isolated patches of *Carisa lanceolata* and heavily grazed stylo and *Chloris inflata*.

The species has been confirmed present within the Project area, under the Significant impact guidelines for the endangered black-throated finch, actions proposed within 5 km of confirmed records of the species within post-1995 will require habitat assessment. Where suitable habitat exists, the species should be considered present. Therefore the Project area is considered to be within 5 km of a record (i.e. black-throated finches are presumed to be present).

Foraging habitat for the black-throated finch (southern) occurs broadly across the Project area in woodland to open woodland occupied by *Corymbia*, *Eucalyptus* and *Melaleuca* species including *Eucalyptus platyphylla*, *Corymbia tessellaris*, *Corymbia dallachiana*, *Corymbia clarksoniana* and *Melaleuca viridiflora*. Grass species present across the Project footprint suitable for foraging by the black-throated finch are provided below in Table 6.9. The number of suitable grass species present is likely to be under-represented due to the dry conditions and lack of reproductive material present at the time of the survey.

Table 6.9 Black-throated finch foraging grasses within the Project area

Scientific name	Common name
<i>Aristida holathera</i>	Erect kerosine grass
<i>Bothriochloa bladonii</i> subsp. <i>bladonii</i>	Forest bluegrass
<i>Bothriochloa decipiens</i>	Pitted grass



Scientific name	Common name
* <i>Bothriochloa pertusa</i>	Indian bluegrass
* <i>Chloris gayana</i>	Rhodes grass
* <i>Chloris inflata</i>	Purpletop chloris
* <i>Dichanthium annulatum</i>	Sheda grass
* <i>Dichanthium aristatum</i>	Angleton grass
<i>Dichanthium sericeum subsp. sericeum</i>	Queensland bluegrass
<i>Enteropogon ramosus</i>	Twirly windmill grass
<i>Eragrostis sororia</i>	
<i>Eragrostis sp (indet)</i>	
<i>Eriochloa pseudoacrotricha</i>	Early spring cupgrass
<i>Eulalia aurea</i>	Silky browntop
<i>Heteropogon contortus</i>	Black speargrass
* <i>Melinis repens</i>	Red natal grass
<i>Oryza australiensis</i>	Australian wild rice
<i>Panicum decompositum</i>	Australian millet
<i>Sporobolus jacquemontii</i>	Rat's tail grass
<i>Themeda triandra</i>	Kangaroo grass
* <i>Urochloa mutica</i>	Para grass

Note: '\*' – introduced species

Water sources including stock dams, troughs and ephemeral watercourses and drainage lines were present across the Project area. Substantial areas were heavily degraded by cattle grazing and with areas of groundcover dominated by sida.

Foraging and nesting habitat has been identified and mapped in accordance with criteria defined on the basis of the habitat description outlined in the Commonwealth listing advice and locally occurring RE communities that are identified by the Queensland Government essential habitat mapping framework as essential habitat factors for the black-throated finch (southern).

In the order of 76.72 ha of nesting habitat and 40.77 ha of foraging habitat for the black-throated finch (southern) is present within the Project area.

The distribution of breeding and foraging habitat is mapped in Figure 6-3.



Plate 6.5 Black-throated finch recorded in the Project area

## 6.3.5 Significance of project footprint

This section assesses the significance of black-throated finch (southern) habitats within the Project area, whether they constitute habitat critical to the survival of the species, their importance in the context of the local population and whether the local population is important at a national level.

### 6.3.5.1 Status as an important population

At sites around Townsville and Charters Towers, the black-throated finch (southern) is still considered locally common (BTF Recovery Team 2007), and is therefore not considered an important population. However, given that a reliable estimate of population size is currently not available, and that sightings have been infrequent in recent years (Barrett et al. 2003), recovery efforts should aim to conserve all existing populations of the species.

### 6.3.5.2 Status as habitat critical to the survival of the species

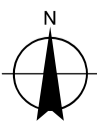
Habitat critical to the survival of the species has not been formally defined in the National Recovery Plan for the species (Black-throated finch Recovery Team 2007) or the Referral guidelines for the black-throated finch (southern) (DEWHA 2009). Habitat critical to the survival of the species is likely to include nesting habitat. In the Townsville region the black-throated finch (southern) typically nests within 400 m of a water source, and is rarely seen more than one km from permanent water during the breeding season (NRA 2006). Nesting sites also need to be near foraging habitat as observations suggest that during the breeding season the subspecies travels smaller distances than it does during the dry season (Mitchell 1996; NRA 2006; NRA 2007). The presence of suitable trees close to seasonal water sources is critical for the black-throated finch. For the purposes of this assessment, all suitable nesting habitat within 1 km of water has been considered habitat critical to the survival of the species.





Based on or contains data provided by the State of QLD 2021. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.

Paper Size ISO A3  
 0 1 2  
 Kilometres  
 Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 55



Townsville City Council  
 Houghton Pipeline Stage 2 - MNES Assessment  
**Distribution of potential black-throated finch (southern) habitat within and surrounding the Project area**

Project No. 12537606  
 Revision No. 0  
 Date 12/17/2021

**FIGURE 6-3**



## 6.3.6 Threatening processes

Threats to the black-throated finch (southern) include (DAWE 2021a):

- Degradation of habitat by domestic livestock
- Clearance and fragmentation of habitat
- Alteration of habitat by changes in fire regimes
- Invasion of habitat by invasive weeds
- Illegal trapping
- Predation by introduced predators
- Hybridisation with the northern subspecies of black-throated finch

## 6.3.7 Potential impacts

The Project is unlikely to have any substantial impact in terms of operational impacts to the black-throated finch, with negligible vehicular movements and maintenance occurring. Vehicle movements during operations are expected to be in the order of one to two light utility vehicles traversing designated access tracks once per week and impacts will be negligible.

Potential impacts to the black-throated finch that are likely to be experienced during the construction phase of the Project may include the following:

- Loss of habitat
- Injury and mortality
- Disturbance from increased light, noise and vibration
- Habitat degradation through increased dust, run-off and sedimentation
- Introduction and spread of invasive fauna species
- Introduction and spread of weed species
- Disturbance of surface waterways and waterbodies.

These impacts are described further in the following sections.

### 6.3.7.1 Loss of habitat

The Project area is considered an ‘important area’ under the Significant impact guidelines for the black-throated finch, as the entire Project area is considered to be 5 km from a post-1995 black-throated finch record. The Project is not expected to result in any loss artificial dams and wetlands that represent drinking sites for the species. The Project is anticipated to result in the loss of 117.49 ha of potential habitat critical to the survival of the species. Loss of habitat includes of 40.77 ha of foraging habitat, and 76.72 ha of nesting habitat. Nesting and foraging habitat is mapped broadly across the landscape in which the Project area is situated. Vegetation loss will be localised along a narrow linear alignment for the pipeline, with vegetation retained on both sides of the impact area. Indiscriminate clearing of trees in areas within 1 km of water is required in localised areas such as the pump station, stockpiles and other ancillary infrastructure. Loss of habitat for the black-throated finch (southern) is summarised in Table 6.10 according to habitat type and nature of impact. Rehabilitation commitments for the Project are outlined in Section 4.3, with the mitigation measures provided in Section 6.3.8.

Table 6.10 *Black-throated finch (southern) loss of habitat*

Habitat type	Temporary project footprint (ha)	Permanent project footprint (ha)	Total (ha)
Foraging	40.77	0	40.77
Nesting	43.61	33.11	76.72
<b>Total</b>	<b>84.38</b>	<b>33.11</b>	

### **6.3.7.2 Injury and mortality**

Vegetation clearance during construction of the Project will potentially cause injury and/or mortality to black-throated finch hatchlings during breeding. In the Townsville area, breeding typically occurs during the wet season, usually between February and May (DAWE 2021a).

### **6.3.7.3 Disturbance from increased light, noise and vibration**

Construction will result in a substantial, localised increase in vehicle movements in the short-term, which will increase light, noise and vibration disturbance to local wildlife. Increased light, noise and vibration can alter individual species' behaviours, and disrupt the balance of inter-species interactions. Such disruptions typically favour feral predators and generalist species that owe their success to broad ecological tolerances and possess the ability to tolerate or actively exploit disturbed environments (Hero et al. 2004).

### **6.3.7.4 Habitat degradation by increased dust, run-off and sedimentation**

Construction activities have the potential to generate localised dust, erosion, run-off and sedimentation through increased vehicle movements, clearance of vegetation and earthworks. This can reduce the abundance and diversity of adjacent terrestrial and aquatic habitats by physically smothering vegetation, changing nutrient levels, impeding the growth and germination of plant species, encouraging weed incursions and altering the movement and behaviour of fauna species.

The receiving environment has already been subject to high levels of erosion and sedimentation as a result of existing land-clearing and grazing activities. Nevertheless, sensitive ecological receptors (e.g. larger woodland remnants and aquatic habitats) are particularly susceptible to adverse impacts associated with dust, run-off, erosion and sedimentation. These areas require protection through the implementation of sediment and erosion control measures during construction.

Adverse weather conditions during construction can exacerbate the potential impact of erosion and sedimentation. High rainfall has the potential to remove exposed topsoil, destabilise creek beds and distribute sediment through creek lines. Strong winds have the potential to spread exposed topsoil, decreasing the likelihood of recolonisation by vegetation and potentially distributing dust into nearby sensitive environments.

### **6.3.7.5 Introduction and spread of pest fauna species**

Pest fauna species recorded within the Project area included the cat (*Felis catus*). The Commonwealth listing advice identifies predation by introduced predators as a key threat to the species (DAWE, 2021a). The Project is already subject to high levels of disturbance and cats and other introduced predators are likely to be ubiquitous in the landscape. While construction of new tracks can facilitate the movement of feral predators, the network of existing farm tracks is such that the Project is unlikely to exacerbate movement of feral animals across the Project area. Management measures will be incorporated to avoid increasing the abundance or distribution of introduced pests throughout the Project area as part of the Project's CEMP.

### **6.3.7.6 Introduction and spread of weed species**

The Project has the potential to adversely impact habitat for the black-throated finch (southern) by introducing or spreading exotic weed species. The species is reliant on a mosaic of different habitats in which it can find native grass seed during the wet season. As such, the introduction and spread of weeds, particularly exotic pasture grasses can substantially reduce the availability and quality of foraging habitat. Foraging habitat within the Project area is already highly degraded by weeds and grazing. The Project has the potential to exacerbate the loss through introduction and spread of weeds. Clearing native vegetation creates areas of disturbance that are naturally susceptible to colonisation by invasive weed species. These can form a local source of future weed infestations within the surrounding landscape.

### **6.3.7.7 Disturbance of surface waterways and waterbodies**

Construction activities within and/or in the vicinity of watercourses have the potential to cause degradation of riparian habitats through:

- Removal of riparian vegetation



- Run-off, sedimentation and erosion
- Point-source pollution (chemical and fuel spills)
- Disturbance associated with noise, vibration and/or artificial lighting.

The pipeline and associated haulage and access tracks intersect a number of ephemeral watercourses and drainage lines. The pump station, power supply works, and stockpile areas have been sited to minimise the number of water crossings; however, mapped watercourses and ephemeral creek lines are still located in close proximity to some of these project components. These areas are ecologically important for movement of wildlife, as habitat and drinking sites and are potentially susceptible to construction-related disturbance..

## 6.3.8 Measures to avoid, reduce or mitigate impacts

### 6.3.8.1 Loss of habitat

Planning phase measures that have been employed to avoid and reduce the direct loss of habitat include:

- Locating the Project footprint in open areas that have been subject to historical land clearing and cattle grazing
- Minimising impacts to watercourses
- Utilising existing tracks and locating proposed tracks within previously disturbed areas

During the construction phase of the Project, the following mitigation measures will be employed:

- Land clearing will be restricted to the minimal amount necessary for the construction of the Project and will not extend outside of the Project footprint
- The extent of vegetation clearing (and any no-go areas) will be clearly identified on construction plans and in the field using high visibility fencing or flagging in the vicinity of high conservation significant areas. Clearing extents will be communicated to construction supervisors
- Where infrastructure crosses waterways, the Project footprint has been minimised to a 20 m wide construction corridor
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed
- A CEMP will be prepared to inform actions with regards to managing weed hygiene, erosion, fuels and hazardous substances, fire, etc. and the CEMCP and ESCPs will include additional erosion and sediment control measures
- All construction personnel will attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vegetation clearing protocols. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions
- A large portion of the Project footprint will be revegetated with locally occurring grasses and trees and will therefore retain foraging and nesting habitat values for the black-throated finch.

### 6.3.8.2 Injury and mortality

While the black-throated finch (southern) hatchlings may be susceptible to injury and mortality during construction projects undertaken in the breeding season, the risks can be effectively managed using routine management measures targeted at the species. The following measures will be implemented to avoid/minimise injury and/or mortality to black-throated finch (southern) during construction of the Project:

- Pre-clearance surveys will specifically target areas of habitat identified within the clearing footprint. Pre-clearance surveys will be undertaken to mark the locations of potential breeding nests
- Vehicles to be restricted to 40 km/hr along access tracks
- All clearing will be supervised by suitably qualified and experienced fauna spotter-catchers. This will involve relocating any resident fauna to the nearest suitable, safe habitat outside the clearing footprint
- Where deemed necessary by the fauna spotter-catcher, temporary exclusion fencing may be required in specific areas of high ecological sensitivity to prevent wildlife from returning to work areas

- Adverse incident response procedures will be developed to detail actions to be taken in the event of wildlife injury or mortality during clearing
- A Traffic Management Plan, will be developed for the Project with designated access routes, speed limits and identified sensitive ecological areas (particularly areas where black-throated finch have the potential to nest and forage)
- The CEMP will comprise protocols to limit injury and mortality to fauna including management of risks associated with vegetation clearing, waterbodies and responses and reporting for adverse incident protocols
- A high risk SMP will be prepared in accordance with the requirements of Section 335 of the Nature Conservation (Animals) Regulation 2020.

### **6.3.8.3 Disturbance from increased light, noise and vibration**

Routine mitigation measures will be undertaken to minimise the impact that noise, light, vibration and disturbance have on local wildlife populations. This is particularly important within the vicinity of habitat for conservation significant fauna species, including the black-throated finch (southern). The following measures will be used to minimise the impacts of light, noise and vibration during construction:

- Site lighting will be kept to the minimum (security) required for safety. Placement and orientation of lighting to be directed away from sensitive fauna habitat. Direction of lighting beam downwards or use of shields and baffles to limit light spill beyond site boundary.
- Wherever practicable, construction activities will be limited to daylight hours to reduce the need for lighting and resultant light spill into adjacent habitat. However, it is noted that some of the road crossings may require night works for traffic management reasons.
- A Traffic Management Plan will be developed for the construction site to control vehicle movements and reduce the unnecessary generation of vehicular noise.
- All construction vehicles will comply with maintenance schedules and operational restrictions designed to limit noise impacts during construction.

### **6.3.8.4 Habitat degradation by increased dust, run-off and sedimentation**

The following mitigation measures will be used to minimise the impacts of dust, run off and sedimentation during construction of the Project:

- Erosion and sediment controls have been developed as part of the CESCOP and will be expanded on by the construction Contractor as part of their ESCPs.
- Routine dust suppression and monitoring will be undertaken throughout construction and operation.
- Duration of in-stream works will be minimised wherever practicable to reduce the potential for sedimentation.
- Erosion and sediment control measures will be installed where in-stream disturbance must be undertaken during flow conditions.
- Areas subject to clearing will be stabilised as soon as practicable.
- All vehicle movement will be restricted to designated tracks located within the Project footprint.
- Weather conditions will be monitored during the construction stage and temporary controls will be established during extreme weather events.
- Construction activities during adverse weather conditions will be managed in accordance with the CEMP
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed.

### **6.3.8.5 Introduction and spread of pest fauna species**

Although the Project area is already exposed to relatively high levels of pest infestation, mitigation measures will be required to limit any spread of pest fauna that could result from construction activities. The following mitigation measures will be used to minimise the introduction and spread of pest fauna and weed species during construction for the Project:

- Responsible waste management practices (e.g. not leaving out food waste and not feeding wildlife) will be implemented and followed by all construction personnel. All waste will be stored in secure temporary holding containers and transported off site
- Waste management actions to be included in the CEMP:
  - Requirements for details on the location and specifications for disposal and removal of waste from the construction site
  - All putrescible waste to be stored in secure temporary holding containers and transported off site
- As part of CEMP, the Project will implement feral pest control measures
- Construction staff will not bring domestic animals to the Project area
- All construction personnel shall attend environmental training as part of site inductions. As part of this training, all personnel will be instructed on their responsibilities related to avoiding and minimising the introduction/attraction to the construction site of pest animals.

### **6.3.8.6 Introduction and spread of weed species**

The following measures will be implemented to minimise the introduction and spread of weeds:

- Weed management actions are included in the CEMP and include:
  - Hygiene protocols restricting the movement of vegetation and soil between impacted areas and areas of significantly lower weed infestation.
  - Protocols for monitoring and management of weeds to identify and appropriately respond to significant changes in weed distribution and density
- All vehicles / equipment travelling from a declared restricted place or quarantine area will be required to wash down and possess a current weed hygiene inspection certificate before moving to a weed free area or commencing construction works onsite. The weed hygiene inspection certificate is to be obtained from an inspector who is deemed competent and is certified in line with DAF requirements.
- Vehicle access will be restricted to within the Project footprint and existing roads and tracks

### **6.3.8.7 Disturbance of surface waterways and waterbodies**

The following mitigation measures will be used to minimise the disturbance of waterways and waterbodies during construction of the Project:

- Wherever practicable, watercourse crossings have been located at established crossing points on existing access tracks. Where this is not practicable, the disturbance area is restricted to within the Project footprint.
- Erosion and sediment controls will be developed as part of the CESC and ESCPs.
- Dust suppression activities will be undertaken where appropriate. Stabilisation of disturbed areas will be undertaken as soon as practicable after disturbance.
- Rehabilitation of cleared areas adjacent to waterways will be undertaken as soon as practicable after completion of the pipe installation works.
- Refuelling will be undertaken away from waterways.
- Storage of fuels, chemicals, wastes and other potentially environmentally hazardous substances will be banded or otherwise contained areas away from waterways.
- Emergency response protocols and procedures will be developed as part of the CEMP for implementation in the event of a contaminant spill or leak and provision of spill response equipment.

## **6.3.9 Residual impacts on the black-throated finch (southern) and its' habitat**

A summary of the Project's potential impacts on the black-throated finch (southern) and mitigation measures is presented in Table 6.15. The risk ratings are presented in Appendix D.

Table 6.11 Residual impact assessment for the black-throated finch (southern)

Impact	Initial impact rating	Mitigation measures	Residual impact
<p>Habitat loss</p> <p>The Project will involve permanent and temporary loss of habitat.</p> <p>Loss of nesting habitat critical to the survival of the species:</p> <ul style="list-style-type: none"> <li>– Permanent nesting habitat loss – 33.11 ha</li> <li>– Temporary nesting habitat loss – 43.61 ha</li> </ul> <p>Loss of foraging habitat:</p> <ul style="list-style-type: none"> <li>– Permanent foraging habitat loss: 0 ha</li> <li>– Temporary foraging habitat loss: 40.77 ha</li> </ul>	Severe	<p>Utilise existing tracks where possible</p> <p>Land clearing restricted to minimal amount necessary and will not extend outside of the Project footprint</p> <p>Establishing no-go areas</p> <p>Where infrastructure crosses waterways existing disturbed areas to be selected where possible</p> <p>Rehabilitation will be undertaken for all areas within 400 m of a water source (with exception to 4 m access road) will be undertaken, these measures will involve hydro mulching and sowing of grass seeds suitable for foraging by the black-throated finch (southern). Rehabilitation will be undertaken as soon as practicable</p> <p>Planting of 43.61 ha of tubestock <i>E. platyphylla</i> trees representing potential nesting habitat</p> <p>Reinstatement and natural regeneration of vegetation of areas beyond 400 m of a water source within the pipeline alignment</p> <p>Preparation of a CEMP</p>	High
Injury or mortality due to vegetation clearing	Severe	<p>Employ a fauna spotter catcher during clearing.</p> <p>Reduce speed limits within areas of potential habitat</p> <p>Allow a fauna spotter catcher to walk through clearing footprints prior to clearing.</p> <p>Identify areas of potential habitat with signage and flagging tape.</p>	Moderate
Habitat fragmentation and reduced connectivity	High	<p>Rehabilitation will be undertaken for all areas within 400 m of a water source (with exception to 4 m access road) will be undertaken, these measures will involve hydro mulching and sowing of grass seeds suitable for foraging by the black-throated finch (southern).</p> <p>Planting of 43.61 ha of <i>E. platyphylla</i> tubestock representing potential nesting habitat for the species</p> <p>Reinstatement and natural regeneration of vegetation in areas beyond 400 m of a water source within the pipeline alignment</p>	Moderate
Disturbance from increased light, noise and vibration	Moderate	<p>Restricted sources of artificial lighting.</p> <p>Direct lighting away from sensitive areas for the species</p>	Low

Impact	Initial impact rating	Mitigation measures	Residual impact
Habitat degradation through increased dust, run-off and sedimentation.	High	<p>Reduce duration of works in watercourses and drainage lines.</p> <p>Monitor weather events when working within watercourses.</p> <p>Reduce speed limits during dry conditions or employ water truck to reduce dust rates.</p>	Moderate
Introduction and spread of invasive fauna and weed species	High	<p>Implement measures for introduced flora and fauna (to be outlined in the CEMP).</p> <p>Require construction vehicles to hold valid weed free declarations prior to the commencement of construction works.</p> <p>Educate staff on the impacts of weeds and their general environmental obligation.</p> <p>Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area.</p>	Moderate
Disturbance of surface waterways and waterbodies.	High	<p>Reduce duration of works in watercourses and drainage lines.</p> <p>Monitor weather events when working within watercourses.</p> <p>Reduce speed limits during dry conditions to reduce dust generation and potential sedimentation.</p>	Low



## 6.3.10 Significance of impact assessment

An assessment of the significance of the Project's impacts on the black-throated finch(southern) was undertaken against the thresholds detailed in the Significant impact guidelines for the black-throated finch (southern) (DEWHA 2009) presented in Table 6.12 and against the criteria outlined in the Significant Impact Guidelines 1.1 (DoE 2013), presented in Table 6.13.

Table 6.12 Significance of impact on black-throated finch (southern) assessed against criteria outlined in DEWHA 2009

Impact criteria	Potential to occur
Net loss or degradation of water sources (either permanent or seasonal) in the locality	<p><b>Unlikely</b></p> <p>The Preliminary route selection has been sited to avoid net loss of water sources for the species. The pipeline and access tracks intersect a number of ephemeral watercourses and drainage lines, during the construction phase of the pipeline and access tracks, impacts to ephemeral watercourses may result in degradation of watercourses. However, these impacts will be temporary and localised, mitigation measures will be implemented including erosion and sediment controls, rehabilitation of cleared areas adjacent to waterways, dust suppression and stabilisation of disturbed areas. No net loss or degradation of water sources will result from the operational phase of the project. Accordingly, the Project is unlikely to result in a net loss of water sources in the locality.</p>
Widespread or indiscriminate loss of trees, including known nest trees within one km of a water source	<p><b>Likely</b></p> <p>Loss of trees will be localised along a narrow linear alignment, with trees and grasses retained on both sides of the pipeline. As the project largely intersects open woodland habitat, where the density of trees is low – vegetation clearing will result in small losses of trees in any local area. The construction of the Project will impact 76.72 ha of nesting habitat critical to the survival of the species. The Project is committed to rehabilitation of vegetation to reduce the impact of the Project on black-throated finch (southern) nesting habitat. Planting of 43.61 ha of <i>E. platyphylla</i> tubestock will be undertaken in areas of the Project footprint, while this does not completely offset the loss of nesting habitat, the permanent loss of nesting habitat critical to the survival of the species has been reduced to 33.11 ha. While the Project will result in the permanent loss of 33.11 ha of potential nesting habitat, most of this represents a targeted loss of individual trees within the linear corridor, which due to the retention of trees adjacent to the pipeline would not constitute indiscriminate loss of potential nesting resources. Despite this, locally concentrated clearing of two stockpiles (one at the southern end of McMullen Road and one at the southern end of the pipeline) and the pump station site will result in the indiscriminate clearing of trees within 1 km of water. This will account for a localised loss of 13.2 ha of potential nesting habitat, which would constitute habitat critical to the survival of the species. This clearing would result in an indiscriminate loss of trees within 1 km of water and would still result in a significant impact on the species.</p>
A decrease in tree recruitment capacity which limits the area's ability to be self-sustaining	<p><b>Unlikely</b></p> <p>The Project will result in the localised loss of trees within the Project footprint and will not limit the potential for tree recruitment immediately adjacent to the pipeline, stockpiles, access tracks, pump station and power supply areas.</p>
The degradation of foraging habitat (grassland) where known black throated finch (southern) records exist, including the intensification of biomass reduction or stocking rates.	<p><b>Unlikely</b></p> <p>The Project will result in the temporary loss of 40.77 ha of potential foraging habitat for the species. The Project will involve temporary disturbance areas (i.e. pipeline construction corridor, access and haulage tracks and stockpile areas) and permanent disturbance areas (i.e. buried pipeline, 4 m wide pipeline access road, pump station, intake structure, substation and power supply works). The degradation of foraging habitat for temporary disturbance areas will be hydromulched with native seeds suitable for foraging by the species, with other areas also reinstated for natural regeneration of vegetation for foraging value for the black-throated finch. Accordingly, after rehabilitation, the Project will not result in any permanent loss of foraging habitat. Land clearing will be restricted to the minimal amount necessary for the construction of the Project and will not extend outside of the Project footprint. The clearing of foraging habitat in these areas is unlikely to result in degradation and the substantial intensification of biomass reduction or stocking rates. The construction of the Project is unlikely to result in the degradation of foraging habitat where known black-throated finch (southern) records exist.</p>

Table 6.13 Significance of impact on black-throated finch (southern) assessed against criteria outlined in DoE 2013

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	Response
Lead to a long-term decrease in the size of a population of a species; or	<p><b>Unlikely</b></p> <p>The Project will result in the loss of 76.72 ha of potential nesting habitat for the species. To reduce impact to nesting habitat, the Project is committed to rehabilitation measures, these include planting of 43.61 ha of <i>E. platyphylla</i> tubestock across the Project footprint, representing potential nesting habitat for the species. Accordingly, the Project will result in the permanent loss of 33.11 ha of nesting habitat and temporary loss of 43.61 ha of nesting habitat, most of this represents a temporary and targeted loss of individual trees within a linear pipeline corridor. Retention of trees within the surrounding areas would provide ongoing nesting resources for the species. Localised loss of potential nesting habitat are associated with temporary clearing of laydown areas which will be revegetated after construction. While clearing of trees within the pump station will cause a local adverse impact on habitat critical to the survival of the species, the small scale of impact is unlikely to have implications at a population level.</p>
Reduce the area of occupancy of the species; or	<p><b>Unlikely</b></p> <p>As detailed above, loss of habitat critical to the survival of the species is mostly attributed to a linear footprint in a landscape in which habitats are broadly available. Suitable nesting habitat is abundant in the surrounding region. The scale of the impact is unlikely to cause the species to disappear from an area of sufficient size to reduce the area of occupancy of the species at the scale measured by the IUCN (i.e. from a 2 km x 2 km area).</p>
Fragment an existing population into two or more populations; or	<p><b>Unlikely</b></p> <p>Clearing of habitat will occur within a narrow footprint, with no broad-scale fragmentation of habitat resulting or barriers to movement imposed. Localised clearance of habitat will not restrict ongoing access to riparian habitats or the capacity for the species to move between habitats within the region.</p>
Adversely affect habitat critical to the survival of a species; or	<p><b>Likely</b></p> <p>As detailed above, a series of targeted measures have been undertaken to reduce the loss of nesting habitat through strategic replanting of <i>E. platyphylla</i> and hydromulching with a mix of native food grass species for the black-throated finch (southern). As detailed in Table 6.10, the Project will result in the temporary loss of 43.61 ha and the permanent loss of 33.11 ha of nesting habitat critical to the survival of the species. The temporary loss of habitat includes 13.2 ha of locally concentrated clearing (at two stockpile locations and the pump station site) that would result in locally indiscriminate but temporary loss of nesting resources. This loss of nesting habitat would constitute a significant adverse impact on habitat critical to the survival of the species.</p>
Disrupt the breeding cycle of a population; or	<p><b>Possible</b></p> <p>As detailed above and in Table 6.10, the Project will result in the loss of 76.72 ha of nesting habitat critical to the survival of the species. Taking into account the rehabilitation measures committed by the Project to reduce impacts to the species, the Project will result in the temporary loss of 43.61 ha and permanent loss of 33.11 ha of nesting habitat. The loss of habitat is localised and forms a small proportion of nesting resources available within the surrounding landscape. While 56% of the impact is temporary and can be minimised in the long-term through rehabilitation measures, the loss could disrupt the breeding cycle of the local black-throated finch (southern) population in the short term.</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; or	<p><b>Unlikely</b></p> <p>The Project will remove up to 76.72 ha of potential nesting habitat critical to the survival of the species. Taking into account the rehabilitation measures committed by the Project, the Project will result in the temporary loss of 43.61 ha and permanent loss of 33.11 ha of nesting habitat. The loss of habitat is from a relatively narrow footprint, within a broader landscape in which suitable nesting habitat is widely available. Large parts of the Project area will be revegetated after construction. The localised loss of potential nesting and foraging habitat is not likely to impact the species' survival in the region. As such, it is unlikely the Project will modify, destroy, remove, isolate or</p>

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	Response
	decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat; or	<p><b>Unlikely</b></p> <p>The Project area is already subject to high levels of weed infestation that would reduce the value of foraging habitats. While land clearing and construction activities have the potential to exacerbate weed infestations, implementation of a site-specific CEMP will control the potential for weed spread. Mitigation areas will be rehabilitated and sown with native grass species using a mix of species to maximise food availability for the black-throated finch (southern). As such, the Project is not expected to result in invasive species that are harmful to the black-throated finch (southern) becoming established in the species habitat.</p>
Introduce disease that may cause the species to decline; or	<p><b>Unlikely</b></p> <p>The black-throated finch (southern) is not known to be adversely affected by any disease. Hygiene protocols during clearing will limit any potential for novel diseases.</p>
Interfere substantially with the recovery of the species.	<p><b>Unlikely</b></p> <p>While the Project will result in a localised loss of potential nesting habitat, this is not at a scale that would interfere substantially with the recovery of the species.</p>

### 6.3.11 Conclusion

While the mitigation measures have substantially reduced the impact to the species, residual impacts on potential nesting habitat remain with a permanent loss of 33.11 ha of potential nesting habitat that would constitute habitat critical to the survival of the species. Accordingly, the Project is considered **likely** to have a significant impact on the black-throated finch (southern).

## 6.4 Squatter pigeon (southern)

### 6.4.1 Conservation status and documentation

The squatter pigeon (southern) is listed as Vulnerable under the EPBC Act.

Its current distribution extends from central Queensland, west to Longreach and Charleville, and south to New South Wales (TSSC 2015). The species occurs in remnant and regrowth open forest and woodland dominated by *Eucalyptus*, *Corymbia*, *Acacia* and *Callitris* species with tussock grassy understorey within 3 km of water sources (TSSC 2015). Soils are generally a good predictor of their foraging and breeding habitat, which is generally restricted to well-draining, gravelly, sandy or loamy soils. These typically have a patchy ground layer composed of native perennial tussock grasses or a mix of native perennial tussock grasses and low shrubs or forbs (Squatter Pigeon Workshop 2011).

Breeding habitats are typically on stony rises within 1 km of permanent water (Squatter Pigeon Workshop 2011). In Queensland, the Commonwealth listing advice specifically nominates RE Land Zone 5 (well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills) and RE Land Zone 7 (lateritic (duplex) soils on low 'jump-ups' and escarpments) as suitable foraging and breeding habitat for the species. Ground-level vegetation is typically patchy with vegetation cover rarely exceeding 33 percent (Squatter Pigeon Workshop 2011). Waterbodies that are suitable for the squatter pigeon (southern) occur on RE land zones 10, 3 and 4 (DAWE 2021a). Hence, where natural foraging or breeding habitat occurs (i.e. on RE Land Zones 5 and 7), the squatter pigeon (southern) may be found in vegetation types growing on the above soil types (DAWE 2021a).

### 6.4.2 Criteria used to map squatter pigeon (southern) habitat

**Commonwealth habitat definition:** Squatter Pigeon (southern) habitat is generally defined as open-forests to sparse, open-woodlands and scrub that are (Baldwin 1975; Beruldsen 1972; Cooper et al. 2014; EPA 2006; Frith 1982b; Leach 1988; North 1913-14; Squatter Pigeon Workshop 2011):

- Mostly dominated in the overstorey by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species
- Remnant, regrowth or partly modified vegetation communities, and
- Within 3 km of water bodies or courses.

Soil landscapes are good indicators of where natural, foraging and breeding habitats for the Squatter Pigeon (southern) occur (Squatter Pigeon Workshop 2011). Well-draining, gravelly, sandy or loamy soils support the open-forest to woodland communities with patchy, tussock-grassy understories that support the subspecies' foraging and breeding requirements. Given that the subspecies nests in shallow depressions in the ground, it requires well-draining soils.

Table 6.14 Criteria used to map squatter pigeon (southern) habitat

Habitat	Commonwealth definition	Criteria used to map habitat
Critical to survival of the species	Habitat critical to the survival of the squatter pigeon (southern) has not been formally defined in the Commonwealth listing advice for the species. In the absence of a formal definition, the definition outlined in the Significant impact guidelines 1.1 applies.	All foraging and breeding habitat (as defined below) was considered habitat critical to the survival of the species.

Habitat	Commonwealth definition	Criteria used to map habitat
Foraging	<p>Natural foraging habitat for the Squatter Pigeon (southern) is any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by <i>Eucalyptus</i>, <i>Corymbia</i>, <i>Acacia</i> or <i>Callitris</i> species, on sandy or gravelly soils, within 3 km of a suitable, permanent or seasonal waterbody (Squatter Pigeon Workshop 2011). In Queensland, Squatter Pigeon (southern) foraging and breeding habitat is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills (i.e. Queensland Regional Ecosystem Land Zone 5), and lateritic (duplex) soils on low 'jump-ups' and escarpments (i.e. Queensland Regional Ecosystem Land Zone 7) (Squatter Pigeon Workshop 2011). Clay soils usually support denser vegetation types which the Squatter Pigeon (southern) is unlikely to use as foraging or breeding habitat. However, given that clay soil types tend to form in lower lying areas where the drainage and storage of water naturally occurs in the landscape, the subspecies is known to utilise forests or woodlands occurring on these soils to move between patches of foraging or breeding habitat and suitable waterbodies (Squatter Pigeon Workshop 2011).</p>	<p>Any remnant and regrowth REs listed as essential habitat factor by DoR within 3 km of permanent or seasonal waterbodies (including watercourses, irrigation channels, stock dams and natural wetlands) on suitable soil (i.e. land zone 5 or 7 RE as included in the listing advice and also any land zone 10 and 11). REs within a 10 km buffer relevant to the species include:</p> <ul style="list-style-type: none"> <li>- 11.11.1 <i>Eucalyptus crebra</i> +/- <i>Acacia rhodoxylon</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding</li> <li>- 11.11.15 <i>Eucalyptus crebra</i> woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics</li> </ul>
Breeding	<p>Breeding habitat occurs on stony rises occurring on sandy or gravelly soils, within 1 km of a suitable, permanent waterbody (Squatter Pigeon Workshop 2011).</p>	<p>Breeding habitat: Any remnant or regrowth RE that is listed as an essential habitat factor and occurs on suitable soil (i.e. land zone 5 or 7 RE as included in the listing advice and also land zone 10 and 11) within 1 km of permanent or seasonal waterbodies (including watercourses, irrigation channels, stock dams and wetlands). REs within a 10 km buffer relevant to the species include:</p> <ul style="list-style-type: none"> <li>- 11.11.1 <i>Eucalyptus crebra</i> +/- <i>Acacia rhodoxylon</i> woodland on old sedimentary rocks with varying degrees of metamorphism and folding</li> <li>- 11.11.15 <i>Eucalyptus crebra</i> woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics</li> <li>-</li> </ul>



Habitat	Commonwealth definition	Criteria used to map habitat
Drinking and dispersal	<p>The Squatter Pigeon (southern) is known to access suitable waterbodies to drink on a daily basis. Waterbodies suitable for the subspecies include permanent or seasonal rivers, creeks, lakes, ponds and waterholes, and artificial dams. Waterbodies that are suitable for the subspecies occur on the lower, gentle slopes and plateaus of sandstone ranges (equivalent to Queensland Regional Ecosystem Land Zone 10), alluvial clay soils on river or creek flats (represented by Queensland Regional Ecosystem Land Zone 3) or non-alluvial clay soils on flats or plains which are not associated with current alluvial deposits (represented by Queensland Regional Ecosystem Land Zone 4). Hence, where natural foraging or breeding habitat occurs (i.e. on Queensland Regional Ecosystem Land Zones 5 and 7), the Squatter Pigeon (southern) may be found in vegetation types growing on the above soil types. Squatter Pigeon (southern) dispersal habitat is any forest or woodland occurring between patches of foraging or breeding habitat, and suitable waterbodies. Such patches of vegetation tend not to be suitable for the subspecies' foraging or breeding but facilitate the local movement of the subspecies between patches of foraging habitat, breeding habitat and/or waterbodies, or the wider dispersal of individuals in search of reliable water sources during the dry season or during droughts (Squatter Pigeon Workshop 2011). Clay soils usually support denser vegetation types which the Squatter Pigeon (southern) is unlikely to use as foraging or breeding habitat. However, given that clay soil types tend to form in lower lying areas where the drainage and storage of water naturally occurs in the landscape, the subspecies is known to utilise forests or woodlands occurring on these soils to move between patches of foraging or breeding habitat and suitable waterbodies (Squatter Pigeon Workshop 2011). The subspecies is unlikely to move far from woodland trees which provide protection from predatory birds (Squatter Pigeon Workshop 2011). Where scattered trees still occur, and the distance of cleared land between remnant trees or patches of habitat does not exceed 100 m, individuals may be found foraging in, or moving across modified or degraded environments (Squatter Pigeon Workshop 2011).</p>	<p>Any remnant or regrowth landzone 3 RE that is listed as an essential habitat for the species by DoR or areas of non-remnant that occur within 100 m of foraging or breeding habitat. REs within 10 km buffer include:</p> <ul style="list-style-type: none"> <li>– 11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains</li> <li>– 11.3.7 <i>Corymbia</i> spp. open woodland on alluvial plains</li> <li>– 11.3.9 <i>Eucalyptus platyphylla</i>, <i>Corymbia</i> spp. woodland on alluvial plains</li> <li>– 11.3.10 <i>Eucalyptus brownii</i> woodland on alluvial plains</li> <li>– 11.3.12 <i>Melaleuca viridiflora</i>, <i>M. argentea</i> +/- <i>M. dealbata</i> woodland on alluvial plains</li> <li>– 11.3.13 <i>Grevillea striata</i> open woodland on coastal alluvial plains</li> <li>– 11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines</li> <li>– 11.3.27 Freshwater wetlands</li> <li>– 11.3.30 <i>Eucalyptus crebra</i>, <i>Corymbia dallachiana</i> woodland on alluvial plains</li> <li>– 11.3.35 <i>Eucalyptus platyphylla</i>, <i>Corymbia clarksoniana</i> woodland on alluvial plains</li> </ul>

### 6.4.3 Desktop results

The squatter pigeon was not identified within the PMST (Appendix A) as having potential to occur within a 30 km radius from a central point within the Project area. A search of WildNet (Appendix A) reported 13 historical records within 30 km of the search coordinates.

### 6.4.4 Survey results

Ten squatter pigeons were confirmed present across the Project area and surrounds in open woodland to very sparse open woodland or highly disturbed pastures for cattle grazing. Squatter pigeons were recorded within 1 km of permanent or seasonal waterbodies and near tussocky grasses.

Drinking and dispersal habitat for the squatter pigeon occurs broadly across the Project area in open woodland and pastures occupied by tussocky grass species nearby permanent or seasonal waterbodies including ephemeral watercourses and drainage lines, stock dams, irrigation channels and wetlands. The squatter pigeon was also recorded in areas heavily degraded by cattle grazing. Substantial groundcover in the mid-north section of the Project area were dominated by dense *Sida spp.*, rendering the habitat unsuitable for the squatter pigeon (southern).

Foraging, nesting and drinking and dispersal habitat has been identified and mapped in accordance with criteria defined on the basis of the habitat description outlined in the Commonwealth listing advice and locally occurring RE communities that are identified by the Queensland Government essential habitat mapping framework as essential habitat factors for the squatter pigeon (southern).

No suitable breeding habitat or foraging habitat for the squatter pigeon (southern) is present within the Project area. 120.74 ha of drinking and dispersal habitat is present within the Project footprint.

The distribution of breeding and foraging habitat is mapped in Figure 6-4.



Plate 6.6 *Squatter pigeons recorded adjacent to the Project area*

### 6.4.5 Significance of project footprint

This section assesses the significance of squatter pigeon (southern) habitats within the Project area, whether they constitute habitat critical to the survival of the species, their importance in the context of the local population and whether the local population is important at a national level.

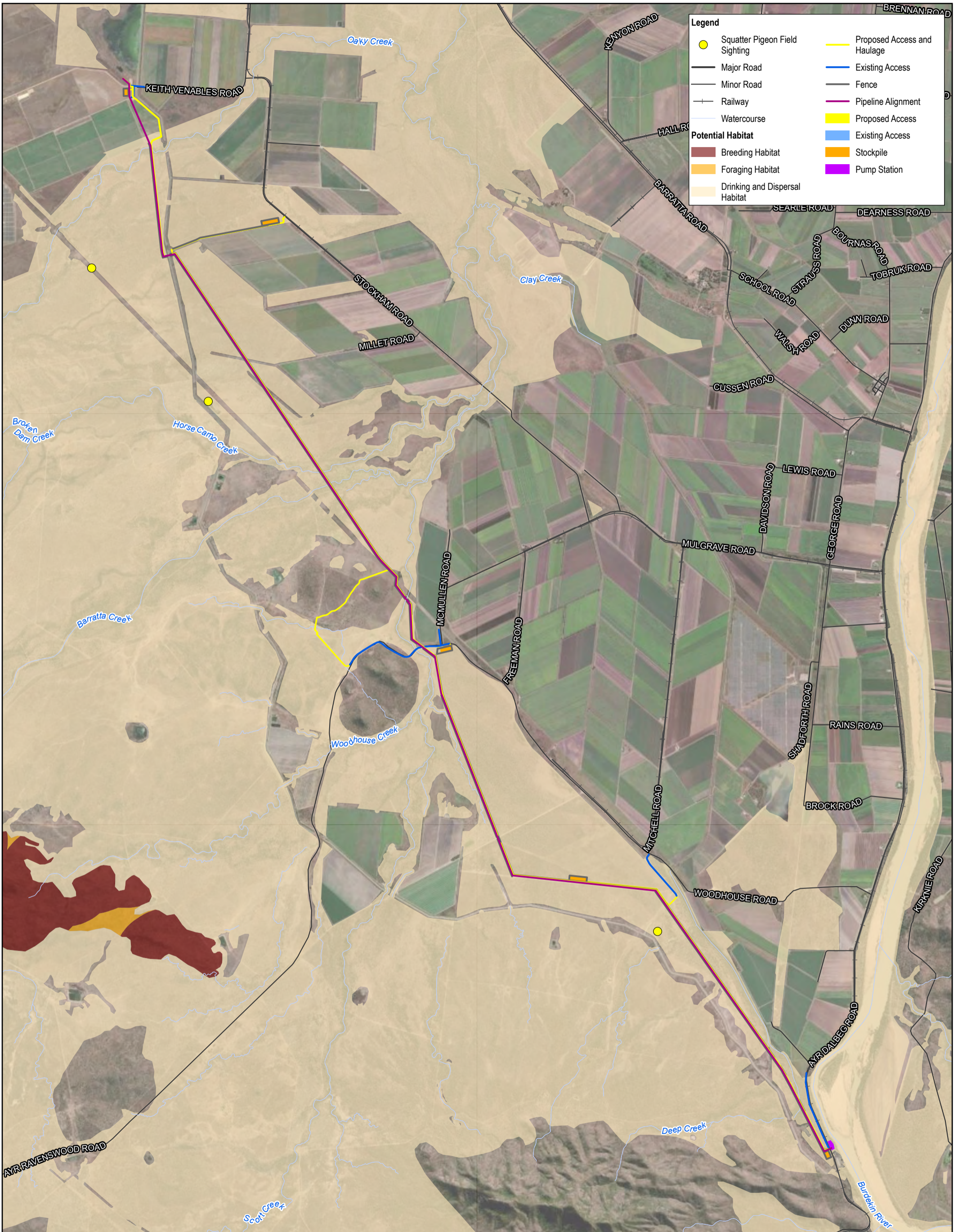
#### 6.4.5.1 Status as an important population

The Project area is not south of the Carnarvon Ranges and not near the edge of the sub-species' known range. The local population is not an important population under the definition outlined in the EPBC Act.

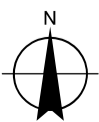
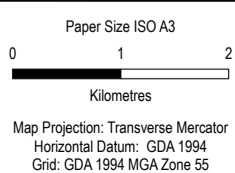
#### **6.4.5.2 Habitat critical to the survival of the species**

Habitat critical to the survival of the squatter pigeon (southern) has not been formally defined in the Commonwealth listing advice for the species. In the absence of a formal definition, the definition outlined in the Significant impact guidelines 1.1 applies. 'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary: for activities such as foraging, breeding, roosting, or dispersal; for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators); to maintain genetic diversity and long term evolutionary development, or; for the reintroduction of populations or recovery of the species or ecological community. In that context, habitat critical to the survival of the squatter pigeon (southern) would include all foraging, breeding, roosting or dispersal habitat necessary for maintaining the viability of important populations. Important populations of the squatter pigeon (southern) are nominated in the listing advice as those occurring at the southern extent of the species range, including all small and sparsely distributed sub-populations south of Carnarvon Range (Squatter Pigeon Workshop 2011). While local habitats for the squatter pigeon (southern) should be protected from impact, they would not constitute habitat critical to the survival of the species.





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Townsville City Council  
Haughton Pipeline Stage 2 - MNES Assessment

**Distribution of potential squatter pigeon (southern) habitat within and surrounding the Project area**

Project No. 12537606  
Revision No. 0  
Date 12/17/2021

**FIGURE 6-4**



## 6.4.6 Threatening processes

Squatter pigeon populations have declined rapidly during the late 19<sup>th</sup> and early 20<sup>th</sup> centuries in southern Queensland, as much of its original habitat has been replaced with improved pastures for cattle grazing (Cooper et al., 2014; Higgins & Davies, 1996; Garnett & Crowley, 2000 in TSSC, 2015). The TSSC (2015) lists a large range of current threats including ongoing vegetation clearance and fragmentation, loss of habitat through overgrazing by livestock and feral herbivores, such as rabbits, introduction of weeds, inappropriate fire regimes, thickening of understorey vegetation, predation by feral cats and foxes, trampling of nests by domestic stock and illegal shooting.

## 6.4.7 Potential impacts

The Project is unlikely to have any substantial impact in terms of operational impacts to the squatter pigeon, with negligible vehicular movements and maintenance occurring. Vehicle movements during operations are expected to be in the order of one to two light utility vehicles traversing designated access tracks once per week and impacts will be negligible.

Potential impacts to the squatter pigeon that are likely to be experienced during the construction phase of the Project may include the following:

- Loss of habitat
- Injury and mortality
- Disturbance from increased light, noise and vibration
- Habitat degradation through increased dust, run-off and sedimentation
- Introduction and spread of invasive fauna species
- Introduction and spread of weed species
- Disturbance of surface waterways and waterbodies.

These impacts are described further in the following sections.

### 6.4.7.1 Loss of habitat

The Project is not expected to result in any loss of breeding or foraging habitat or artificial dams that represent drinking sites for the species. The Project is anticipated to result in the loss of 120.74 ha of drinking and dispersal habitat, which represents a loss of 2.6 percent of habitat within a 1 km radius of the Project area and 0.025 percent of habitat within a 10 km radius. The loss of habitat is small in the context of the local and regional landscape. Temporary disturbance areas where habitat is impacted by the construction phase of the project for the pipeline will be reinstated and rehabilitated, therefore the loss in these areas is not permanent. Within the Project area, the squatter pigeon already utilises habitats that have been subject to a high level of disturbance, occurring in sparse, modified grassland and open woodland habitats, where connectivity is loosely maintained to larger open woodland remnants and water sources.

### 6.4.7.2 Injury and mortality

Vegetation clearance during construction of the Project will potentially cause injury and/or mortality to squatter pigeons sheltering within ground-level microhabitats. Increased vehicular movements during the construction phase will also increase the risk of injury and mortality, due to the squatter pigeon's sedentary nature and habit of foraging on access tracks.

### 6.4.7.3 Disturbance from increased light, noise and vibration

Construction will result in a substantial, localised increase in vehicle movements in the short-term, which will increase light, noise and vibration disturbance to local wildlife. Increased light, noise and vibration can alter individual species' behaviours, and disrupt the balance of inter-species interactions. Such disruptions typically favour feral predators and generalist species that owe their success to broad ecological tolerances and possess the ability to tolerate or actively exploit disturbed environments (Hero et al. 2004).



#### **6.4.7.4 Habitat degradation by increased dust, run-off and sedimentation**

Construction activities have the potential to generate localised dust, erosion, run-off and sedimentation through increased vehicle movements, clearance of vegetation and earthworks. This can reduce the abundance and diversity of adjacent terrestrial and aquatic habitats by physically smothering vegetation, changing nutrient levels, impeding the growth and germination of plant species, encouraging weed incursions and altering the movement and behaviour of fauna species.

The receiving environment has already been subject to high levels of erosion and sedimentation as a result of existing land-clearing and grazing activities. Nevertheless, sensitive ecological receptors (e.g. larger open woodland remnants and aquatic habitats) are particularly susceptible to adverse impacts associated with dust, run-off, erosion and sedimentation. These areas require protection through the implementation of sediment and erosion control measures during construction.

Adverse weather conditions during construction can exacerbate the potential impact of erosion and sedimentation. High rainfall has the potential to remove exposed topsoil, destabilise creek beds and distribute sediment through creek lines. Strong winds have the potential to spread exposed topsoil, decreasing the likelihood of recolonisation by vegetation and potentially distributing dust into nearby sensitive environments.

#### **6.4.7.5 Introduction and spread of pest fauna species**

Pest fauna species recorded within the Project area included cat (*Felis catus*). The Commonwealth listing advice identifies predation by cats and foxes and to a lesser extent, dingos, birds of prey and snakes as key threats to the species (DAWE, 2021a). The Project is already subject to high levels of disturbance and cats and potentially foxes are likely to be ubiquitous in the landscape. The Commonwealth listing advice also identifies overgrazing of habitat by livestock and feral herbivores such as rabbits as a key threat to the species (DAWE 2021a). The project is already subject to ongoing grazing pressure within the Project area by cattle. While construction of new tracks can facilitate the movement of feral predators, the network of existing farm tracks is such that the Project is unlikely to exacerbate movement of feral animals across the Project area. Management measures will be incorporated to avoid increasing the abundance or distribution of introduced pests throughout the Project area as part of the Project's CEMP.

#### **6.4.7.6 Introduction and spread of weed species**

The Project has the potential to adversely impact habitat for the squatter pigeon (southern) by introducing or spreading exotic weed species. The squatter pigeon is reliant on foraging habitat within native tussocky grasses. As such, the introduction and spread of weeds, particularly exotic pasture grasses can substantially reduce the availability and quality of foraging habitat. Foraging habitat within the Project area is already highly degraded by weeds. The Project has the potential to exacerbate the loss through introduction and spread of weeds. Clearing native vegetation creates areas of disturbance that are naturally susceptible to colonisation by invasive weed species. These can form a local source of future weed infestations within the surrounding landscape.

#### **6.4.7.7 Disturbance of surface waterways and waterbodies**

Construction activities within and/or in the vicinity of watercourses have the potential to cause degradation of riparian habitats through:

- Removal of riparian vegetation
- Run-off, sedimentation and erosion
- Point-source pollution (chemical and fuel spills)
- Disturbance associated with noise, vibration and/or artificial lighting.

The pipeline and associated haulage and access tracks intersect a number of ephemeral watercourses and drainage lines. The pump station, power supply works, and stockpile areas have been sited to minimise the number of water crossings; however, mapped watercourses and ephemeral creek lines are still located in close proximity to some of these project components. These areas are ecologically important for movement of wildlife, as habitat and drinking sites and are potentially susceptible to construction-related disturbance..

## 6.4.8 Measures to avoid, reduce or mitigate impacts

### 6.4.8.1 Loss of habitat

Planning phase measures that have been employed to avoid and reduce the direct loss of habitat include:

- Locating the Project footprint in open areas that have been subject to historical land clearing and cattle grazing
- Minimising impacts to watercourses
- Utilising existing tracks and locating proposed tracks within previously disturbed areas

During the construction phase of the Project, the following mitigation measures will be employed:

- Land clearing will be restricted to the minimal amount necessary for the construction of the Project and will not extend outside of the Project footprint
- The extent of vegetation clearing (and any no-go areas) will be clearly identified on construction plans and in the field using high visibility fencing or flagging in the vicinity of high conservation significant areas. Clearing extents will be communicated to construction supervisors
- Where infrastructure crosses waterways, the Project footprint has been minimised to a 20 m wide construction corridor
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed
- A CEMP will be prepared to inform actions with regards to managing weed hygiene, erosion, fuels and hazardous substances, fire, etc. and the CESCOP and ESCPs will include additional erosion and sediment control measures
- All construction personnel will attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vegetation clearing protocols. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions
- A large portion of the Project footprint will be revegetated with locally occurring grasses and will therefore retain habitat values for the squatter pigeon.

### 6.4.8.2 Injury and mortality

While the squatter pigeon (southern) is susceptible to injury and mortality during construction projects, the risks can be effectively managed using routine management measures targeted at the species. The following measures will be implemented to avoid/minimise injury and/or mortality to squatter pigeons during construction of the Project:

- Pre-clearance surveys will specifically target areas of habitat identified within the clearing footprint. Pre-clearance surveys will be undertaken to mark the locations of potential breeding places
- Vehicles to be restricted to 40 km/hr along access tracks
- Areas of habitat for the squatter pigeon will be flushed immediately prior to clearing (i.e. spotter-catcher to walk in front of clearing machinery)
- All clearing will be supervised by suitably qualified and experienced fauna spotter-catchers. This will involve relocating any resident fauna to the nearest suitable, safe habitat outside the clearing footprint
- Where deemed necessary by the fauna spotter-catcher, temporary exclusion fencing may be required in specific areas of high ecological sensitivity to prevent wildlife from returning to work areas
- Adverse incident response procedures will be developed to detail actions to be taken in the event of wildlife injury or mortality during clearing
- A Traffic Management Plan will be developed for the Project with designated access routes, speed limits and identified sensitive ecological areas (particularly areas where squatter pigeons have the potential to occur on access roads)
- Squatter pigeon awareness will be included in all worker inductions and in the Traffic Management Plan
- A register of squatter pigeon sightings will be maintained to identify areas that have a high risk of collision

- The CEMP will comprise protocols to limit injury and mortality to fauna including management of risks associated with open excavations, trenching, waterbodies and responses and reporting for roadkill and adverse incident protocols
- A high risk SMP will be prepared in accordance with the requirements of Section 335 of the Nature Conservation (Animals) Regulation 2020.

#### **6.4.8.3 Disturbance from increased light, noise and vibration**

Routine mitigation measures will be undertaken to minimise the impact that noise, light, vibration and disturbance have on local wildlife populations. This is particularly important within the vicinity of habitat for conservation significant fauna species, including the squatter pigeon. The following measures will be used to minimise the impacts of light, noise and vibration during construction:

- Site lighting will be kept to the minimum (security) required for safety. Placement and orientation of lighting to be directed away from sensitive fauna habitat. Direction of lighting beam downwards or use of shields and baffles to limit light spill beyond site boundary.
- Wherever practicable, construction activities will be limited to daylight hours to reduce the need for lighting and resultant light spill into adjacent habitat. However, it is noted that some of the road crossings may require night works for traffic management reasons.
- A Traffic Management Plan will be developed for the construction site to control vehicle movements and reduce the unnecessary generation of vehicular noise.
- All construction vehicles will comply with maintenance schedules and operational restrictions designed to limit noise impacts during construction.

#### **6.4.8.4 Habitat degradation by increased dust, run-off and sedimentation**

The following mitigation measures will be used to minimise the impacts of dust, run off and sedimentation during construction of the Project:

- Erosion and sediment controls have been developed as part of the CEMCP and will be expanded on by the construction Contractor as part of their ESCPs.
- Routine dust suppression and monitoring will be undertaken throughout construction and operation.
- Duration of in-stream works will be minimised wherever practicable to reduce the potential for sedimentation.
- Erosion and sediment control measures will be installed where in-stream disturbance must be undertaken during flow conditions.
- Areas subject to clearing will be stabilised as soon as practicable.
- All vehicle movement will be restricted to designated tracks located within the Project footprint.
- Weather conditions will be monitored during the construction stage and temporary controls will be established during extreme weather events.
- Construction activities during adverse weather conditions will be managed in accordance with the CEMP
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed.

#### **6.4.8.5 Introduction and spread of pest fauna species**

Although the Project area is already exposed to relatively high levels of pest infestation, mitigation measures will be required to limit any spread of pest fauna that could result from construction activities. The following mitigation measures will be used to minimise the introduction and spread of pest fauna and weed species during construction for the Project:

- Responsible waste management practices (e.g. not leaving out food waste and not feeding wildlife) will be implemented and followed by all construction personnel. All waste will be stored in secure temporary holding containers and transported off site
- Waste management actions to be included in the CEMP:

- Requirements for details on the location and specifications for disposal and removal of waste from the construction site
- All putrescible waste to be stored in secure temporary holding containers and transported off site
- As part of CEMP, the Project will implement feral pest control measures
- Construction staff will not bring domestic animals to the Project area
- All construction personnel shall attend environmental training as part of site inductions. As part of this training, all personnel will be instructed on their responsibilities related to avoiding and minimising the introduction/attraction to the construction site of pest animals.

#### **6.4.8.6 Introduction and spread of weed species**

The following measures will be implemented to minimise the introduction and spread of weeds:

- Weed management actions are included in the CEMP and include:
  - Hygiene protocols restricting the movement of vegetation and soil between impacted areas and areas of significantly lower weed infestation.
  - Protocols for monitoring and management of weeds to identify and appropriately respond to significant changes in weed distribution and density
- All vehicles / equipment travelling from a declared restricted place or quarantine area will be required to wash down and possess a current weed hygiene inspection certificate before moving to a weed free area or commencing construction works onsite. The weed hygiene inspection certificate is to be obtained from an inspector who is deemed competent and is certified in line with DAF requirements.
- Vehicle access will be restricted to within the Project footprint and existing roads and tracks

#### **6.4.8.7 Disturbance of surface waterways and waterbodies**

The following mitigation measures will be used to minimise the disturbance of waterways and waterbodies during construction of the Project:

- Wherever practicable, watercourse crossings have been located at established crossing points on existing access tracks. Where this is not practicable, the disturbance area is restricted to within the Project footprint.
- Erosion and sediment controls will be developed as part of the CEMCP and ESCPs.
- Dust suppression activities will be undertaken where appropriate. Stabilisation of disturbed areas will be undertaken as soon as practicable after disturbance.
- Rehabilitation of cleared areas adjacent to waterways will be undertaken as soon as practicable after completion of the pipe installation works.
- Refuelling will be undertaken away from waterways.
- Storage of fuels, chemicals, wastes and other potentially environmentally hazardous substances will be bunded or otherwise contained areas away from waterways.
- Emergency response protocols and procedures will be developed as part of the CEMP for implementation in the event of a contaminant spill or leak and provision of spill response equipment.

### **6.4.9 Residual impacts on squatter pigeon (southern)**

A summary of the Project's potential impacts on the squatter pigeon (southern) and mitigation measures is presented in Table 6.15. The risk ratings are presented in Appendix D.

Table 6.15 Residual impact assessment for the squatter pigeon (southern)

Impact	Initial impact rating	Mitigation measures	Residual impact
Habitat loss	High	<p>Utilise existing tracks where possible</p> <p>Land clearing restricted to minimal amount necessary and will not extend outside of the Project footprint</p> <p>Establishing no-go areas</p> <p>Where infrastructure crosses waterways existing disturbed areas to be selected where possible</p> <p>Rehabilitation of temporary disturbance areas undertaken as soon as practicable with native species</p> <p>Reinstatement and rehabilitation of pipeline with native species</p> <p>Preparation of a CEMP</p>	Low
Injury or mortality due to vegetation clearing	High	<p>Employ a fauna spotter catcher during clearing.</p> <p>Reduce speed limits within areas of potential habitat</p> <p>Allow a fauna spotter catcher to walk through clearing footprints prior to clearing.</p> <p>Identify areas of potential habitat with signage and flagging tape.</p>	Low
Habitat fragmentation and reduced connectivity	Moderate	<p>Revegetate temporarily cleared areas (e.g. laydown areas) with native grasses.</p>	Low
Disturbance from increased light, noise and vibration	Moderate	<p>Restricted sources of artificial lighting.</p> <p>Direct lighting away from sensitive areas for the species</p>	Low
Habitat degradation through increased dust, run-off and sedimentation.	Low	<p>Reduce duration of works in watercourses and drainage lines.</p> <p>Monitor weather events when working within watercourses.</p> <p>Reduce speed limits during dry conditions or employ and water truck to reduce dust rates.</p>	Negligible
Introduction and spread of invasive fauna and weed species	Moderate	<p>Implement measures for introduced flora and fauna (to be outlined in the CEMP).</p> <p>Require construction vehicles to hold valid weed free declarations prior to the commencement of construction works.</p> <p>Educate staff on the impacts of weeds and their general environmental obligation.</p> <p>Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area.</p>	Low
Disturbance of surface waterways and waterbodies.	Moderate	<p>Reduce duration of works in watercourses and drainage lines.</p> <p>Monitor weather events when working within watercourses.</p> <p>Reduce speed limits during dry conditions to reduce dust generation and potential sedimentation.</p>	Low



## 6.4.10 Significance of impact assessment

An assessment of the significance of the Project's impacts on the squatter pigeon (southern) was undertaken against the Significant Impact Guidelines 1.1 (DoE 2013) and presented in Table 6.16.

Table 6.16 Significance of impact on squatter pigeon

Impact criteria	Potential to occur
Lead to a long-term decrease in the size of an important population of a species.	<p><b>Unlikely</b></p> <p>The local squatter pigeon population is not classified as an important population under the definition outlined in the EPBC Act (Squatter Pigeon Workshop 2011). The Project will result in a direct loss of 120.74 ha of drinking and dispersal habitat for the squatter pigeon (southern), representing only 2.5 percent of the habitat available within a 1 km radius of the Project area. No suitable breeding or foraging habitat or drinking sites will be directly or indirectly impacted. The loss of habitat is small in the context of the local and regional landscape. Habitat that is impacted by the construction phase of the project for the pipeline will be reinstated, therefore the loss is not permanent. Increased vehicular movements during construction has the potential to increase the risk of mortality and injury of squatter pigeons, however this will be managed through implementing speed limits and signage in areas that may support the species. The Project is unlikely to have any substantial operational impacts on this species, with negligible vehicular movements. Permanent speed limits and signage on internal roads and education of staff during inductions will minimise the risk of direct mortality by operational vehicles. As such, the Project is therefore unlikely to lead to a long-term decrease in the size of an important population of a species.</p>
Reduce the area of occupancy of an important population.	<p><b>Unlikely</b></p> <p>As detailed above the local squatter pigeon population is not among the listed important populations of the species. The project will result in the direct loss of 120.74 ha of drinking and dispersal habitat for the squatter pigeon (southern), representing only 2.5 percent of the habitat available within a 1 km radius of the Project area. No suitable breeding or foraging habitat or drinking sites will be directly or indirectly impacted. The project is unlikely to have any substantial impact on the species in the operation phase. The species is locally abundant. The project footprint represents a minor local loss that will not result in the species' disappearance from any 1 km x 1 km area (the scale at which the area of occupancy is measured under the IUCN). Given the Project is unlikely to have any substantial impact on the species in the operational phase, and the continued presence of suitable habitat within the local area, the Project is unlikely to reduce the area of occupancy of the local squatter pigeon population.</p>
Fragment an existing important population into two or more populations.	<p><b>Unlikely</b></p> <p>As detailed above the local squatter pigeon population is not among the listed important populations of the species. Within the Project area, the squatter pigeon already utilises habitats that have been subject to a high level of fragmentation, occurring in sparse, modified grassland and open woodland habitats, where connectivity is loosely maintained to larger open woodland remnants and water sources. The Project will have minimal direct impact on habitat for the squatter pigeon, resulting in a loss of 120.74 ha from a relatively dispersed area. The pipeline will be buried and reinstated with native grasses – and will not form a barrier to movement. Habitat connectivity will be maintained among areas of habitat both within the Project area and adjacent to it by maintaining ground-level substrates and vegetation and by retaining existing unsealed tracks that provide pathways for local squatter pigeon movement. Accordingly, the Project is unlikely to fragment the important population into two or more populations.</p>
Adversely affect habitat critical to the survival of a species.	<p><b>Unlikely</b></p> <p>The Preliminary route selection has been sited to avoid impact on breeding and foraging habitat for the species. The Project will result in the direct loss of 120.74 ha of drinking and dispersal habitat for the squatter pigeon. The loss of habitat represents only 2.6 percent of that available within a 1 km radius of the Project area and there will be no impact on breeding or foraging habitat or known drinking sites. The Project will only cause a temporary impact to dispersal habitat. As the pipeline will be buried, reinstated and revegetated with native grasses, the project will have no long-lasting impacts to habitat critical to the survival of the species.</p>

Impact criteria	Potential to occur
Disrupt the breeding cycle of an important population.	<p><b>Unlikely</b></p> <p>As detailed above the local squatter pigeon population is not among the listed important populations of the species. No predicted breeding or foraging habitat will be cleared for the Project, therefore will not be directly or indirectly impacted. Connectivity will be maintained with adjacent drinking sources. Critical drinking sources such as dams and water troughs will be maintained where practicable to support the viability of local breeding habitats. Construction activities have the potential to cause short-term disruption to breeding activities immediately adjacent to construction areas. The impact will be temporary and is unlikely to result in a loss of an entire annual cohort as the species is expected to continue to breed in some areas that are located further from construction areas and the species is known to breed all year round (Squatter Pigeon Workshop 2011). The Project is therefore not expected to disrupt the breeding cycle of the population.</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<p><b>Unlikely</b></p> <p>The Project will impose no direct or indirect impact on breeding or foraging habitat or drinking sites for the squatter pigeon. As the Project will not impose any barriers to squatter pigeon movement it will not restrict ongoing access to resources during the operation phase. Habitat impacts will be limited to a loss of 120.74 ha of drinking and dispersal habitat. The impact is dispersed over a large area and affects areas of habitat that are already substantially degraded by cattle grazing. The proportional loss of resources is relatively minor, representing only 2.6 percent of the drinking and dispersal habitat in a 1 km radius of the Project area. The Project will cause localised, temporary loss of dispersal habitat. The loss of habitat will be temporary, the pipeline will be buried, reinstated and revegetated with native grasses. On this basis, the loss is considered unlikely to cause the species to decline. Furthermore, the 120.74 ha includes areas such as stockpile areas that will be reinstated and utilised by the species for foraging and/or dispersal during the operation phase. Weed and feral pest management measures will be implemented over the lifetime of the Project. As there is currently no strategic weed or pest management in the area, these management measures are likely to increase the quality of foraging habitats by reducing competition with weeds and limiting predation by foxes and cats.</p>
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat	<p><b>Unlikely</b></p> <p>Known feral predators of the squatter pigeon (i.e. cats, dogs and foxes) are considered to be present in low densities in the Project area region. The Project will not introduce any external food sources that could increase the local densities of these feral predators. The Project area is currently subject to high levels of weed infestation. Unmitigated, the Project has the potential to increase local weed densities and thereby threaten the potential for squatter pigeons to move through the landscape. Implementation of standard weed management protocols during construction and operation is expected to mitigate this risk to high levels. The Project is unlikely to result in invasive species that are harmful to the squatter pigeon becoming established in the species habitat.</p>
Introduce disease that may cause the species to decline, or	<p><b>Unlikely</b></p> <p>No diseases or pathogens are identified among current known threats to the squatter pigeon. The weed-wash down and hygiene protocols that will be implemented through construction to manage the on-site spread or export of weeds will also act to reduce the potential for transmission of disease. This risks to squatter pigeons associated with disease transmission are therefore considered negligible.</p>
Interfere substantially with the recovery of the species.	<p><b>Unlikely</b></p> <p>The loss of habitat is small in the context of the local and regional landscape. Despite the impacts on drinking and dispersal habitat, the project is unlikely to have any substantial impact in terms of its impact during the operational phase. Operation of the project is unlikely to have any impact on the behaviour or use of habitats among the local squatter pigeon population. Implementation of a Weed Management Plan for the project has the potential to increase the value of local habitats. Local noise disturbance and mortality threats associated with the project are also expected to be low. The sub-species is locally abundant, the Project is unlikely to interfere with the recovery of the species.</p>

## 6.4.11 Conclusion

The Project is considered **unlikely** to have a significant impact on the squatter pigeon (southern).

## 6.5 White-throated needletail

### 6.5.1 Conservation status and documentation

The white-throated needletail is listed as Vulnerable and Migratory under the EPBC Act.

The species is almost exclusively aerial, occurring from heights of less than 1 m up to more than 1,000 m above the ground (Coventry 1989; Tarburton 1993, cited in TSSC 2019). The species forages at heights up to cloud height over a range of habitat types including woodland, open forest, rainforest, heathland and partly cleared pasture and agricultural land (Higgins 1999, cited in TSSC 2019). The species does not breed in Australia; it breeds in the Northern Hemisphere and migrates south for the boreal winter. The species roosts in trees amongst dense foliage in the canopy or in hollows, however the number of references probably over-emphasises such occurrences (Higgins 1999). The species is not reliant on terrestrial habitat types. The species has been suggested that they also sometimes roost aerially (DAWE 2021a).

### 6.5.2 Criteria used to map habitat for the white-throated needletail

**Commonwealth general habitat definition:** white-throated needletail is mostly aerial, from heights of less than 1 m up to more than 1000 m above the ground. Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings (DAWE 2021a).

Table 6.17 Criteria used to map white-throated needletail habitat

Habitat	Commonwealth definition	Criteria used to map habitat
Foraging	The species almost always forage aerially, at heights up to 'cloud level', above a wide variety of habitats ranging from heavily treed forests to open habitats, such as farmland, heathland or mudflats	All habitat above the Project area and surrounds were considered potential foraging habitat for the species. As the species is almost exclusively aerial and is therefore not directly dependent on ground habitat, no foraging habitat was mapped for the white-throated needletail.
Roosting	The species roosts in trees amongst dense foliage in the canopy or in hollows (DAWE 2021a)	The Project area consisted of open woodland. In Australia, confirmed and high confidence records of white-throated needletail roosting indicate the species roosts in dense foliage of canopy trees in large tracts of treed remnant vegetation along or contiguous with mountain ranges (Nature Advisory, 2021). Given the absence of suitable roosting habitat, no roosting habitat for the white-throated needletail has been mapped for the Project area.

### 6.5.3 Desktop results

The white-throated needletail was identified within the PMST (Appendix A) as having potential to occur within a 30 km radius from a central point within the Project area. A search of WildNet (Appendix A) reported one historical record within 30 km of the search coordinates.

### 6.5.4 Survey results

The white-throated needletail was not recorded during field surveys however, the species has been historically recorded nearby.

### 6.5.5 Significance of project footprint

This section assesses the significance of white-throated needletail habitats within the Project area, their importance in the context of the local population and whether the local population is important at a national level.

### **6.5.5.1 Status as an important population**

'Important population' for the white-throated needletail has not been formally defined in the Commonwealth listing advice for the species. In the absence of a formal definition, the definition outlined in the Significant Impact Guidelines 1.1 applies. An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are key source populations either for breeding or dispersal; populations that are necessary for maintaining genetic diversity, and/or; populations that are near the limit of the species range.

Given the species capacity for large-scale migration, the species is unlikely to have localised important populations. As the Project area is not near the edges of the species known range and is a non-breeding visitor to Australia, it is unlikely to be an important population under the Significant impact guidelines 1.1.

### **6.5.5.2 Status as habitat critical for survival of the white-throated needletail**

Habitat critical to the survival of the species has not been specified in the Commonwealth conservation advice for the white-throated needletail. However, using the general definition in the Significant impact guidelines 1.1 (DoE 2013), this is likely to include areas that are necessary:

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

Utilisation of the airspace above the Project area was consistent with general foraging that would be undertaken over a broad area in the surrounding landscape. The species does not breed in Australia, so is not reliant on any breeding resources locally. While roosting habitat is likely to represent habitat critical to the survival of the species, this is typically associated with heavily vegetated woodland on mountainous terrain. No suitable roosting habitat occurs within the Project area. On that basis, the Project area would not provide habitat critical to the survival of the white-throated needletail.

## **6.5.6 Threatening processes**

There is evidence of white-throated needletails colliding with wind turbines, overhead wires, windows and lighthouses in Australia; however the scale of impact at the population level requires further investigation (TSSC 2019). Other threatening processes identified as possible causes of decline of the white-throated needletail in Australia include the use of insecticides and the loss of roosting sites (Tarbuton 2014, cited in TSSC 2019). Loss of forest and woodland habitats may have also resulted in reduction in invertebrate prey (TSSC 2019).

The greatest risk posed to the white-throated needletail occurs in the northern hemisphere where logging of forests has occurred in breeding grounds and where the species was formerly hunted in its breeding grounds (TSSC 2019).

## **6.5.7 Potential impacts**

As the white-throated needletail is exclusively aerial, it does not have typical associations with habitat. Clearing for the Project is unlikely to have a significant impact on the species' local abundance. The species occurs in Australia during the non-breeding season and as such the Project has no capacity to impact on more sensitive breeding habitat.

## **6.5.8 Significance of impact assessment**

An assessment against the Significant Impact Guidelines 1.1 (DoE 2013) with regards to the white-throated needletail was undertaken and the outcomes provided in Table 6.18.

Table 6.18 Significance of impact on the white-throated needletail

Impact criteria	Potential to occur
Lead to a long-term decrease in the size of an important population of a species.	<b>Unlikely</b> Important populations of the white-throated needletail have not been formally defined in the Commonwealth listing advice. Given the species capacity for large-scale migration, the species is unlikely to have localised important populations. As the Project area is not near the edges of the species known range and is a non-breeding visitor to Australia, it is unlikely to be an important population. The white-throated needletail is exclusively aerial and does not have typical associations with habitat (DAWE 2021a). As such, clearing for the Project is unlikely to have a significant impact on the species' local abundance or lead to long-term decrease in the population.
Reduce the area of occupancy of an important population.	<b>Unlikely</b> The Project will not result in loss of habitat for the white-throated needletail.
Fragment an existing important population into two or more populations.	<b>Unlikely</b> The white-throated needletail is not directly dependent on habitats at ground level and has the capacity to fly over cleared and fragmented areas. As such, the Project has no capacity to fragment the population into two or more populations.
Adversely affect habitat critical to the survival of a species.	<b>Unlikely</b> The white-throated needletail does not have conventional habitat requirements. Accordingly, vegetation clearing for the Project will not adversely impact habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population.	<b>Unlikely</b> The white-throated needletail does not breed in Australia, spending its breeding season in Asia, from central and south-eastern Siberia and Mongolia, east to the Maritime Territories of Russia, Sakhalin and the Kuril Islands and south to northern Japan and north-eastern China (DAWE 2021a). As such, the Project will not disrupt the breeding cycle of an important population of this species.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	<b>Unlikely</b> As detailed above, the white-throated needletail does not have conventional habitat requirements. Accordingly, vegetation clearing for the Project will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat	<b>Unlikely</b> No invasive species are identified as threats to the white-throated needletail. The Project is unlikely to cause any increase in invasive species that could threaten local abundance of white-throated needletails.
Introduce disease that may cause the species to decline	<b>Unlikely</b> Disease is not identified as a key threat to the white-throated needletail. It is almost exclusively aerial habit means it is unlikely to have many opportunities to contract diseases that could threaten the viability of local populations. The Project is therefore unlikely to introduce disease that cause the species to decline.
Interfere substantially with the recovery of the species.	<b>Unlikely</b> The species does not have conventional habitat requirements and remains almost exclusively aerially. The species is a non-breeding visitor to Australia, as such, the Project is unlikely to interfere with the recovery of the species.

## 6.5.9 Conclusion

The Project is **unlikely** to have a significant impact on the white-throated needletail.



## 6.6 Fork-tailed swift

### 6.6.1 Conservation status and documentation

The fork-tailed swift is listed as a Migratory species under the EPBC Act.

The species is a non-breeding visitor to all states and territories in Australia. In the north-east region there are many records east of the Great Divide from near Cooktown and south to Townsville. There are widespread but scattered records of the fork-tailed swift in coastal areas from 20°S, south to Brisbane (Higgins 1999, cited in DAWE 2021a).

The fork-tailed swift is an aerial eater, flying anywhere in a range from 1 m to 300 m above the ground to forage on insects. It occurs over a wide range of dry and open habitats including riparian woodland, salt marshes, grasslands, sand plains and farmland (DAWE 2021a).

### 6.6.2 Criteria used to map fork-tailed swift habitat

The fork-tailed swift is almost exclusively aerial in nature. The species typically roosts aerially. Accordingly, the Project area does not provide habitat for this species and no habitat has been mapped.

### 6.6.3 Desktop results

The white-throated needletail was identified within the PMST (Appendix A) as having potential to occur within a 30 km radius from a central point within the Project area. A search of WildNet (Appendix A) reported two historical records within 30 km of the search coordinates.

### 6.6.4 Survey results

The fork-tailed swift has not been recorded in any of the field surveys undertaken for the Project. It has only been historically recorded twice within the desktop search extent however it is considered likely to occur within the Project area.

### 6.6.5 Significance of project footprint

#### 6.6.5.1 Status as an important habitat

There is no formally defined 'important habitat' for the fork-tailed swift. In the absence of a formal definition, the definition outlined in the Significant Impact Guidelines 1.1 applies. An area of 'important habitat' for a migratory species is: habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or; habitat that is of critical importance to the species at particular life-cycle stages, and/or; habitat utilised by a migratory species which is at the limit of the species range, and/or d. habitat within an area where the species is declining.

The Commonwealth listing states many records of the species are located between Cooktown to Townsville, Queensland, with widespread but scattered records from 20°S, south to Brisbane (DAWE 2021a). As the Project area is not near the edges of the species known range and is a non-breeding visitor to Australia, it is unlikely to be an important habitat for the migratory species.

### 6.6.6 Threatening processes

Potential threats to the fork-tailed swift include habitat destruction and predation by feral animals however due to the wide range of the species, the potential impacts are thought to be negligible (BirdLife International 2009b, cited in DAWE 2021).

## 6.6.7 Potential impacts

As the fork-tailed swift is exclusively aerial, it does not have typical associations with habitat. Clearing for the Project is unlikely to have a significant impact on the species' local abundance. The species occurs in Australia during the non-breeding season and as such the Project has no capacity to impact on more sensitive breeding habitat.

## 6.6.8 Significance of impact assessment

An assessment against the Significant Impact Guidelines 1.1 (DoE 2013) with regards to the fork-tailed swift was undertaken and the outcomes provided in Table 6.19.

Table 6.19 Significance of impact on the fork-tailed swift

Impact criteria	Potential to occur
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	<b>Unlikely</b> The fork-tailed swift is exclusively aerial and does not have typical associations with habitat. As such, clearing for the Project is unlikely to have a significant impact on the species' local abundance. The species occurs in Australia during the non-breeding season. As such, the Project has no capacity to impact on more sensitive breeding habitat.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	<b>Unlikely</b> No invasive species are identified as threats to the fork-tailed swift. The Project is unlikely to cause any increase in invasive species that could threaten local abundance of the species.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	<b>Unlikely</b> The fork-tailed swift does not breed in Australia, spending its breeding season in Asia, from central and south-eastern Siberia and Mongolia, east to the Maritime Territories of Russia, Sakhalin and the Kuril Islands and south to northern Japan and north-eastern China (DoE 2020b). As such, the Project will not disrupt the breeding cycle of an important population of this species.

## 6.6.9 Conclusion

The Project is considered **unlikely** to have a significant impact on the fork-tailed swift.

## 6.7 Eastern osprey

### 6.7.1 Conservation status and documentation

The eastern osprey is listed as Migratory under the EPBC Act.

The breeding range of the eastern osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW, with a separate population occurring in south Australia (DAWE 2021a). The Eastern Osprey is considered to be moderately common in Australia (Olsen 1998). The species is most abundant in northern Australia, where high population densities occur in remote areas (Garnett 1993; Johnstone & Storr 1998). The species occurs in littoral and coastal habitats and wetlands, of tropical and temperate Australia. Eastern osprey are known to travel inland along major rivers where they require extensive areas to forage in open fresh, brackish or saline water (DAWE 2021a). Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea (OEH, 2020) or major rivers.

### 6.7.2 Criteria used to map eastern osprey habitat

**Commonwealth general habitat definition:** The eastern osprey is 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 (DAWE 2021a).

Table 6.20 Criteria used to map habitat for the eastern osprey

Habitat	Commonwealth definition	Criteria used to map habitat
Foraging	The eastern osprey forages over clear estuarine and inshore marine waters and coastal rivers (NSW Scientific Committee, 2009)	Burdekin River and riparian fringe along the Burdekin river, no further back than the top bank and no side tributaries
Breeding	The eastern osprey nests in tall (usually dead or dead-topped) trees in coastal habitats from open woodland to open forest, within 1-2 km of water (NSW Scientific Committee, 2009)	Area of riparian fringe along the Burdekin river, no further back than the top bank and no side tributaries

### 6.7.3 Desktop results

The eastern osprey was identified within the PMST (Appendix A) as having potential to occur within a 30 km radius from a central point within the Project area. A search of WildNet (Appendix A) reported one historical record within 30 km of the search coordinates.

### 6.7.4 Survey results

The species was not recorded during the field survey, however the species has been historically recorded within the desktop search extent. Potential foraging and nesting habitat was recorded along the southern section of the Project area, along the Burdekin River. The eastern osprey is considered likely to occur.

No suitable foraging or nesting habitat is present within the Project footprint. Potential habitat for the eastern osprey is mapped in Figure 6-5.

### 6.7.5 Significance of project footprint

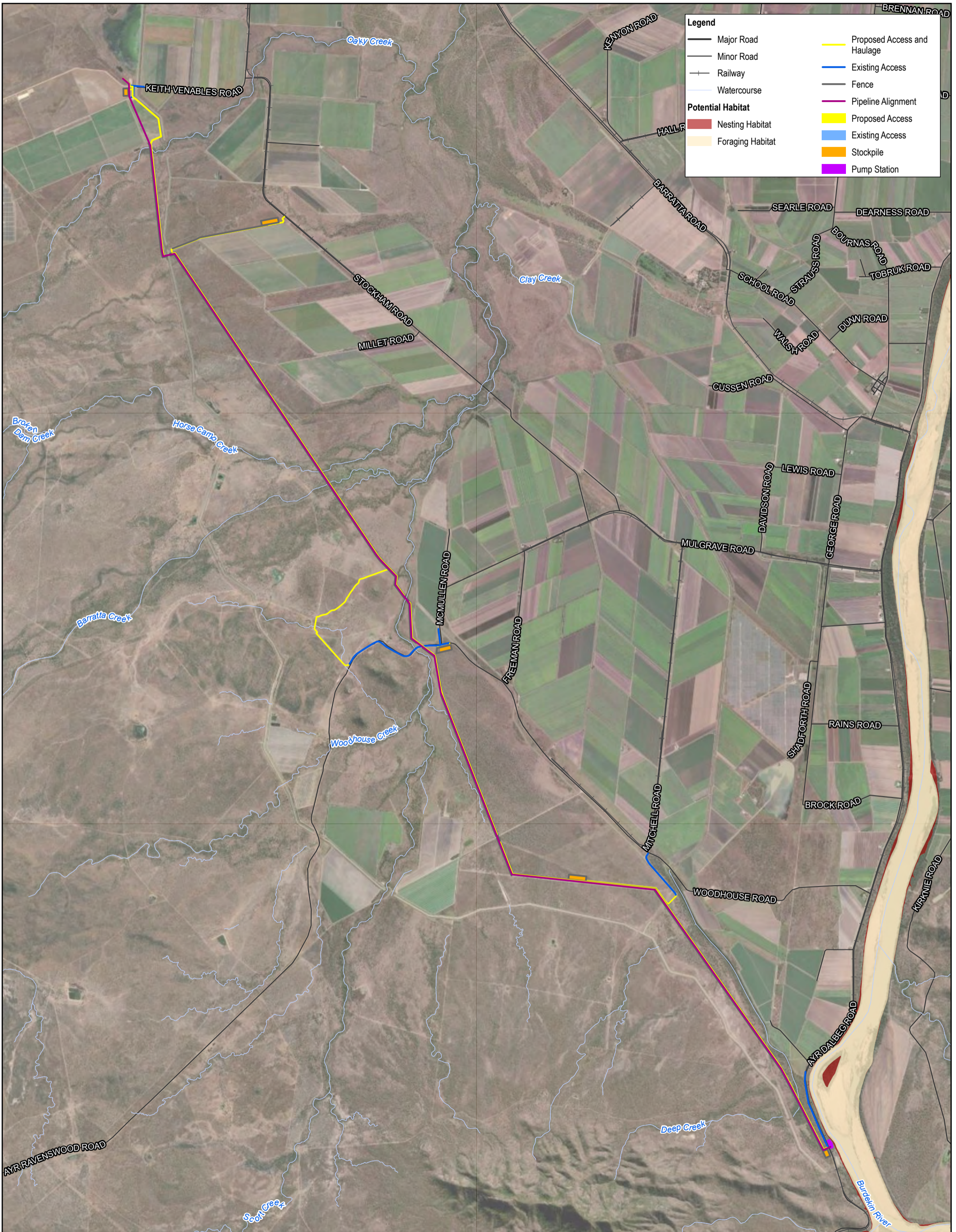
#### 6.7.5.1 Status as an important habitat

There is no formally defined 'important habitat' for the eastern osprey. In the absence of a formal definition, the definition outlined in the Significant Impact Guidelines 1.1 applies. An area of 'important habitat' for a migratory species is: habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or; habitat that is of critical importance to

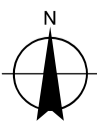
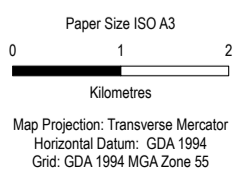
the species at particular life-cycle stages, and/or; habitat utilised by a migratory species which is at the limit of the species range, and/or d. habitat within an area where the species is declining.

The Commonwealth listing states the species is moderately common in Australia. As the Project area is not near the edges of the species known range, the Project area is not considered to support an ecologically significant proportion of the population, it is unlikely to be an important habitat for the migratory species.





Based on or contains data provided by the State of QLD 2021. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.



Townsville City Council  
Houghton Pipeline Stage 2 - MNES Assessment

Distribution of potential eastern osprey habitat within and surrounding the Project area

Project No. 12537606  
Revision No. 0  
Date 12/17/2021

**FIGURE 6-5**



## 6.7.6 Threatening processes

The main threat to the eastern osprey is loss, degradation or alteration of habitat. Other less persistent threats include ingestion of prey containing pollutants, pesticides, heavy metals or fishing tackle, competition for food with commercial fisheries, reduced water quality at foraging grounds, disturbance by humans and accidental mortality from collision with powerlines (DAWE 2021).

## 6.7.7 Potential impacts

The Project is unlikely to have any substantial impact in terms of operational impacts to the eastern osprey, with negligible maintenance occurring. Potential impacts to the species that are likely to be experienced during the construction phase of the Project may include the following:

- Loss of habitat
- Disturbance from increased light, noise and vibration
- Habitat degradation through increased dust, run-off and sedimentation
- Disturbance of surface waterways and waterbodies.

These impacts are described further in the following sections.

### 6.7.7.1 Loss of habitat

The Project is not anticipated to result in any loss of foraging or nesting habitat for the species. 204.28 ha of suitable foraging and nesting habitat is present within 1 km radius of the Project footprint.

### 6.7.7.2 Disturbance from increased light, noise and vibration

Construction will result in a substantial, localised increase in vehicle movements in the short-term, which will increase light, noise and vibration disturbance to local wildlife. Increased light, noise and vibration can alter individual species' behaviours, and disrupt the balance of inter-species interactions. Such disruptions typically favour feral predators and generalist species that owe their success to broad ecological tolerances and possess the ability to tolerate or actively exploit disturbed environments (Hero et al. 2004).

### 6.7.7.3 Habitat degradation through increased dust, run-off and sedimentation

Construction activities have the potential to generate localised dust, erosion, run-off and sedimentation through increased vehicle movements, clearance of vegetation and earthworks. This can reduce the abundance and diversity of adjacent terrestrial and aquatic habitats by physically smothering vegetation, changing nutrient levels, degrading water quality, impeding the growth and germination of plant species, encouraging weed incursions and altering the movement and behaviour of fauna species.

The receiving environment has already been subject to high levels of erosion and sedimentation as a result of existing land-clearing and grazing activities. Nevertheless, sensitive ecological receptors (e.g. larger open woodland remnants and aquatic habitats) are particularly susceptible to adverse impacts associated with dust, run-off, erosion and sedimentation. These areas require protection through the implementation of sediment and erosion control measures during construction.

Adverse weather conditions during construction can exacerbate the potential impact of erosion and sedimentation. High rainfall has the potential to remove exposed topsoil, destabilise creek beds and distribute sediment through creek lines. Strong winds have the potential to spread exposed topsoil, decreasing the likelihood of recolonisation by vegetation and potentially distributing dust into nearby sensitive environments.

### 6.7.7.4 Disturbance of surface waterways and waterbodies.

Construction activities within and/or in the vicinity of watercourses have the potential to cause degradation of riparian habitats through:

- Removal of riparian vegetation
- Run-off, sedimentation and erosion

- Point-source pollution (chemical and fuel spills)
- Disturbance associated with noise, vibration and/or artificial lighting.

The pipeline and associated haulage and access tracks intersect a number of ephemeral watercourses and drainage lines. The pump station, power supply works, and stockpile areas have been sited to minimise the number of water crossings; however, mapped watercourses and ephemeral creek lines are still located in close proximity to some of these project components. These areas are ecologically important for movement of wildlife, as habitat and drinking sites and are potentially susceptible to construction-related disturbance..

## 6.7.8 Measures to avoid, reduce or mitigate impacts

### 6.7.8.1 Loss of habitat

Planning phase measures that have been employed to avoid and reduce the direct loss of habitat include:

- Locating the Project footprint in open areas that have been subject to historical land clearing and cattle grazing
- Minimising impacts to watercourses
- Utilising existing tracks and locating proposed tracks within previously disturbed areas

During the construction phase of the Project, the following mitigation measures will be employed:

- Land clearing will be restricted to the minimal amount necessary for the construction of the Project and will not extend outside of the Project footprint
- The extent of vegetation clearing (and any no-go areas) will be clearly identified on construction plans and in the field using high visibility fencing or flagging in the vicinity of high conservation significant areas. Clearing extents will be communicated to construction supervisors
- Where infrastructure crosses waterways, the Project footprint has been minimised to a 20 m wide construction corridor
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed
- A CEMP will be prepared to inform actions with regards to managing weed hygiene, erosion, fuels and hazardous substances, fire, etc. and the CESCOP and ESCPs will include additional erosion and sediment control measures
- All construction personnel will attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vegetation clearing protocols. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions
- A large portion of the Project footprint will be revegetated with locally occurring native tree and grass species and will therefore retain future habitat values for the eastern osprey.

### 6.7.8.2 Disturbance from increased light, noise and vibration

Routine mitigation measures will be undertaken to minimise the impact that noise, light, vibration and disturbance have on local wildlife populations. This is particularly important within the vicinity of habitat for conservation significant fauna species, including the eastern osprey. The following measures will be used to minimise the impacts of light, noise and vibration during construction:

- Site lighting will be kept to the minimum (security) required for safety. Placement and orientation of lighting to be directed away from sensitive fauna habitat. Direction of lighting beam downwards or use of shields and baffles to limit light spill beyond site boundary.
- Wherever practicable, construction activities will be limited to daylight hours to reduce the need for lighting and resultant light spill into adjacent habitat. However, it is noted that some of the road crossings may require night works for traffic management reasons.
- A Traffic Management Plan will be developed for the construction site to control vehicle movements and reduce the unnecessary generation of vehicular noise.

- All construction vehicles will comply with maintenance schedules and operational restrictions designed to limit noise impacts during construction.

### **6.7.8.3 Habitat degradation by increased dust, run-off and sedimentation**

The following mitigation measures will be used to minimise the impacts of dust, run off and sedimentation during construction of the Project:

- Erosion and sediment controls have been developed as part of the CЕССР and will be expanded on by the construction Contractor as part of their ESCPs.
- Routine dust suppression and monitoring will be undertaken throughout construction and operation.
- Duration of in-stream works will be minimised wherever practicable to reduce the potential for sedimentation.
- Erosion and sediment control measures will be installed where in-stream disturbance must be undertaken during flow conditions.
- Areas subject to clearing will be stabilised as soon as practicable.
- All vehicle movement will be restricted to designated tracks located within the Project footprint.
- Weather conditions will be monitored during the construction stage and temporary controls will be established during extreme weather events.
- Construction activities during adverse weather conditions will be managed in accordance with the CEMP
- Rehabilitation of temporary disturbance areas will be undertaken as soon as practicable after construction activities have been completed.

### **6.7.8.4 Disturbance of surface waterways and waterbodies**

The following mitigation measures will be used to minimise the disturbance of waterways and waterbodies during construction of the Project:

- Wherever practicable, watercourse crossings have been located at established crossing points on existing access tracks. Where this is not practicable, the disturbance area is restricted to within the Project footprint.
- Erosion and sediment controls will be developed as part of the CЕССР and ESCPs.
- Dust suppression activities will be undertaken where appropriate. Stabilisation of disturbed areas will be undertaken as soon as practicable after disturbance.
- Rehabilitation of cleared areas adjacent to waterways will be undertaken as soon as practicable after completion of the pipe installation works.
- Refuelling will be undertaken away from waterways.
- Storage of fuels, chemicals, wastes and other potentially environmentally hazardous substances will be bunded or otherwise contained areas away from waterways.
- Emergency response protocols and procedures will be developed as part of the CEMP for implementation in the event of a contaminant spill or leak and provision of spill response equipment.

### 6.7.8.5 Summary of residual impacts on eastern osprey

A summary of the Project's potential impacts on the eastern osprey and mitigation measures is presented in Table 6.21. The risk ratings are presented in Appendix D.

Table 6.21 Residual impact assessment for the eastern osprey

Impact	Initial impact rating	Mitigation measures	Residual impact
Habitat loss	Low	<ul style="list-style-type: none"> <li>Utilise existing tracks where possible</li> <li>Land clearing restricted to minimal amount necessary and will not extend outside of the Project footprint</li> <li>Establishing no-go areas</li> <li>Where infrastructure crosses waterways existing disturbed areas to be selected where possible</li> <li>Rehabilitation of temporary disturbance areas undertaken as soon as practicable with native species</li> <li>Reinstatement and rehabilitation of pipeline with native species</li> <li>Preparation of a CEMP</li> </ul>	Negligible
Injury or mortality due to vegetation clearing	Moderate	<ul style="list-style-type: none"> <li>Employ a fauna spotter catcher during clearing.</li> <li>Allow a fauna spotter catcher to check trees for nests potentially present within the clearing footprints prior to clearing.</li> <li>Identify areas of potential habitat with signage and flagging tape.</li> </ul>	Low
Habitat fragmentation and reduced connectivity	Low	Revegetate temporarily cleared areas (e.g. laydown areas) with native grass and tree species.	Negligible
Disturbance from increased light, noise and vibration	Moderate	<ul style="list-style-type: none"> <li>Restricted sources of artificial lighting.</li> <li>Direct lighting away from sensitive areas for the species</li> </ul>	Low
Habitat degradation through increased dust, run-off and sedimentation.	Moderate	<ul style="list-style-type: none"> <li>Reduce duration of works in watercourses and drainage lines.</li> <li>Monitor weather events when working within watercourses.</li> <li>Reduce speed limits during dry conditions or employ and water truck to reduce dust rates.</li> </ul>	Negligible
Introduction and spread of invasive fauna and weed species	Moderate	<ul style="list-style-type: none"> <li>Implement measures for introduced flora and fauna (to be outlined in the CEMP).</li> <li>Require construction vehicles to hold valid weed free declarations prior to the commencement of construction works.</li> <li>Educate staff on the impacts of weeds and their general environmental obligation.</li> <li>Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area.</li> </ul>	Low

Impact	Initial impact rating	Mitigation measures	Residual impact
Disturbance of surface waterways and waterbodies.	Moderate	<p>Reduce duration of works in watercourses and drainage lines.</p> <p>Monitor weather events when working within watercourses.</p> <p>Reduce speed limits during dry conditions to reduce dust generation and potential sedimentation.</p>	Low

### 6.7.9 Significance of impact assessment

An assessment against the Significant Impact Guidelines 1.1 (DoE 2013) with regards to the eastern osprey was undertaken and the outcomes provided in Table 6.22.

Table 6.22 Significance of impact on the eastern osprey

Impact criteria	Potential to occur
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	<p><b>Unlikely</b></p> <p>The Project will result in no direct loss or fragmentation of habitat for the eastern osprey. Indirect impacts on habitat are considered negligible and will be mitigated through routine mitigation measures. The habitats within the Project area are unlikely to be considered important habitat. Important habitat for the eastern osprey are typically associated with extensive areas of freshwater, saline or brackish water typically in estuaries, rivers or the ocean and riparian habitat adjacent to these areas. The species is known to utilise the same nest each season, the low number of historical records would suggest habitat within the Project area is not important for eastern osprey individuals. The Project is unlikely to substantially modify, destroy or isolate and area of important habitat for the eastern osprey.</p>
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	<p><b>Unlikely</b></p> <p>Invasive species have not been identified as a threat to eastern osprey (DAWE 2021a). The action is unlikely to result in invasive species that are harmful to the eastern osprey becoming established in the species' habitat.</p>
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	<p><b>Unlikely</b></p> <p>The eastern osprey has only been recorded once in the desktop search extent. As individuals are known to utilise the same nest each breeding season, the relatively low number of historical records in an area suggests the area does not represent important habitat for breeding, foraging or resting during migration. While the species has been recorded historically, the low number of records suggests the local habitats are not likely to be used by an ecologically significant proportion of the population. Given the habitats will not be directly or indirectly impacted, and are not considered important habitat, the Project is unlikely to disrupt the lifecycle of an ecologically significant proportion of the population of the species.</p>

### 6.7.10 Conclusion

The Project is considered **unlikely** to have a significant impact on the eastern osprey.



# 7. Summary of MNES impacts

## 7.1 Summary of significant impact assessment

Despite the general mitigations measures proposed in Section 4.3, a significant residual is still anticipated on two species, the black-throated finch (southern) and bare-rumped sheathtail bat. The Project's significant residual impacts on MNES after mitigation measures have been considered are summarised Table 7.1.

Table 7.1 Summary of impacts on MNES

Matter	Impact	Impact on habitat critical to the survival of the species	Significance of impact
Flora species			
<i>Eucalyptus raveretiana</i>	Maximum removal of four individuals	No impact	Not significant
Fauna species			
Koala	Loss of habitat that does not constitute habitat critical to the survival of the species (121.08 ha), representing 2.6 percent of habitat within 1 km of the Project area	No impact	Not significant
Bare-rumped sheathtail bat	Loss of 10 large and 27 moderate-sized <i>E.platyphylla</i> hollows that represent potential roosting habitat (i.e. habitat critical to the survival of the species). Loss of 325 small <i>E. platyphylla</i> hollows that represent future potential roosting habitat. Temporary loss of habitat: – Foraging: 77.04 ha – Roosting: 34.40 ha Permanent loss of habitat: – Foraging: 7.5 ha – Roosting: 4.69 ha	Loss of 10 large and 27 moderate-sized <i>E.platyphylla</i> hollows that represent potential roosting habitat (i.e. habitat critical to the survival of the species). Permanent loss of 4.69 ha of potential roosting habitat.	Significant
Black-throated finch (southern)	Indiscriminate loss of trees within 1 km of water <b>Temporary loss of habitat:</b> – Foraging: 40.77 ha – Nesting: 43.61 ha <b>Permanent loss of habitat:</b> – Foraging: 0 ha – Nesting: 33.11 ha	Indiscriminate loss of trees within 1 km of water associated with pump station and laydown areas Permanent loss of 33.11 ha of potential nesting habitat	Significant
Squatter pigeon (southern)	Loss of habitat (121.08 ha) of drinking and dispersal habitat, representing 2.6 percent of habitat within 1 km of the Project area No impact on breeding or foraging habitat	No impact	Not significant
White-throated needletail	No impact – almost exclusively aerial forager and does not have typical associations with habitat., non-breeding visitor	No impact	Not significant

Matter	Impact	Impact on habitat critical to the survival of the species	Significance of impact
Fork-tailed swift	No impact – almost exclusively aerial forager and does not have typical associations with habitat, non-breeding visitor	No impact	Not significant
Eastern osprey	No impact – clearing avoided through Project design	No impact	Not significant

## 8. Conclusion

Substantial avoidance has been achieved by locating the Project footprint within areas of existing disturbance wherever possible. Key impacts during the construction phase include localised losses of vegetation and habitat, due to clearing for the pump station, stockpiles, access and haulage tracks and other ancillary infrastructure. The siting of this infrastructure will result in direct loss of habitat, potential for mortality and injury of wildlife and indirect ecological impacts such as temporary disturbance of wildlife through construction light, noise, vibration, increased vehicle movements, restricted fauna movement and barrier effects, as well as the degradation of adjacent habitats through erosion and sedimentation and weed and pest invasion. Rehabilitation of temporary works areas will reduce the magnitude of impact on MNES. Despite this, the Project will have a significant impact on two MNES:

- Bare-rumped sheath-tail bat - due to a residual loss 4.9 ha of potential roosting habitat and the clearing and translocation of 10 large and 27 moderate *E. platyphylla* hollows representing potential roosting trees that would constitute habitat critical to the survival of the species)
- Black-throated finch (southern) – due to indiscriminate loss of trees within 1 km of water, and a residual loss of 33.11 ha of potential nesting habitat representing habitat critical to the survival of the species.

While the rehabilitation measures proposed in Section 4.3 have substantially reduced the magnitude and severity of impact, the Project is still likely to have a significant residual impact on the black-throated finch (southern) and bare-rumped sheath-tail bat. TCC are committed to exploring further opportunities to reduce the impact on habitat through practical mitigation measures that may be deemed suitable or if required an appropriate offset strategy to manage the residual risks in accordance with the requirements of the EPBC Act and the Commonwealth Environmental Offsets Policy.

## 9. References

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# Appendices

# Appendix A

Desktop results



# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 22/11/21 13:08:58

[Summary](#)

[Details](#)

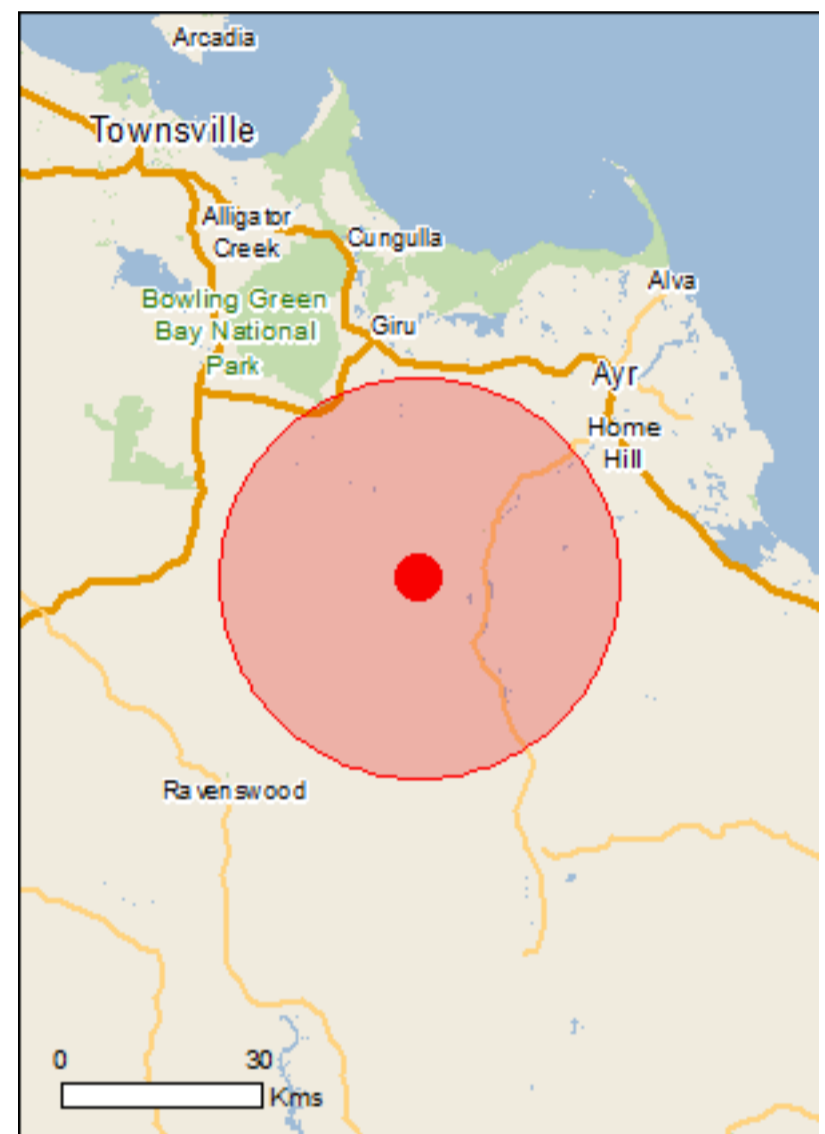
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

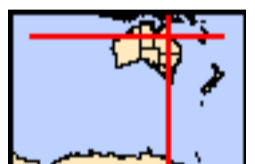
[Acknowledgements](#)



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[Coordinates](#)

Buffer: 30.0Km



# Summary

## Matters of National Environmental 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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	1
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	2
<a href="#">Listed Threatened Species:</a>	27
<a href="#">Listed Migratory Species:</a>	18

## 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 <http://www.environment.gov.au/heritage>

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

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	22
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	1
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	32
<a href="#">Nationally Important Wetlands:</a>	5
<a href="#">Key Ecological Features (Marine)</a>	None



# Details

## Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[ Resource Information ]
Name	Proximity
<a href="#">Bowling green bay</a>	Within 10km of Ramsar

## Listed Threatened Ecological Communities

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
<a href="#">Poplar Box Grassy Woodland on Alluvial Plains</a>	Endangered	Community may occur within area
<a href="#">Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions</a>	Endangered	Community likely to occur within area

## Listed Threatened Species

Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Erythrotriorchis radiatus</a> Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Neochmia ruficauda ruficauda</a> Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Poephila cincta cincta</a> Southern Black-throated Finch [64447]	Endangered	Species or species habitat known to occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<a href="#">Turnix olivii</a> Buff-breasted Button-quail [59293]	Endangered	Species or species habitat may occur within area
<a href="#">Tyto novaehollandiae kimberli</a> Masked Owl (northern) [26048]	Vulnerable	Species or species

Name	Status	Type of Presence
<b>Mammals</b>		
<a href="#">Dasyurus hallucatus</a> Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
<a href="#">Hipposideros semoni</a> Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area
<a href="#">Macroderma gigas</a> Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Rhinolophus robertsi</a> Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Vulnerable	Species or species habitat may occur within area
<a href="#">Saccolaimus saccolaimus nudicluniatus</a> Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Xeromys myoides</a> Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area
<b>Plants</b>		
<a href="#">Bulbophyllum globuliforme</a> Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Dichanthium setosum</a> bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Eucalyptus raveretiana</a> Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Marsdenia brevifolia</a> [64585]	Vulnerable	Species or species habitat may occur within area
<a href="#">Omphalea celata</a> [64586]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Tephrosia leveillei</a> [16946]	Vulnerable	Species or species habitat likely to occur within area
<b>Reptiles</b>		
<a href="#">Denisonia maculata</a> Ornamental Snake [1193]	Vulnerable	Species or species habitat may occur within area
<a href="#">Egernia rugosa</a> Yakka Skink [1420]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Lerista vittata</a> Mount Cooper Striped Skink, Mount Cooper Striped Lerista [1308]	Vulnerable	Species or species habitat may occur within area
<b>Sharks</b>		
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence
[60756]		within area
<b>Listed Migratory Species</b>		<a href="#">[ Resource Information ]</a>
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a>		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<b>Migratory Marine Species</b>		
<a href="#">Crocodylus porosus</a>		
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
<a href="#">Pristis pristis</a>		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Cuculus optatus</a>		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
<a href="#">Hirundapus caudacutus</a>		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Monarcha melanopsis</a>		
Black-faced Monarch [609]		Species or species habitat likely to occur within area
<a href="#">Monarcha trivirgatus</a>		
Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla flava</a>		
Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a>		
Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Rhipidura rufifrons</a>		
Rufous Fantail [592]		Species or species habitat likely to occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a>		
Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Calidris acuminata</a>		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a>		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a>		
Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Gallinago hardwickii</a>		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a>		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur

Name	Threatened	Type of Presence within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat known to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

## Other Matters Protected by the EPBC Act

### Listed Marine Species [\[ Resource Information \]](#)

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Anseranas semipalmata</a> Magpie Goose [978]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat known to occur within area
<a href="#">Chrysococcyx osculans</a> Black-eared Cuckoo [705]		Species or species habitat known to occur within area
<a href="#">Gallinago hardwickii</a> Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
<a href="#">Hirundapus caudacutus</a> White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Monarcha melanopsis</a> Black-faced Monarch [609]		Species or species habitat likely to occur within area
<a href="#">Monarcha trivirgatus</a> Spectacled Monarch [610]		Species or species habitat known to occur within area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Myiagra cyanoleuca</a> Satin Flycatcher [612]		Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat known to occur within area
<a href="#">Rhipidura rufifrons</a> Rufous Fantail [592]		Species or species habitat likely to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
<b>Reptiles</b>		
<a href="#">Crocodylus porosus</a> Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

## Extra Information

State and Territory Reserves	[ <a href="#">Resource Information</a> ]
Name	State
Bowling Green Bay	QLD



## Invasive Species

[ [Resource Information](#) ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
<b>Birds</b>		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
<b>Frogs</b>		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
<b>Mammals</b>		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

## Plants

Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

## Reptiles

Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area
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## Nationally Important Wetlands

Name	State
<a href="#">Barrattas Channels Aggregation</a>	QLD

[ [Resource Information](#) ]

Name	State
<a href="#">Burdekin - Townsville Coastal Aggregation</a>	QLD
<a href="#">Haughton Balancing Storage Aggregation</a>	QLD
<a href="#">Jerona Aggregation</a>	QLD
<a href="#">Junction of the Bogie River and Kirknie Creek Aggregation</a>	QLD

# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

# Coordinates

-19.83293 147.13819

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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# Queensland Government

## WildNet species list

Search Criteria: Species List for a Specified Point  
Species: All  
Type: All  
Queensland status: All  
Records: All  
Date: All  
Latitude: -19.8329  
Longitude: 147.1381  
Distance: 30  
Email: pascale.lin@ghd.com  
Date submitted: Thursday 30 Sep 2021 12:31:34  
Date extracted: Thursday 30 Sep 2021 12:40:02

The number of records retrieved = 677

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufo	<i>Rhinella marina</i>	cane toad	Y			12
animals	amphibians	Hylidae	<i>Litoria bicolor</i>	northern sedgefrog		C		1
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		1
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		2
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		2
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		1
animals	amphibians	Limnodynastidae	<i>Limnodynastes convexiusculus</i>	marbled frog		C		1
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		17
animals	birds	Acanthizidae	<i>Gerygone palpebrosa</i>	fairy gerygone		C		3
animals	birds	Acanthizidae	<i>Smicromis brevirostris</i>	weebill		C		13
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		7
animals	birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk		C		1
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		11
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		8
animals	birds	Accipitridae	<i>Circus approximans</i>	swamp harrier		C		6
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		6
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		7
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		19
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahmny kite		C		3
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		45
animals	birds	Accipitridae	<i>Lophoictinia isura</i>	square-tailed kite		C		3
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		61
animals	birds	Accipitridae	<i>Pandion cristatus</i>	eastern osprey		SL		1
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		7
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owlet-nightjar		C		1
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		4
animals	birds	Alcedinidae	<i>Ceyx pusillus</i>	little kingfisher		C		1
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		8
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		39
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		18
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		6
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		19
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		18
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		17/3
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		C		12
animals	birds	Anatidae	<i>Nettapus pulchellus</i>	green pygmy-goose		C		11
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		45
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	magpie goose		C		42
animals	birds	Apodidae	<i>Aerodramus terraereginae</i>	Australian swiftlet		C		2
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		2
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	1
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		36
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		24
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		14
animals	birds	Ardeidae	<i>Ardea sumatrana</i>	great-billed heron		C		2
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		10

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		9
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		27
animals	birds	Ardeidae	<i>Egretta picata</i>	piebald heron		C		1
animals	birds	Ardeidae	<i>Ixobrychus dubius</i>	Australian little bittern		C		1
animals	birds	Ardeidae	<i>Ixobrychus flavicollis</i>	black bittern		C		4
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		8
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		15
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		49
animals	birds	Artamidae	<i>Artamus minor</i>	little woodswallow		C		1
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		1
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		2
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	piebald butcherbird		C		45
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		6
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		58
animals	birds	Artamidae	<i>Strepera graculina</i>	piebald currawong		C		13
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		7
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		31
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		51
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		4
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		3
animals	birds	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		48
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		70
animals	birds	Campephagidae	<i>Coracina tenuirostris</i>	cidabird		C		2
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		6
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		27
animals	birds	Caprimulgidae	<i>Caprimulgus macrurus</i>	large-tailed nightjar		C		1
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		1
animals	birds	Charadriidae	<i>Charadrius ruficapillus</i>	red-capped plover		C		1
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel		C		5
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		35
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		14
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		10
animals	birds	Cisticolidae	<i>Cisticola juncidis laveryi</i>	zitting cisticola		C		2
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			5
animals	birds	Columbidae	<i>Ducula bicolor</i>	piebald imperial-pigeon		C		2
animals	birds	Columbidae	<i>Geopelia cuneata</i>	diamond dove		C		8
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		23
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		88
animals	birds	Columbidae	<i>Geophaps scripta</i>	squatter pigeon		C		11
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	2
animals	birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon		C		4
animals	birds	Columbidae	<i>Macropygia amboinensis</i>	brown cuckoo-dove		C		2
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		39
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		1
animals	birds	Columbidae	<i>Streptopelia chinensis</i>	spotted dove	Y			2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		21
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged cough		C		5
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		17
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		29
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		30
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		6
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		20
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		34/1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		44
animals	birds	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		C		11
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		2
animals	birds	Cuculidae	<i>Chalcites minutillus</i>	little bronze-cuckoo		C		11
animals	birds	Cuculidae	<i>Chalcites minutillus russatus</i>	Gould's bronze-cuckoo		C		4
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		12
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		14
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		45
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		341
animals	birds	Estrildidae	<i>Lonchura punctulata</i>	nutmeg mannikin	Y			8
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		12
animals	birds	Estrildidae	<i>Neochmia phaeton</i>	crimson finch		C		10
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch		C		12
animals	birds	Estrildidae	<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)		E	E	15
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		63
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		7
animals	birds	Eurostopodidae	<i>Eurostopodus argus</i>	spotted nightjar		C		1
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		13
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		10
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		7
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		5
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		1
animals	birds	Gruidae	<i>Antigone rubicunda</i>	broilga		C		13
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		60
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		33
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		60
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		3
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		31
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		14
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		22
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		23
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		26
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		2
animals	birds	Laridae	<i>Gelochelidon nilotica</i>	gull-billed tern		SL		2
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		SL		5
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		75
animals	birds	Megaluridae	<i>Cincloramphus mathewsi</i>	rufous songlark		C		21

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animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		22
animals	birds	Megapodiidae	<i>Alectura lathami</i>	Australian brush-turkey		C		6
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		1
animals	birds	Meliphagidae	<i>Conopophila rufogularis</i>	rufous-throated honeyeater		C		14
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		52/1
animals	birds	Meliphagidae	<i>Epthianura tricolor</i>	crimson chat		C		1
animals	birds	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater		C		1
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		47
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		25
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		5
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		5
animals	birds	Meliphagidae	<i>Meliphaga notata</i>	yellow-spotted honeyeater		C		3
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		56
animals	birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater		C		10
animals	birds	Meliphagidae	<i>Myzomela obscura</i>	dusky honeyeater		C		5
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		5
animals	birds	Meliphagidae	<i>Philemon buceroides</i>	helmeted friarbird		C		7
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		60
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		23
animals	birds	Meliphagidae	<i>Ramsayornis fasciatus</i>	bar-breasted honeyeater		C		3
animals	birds	Meliphagidae	<i>Ramsayornis modestus</i>	brown-backed honeyeater		C		21
animals	birds	Meliphagidae	<i>Stomiopera flava</i>	yellow honeyeater		C		91
animals	birds	Meliphagidae	<i>Stomiopera unicolor</i>	white-gaped honeyeater		C		6
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		66
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		80
animals	birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch		SL		3
animals	birds	Monarchidae	<i>Myiagra cyanoleuca</i>	satin flycatcher		SL		1
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		12
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		64
animals	birds	Monarchidae	<i>Symposiachrus trivirgatus</i>	spectacled monarch		SL		3
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		5
animals	birds	Nectariniidae	<i>Cinnyris jugularis</i>	olive-backed sunbird		C		32
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		18
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		2
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		23
animals	birds	Oriolidae	<i>Sphecotheres vieillotii</i>	Australasian figbird		C		24
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		10
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		1
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		12
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		1
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		89
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		51
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			6
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		17
animals	birds	Petroicidae	<i>Melanodryas cucullata</i>	hooded robin		C		1
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		10



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animals	birds	Petroicidae	<i>Microeca flavigaster</i>	lemon-bellied flycatcher		C		49
animals	birds	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin		C		2
animals	birds	Petroicidae	<i>Poecilodryas superciliosa</i>	white-browed robin		C		1
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		35
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		12
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		31
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	pied cormorant		C		3
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		11
animals	birds	Pittidae	<i>Pitta versicolor</i>	noisy pitta		C		1
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		5
animals	birds	Podicipedidae	<i>Podiceps cristatus</i>	great crested grebe		C		8
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		20
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		8
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		26
animals	birds	Psittacidae	<i>Melopsittacus undulatus</i>	budgerigar		C		2
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		58
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		25
animals	birds	Psittacidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		43
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	spotted bowerbird		C		1
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus nuchalis</i>	great bowerbird		C		29
animals	birds	Rallidae	<i>Amaurornis cinerea</i>	white-browed crane		C		3
animals	birds	Rallidae	<i>Amaurornis moluccana</i>	pale-vented bush-hen		C		7
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		5
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		5
animals	birds	Rallidae	<i>Gallirallus philippensis</i>	buff-banded rail		C		6
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		2
animals	birds	Rallidae	<i>Porzana fluminea</i>	Australian spotted crane		C		1
animals	birds	Rallidae	<i>Porzana pusilla</i>	Baillon's crane		C		1
animals	birds	Rallidae	<i>Porzana tabuensis</i>	spotless crane		C		1
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		4
animals	birds	Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	red-necked avocet		C		1
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		72
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		76
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		SL		2
animals	birds	Rhipiduridae	<i>Rhipidura rufiventris</i>	northern fantail		C		1
animals	birds	Scelopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		SL		1
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		1
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		8
animals	birds	Strigidae	<i>Ninox rufa queenslandica</i>	rufous owl (southern subspecies)		C		1
animals	birds	Sturnidae	<i>Aplonis metallica</i>	metallic starling		C		1
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		18
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		17
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		SL		4
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		34
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		39
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		2

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animals	birds	Turnicidae	<i>Turnix maculosus</i>	red-backed button-quail		C		4
animals	birds	Turnicidae	<i>Turnix pyrrhоторax</i>	red-chested button-quail		C		2
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		1
animals	birds	Tytonidae	<i>Tyto delicatula</i>	eastern barn owl		C		2
animals	mammals	Cervidae	<i>Axis axis</i>	chital	Y			1
animals	mammals	Dasyuridae	<i>Dasyurus hallucatus</i>	northern quoll		C	E	2
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			1
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		2
animals	mammals	Macropodidae	<i>Notamacropus agilis</i>	agile wallaby		C		2
animals	mammals	Macropodidae	<i>Petrogale assimilis</i>	allied rock-wallaby		C		5/5
animals	mammals	Macropodidae	<i>Petrogale inornata</i>	unadorned rock-wallaby		C		3/3
animals	mammals	Miniopteridae	<i>Miniopterus australis</i>	little bent-wing bat		C		1
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		1
animals	mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot		C		2/2
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	1
animals	mammals	Pteropodidae	<i>Pteropus alecto</i>	black flying-fox		C		2/1
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		1
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			6
animals	mammals	Vespertilionidae	<i>Myotis macropus</i>	large-footed myotis		C		1
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				1
animals	ray-finned fishes	Ambassidae	<i>Ambassis agrammus</i>	sailfin glassfish				11
animals	ray-finned fishes	Ambassidae	<i>Ambassis species</i>	northwest glassfish				2
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				40
animals	ray-finned fishes	Apogonidae	<i>Glossamia aprion</i>	mouth almighty				45
animals	ray-finned fishes	Ariidae	<i>Neoarius graeffei</i>	blue catfish				7
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				400
animals	ray-finned fishes	Belonidae	<i>Strongylura krefftii</i>	freshwater longtom				47
animals	ray-finned fishes	Centropomidae	<i>Lates calcarifer</i>	barramundi				188
animals	ray-finned fishes	Cichlidae	<i>Oreochromis mossambica</i>	Mozambique mouthbrooder	Y			4
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				518
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				67
animals	ray-finned fishes	Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod				218
animals	ray-finned fishes	Gobiidae	<i>Awaous acritosus</i>	roman-nose goby				1
animals	ray-finned fishes	Hemiramphidae	<i>Arrhamphus sclerolepis</i>	snubnose garfish				7
animals	ray-finned fishes	Megalopidae	<i>Megalops cyprinoides</i>	oxeye herring				36
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				84
animals	ray-finned fishes	Mugilidae	<i>Mugil cephalus</i>	sea mullet				1
animals	ray-finned fishes	Osteoglossidae	<i>Scleropages jardinii</i>	northern saratoga				1
animals	ray-finned fishes	Plotosidae	<i>Neosilurus ater</i>	black catfish				35
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtlii</i>	Hyrtl's catfish				1
animals	ray-finned fishes	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish	Y			1
animals	ray-finned fishes	Scatophagidae	<i>Scatophagus argus</i>	spotted scat				2
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				36
animals	ray-finned fishes	Terapontidae	<i>Hephaestus fuliginosus</i>	sooty grunter				22
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				6
animals	ray-finned fishes	Terapontidae	<i>Scortum parviceps</i>	smallhead grunter				3

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animals	ray-finned fishes	Toxotidae	<i>Toxotes chatareus</i>	sevenspot archerfish				20
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		2/1
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python		C		1/1
animals	reptiles	Carphodactylidae	<i>Nephrurus asper</i>	spiny knob-tailed gecko		C		1
animals	reptiles	Chelidae	<i>Chelodina canni</i>	Cann's longneck turtle		C		1
animals	reptiles	Chelidae	<i>Elseya irwini</i>	Irwin's turtle		C		1
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake		C		2
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		1
animals	reptiles	Diplodactylidae	<i>Oedura castelnaui</i>	northern velvet gecko		C		1
animals	reptiles	Elapidae	<i>Antaioserpens albiceps</i>	north-eastern plain-nosed burrowing snake		C		1/1
animals	reptiles	Elapidae	<i>Demansia torquata</i>	collared whipsnake		C		1
animals	reptiles	Elapidae	<i>Furina diadema</i>	red-naped snake		C		1
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		1
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		1/1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		2/1
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		4
animals	reptiles	Pygopodidae	<i>Delma tincta</i>	excitable delma		C		1/1
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		2/2
animals	reptiles	Scincidae	<i>Carlia jarnoldae</i>	lined rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		2
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus adamsi</i>	Adams' snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus sp.</i>			C		1
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		1
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>	fine-spotted mulch-skink		C		4/4
animals	reptiles	Scincidae	<i>Lampropholis delicata</i>	dark-flecked garden sunskink		C		3/3
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		2
animals	reptiles	Scincidae	<i>Pygmaeascincus timlowi</i>	dwarf litter-skink		C		1
animals	reptiles	Typhlopidae	<i>Anilius affinis</i>	small-headed blind snake		C		1
animals	reptiles	Varanidae	<i>Varanus storri</i>	Storr's monitor		C		2
plants	land plants	Acanthaceae	<i>Asystasia gangetica subsp. gangetica</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Hygrophila angustifolia</i>			C		1/1
plants	land plants	Acanthaceae	<i>Hypoestes floribunda var. floribunda</i>			C		1/1
plants	land plants	Acanthaceae	<i>Nelsonia campestris</i>			C		1/1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens subsp. adscendens</i>			C		1/1
plants	land plants	Acanthaceae	<i>Ruellia tuberosa</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Thunbergia fragrans</i>		Y			4/4
plants	land plants	Acanthaceae	<i>Thunbergia grandiflora</i>	sky flower	Y			1/1
plants	land plants	Alismataceae	<i>Caldesia oligococca</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera angustifolia</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera denticulata var. micrantha</i>			C		4/4
plants	land plants	Amaranthaceae	<i>Alternanthera ficoidea</i>		Y			2/2
plants	land plants	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		1/1

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plants	land plants	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed		C		1/1
plants	land plants	Amaranthaceae	<i>Amaranthus spinosus</i>	needle burr	Y			2/2
plants	land plants	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry		C		3/3
plants	land plants	Amaranthaceae	<i>Guilleminea densa</i>	small matweed	Y			1/1
plants	land plants	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum		C		1/1
plants	land plants	Apocynaceae	<i>Alyxia spicata</i>			C		1/1
plants	land plants	Apocynaceae	<i>Catharanthus roseus</i>	pink periwinkle	Y			1/1
plants	land plants	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			7/2
plants	land plants	Apocynaceae	<i>Nerium oleander</i>	oleander	Y			1/1
plants	land plants	Apocynaceae	<i>Parsonsia lanceolata</i>	northern silkpod		C		1/1
plants	land plants	Apocynaceae	<i>Vincetoxicum erectum</i>			C		5/5
plants	land plants	Apocynaceae	<i>Wrightia saligna</i>			C		1/1
plants	land plants	Araceae	<i>Lemna aequinoctialis</i>	common duckweed		C		1/1
plants	land plants	Asteraceae	<i>Acanthospermum hispidum</i>	star burr	Y			1/1
plants	land plants	Asteraceae	<i>Acmella grandiflora</i> var. <i>brachyglossa</i>			C		1/1
plants	land plants	Asteraceae	<i>Blumea saxatilis</i>			C		1/1
plants	land plants	Asteraceae	<i>Camptacra barbata</i>			C		1/1
plants	land plants	Asteraceae	<i>Centipeda borealis</i>			C		2/2
plants	land plants	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons		C		2/2
plants	land plants	Asteraceae	<i>Coronidium lanuginosum</i>			C		1/1
plants	land plants	Asteraceae	<i>Cyanthillium cinereum</i>			C		1/1
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			3/3
plants	land plants	Asteraceae	<i>Gynura drymophila</i> var. <i>drymophila</i>			C		1/1
plants	land plants	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			1/1
plants	land plants	Asteraceae	<i>Peripleura scabra</i>			C		2/2
plants	land plants	Asteraceae	<i>Pseudognaphalium luteoalbum</i>	Jersey cudweed		C		1/1
plants	land plants	Asteraceae	<i>Pterocaulon serrulatum</i> var. <i>serrulatum</i>			C		2/2
plants	land plants	Asteraceae	<i>Sphaeranthus indicus</i>			C		1/1
plants	land plants	Asteraceae	<i>Synedrella nodiflora</i>		Y			1/1
plants	land plants	Asteraceae	<i>Xanthium occidentale</i>		Y			1/1
plants	land plants	Asteraceae	<i>Xerochrysum bracteatum</i>	golden everlasting daisy		C		1/1
plants	land plants	Asteraceae	<i>Xerochrysum bracteatum</i> subsp. ( <i>Mount Elliot A.R.Bean 3593</i> )			C		1/1
plants	land plants	Bignoniaceae	<i>Dolichandrone alternifolia</i>			C		1/1
plants	land plants	Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine		C		1/1
plants	land plants	Bombacaceae	<i>Lagunaria queenslandica</i>			C		2/2
plants	land plants	Boraginaceae	<i>Cordia dichotoma</i>			C		1/1
plants	land plants	Boraginaceae	<i>Ehretia grahamii</i>			C		1/1
plants	land plants	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium ovalifolium</i>			C		2/2
plants	land plants	Byttneriaceae	<i>Hannafordia shanesii</i>			C		1/1
plants	land plants	Caesalpiniaceae	<i>Chamaecrista absus</i> var. <i>absus</i>			C		2/2
plants	land plants	Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C		1/1
plants	land plants	Caesalpiniaceae	<i>Parkinsonia aculeata</i>	parkinsonia	Y			2/2
plants	land plants	Caesalpiniaceae	<i>Senna gaudichaudii</i>			C		1/1
plants	land plants	Campanulaceae	<i>Lobelia quadrangularis</i>			C		1/1

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plants	land plants	Campanulaceae	<i>Wahlenbergia caryophylloides</i>			C		1/1
plants	land plants	Capparaceae	<i>Capparis canescens</i>			C		1/1
plants	land plants	Caryophyllaceae	<i>Polycarpaea spirostylis subsp. spirostylis</i>			C		1/1
plants	land plants	Casuarinaceae	<i>Casuarina cunninghamiana subsp. cunninghamiana</i>			C		1/1
plants	land plants	Celastraceae	<i>Denhamia cunninghamii</i>			C		2/2
plants	land plants	Celastraceae	<i>Denhamia oleaster</i>			C		1/1
plants	land plants	Celastraceae	<i>Elaeodendron melanocarpum</i>			C		1/1
plants	land plants	Chenopodiaceae	<i>Chenopodium album</i>	fat-hen	Y			2/2
plants	land plants	Chenopodiaceae	<i>Dysphania glomulifera subsp. glomulifera</i>			C		1/1
plants	land plants	Cleomaceae	<i>Arivela viscosa</i>			C		1/1
plants	land plants	Cleomaceae	<i>Tarenaya aculeata</i>		Y			1/1
plants	land plants	Clusiaceae	<i>Hypericum gramineum</i>			C		1/1
plants	land plants	Cochlospermaceae	<i>Cochlospermum gillivraei</i>			C		2/2
plants	land plants	Combretaceae	<i>Terminalia sericocarpa</i>	damson		C		1/1
plants	land plants	Convolvulaceae	<i>Argyreia nervosa</i>		Y			2/2
plants	land plants	Convolvulaceae	<i>Distimake quinquefolius</i>		Y			2/2
plants	land plants	Convolvulaceae	<i>Evolvulus nummularius</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Ipomoea abrupta</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea aquatica</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea eriocarpa</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea funicularis</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Jacquemontia paniculata</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Operculina turpethum</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Xenostegia tridentata</i>			C		1/1
plants	land plants	Cornaceae	<i>Alangium polyosmoides subsp. tomentosum</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Cucumis anguria var. anguria</i>	West Indian gherkin	Y			1/1
plants	land plants	Cucurbitaceae	<i>Diplocyclos palmatus subsp. affinis</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Luffa aegyptiaca</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus bulbosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus concinnus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus distans</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus iria</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus nervulosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus perangustus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus platystylis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus procerus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus scariosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis geniculata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis bisumbellata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush		C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis littoralis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis sieberiana</i>			C		1/1
plants	land plants	Cyperaceae	<i>Gahnia aspera</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenus falcatus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Scleria sphacelata</i>			C		2/2
plants	land plants	Droseraceae	<i>Drosera finlaysoniana</i>			C		1/1



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plants	land plants	Ebenaceae	<i>Diospyros geminata</i>	scaly ebony		C		1/1
plants	land plants	Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony		C		1/1
plants	land plants	Ebenaceae	<i>Diospyros laurina</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Acalypha eremorum</i>	soft acalypha		C		2/2
plants	land plants	Euphorbiaceae	<i>Claoxylon tenerifolium subsp. tenerifolium</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Croton</i>					1/1
plants	land plants	Euphorbiaceae	<i>Croton arnhemicus</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Croton pheballoides</i>	narrow-leaved croton		C		1/1
plants	land plants	Euphorbiaceae	<i>Euphorbia bifida</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Jatropha gossypifolia</i>	bellyache bush	Y			2/2
plants	land plants	Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C		2/2
plants	land plants	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	Y			5/1
plants	land plants	Fabaceae	<i>Abrus precatorius subsp. precatorius</i>			C		1/1
plants	land plants	Fabaceae	<i>Aeschynomene americana var. glandulosa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Aeschynomene indica</i>	budda pea		C		1/1
plants	land plants	Fabaceae	<i>Aeschynomene villosa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Alysicarpus bupleurifolius</i>	sweet alys	Y			1/1
plants	land plants	Fabaceae	<i>Alysicarpus ovalifolius</i>		Y			1/1
plants	land plants	Fabaceae	<i>Alysicarpus vaginalis</i>		Y			1/1
plants	land plants	Fabaceae	<i>Canavalia papuana</i>	wild jack bean		C		1/1
plants	land plants	Fabaceae	<i>Centrosema molle</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria aridicola subsp. aridicola</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria gorensis</i>	gambia pea	Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria laburnifolia</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria medicaginea var. medicaginea</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria mitchellii subsp. mitchellii</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria montana var. exserta</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria pallida var. obovata</i>		Y			3/3
plants	land plants	Fabaceae	<i>Crotalaria quinquefolia</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria retusa var. retusa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria sessiliflora var. anthylloides</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria verrucosa</i>			C		1/1
plants	land plants	Fabaceae	<i>Cullen badocanum</i>			C		3/3
plants	land plants	Fabaceae	<i>Desmodium scorpiurus</i>		Y			1/1
plants	land plants	Fabaceae	<i>Flemingia lineata</i>			C		1/1
plants	land plants	Fabaceae	<i>Galactia</i>					1/1
plants	land plants	Fabaceae	<i>Galactia tenuiflora var. lucida</i>			C		2/2
plants	land plants	Fabaceae	<i>Glycine</i>					1/1
plants	land plants	Fabaceae	<i>Hovea longipes</i>	brush hovea		C		1/1
plants	land plants	Fabaceae	<i>Indigofera</i>					1/1
plants	land plants	Fabaceae	<i>Indigofera linifolia</i>			C		1/1
plants	land plants	Fabaceae	<i>Indigofera pratensis</i>			C		1/1
plants	land plants	Fabaceae	<i>Indigofera tryonii</i>			C		1/1
plants	land plants	Fabaceae	<i>Macroptilium lathyroides</i>		Y			1/1
plants	land plants	Fabaceae	<i>Millettia pinnata</i>			C		1/1
plants	land plants	Fabaceae	<i>Mucuna gigantea</i>	burny bean		C		1/1

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plants	land plants	Fabaceae	<i>Tephrosia</i>					1/1
plants	land plants	Fabaceae	<i>Tephrosia brachyodon</i> var. <i>longifolia</i>			C		2/2
plants	land plants	Fabaceae	<i>Tephrosia filipes</i> subsp. <i>filipes</i>			C		1/1
plants	land plants	Fabaceae	<i>Tephrosia macrostachya</i>			C		1/1
plants	land plants	Fabaceae	<i>Uraria lagopodioides</i>			C		1/1
plants	land plants	Fabaceae	<i>Vigna radiata</i> var. <i>sublobata</i>			C		1/1
plants	land plants	Fabaceae	<i>Vigna</i> sp. (Greta Creek R.J.Lawn+ AQ532201)			C		3/3
plants	land plants	Fabaceae	<i>Vigna</i> sp. (Station Creek R.J.Lawn CQ3284)			C		2/2
plants	land plants	Fabaceae	<i>Zornia muelleriana</i> subsp. <i>muelleriana</i>			C		1/1
plants	land plants	Fabaceae	<i>Zornia muriculata</i> subsp. <i>angustata</i>			C		3/3
plants	land plants	Goodeniaceae	<i>Goodenia pilosa</i>			C		1/1
plants	land plants	Goodeniaceae	<i>Goodenia rosulata</i>			C		1/1
plants	land plants	Haloragaceae	<i>Gonocarpus acanthocarpus</i>			C		1/1
plants	land plants	Haloragaceae	<i>Myriophyllum verrucosum</i>	water milfoil		C		1/1
plants	land plants	Helicteraceae	<i>Helicteres semiglabra</i>			C		1/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i>			C		2/2
plants	land plants	Hydrocharitaceae	<i>Hydrilla verticillata</i>	hydrilla		C		1/1
plants	land plants	Hydrocharitaceae	<i>Hydrocharis dubia</i>	frogbit	Y			1/1
plants	land plants	Hydrocharitaceae	<i>Ottelia alismoides</i>			C		1/1
plants	land plants	Hydrocharitaceae	<i>Ottelia ovalifolia</i> subsp. <i>ovalifolia</i>			C		1/1
plants	land plants	Lamiaceae	<i>Basilicum polystachyon</i>			C		2/2
plants	land plants	Lamiaceae	<i>Clerodendrum floribundum</i>			C		5/5
plants	land plants	Lamiaceae	<i>Coleus graveolens</i>			C		1/1
plants	land plants	Lamiaceae	<i>Coleus scutellarioides</i>			C		1/1
plants	land plants	Lamiaceae	<i>Leucas decemdentata</i>			C		1/1
plants	land plants	Lamiaceae	<i>Leucas lavandulifolia</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Mesosphaerum suaveolens</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Ocimum americanum</i>		Y			2/2
plants	land plants	Lamiaceae	<i>Pityrodia salviiifolia</i>	pityrodia		C		1/1
plants	land plants	Lamiaceae	<i>Premna dallachyana</i>			C		1/1
plants	land plants	Lamiaceae	<i>Premna serratifolia</i>			C		1/1
plants	land plants	Lamiaceae	<i>Teucrium modestum</i>			C		2/2
plants	land plants	Lauraceae	<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>			C		2/2
plants	land plants	Lauraceae	<i>Litsea glutinosa</i>			C		2/2
plants	land plants	Laxmanniaceae	<i>Lomandra longifolia</i>			C		1/1
plants	land plants	Lentibulariaceae	<i>Utricularia aurea</i>	golden bladderwort		C		1/1
plants	land plants	Lentibulariaceae	<i>Utricularia stellaris</i>			C		1/1
plants	land plants	Loranthaceae	<i>Lysiana subfalcata</i>			C		1/1
plants	land plants	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry		C		1/1
plants	land plants	Malvaceae	<i>Abutilon auritum</i>	Chinese lantern		C		1/1
plants	land plants	Malvaceae	<i>Abutilon guineense</i>		Y			1/1
plants	land plants	Malvaceae	<i>Abutilon micropetalum</i>			C		1/1
plants	land plants	Malvaceae	<i>Hibiscus krichauffianus</i>			C		1/1
plants	land plants	Malvaceae	<i>Hibiscus panduriformis</i>			C		2/2
plants	land plants	Malvaceae	<i>Hibiscus vitifolius</i>			C		1/1
plants	land plants	Malvaceae	<i>Sida acuta</i>	spinyhead sida	Y			1/1

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plants	land plants	Malvaceae	<i>Sida hackettiana</i>			C		1/1
plants	land plants	Malvaceae	<i>Urena lobata</i>	urena weed	Y			1/1
plants	land plants	Marsileaceae	<i>Marsilea mutica</i>	shiny nardoo		C		1/1
plants	land plants	Martyniaceae	<i>Martynia annua</i>	small-fruited devil's claw	Y			2/2
plants	land plants	Menispermaceae	<i>Pachygone ovata</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia hemsleyi</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia jackesiana</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle		C		1/1
plants	land plants	Mimosaceae	<i>Acacia tephрина</i>			C		2/2
plants	land plants	Mimosaceae	<i>Desmanthus leptophyllus</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Leucaena leucocephala</i>		Y			3
plants	land plants	Mimosaceae	<i>Leucaena leucocephala subsp. leucocephala</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Neptunia gracilis forma gracilis</i>			C		1/1
plants	land plants	Mimosaceae	<i>Neptunia major</i>			C		3/3
plants	land plants	Mimosaceae	<i>Neptunia monosperma</i>			C		1/1
plants	land plants	Mimosaceae	<i>Senegalia</i>					1/1
plants	land plants	Mimosaceae	<i>Vachellia farnesiana</i>		Y			1/1
plants	land plants	Molluginaceae	<i>Glinus lotoides</i>	hairy carpet weed		C		1/1
plants	land plants	Molluginaceae	<i>Glinus oppositifolius</i>			C		1/1
plants	land plants	Molluginaceae	<i>Mollugo verticillata</i>		Y			2/2
plants	land plants	Moraceae	<i>Ficus rubiginosa forma rubiginosa</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Lysimachia ovalis</i>			C		2/2
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		2/2
plants	land plants	Myrtaceae	<i>Corymbia dallachiana</i>			C		2/2
plants	land plants	Myrtaceae	<i>Corymbia lamprophylla</i>			C		1/1
plants	land plants	Myrtaceae	<i>Corymbia leichhardtii</i>	rustyjacket		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus brownii</i>	Reid River box		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus drepanophylla</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus persistens</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum		C		2/2
plants	land plants	Myrtaceae	<i>Eucalyptus raveretiana</i>	black ironbox		C	V	1/1
plants	land plants	Myrtaceae	<i>Eucalyptus shirleyi</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus xanthoclada</i>	yellow-branched ironbark		C		2/2
plants	land plants	Myrtaceae	<i>Gossia bidwillii</i>			C		4/4
plants	land plants	Myrtaceae	<i>Leptospermum anfractum</i>			C		1/1
plants	land plants	Myrtaceae	<i>Lophostemon grandiflorus subsp. riparius</i>			C		5/5
plants	land plants	Myrtaceae	<i>Melaleuca bracteata</i>			C		3/3
plants	land plants	Myrtaceae	<i>Melaleuca leucadendra</i>	broad-leaved tea-tree		C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca nervosa</i>			C		4/4
plants	land plants	Myrtaceae	<i>Melaleuca viminalis</i>			C		1/1
plants	land plants	Myrtaceae	<i>Rhodomyrtus trineura subsp. trineura</i>			C		1/1
plants	land plants	Myrtaceae	<i>Syzygium cumini</i>		Y			1/1
plants	land plants	Najadaceae	<i>Najas tenuifolia</i>	water nymph		C		1/1
plants	land plants	Nelumbonaceae	<i>Nelumbo nucifera</i>	pink waterlily		C		2/2
plants	land plants	Nyctaginaceae	<i>Pisonia aculeata</i>	thorny pisonia		C		2/2
plants	land plants	Orchidaceae	<i>Cymbidium canaliculatum</i>			C		1/1

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plants	land plants	Papaveraceae	<i>Argemone ochroleuca subsp. ochroleuca</i>	Mexican poppy	Y			1/1
plants	land plants	Passifloraceae	<i>Passiflora foetida</i>		Y			1/1
plants	land plants	Passifloraceae	<i>Passiflora suberosa subsp. litoralis</i>		Y			1/1
plants	land plants	Phrymaceae	<i>Glossostigma diandrum</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Antidesma parvifolium</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Breynia oblongifolia</i>				C	2/2
plants	land plants	Phyllanthaceae	<i>Bridelia leichhardtii</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Flueggea virosa subsp. melanthesoides</i>				C	3/3
plants	land plants	Phyllanthaceae	<i>Phyllanthus carpentariae</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus reticulatus</i>				C	1/1
plants	land plants	Phyllanthaceae	<i>Poranthera microphylla</i>	small poranthera			C	1/1
plants	land plants	Picrodendraceae	<i>Dissiliaria indistincta</i>				C	1/1
plants	land plants	Picrodendraceae	<i>Petalostigma banksii</i>				C	1/1
plants	land plants	Pittosporaceae	<i>Bursaria incana</i>				C	1/1
plants	land plants	Plantaginaceae	<i>Bacopa floribunda</i>				C	2/2
plants	land plants	Plantaginaceae	<i>Mecardonia procumbens</i>		Y			1/1
plants	land plants	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			2/2
plants	land plants	Poaceae	<i>Alloteropsis cimicina</i>				C	1/1
plants	land plants	Poaceae	<i>Alloteropsis semialata</i>	cockatoo grass			C	1/1
plants	land plants	Poaceae	<i>Aristida holathera var. holathera</i>				C	1/1
plants	land plants	Poaceae	<i>Arundinella setosa</i>				C	1/1
plants	land plants	Poaceae	<i>Bothriochloa bladhii subsp. bladhii</i>				C	2/2
plants	land plants	Poaceae	<i>Bothriochloa decipiens var. cloncurransis</i>				C	1/1
plants	land plants	Poaceae	<i>Bothriochloa decipiens var. decipiens</i>				C	2/2
plants	land plants	Poaceae	<i>Cenchrus caliculatus</i>	hillside burrgrass			C	1/1
plants	land plants	Poaceae	<i>Cenchrus purpureus</i>		Y			1/1
plants	land plants	Poaceae	<i>Chionachne cyathopoda</i>	river grass			C	2/2
plants	land plants	Poaceae	<i>Chionachne hubbardiana</i>				C	1/1
plants	land plants	Poaceae	<i>Chloris inflata</i>	purpletop chloris	Y			1/1
plants	land plants	Poaceae	<i>Chloris pectinata</i>	comb chloris			C	1/1
plants	land plants	Poaceae	<i>Dactyloctenium radulans</i>	button grass			C	1/1
plants	land plants	Poaceae	<i>Dichanthium annulatum</i>	sheda grass	Y			1/1
plants	land plants	Poaceae	<i>Dichanthium fecundum</i>	curly bluegrass			C	3/3
plants	land plants	Poaceae	<i>Dichanthium sericeum subsp. polystachyum</i>				C	1/1
plants	land plants	Poaceae	<i>Dinebra ligulata</i>				C	1/1
plants	land plants	Poaceae	<i>Dinebra neesii</i>				C	2/2
plants	land plants	Poaceae	<i>Dinebra panicea var. brachiata</i>		Y			1/1
plants	land plants	Poaceae	<i>Echinochloa frumentacea</i>	Siberian millet	Y			1/1
plants	land plants	Poaceae	<i>Echinochloa turneriana</i>	channel millet			C	1/1
plants	land plants	Poaceae	<i>Elytrophorus spicatus</i>				C	1/1
plants	land plants	Poaceae	<i>Enneapogon lindleyanus</i>				C	1/1
plants	land plants	Poaceae	<i>Eragrostis elongata</i>				C	1/1
plants	land plants	Poaceae	<i>Eriochloa crebra</i>	spring grass			C	1/1
plants	land plants	Poaceae	<i>Eriochloa pseudoacrotricha</i>				C	1/1
plants	land plants	Poaceae	<i>Eulalia aurea</i>	silky browntop			C	1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Poaceae	<i>Heteropogon triticeus</i>	giant speargrass		C		1/1
plants	land plants	Poaceae	<i>Hymenachne amplexicaulis</i> 'Olive'		Y			2
plants	land plants	Poaceae	<i>Leersia hexandra</i>	swamp rice grass		C		1/1
plants	land plants	Poaceae	<i>Melinis repens</i>	red natal grass	Y			1/1
plants	land plants	Poaceae	<i>Oryza australiensis</i>			C		1/1
plants	land plants	Poaceae	<i>Oryza meridionalis</i>			C		1/1
plants	land plants	Poaceae	<i>Oryza sativa</i>		Y			1/1
plants	land plants	Poaceae	<i>Oxychloris scariosa</i>	winged chloris		C		1/1
plants	land plants	Poaceae	<i>Panicum decompositum</i> var. <i>decompositum</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum laevinode</i>	pepper grass		C		1/1
plants	land plants	Poaceae	<i>Panicum trachyrhachis</i>			C		1/1
plants	land plants	Poaceae	<i>Panicum trichoides</i>			C		1/1
plants	land plants	Poaceae	<i>Rottboellia cochinchinensis</i>		Y			2/2
plants	land plants	Poaceae	<i>Setaria surgens</i>			C		1/1
plants	land plants	Poaceae	<i>Sorghum arundinaceum</i>	Rhodesian Sudan grass	Y			1/1
plants	land plants	Poaceae	<i>Sorghum bicolor</i>	forage sorghum	Y			5/5
plants	land plants	Poaceae	<i>Sorghum halepense</i>	Johnson grass	Y			2/2
plants	land plants	Poaceae	<i>Sorghum nitidum</i> forma <i>aristatum</i>			C		1/1
plants	land plants	Poaceae	<i>Sorghum x alnum</i>		Y			2/2
plants	land plants	Poaceae	<i>Sporobolus actinocladus</i>	katoora grass		C		1/1
plants	land plants	Poaceae	<i>Sporobolus australasicus</i>			C		1/1
plants	land plants	Poaceae	<i>Sporobolus caroli</i>	fairy grass		C		1/1
plants	land plants	Poaceae	<i>Sporobolus jacquemontii</i>		Y			2/2
plants	land plants	Poaceae	<i>Themeda quadrivalvis</i>	grader grass	Y			4/1
plants	land plants	Poaceae	<i>Themeda triandra</i>	kangaroo grass		C		1/1
plants	land plants	Poaceae	<i>Urochloa subquadripara</i>		Y			1/1
plants	land plants	Poaceae	<i>Vacoparis laxiflorum</i>			C		1/1
plants	land plants	Polygonaceae	<i>Persicaria barbata</i>			C		1/1
plants	land plants	Polygonaceae	<i>Persicaria decipiens</i>	slender knotweed		C		1/1
plants	land plants	Polygonaceae	<i>Persicaria lapathifolia</i>	pale knotweed		C		2/2
plants	land plants	Polygonaceae	<i>Polygonum plebeium</i>	small knotweed		C		2/2
plants	land plants	Pontederiaceae	<i>Monochoria australasica</i>			C		1/1
plants	land plants	Pontederiaceae	<i>Monochoria cyanea</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea glauca</i>	bushy's clothes peg		C		1/1
plants	land plants	Proteaceae	<i>Grevillea parallela</i>			C		1/1
plants	land plants	Proteaceae	<i>Grevillea striata</i>	beefwood		C		1/1
plants	land plants	Pteridaceae	<i>Adiantum atroviride</i>			C		1/1
plants	land plants	Pteridaceae	<i>Ceratopteris thalictroides</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes brownii</i>			C		2/2
plants	land plants	Pteridaceae	<i>Cheilanthes nudiuscula</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes pumilio</i>			C		1/1
plants	land plants	Pteridaceae	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			C		1/1
plants	land plants	Putranjivaceae	<i>Drypetes deplanchei</i>	grey boxwood		C		1/1
plants	land plants	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree		C		1/1
plants	land plants	Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	Y			1/1
plants	land plants	Rubiaceae	<i>Dentella repens</i>	dentella		C		1/1



Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Rubiaceae	<i>Larsenaikia ochreatea</i>			C		1/1
plants	land plants	Rubiaceae	<i>Nauclea orientalis</i>	Leichhardt tree		C		1/1
plants	land plants	Rubiaceae	<i>Pavetta australiensis</i> var. <i>australiensis</i>			C		1/1
plants	land plants	Rubiaceae	<i>Psychotria daphnoides</i> var. <i>daphnoides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Scleromitron galioides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Spermacoce</i> sp. (Lorim Point A.Morton AM1237)			C		1/1
plants	land plants	Rubiaceae	<i>Timonius timon</i> var. <i>timon</i>			C		4/4
plants	land plants	Rutaceae	<i>Acronychia laevis</i>	glossy acronychia		C		1/1
plants	land plants	Salviniaceae	<i>Azolla pinnata</i>	fern azolla		C		1/1
plants	land plants	Salviniaceae	<i>Azolla rubra</i>			C		1/1
plants	land plants	Salviniaceae	<i>Salvinia molesta</i>	salvinia	Y			1/1
plants	land plants	Santalaceae	<i>Exocarpos latifolius</i>			C		1/1
plants	land plants	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		1/1
plants	land plants	Sapindaceae	<i>Arytera divaricata</i>	coogera		C		1/1
plants	land plants	Sapindaceae	<i>Atalaya multiflora</i>	broad-leaved whitewood		C		1/1
plants	land plants	Sapindaceae	<i>Cardiospermum halicacabum</i> var. <i>halicacabum</i>		Y			1/1
plants	land plants	Sapindaceae	<i>Cupaniopsis anacardioides</i>	tuckeroo		C		2/2
plants	land plants	Sapindaceae	<i>Harpullia hillii</i>			C		2/2
plants	land plants	Sapotaceae	<i>Amorphospermum antilogum</i>			C		1/1
plants	land plants	Sapotaceae	<i>Planchonella cotinifolia</i> var. <i>pubescens</i>			C		1/1
plants	land plants	Scrophulariaceae	<i>Myoporum acuminatum</i>	coastal boobialla		C		1/1
plants	land plants	Solanaceae	<i>Datura inoxia</i>		Y			1/1
plants	land plants	Solanaceae	<i>Nicotiana glauca</i>	tree tobacco	Y			1/1
plants	land plants	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		2/2
plants	land plants	Solanaceae	<i>Solanum sporadotrichum</i>			NT		1/1
plants	land plants	Solanaceae	<i>Solanum torvum</i>	devil's fig	Y			1/1
plants	land plants	Sparrmanniaceae	<i>Corchorus olerorius</i>	jute		C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia australis</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia graniticola</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia savannicola</i>			C		1/1
plants	land plants	Stackhousiaceae	<i>Stackhousia intermedia</i>			C		1/1
plants	land plants	Sterculiaceae	<i>Brachychiton</i>					1/1
plants	land plants	Stylidiaceae	<i>Stylidium rotundifolium</i>			C		1/1
plants	land plants	Thymelaeaceae	<i>Pimelea sericostachya</i>			C		1/1
plants	land plants	Turneraceae	<i>Turnera ulmifolia</i>		Y			3/3
plants	land plants	Vitaceae	<i>Cissus cardiophylla</i>			C		1/1

#### CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*.

The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

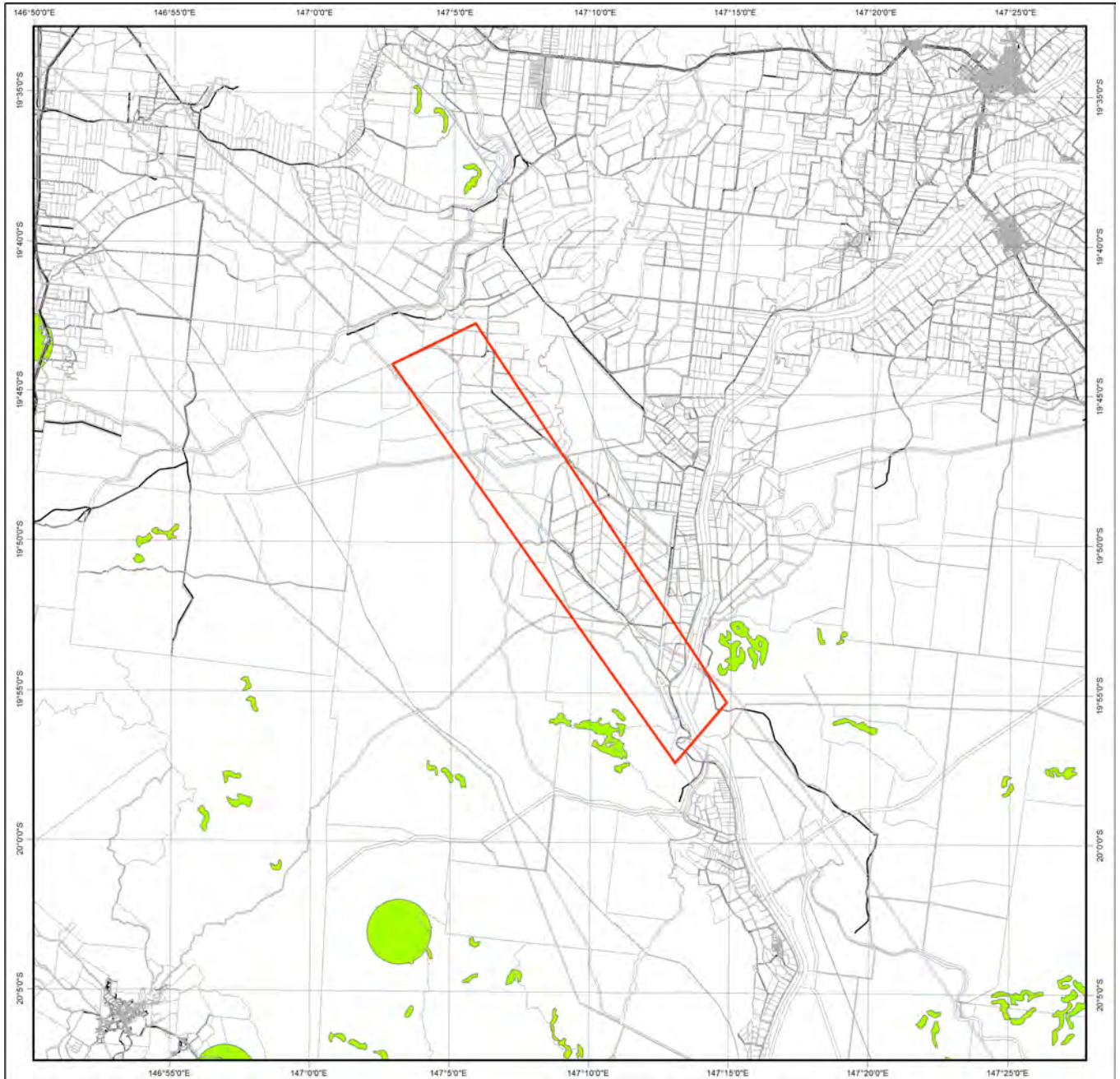
A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.

The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).






This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.

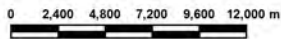
This number is output as 999 if it equals or exceeds this value.



### Protected Plants Flora Survey Trigger Map

**Legend**

-  polygon
-  High risk area
-  Other land parcel boundaries
-  Freeways / motorways / highways
-  Secondary roads / streets



This product is projected into:  
GDA 1994 Queensland Albers

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at [palm@des.qld.gov.au](mailto:palm@des.qld.gov.au)

**Disclaimer:**  
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

## Protected plants flora survey trigger map

The protected plants flora survey trigger map identifies 'high risk areas' where endangered, vulnerable or near threatened plants are known to exist or are likely to exist. Under the *Nature Conservation Act 1992* (the Act) it is an offence to clear protected plants that are 'in the wild' unless you are authorised or the clearing is exempt, for more information see [section 89](#) of the Act.

Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for information on what exemptions may apply in your circumstances, whether you may need to undertake a flora survey, and whether you may need a protected plants clearing permit.

### Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

### Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the [Queensland Spatial Catalogue](#), the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for more information.



Queensland Government

Department of Environment and Science

Environmental Reports

# **Matters of State Environmental Significance**

For the selected area of interest

## Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: [Planning.Support@des.qld.gov.au](mailto:Planning.Support@des.qld.gov.au)

### Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.





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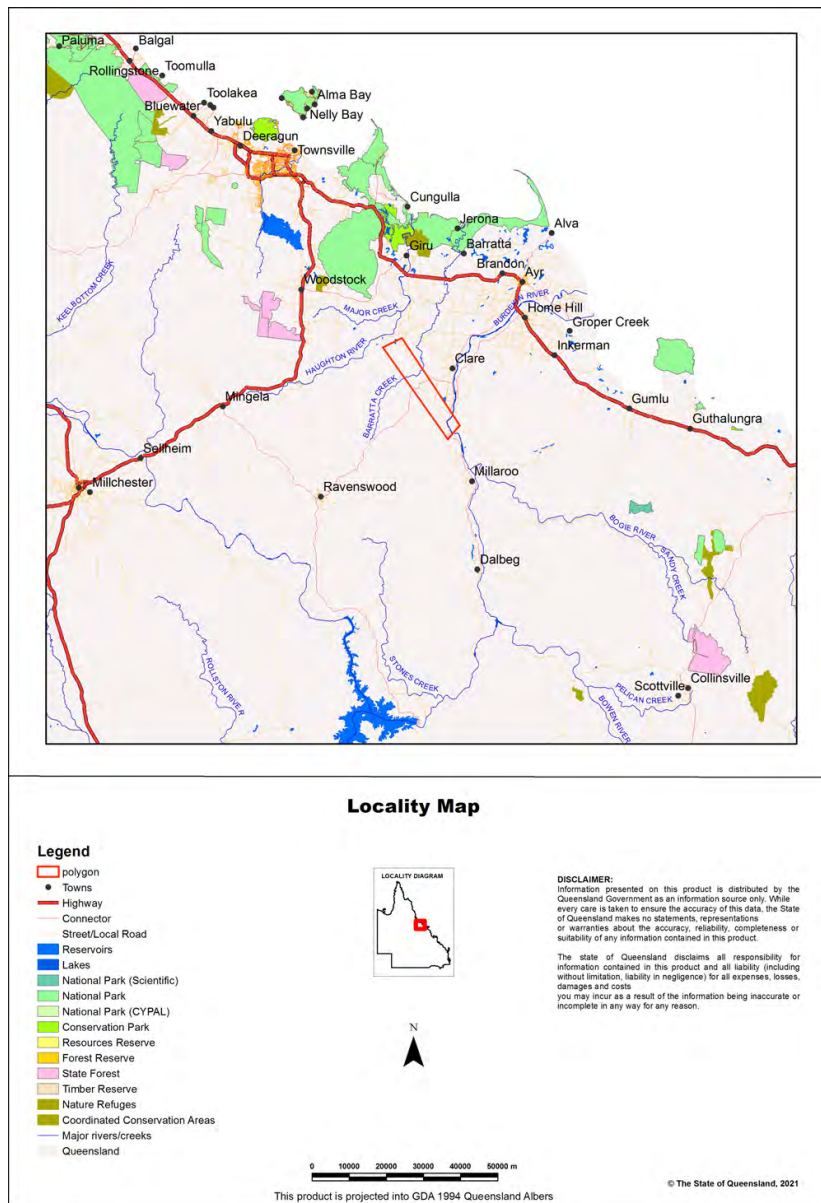
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## Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

**Table 1: Summary table, details for AOI**

Size (ha)	15,299.31
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Bogie River Hills, Townsville Plains
Catchment(s)	Burdekin, Haughton



## Matters of State Environmental Significance (MSES)

### MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;
- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;
- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;
- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;
- Regulated vegetation under the *Vegetation Management Act 1999* that is:
  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;
- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;
- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;
- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

## MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

**Table 2: Summary of MSES present within the AOI**

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
1c Protected Areas- special wildlife reserves	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	6.05 ha	0.0%
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	377.76 ha	2.5%
7b Special least concern animals	0.0 ha	0.0 %
7c i Koala habitat area - core (SEQ)	0.0 ha	0.0 %
7c ii Koala habitat area - locally refined (SEQ)	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	346.25 ha	2.3%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	5.65 ha	0.0%
8c Regulated Vegetation - Category R (GBR riverine regrowth)	75.9 ha	0.5%
8d Regulated Vegetation - Essential habitat	378.44 ha	2.5%
8e Regulated Vegetation - intersecting a watercourse **	115.0 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	40.88 ha	0.3%
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

---

## **Additional Information with Respect to MSES Values Present**

### **MSES - State Conservation Areas**

#### **1a. Protected Areas - estates**

(no results)

#### **1b. Protected Areas - nature refuges**

(no results)

#### **1c. Protected Areas - special wildlife reserves**

(no results)

#### **2. State Marine Parks - highly protected zones**

(no results)

#### **3. Fish habitat areas (A and B areas)**

(no results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

### **MSES - Wetlands and Waterways**

#### **4. Strategic Environmental Areas (SEA)**

(no results)

#### **5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values**

Natural wetlands that are 'High Ecological Significance' (HES) on the Map of Queensland Wetland Environmental Values are present.

#### **6a. Wetlands in High Ecological Value (HEV) waters**

(no results)

#### **6b. Waterways in High Ecological Value (HEV) waters**

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

### **MSES - Species**

#### **7a. Threatened (endangered or vulnerable) wildlife**

Values are present



**7b. Special least concern animals**

Not applicable

**7c i. Koala habitat area - core (SEQ)**

Not applicable

**7c ii. Koala habitat area - locally refined (SEQ)**

Not applicable

**Threatened (endangered or vulnerable) wildlife habitat suitability models**

Species	Common name	NCA status	Presence
<i>Boronia keysii</i>		V	None
<i>Calyptorhynchus lathamii</i>	Glossy black cockatoo	V	None
<i>Casuarus casuarus johnsonii</i>	Sthn population cassowary	E	None
<i>Crinia tinnula</i>	Wallum froglet	V	None
<i>Denisonia maculata</i>	Ornamental snake	V	None
<i>Litoria freycineti</i>	Wallum rocketfrog	V	None
<i>Litoria olongburensis</i>	Wallum sedgefrog	V	None
<i>Melaleuca irbyana</i>		E	None
<i>Petaurus gracilis</i>	Mahogany Glider	E	None
<i>Petrogale persephone</i>	Proserpine rock-wallaby	E	None
<i>Phascolarctos cinereus</i>	Koala - outside SEQ*	V	None
<i>Pezoporus wallicus wallicus</i>	Eastern ground parrot	V	None
<i>Taudactylus pleione</i>	Kroombit tinkerfrog	E	None
<i>Xeromys myoides</i>	Water Mouse	V	None

\*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

**Threatened (endangered or vulnerable) wildlife species records**

Scientific name	Common name	NCA status	EPBC status	Migratory status
<i>Phascolarctos cinereus</i>	koala	V	V	
<i>Crocodylus porosus</i>	estuarine crocodile	V		M-B/E
<i>Saccolaimus saccolaimus nudicluniatus</i>	bare-rumped sheath-tail bat	E	V	

**Special least concern animal species records**

(no results)

\*Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL).  
Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

<https://www.qld.gov.au/environment/plants-animals/species-list/>

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** for an overview of the relevant MSES.

## MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

<https://environment.ehp.qld.gov.au/regional-ecosystems/>

### 8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.12.1/11.12.9/11.3.34/11.3.25	O-subdom	rem_oc
11.3.4	O-dom	rem_oc
11.3.4/11.3.25/11.3.13/11.3.25b	O-dom	rem_oc

### 8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.4	O-dom	hvr_oc
11.3.4/11.3.25/11.3.13/11.3.25b	O-dom	hvr_oc

### 8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number	RVM rule
R	8358	None

### 8d. Regulated Vegetation - Essential habitat

Values are present

### 8e. Regulated Vegetation - intersecting a watercourse\*\*

A vegetation management watercourse is mapped as present

### 8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Regulated vegetation map category	Map number	RVM rule
B	8358	None

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

**MSES - Offsets**

**9a. Legally secured offset areas - offset register areas**

(no results)

**9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation**

(no results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

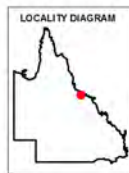
# Map 1 - MSES - State Conservation Areas



## MSES - State Conservation Areas

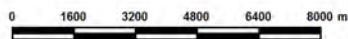
### Area of Interest

-  polygon
-  Towns
-  Freeways/Highways
-  Secondary roads
-  Major rivers/creeks
-  Protected area (estates, nature refuges, special wildlife reserves)
-  Declared fish habitat area (A and B areas)
-  Marine park (highly protected)



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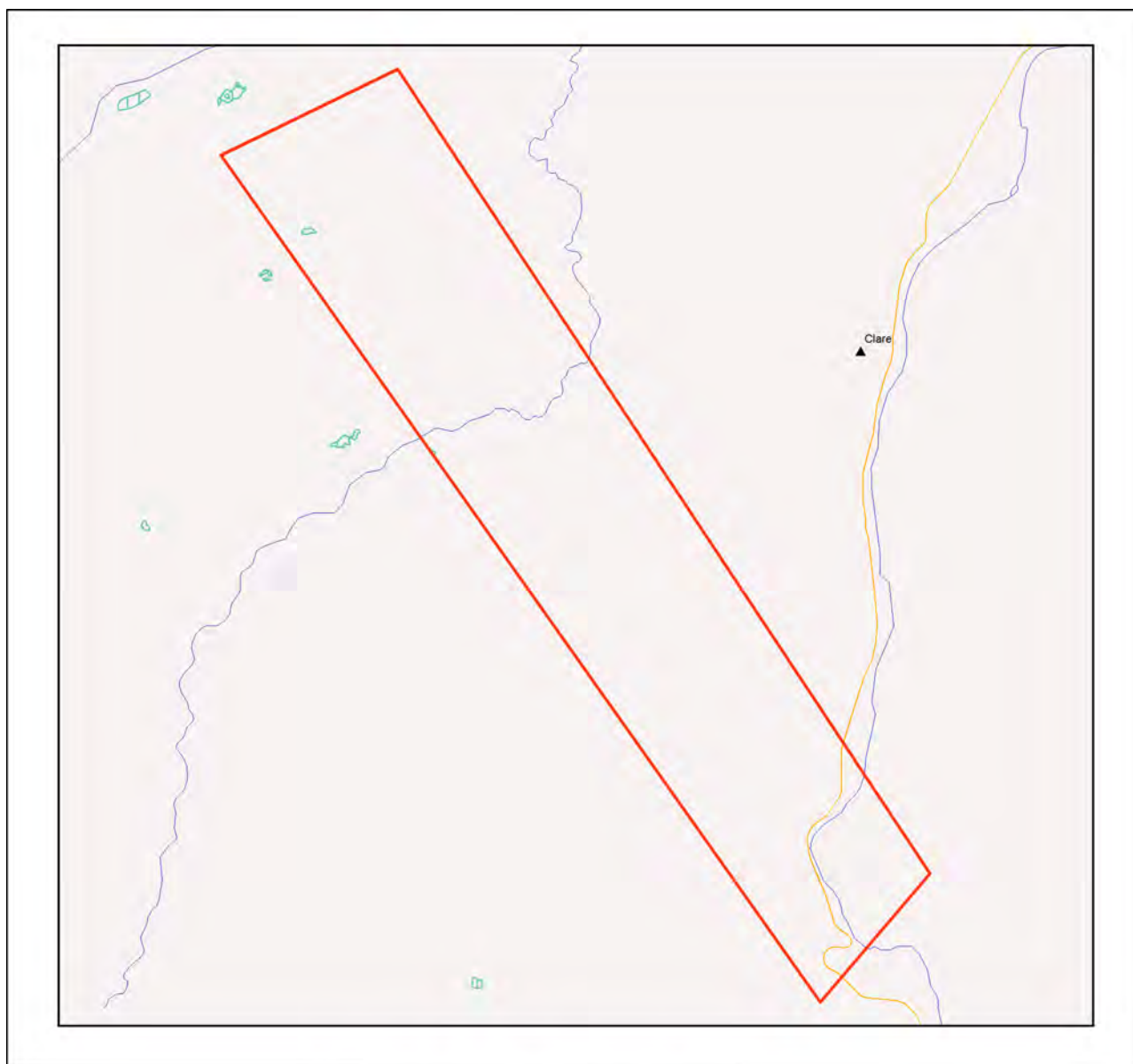
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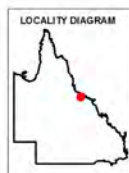
## Map 2 - MSES - Wetlands and Waterways



### MSES - Wetlands and Waterways

**Area of Interest**

- polygon
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- Strategic environmental area (designated precinct)
- Declared high ecological value waters (wetland)
- High ecological significance wetlands



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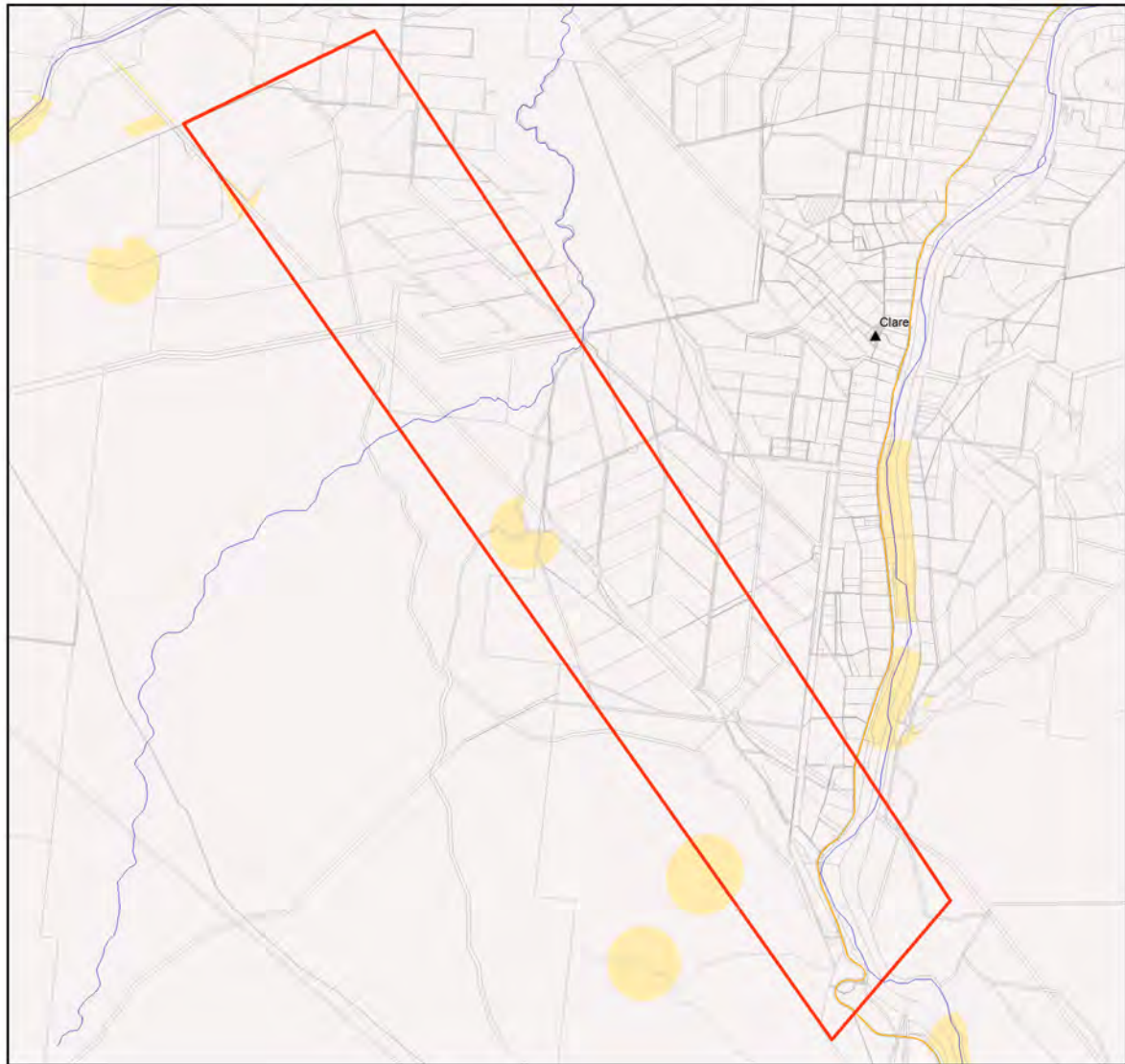
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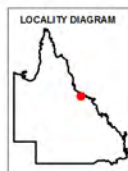
### Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



### MSES - Species Threatened (endangered or vulnerable) wildlife and special least concern animals

**Area of Interest**

- polygon
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Wildlife habitat (special least concern)
- Wildlife habitat (endangered or vulnerable)



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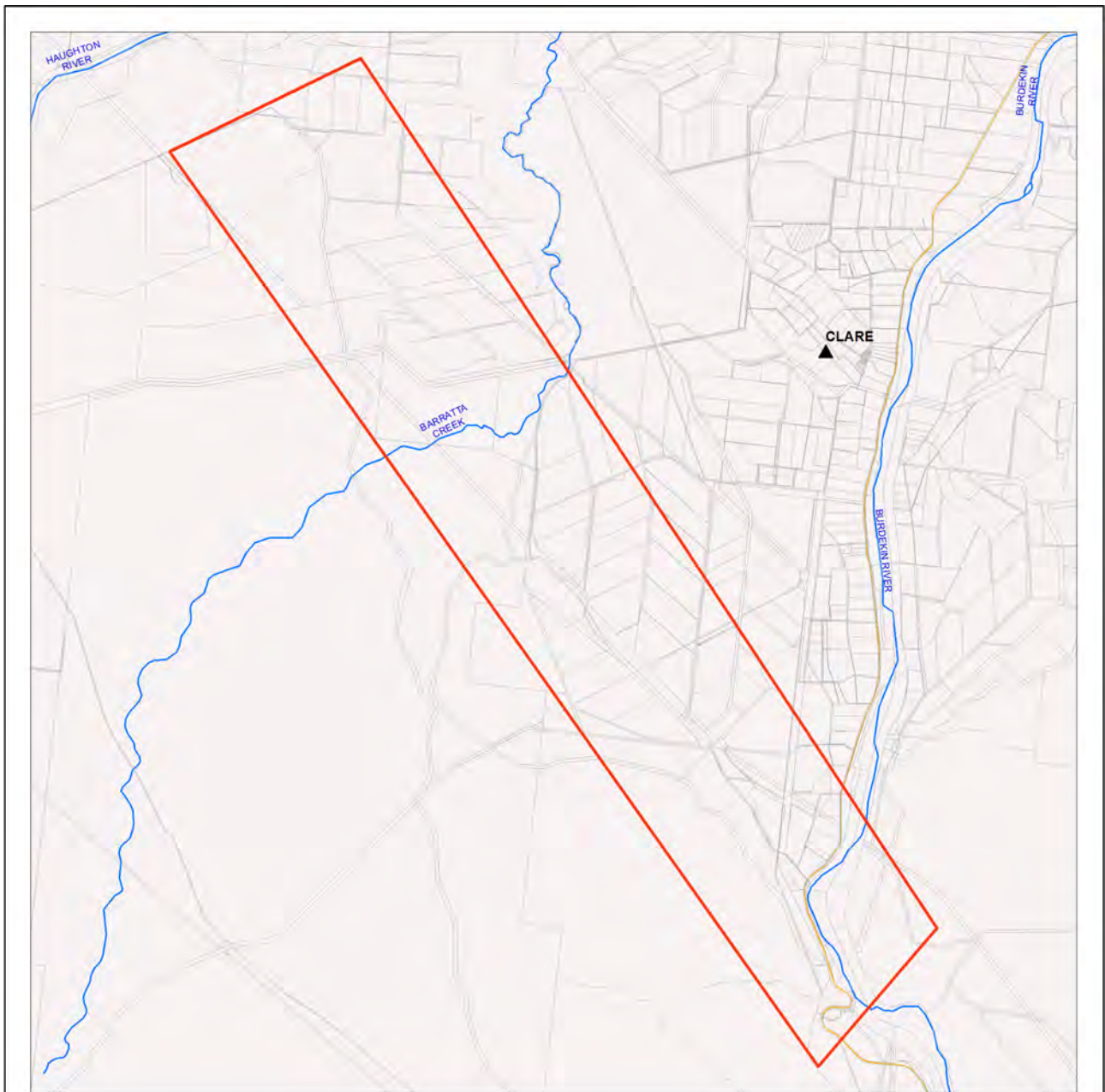
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### Map 3b - MSES - Species - Koala habitat area (SEQ)



### MSES - Species Koala habitat area (SEQ)

**Area of Interest**

- polygon
- Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Koala habitat area (core)
- Koala habitat area (locally refined)



The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



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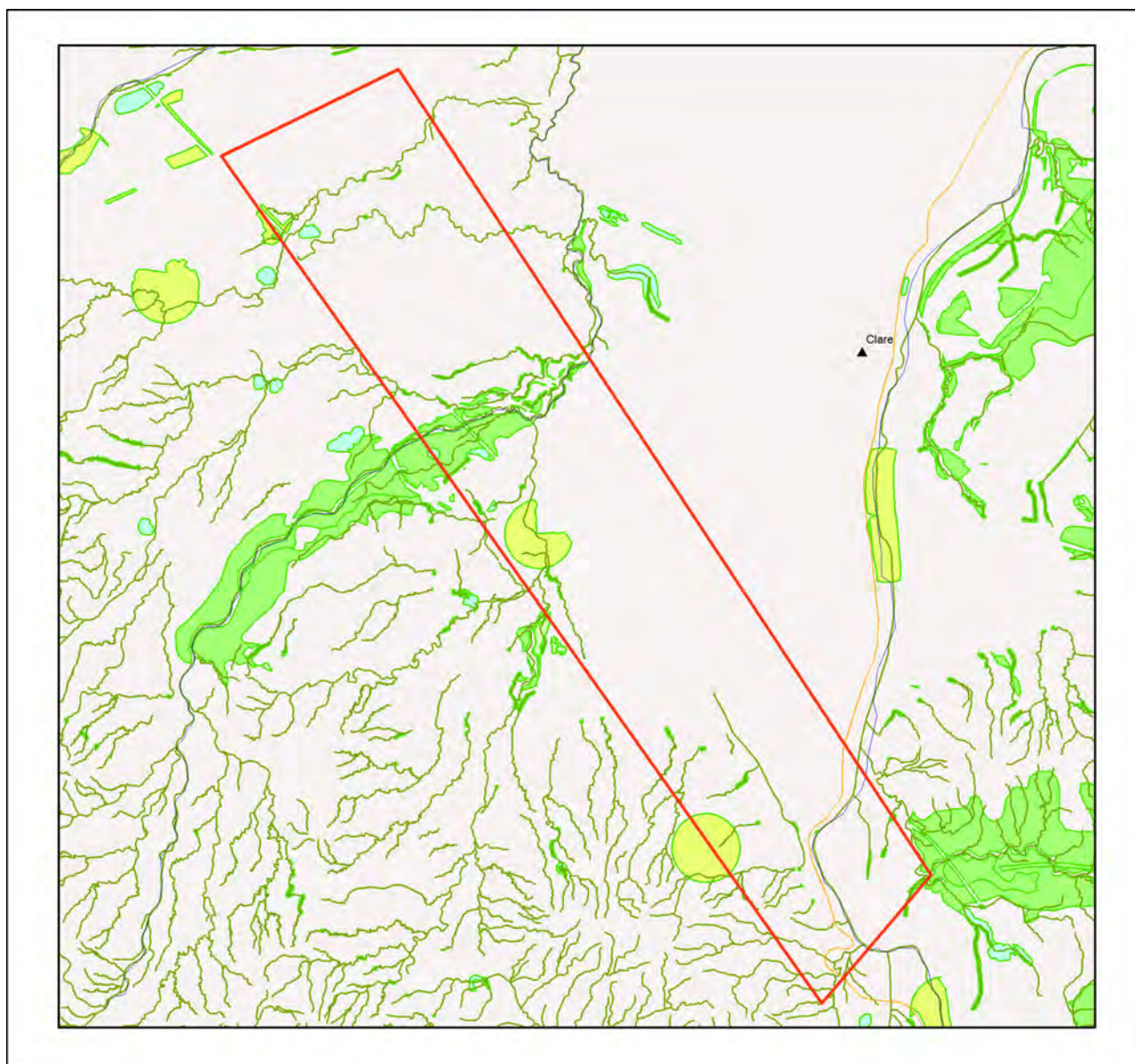
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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping>



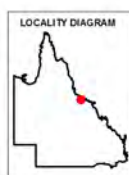
### Map 4 - MSES - Regulated Vegetation



### MSES - Regulated Vegetation

**Area of Interest**

- ▭ polygon
- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)



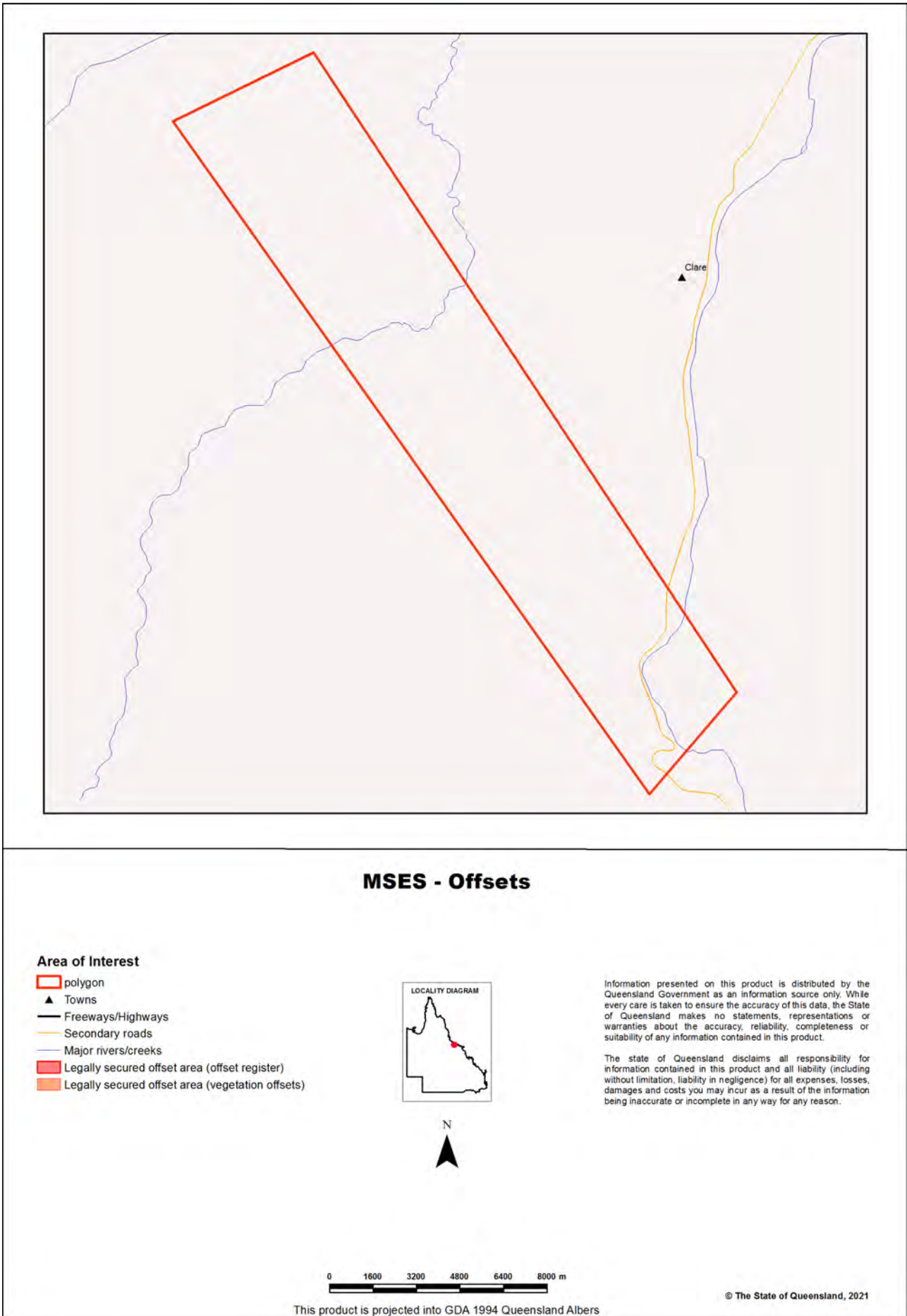
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### Map 5 - MSES - Offset Areas



## Appendices

### Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

<http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html> .

## Appendix 2 - Source Data

The datasets listed below are available on request from:

<http://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

<b>MSES layers</b>	<b>current QSpatial data (<a href="http://qspatial.information.qld.gov.au">http://qspatial.information.qld.gov.au</a>)</b>
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DES
Regulated Vegetation Map	Vegetation management - regulated vegetation management map



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## Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DES	- Department of Environment and Science
EP Act	- <i>Environmental Protection Act 1994</i>
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- <i>Vegetation Management Act 1999</i>



Queensland Government

Department of Environment and Science

Environmental Reports

## **Regional Ecosystems**

### ***Biodiversity Status***

For the selected area of interest

## Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the input coordinates.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no matters of interest have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

### Important Note to User

Information presented in this report is based upon the Queensland Herbarium's Regional Ecosystem framework. The Biodiversity Status has been used to depict the extent of "Endangered", "Of Concern" and "No Concern at Present" regional ecosystems in all cases, rather than the classes used for the purposes of the *Vegetation Management Act 1999* (VMA). Mapping and figures presented in this document reflect the Queensland Herbarium's Remnant and Pre-clearing Regional Ecosystem Datasets, and not the certified mapping used for the purpose of the VMA.

For matters relevant to vegetation management under the VMA, please refer to the Department of Resources website <https://www.dnrme.qld.gov.au/>

Please direct queries about these reports to: Queensland.Herbarium@qld.gov.au

### Disclaimer

Whilst every care is taken to ensure the accuracy of the information provided in this report, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness, or suitability, for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which the user may incur as a consequence of the information being inaccurate or incomplete in any way and for any reason.



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## Summary Information

The following table provides an overview of the AOI with respect to selected topographic and environmental themes. Refer to **Map 1** for locality information.

**Table 1: Area of interest details:**

Size (ha)	15,299.31
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Bogie River Hills, Townsville Plains
Catchment(s)	Burdekin, Haughton

The table below summarizes the extent of remnant vegetation classed as "Endangered", "Of concern" and "No concern at present" regional ecosystems classified by Biodiversity Status within the area of interest (AOI).

**Table 2: Summary table, biodiversity status of regional ecosystems within the AOI**

Biodiversity Status	Area (Ha)	% of AOI
Endangered	16.96	0.11
Of concern	3,655.10	23.89
No concern at present	4,098.81	26.79
Total remnant vegetation	7,770.86	50.79

Refer to **Map 2** for further information.

# Regional Ecosystems

## 1. Introduction

Regional ecosystems are vegetation communities in a bioregion that are consistently associated with particular combinations of geology, landform and soil (Sattler and Williams 1999). Descriptions of Queensland's Regional ecosystems are available online from the Regional Ecosystem Description Database (REDD). Descriptions are compiled from a broad range of information sources including vegetation, land system and geology survey and mapping and detailed vegetation site data. The regional ecosystem classification and descriptions are reviewed as new information becomes available. A number of vegetation communities may form a single regional ecosystem and are usually distinguished by differences in dominant species, frequently in the shrub or ground layers and are denoted by a letter following the regional ecosystem code (e.g. a, b, c). Vegetation communities and regional ecosystems are amalgamated into a higher level classification of broad vegetation groups (BVGs).

A published methodology for survey and mapping of regional ecosystems across Queensland (Neldner et al 2020) provides further details on regional ecosystem concepts and terminology.

This report provides information on the type, status, and extent of vegetation communities, regional ecosystems and broad vegetation groups present within a user specified area of interest. Please note, for the purpose of this report, the Biodiversity Status is used. This report has not been developed for application of the *Vegetation Management Act 1999* (VMA). Additionally, information generated in this report has been derived from the Queensland Herbarium's Regional Ecosystem Mapping, and not the regulated mapping certified for the purposes of the VMA. If your interest/matter relates to regional ecosystems and the VMA, users should refer to the Department of Resources website.

<https://www.dnrme.qld.gov.au/>

With respect to the Queensland Biodiversity Status,

"Endangered" regional ecosystems are described as those where:

- remnant vegetation is less than 10 per cent of its pre-clearing extent across the bioregion; or 10-30% of its pre-clearing extent remains and the remnant vegetation is less than 10,000 hectares, or
- less than 10 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss\*, or
- 10-30 per cent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 hectares; or
- it is a rare\*\* regional ecosystem subject to a threatening process.\*\*\*

"Of concern" regional ecosystems are described as those where:

- the degradation criteria listed above for 'Endangered' regional ecosystems are not met and,
- remnant vegetation is 10-30 per cent of its pre-clearing extent across the bioregion; or more than 20 per cent of its pre-clearing extent remains and the remnant extent is less than 10,000 hectares, or
- 10-30 percent of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss.\*\*\*\*

and "No concern at present" regional ecosystems are described as those where:

- remnant vegetation is over 30 per cent of its pre-clearing extent across the bioregion, and the remnant area is greater than 10,000 hectares, and
- the degradation criteria listed above for 'Endangered' or 'Of concern' regional ecosystems are not met.

*\*Severe degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 50 years even with the removal of threatening processes; or soil surface is severely degraded, for example, by loss of A horizon, surface expression of salinity; surface compaction, loss of organic matter or sheet erosion.*

*\*\*Rare regional ecosystem: pre-clearing extent (1000 ha); or patch size (100 ha and of limited total extent across its range).*

*\*\*\*Threatening processes are those that are reducing or will reduce the biodiversity and ecological integrity of a regional ecosystem. For example, clearing, weed invasion, fragmentation, inappropriate fire regime or grazing pressure, or infrastructure development.*



\*\*\*\*Moderate degradation and/or biodiversity loss is defined as: floristic and/or faunal diversity is greatly reduced but unlikely to recover within the next 20 years even with the removal of threatening processes; or soil surface is moderately degraded.

## 2. Remnant Regional Ecosystems

The following table identifies the remnant regional ecosystems and vegetation communities mapped within the AOI and provides their short descriptions, Biodiversity Status, and remnant extent within the selected AOI. Please note, where heterogeneous vegetated patches (mixed patches of remnant vegetation mapped as containing multiple regional ecosystems) occur within the AOI, they have been split and listed as individual regional ecosystems (or vegetation communities where present) for the purposes of the table below. In such instances, associated area figures have been generated based upon the estimated proportion of each regional ecosystem (or vegetation community) predicted to be present within the larger mixed patch.

**Table 3: Remnant regional ecosystems, description and status within the AOI**

Regional Ecosystem	Short Description	BD Status	Area (Ha)	% of AOI
11.12.1	Eucalyptus crebra woodland on igneous rocks	No concern at present	554.37	3.62
11.12.9	Eucalyptus platyphylla woodland on igneous rocks	No concern at present	1.25	0.01
11.3.10	Eucalyptus brownii woodland on alluvial plains	No concern at present	13.04	0.09
11.3.12	Melaleuca viridiflora, M. argentea +/- M. dealbata woodland on alluvial plains	No concern at present	30.94	0.2
11.3.13	Grevillea striata open woodland on coastal alluvial plains	Endangered	16.96	0.11
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	145.56	0.95
11.3.25b	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	534.95	3.5
11.3.25f	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Of concern	320.29	2.09
11.3.30	Eucalyptus crebra, Corymbia dallachiana woodland on alluvial plains	No concern at present	599.45	3.92
11.3.31	Ophiuros exaltatus, Dichanthium spp. grassland on alluvial plains	Of concern	3.32	0.02
11.3.34	Acacia tephрина woodland on alluvial plains	Of concern	0.5	less than 0.01
11.3.35	Eucalyptus platyphylla, Corymbia clarksoniana woodland on alluvial plains	No concern at present	1,602.87	10.48
11.3.35a	Eucalyptus platyphylla, Corymbia clarksoniana woodland on alluvial plains	No concern at present	34.92	0.23
11.3.4	Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains	Of concern	205.58	1.34
11.3.7	Corymbia spp. open woodland on alluvial plains	Of concern	2,444.90	15.98
11.3.9	Eucalyptus platyphylla, Corymbia spp. woodland on alluvial plains	No concern at present	1,261.96	8.25
non-remnant	None	None	7,520.65	49.16
water	None	None	4.74	0.03

Refer to **Map 2** for further information. **Map 3** also provides a visual estimate of the distribution of regional ecosystems present before clearing.

**Table 4** provides further information in regards to the remnant regional ecosystems present within the AOI. Specifically, the extent of remnant vegetation remaining within the bioregion, the 1:1,000,000 broad vegetation group (BVG) classification, whether the regional ecosystem is identified as a wetland, and extent of representation in Queensland's Protected Area Estate. For a description of the vegetation communities within the AOI and classified according to the 1:1,000,000 BVG, refer to **Table 6**.

**Table 4: Remnant regional ecosystems within the AOI, additional information**

Regional Ecosystem	Remnant Extent	BVG (1 Million)	Wetland	Representation in protected estate
11.12.1	Pre-clearing 1421000 ha; Remnant 2019 854000 ha	13c	None	Low
11.12.9	Pre-clearing 113000 ha; Remnant 2019 97000 ha	9b	None	Medium
11.3.10	Pre-clearing 260000 ha; Remnant 2019 165000 ha	17a	None	Low
11.3.12	Pre-clearing 46000 ha; Remnant 2019 28000 ha	21a	Contains palustrine wetland (e.g. in swales).	Low
11.3.13	Pre-clearing 8000 ha; Remnant 2019 3000 ha	27c	None	Medium
11.3.25	Pre-clearing 797000 ha; Remnant 2019 514000 ha	16a	Riverine wetland or fringing riverine wetland.	Low
11.3.25b	Pre-clearing 797000 ha; Remnant 2019 514000 ha	22c	Riverine wetland or fringing riverine wetland.	Low
11.3.25f	Pre-clearing 797000 ha; Remnant 2019 514000 ha	16d	Riverine wetland or fringing riverine wetland.	Low
11.3.30	Pre-clearing 105000 ha; Remnant 2019 70000 ha	18b	None	Low
11.3.31	Pre-clearing 43000 ha; Remnant 2019 17000 ha	32a	Floodplain (other than floodplain wetlands).	Low
11.3.34	Pre-clearing 16000 ha; Remnant 2019 9000 ha	27a	None	No representation
11.3.35	Pre-clearing 183000 ha; Remnant 2019 108000 ha	9e	None	Low
11.3.35a	Pre-clearing 183000 ha; Remnant 2019 108000 ha	9e	None	Low
11.3.4	Pre-clearing 684000 ha; Remnant 2019 180000 ha	16c	Floodplain (other than floodplain wetlands).	Low
11.3.7	Pre-clearing 139000 ha; Remnant 2019 61000 ha	9e	None	Low
11.3.9	Pre-clearing 144000 ha; Remnant 2019 63000 ha	9e	Floodplain (other than floodplain wetlands).	Low
non-remnant	None	None	None	None
water	None	None	None	None

*Representation in Protected Area Estate: High greater than 10% of pre-clearing extent is represented; Medium 4 - 10% is represented; Low less than 4% is represented, No representation.*

The distribution of mapped wetland systems within the area of interest is displayed in **Map 6**.

The following table lists known special values associated with a regional ecosystem type.

**Table 5: Remnant regional ecosystems within the AOI, special values**

Regional Ecosystem	Special Values
11.12.1	Potential habitat for NCA listed species: <i>Acacia islana</i> , <i>Capparis humistrata</i> , <i>Corymbia petalophylla</i> , <i>Cycas megacarpa</i> , <i>Cycas ophiolitica</i> , <i>Macrozamia crassifolia</i> , <i>Sannantha brachypoda</i> , <i>Solanum graniticum</i>
11.12.9	Potential habitat for NCA listed species: <i>Bertya sharpeana</i> , <i>Sannantha papillosa</i>
11.3.10	Potential habitat for NCA listed species: <i>Acacia armitii</i>
11.3.12	None
11.3.13	None
11.3.25	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle <i>Rheodytes leukops</i> . Known to be important habitat for other riparian freshwater turtle species. This ecosystem is also known to provide suitable habitat for koalas ( <i>Phascolarctos cinereus</i> ).
11.3.25b	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle <i>Rheodytes leukops</i> . Known to be important habitat for other riparian freshwater turtle species. This ecosystem is also known to provide suitable habitat for koalas ( <i>Phascolarctos cinereus</i> ).
11.3.25f	Shown to be associated with a high fauna species richness in the Taroom area (Venz et al. 2002). Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle <i>Rheodytes leukops</i> . Known to be important habitat for other riparian freshwater turtle species. This ecosystem is also known to provide suitable habitat for koalas ( <i>Phascolarctos cinereus</i> ).
11.3.30	Potential habitat for NCA listed species: <i>Eucalyptus paedoglauca</i>
11.3.31	None
11.3.34	None
11.3.35	None
11.3.35a	None
11.3.4	Potential habitat for NCA listed species: <i>Acacia pedleyi</i> , <i>Callicarpa thozetii</i> , <i>Cycas megacarpa</i> , <i>Cycas ophiolitica</i> , <i>Digitaria porrecta</i> , <i>Eriocaulon carsonii</i> subsp. <i>orientale</i> , <i>Livistona nitida</i> , <i>Rhaponticum australe</i> , <i>Samadera bidwillii</i> , <i>Sannantha brachypoda</i> . This ecosystem is also known to provide suitable habitat for koalas ( <i>Phascolarctos cinereus</i> ).
11.3.7	Habitat of the endangered northern hairy-nosed wombat, <i>Lasiorhinus krefftii</i> .
11.3.9	Potential habitat for NCA listed species: <i>Macrozamia serpentina</i>
non-remnant	None
water	None

### 3. Remnant Regional Ecosystems by Broad Vegetation Group

BVGs are a higher-level grouping of vegetation communities. Queensland encompasses a wide variety of landscapes across temperate, wet and dry tropics and semi-arid climatic zones. BVGs provide an overview of vegetation communities across the state or a bioregion and allow comparison with other states. There are three levels of BVGs which reflect the approximate scale at which they are designed to be used: the 1:5,000,000 (national), 1:2,000,000 (state) and 1:1,000,000 (regional)

scales.

A comprehensive description of BVGs is available at:

<https://publications.qld.gov.au/dataset/redd/resource/>

The following table provides a description of the 1:1,000,000 BVGs present and their associated extent within the AOI.

**Table 6: Broad vegetation groups (1 million) within the AOI**

BVG (1 Million)	Description	Area (Ha)	% of AOI
None	None	7,525.39	49.19
13c	Woodlands of <i>Eucalyptus crebra</i> (sens. lat.) (narrow-leaved red ironbark), <i>E. drepanophylla</i> (grey ironbark), <i>E. fibrosa</i> (dusky-leaved ironbark), <i>E. shirleyi</i> (shirley's silver-leaved ironbark) on granitic and metamorphic ranges (land zones 12, 11, 9, [5]) (BRB, EIU, SEQ, NET, CQC)	554.37	3.62
16a	Open forest and woodlands dominated by <i>Eucalyptus camaldulensis</i> (river red gum) (or <i>E. tereticornis</i> (blue gum)) and/or <i>E. coolabah</i> (coolabah) (or <i>E. microtheca</i> (coolabah)) fringing drainage lines. Associated species may include <i>Melaleuca</i> spp., <i>Corymbia tessellaris</i> (carbeen), <i>Angophora</i> spp., <i>Casuarina cunninghamiana</i> (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)	145.56	0.95
16c	Woodlands and open woodlands dominated by <i>Eucalyptus coolabah</i> (coolabah) or <i>E. microtheca</i> (coolabah) or <i>E. largiflorens</i> (black box) or <i>E. tereticornis</i> (blue gum) or <i>E. chlorophylla</i> on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL).	205.58	1.34
16d	River beds, open water or sand, or rock, frequently unvegetated. (land zone 3) (GUP, EIU, BRB, CYP, DEU, [CQC, MUL])	320.29	2.09
17a	Woodlands dominated by <i>Eucalyptus populnea</i> (poplar box) (or <i>E. brownii</i> (Reid River box)) on alluvium, sand plains and footslopes of hills and ranges. (land zones 3, 5, 10, 9, 4, 11, 12, [8]) (BRB, MUL, DEU, MUL, EIU)	13.04	0.09
18b	Woodlands dominated <i>Eucalyptus crebra</i> (sens. lat.) (narrow-leaved red ironbark) frequently with <i>Corymbia</i> spp. or <i>Callitris</i> spp. on flat to undulating plains. (land zones 5, 3) (BRB, DEU, EIU, GUP, CYP)	599.45	3.92
21a	Low woodlands and low open woodlands dominated by <i>Melaleuca viridiflora</i> (coarse-leaved paperbark) on depositional plains. (land zones 3, 5, 11, [10]) (GUP, CYP, BRB, CQC, EIU, WET, SEQ)	30.94	0.2
22c	Open forests dominated by <i>Melaleuca</i> spp. ( <i>M. argentea</i> (silver tea-tree), <i>M. leucadendra</i> (broad-leaved tea-tree), <i>M. dealbata</i> (swamp tea-tree) or <i>M. fluviatilis</i> ), fringing major streams with <i>Melaleuca saligna</i> or <i>M. bracteata</i> (black tea-tree) in minor streams. (land zone 3) (CYP, GUP, EIU, BRB, CQC, DEU, NWH, WET, [SEQ])	534.95	3.5
27a	Low open woodlands dominated by a variety of species including <i>Acacia tephрина</i> (boree), <i>Atalaya hemiglauca</i> (whitewood), <i>Ventilago viminalis</i> (supplejack) and <i>Lysiphillum</i> spp. (land zones 9, 3, 4, [5]) (MGD, GUP, BRB, NWH, DEU, [CYP, EIU])	0.5	less than 0.01

BVG (1 Million)	Description	Area (Ha)	% of AOI
27c	Low open woodlands dominated by a variety of species including <i>Grevillea striata</i> (beefwood), <i>Acacia</i> spp., <i>Terminalia</i> spp. or <i>Cochlospermum</i> spp. (land zones 9, 12, 3, 11, 5) (NWH, EIU, DEU, GUP, [BRB])	16.96	0.11
32a	Closed tussock grasslands dominated by <i>Themeda arguens</i> , <i>Dichanthium sericeum</i> (Queensland bluegrass) or <i>Panicum</i> spp., <i>Eriachne</i> spp., <i>Fimbristylis</i> spp., <i>Aristida</i> spp. or <i>Imperata cylindrica</i> (blady grass) on marine and alluvial plains. (land zones 3, [5]) (GUP, CYP, [BRB,EIU, WET, CQC])	3.32	0.02
9b	Moist to dry woodlands dominated by <i>Eucalyptus platyphylla</i> (poplar gum) and/or <i>E. leptophleba</i> (Molloy red box). Other frequent tree species include <i>Corymbia clarksoniana</i> (grey bloodwood), <i>E. drepanophylla</i> (grey ironbark) and occasionally <i>E. chlorophylla</i> . (land zones 12, 11, 3, 10, 5). (CYP, CQC, BRB, WET, EIU)	1.25	0.01
9e	Open forests, woodlands and open woodlands dominated by <i>Corymbia clarksoniana</i> (grey bloodwood) (or <i>C. novoguineensis</i> or <i>C. intermedia</i> (pink bloodwood) or <i>C. polycarpa</i> (long-fruited bloodwood)) frequently with <i>Erythrophleum chlorostachys</i> (red ironwood) or <i>Eucalyptus platyphylla</i> (poplar gum) predominantly on coastal sandplains and alluvia. (land zones 3, 5, 2) (CYP, BRB, CQC, WET, EIU)	5,344.66	34.93

Refer to **Map 4** for further information. **Map 5** also provides a representation of the distribution of vegetation communities as per the 1:5,000,000 BVG believed to be present prior to European settlement.

#### 4. Technical and BioCondition Benchmark Descriptions

Technical descriptions provide a detailed description of the full range in structure and floristic composition of regional ecosystems (e.g. 11.3.1) and their component vegetation communities (e.g. 11.3.1a, 11.3.1b). See:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

The descriptions are compiled using site survey data from the Queensland Herbarium's CORVEG database. Distribution maps, representative images (if available) and the pre-clearing and remnant extent (hectares) of each vegetation community derived from the regional ecosystem mapping data are included. The technical descriptions should be used in conjunction with the fields from the regional ecosystem description database (REDD) for a full description of the regional ecosystem.

Technical descriptions include data on canopy height, canopy cover and native plant species composition of the predominant layer, which are attributes relevant to assessment of the remnant status of vegetation under the *Vegetation Management Act 1999*. However, as technical descriptions reflect the full range in structure and floristic composition across the climatic, natural disturbance and geographic range of the regional ecosystem, local reference sites should be used for remnant assessment where possible (Neldner et al. 2020 (PDF)\* section 3.3 of:

<https://publications.qld.gov.au/dataset/redd/resource/>

The technical descriptions are subject to review and are updated as additional data becomes available.

When conducting a BioCondition assessment, these technical descriptions should be used in conjunction with BioCondition benchmarks for the specific regional ecosystem, or component vegetation community.

<http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

Benchmarks are based on a combination of quantitative and qualitative information and should be used as a guide only. Benchmarks are specific to one regional ecosystem vegetation community, however, the natural variability in structure and floristic composition under a range of climatic and natural disturbance regimes has been considered throughout the geographic extent of the regional ecosystem. Local reference sites should be used for this spatial and temporal (seasonal and annual) variability.

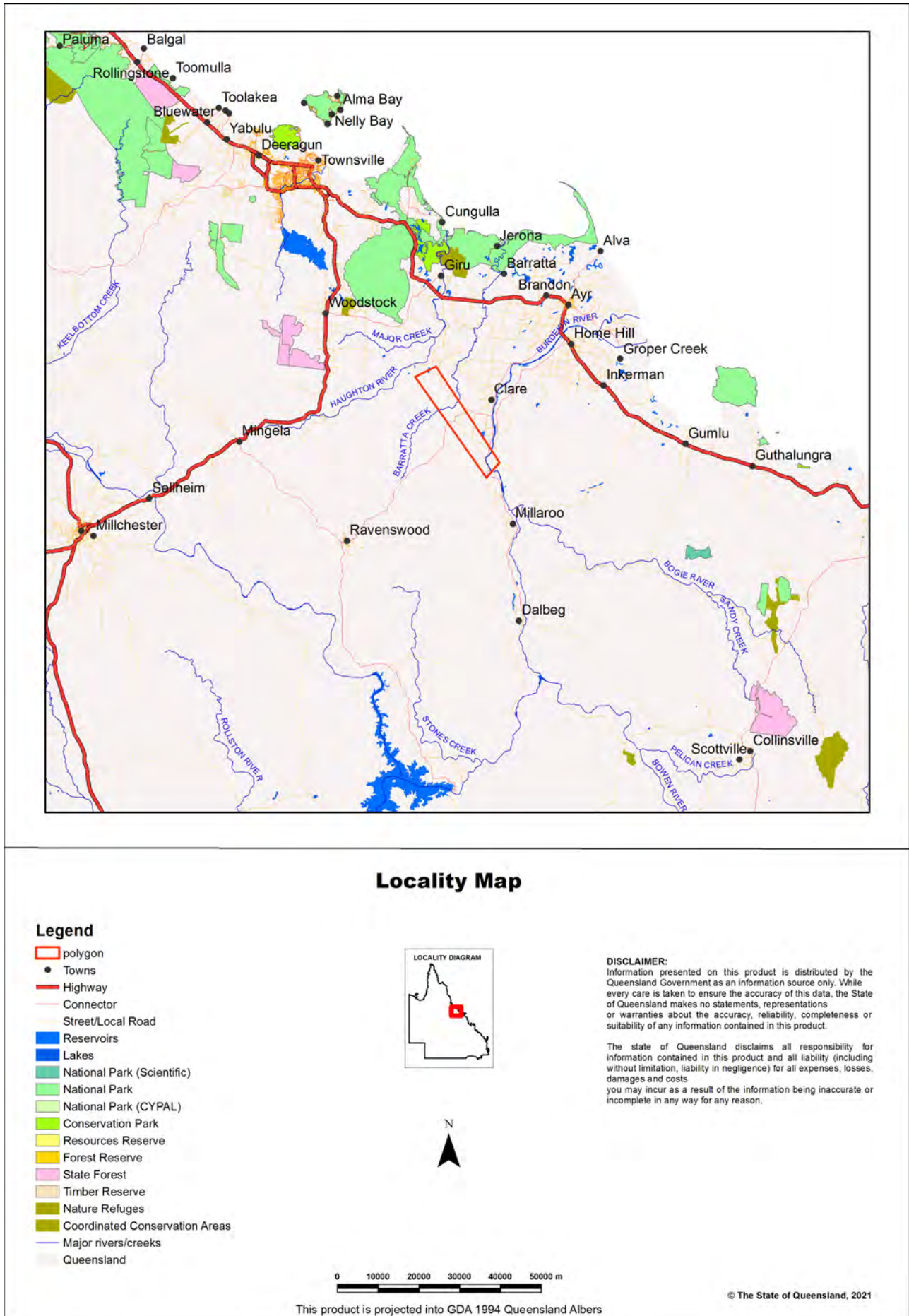
**Table 7: List of remnant regional ecosystems within the AOI for which technical and biocondition benchmark descriptions are available**

Regional ecosystems mapped as within the AOI	Technical Descriptions	Biocondition Benchmarks
11.12.1	Available	Available
11.12.9	Available	Available
11.3.10	Available	Available
11.3.12	Not currently available	Not currently available
11.3.13	Available	Not currently available
11.3.25	Available	Available
11.3.25b	Available	Available
11.3.25f	Not currently available	Not currently available
11.3.30	Available	Available
11.3.31	Available	Not currently available
11.3.34	Available	Not currently available
11.3.35	Available	Available
11.3.35a	Available	Available
11.3.4	Available	Available
11.3.7	Available	Available
11.3.9	Available	Available
non-remnant	Not currently available	Not currently available
water	Not currently available	Not currently available



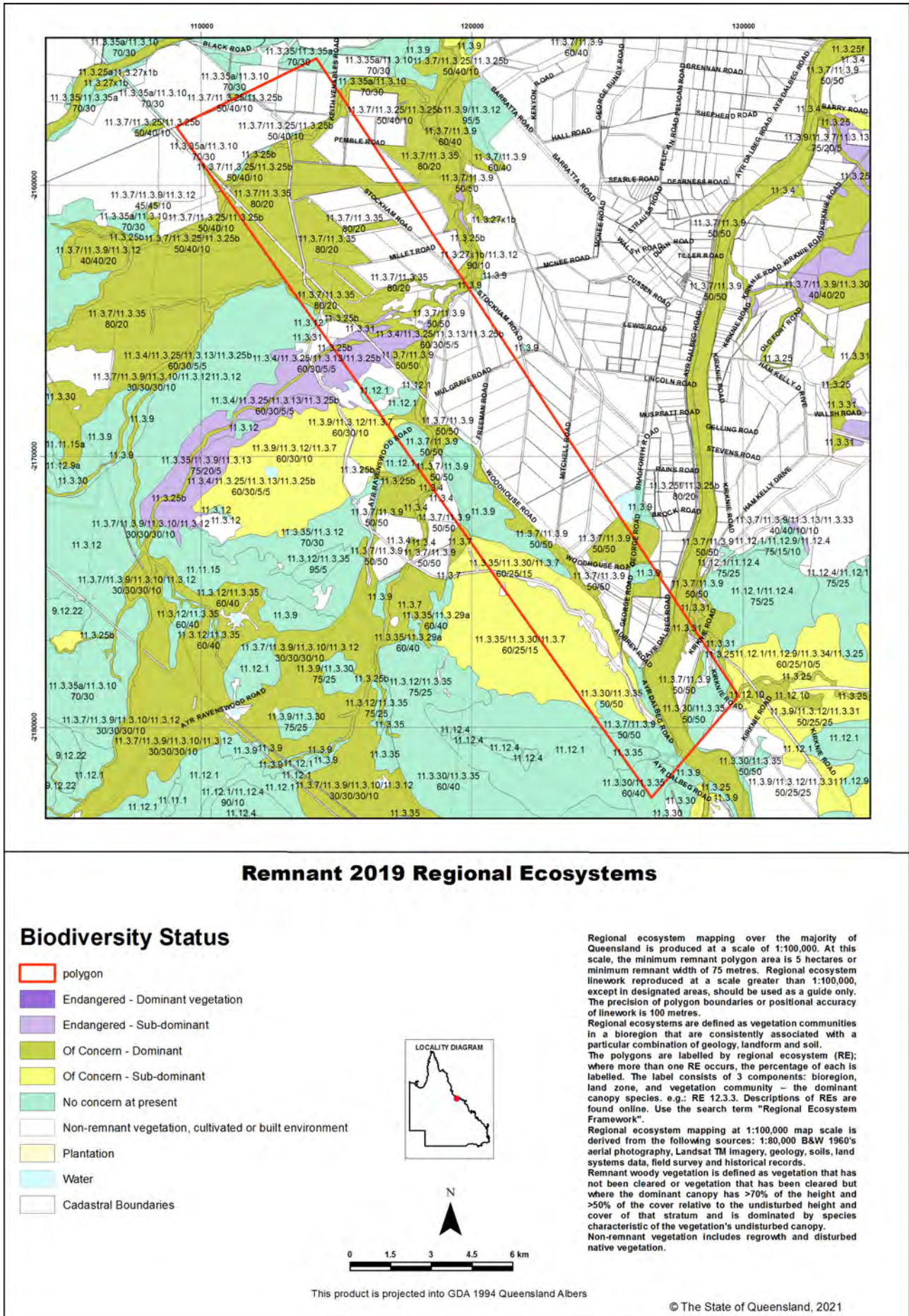
# Maps

## Map 1 - Location



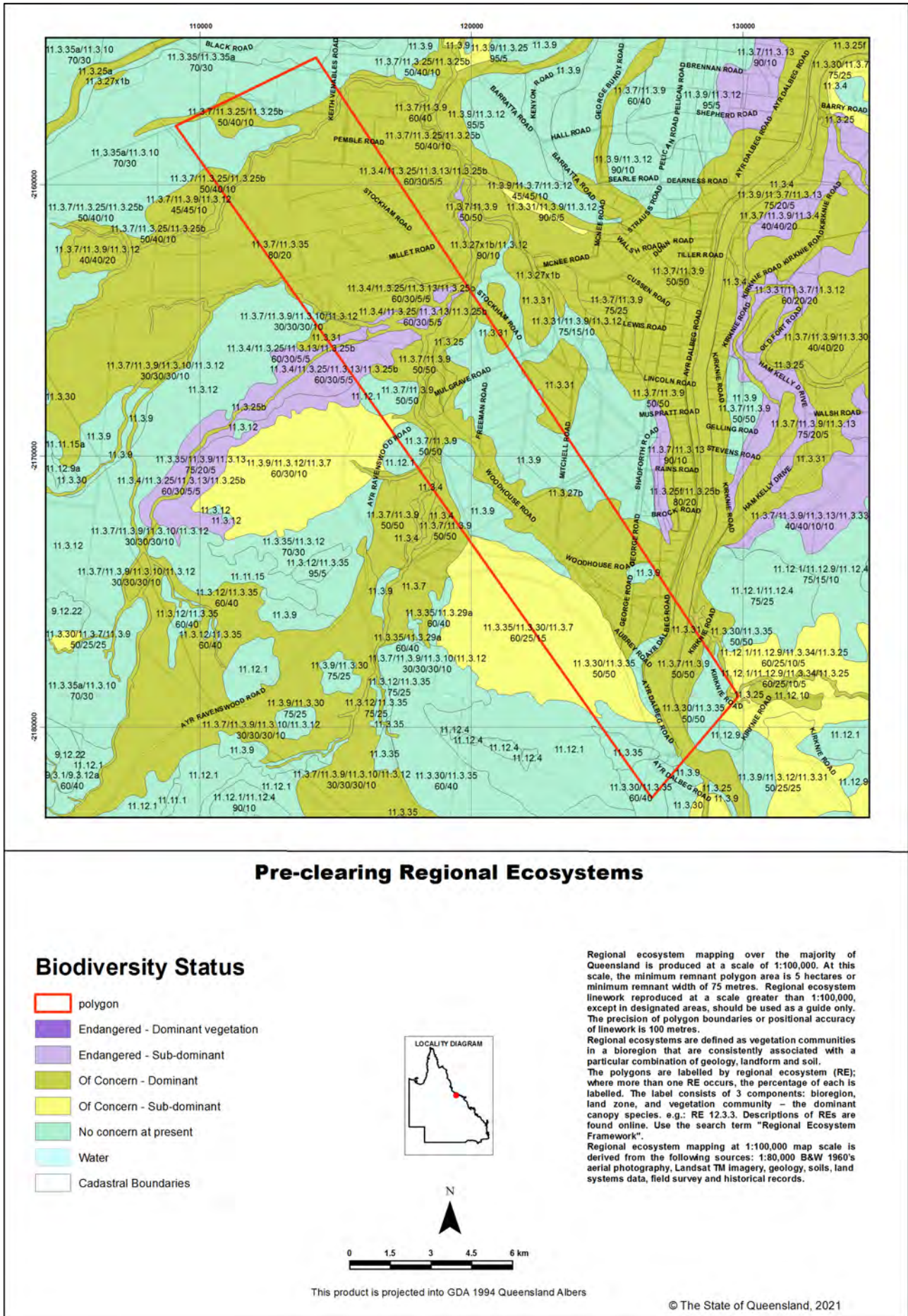


## Map 2 - Remnant 2019 regional ecosystems



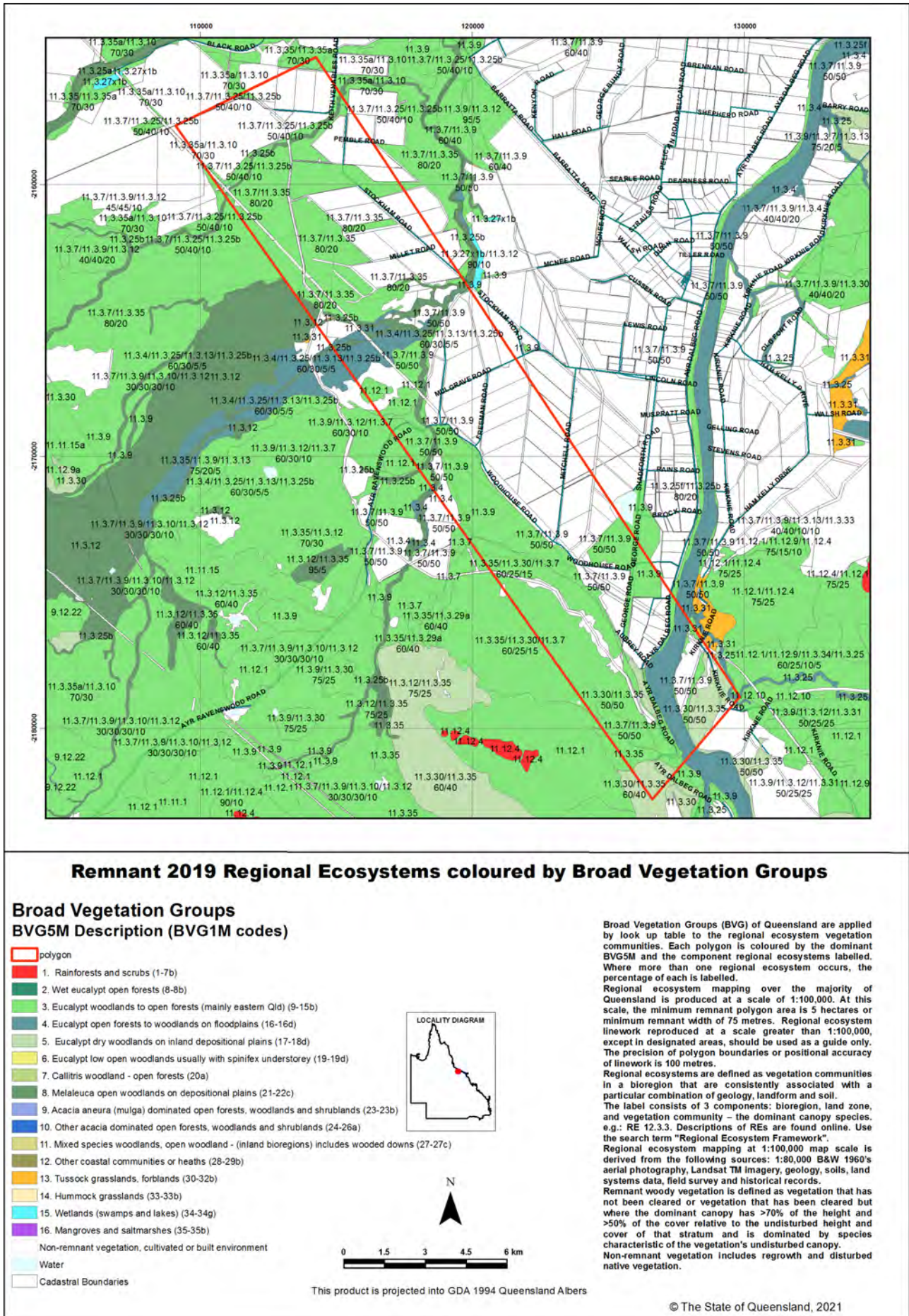


### Map 3 - Pre-clearing regional ecosystems





### Map 4 - Remnant 2019 regional ecosystems by BVG (5M)

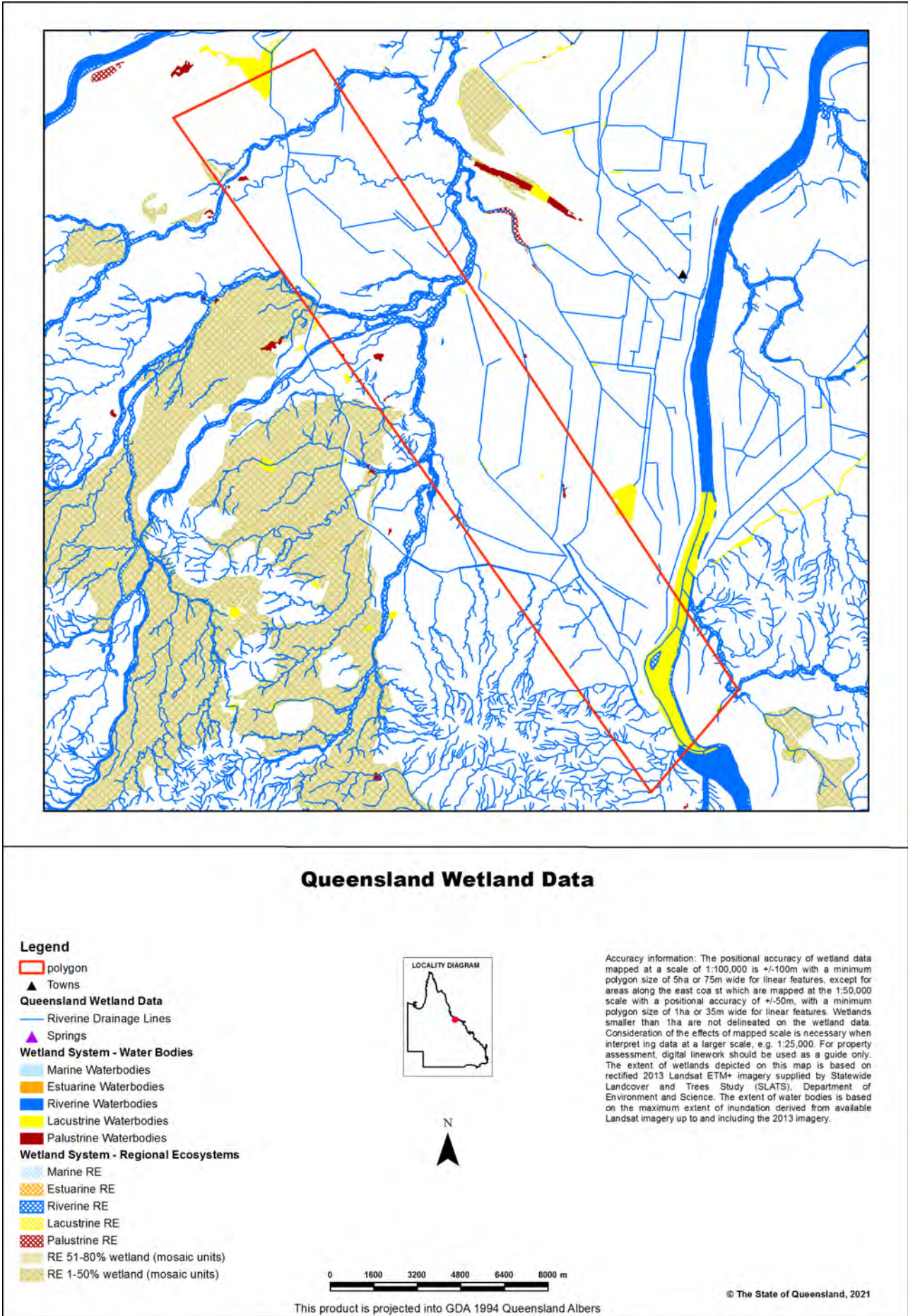








### Map 6 - Wetlands and waterways





## Links and Other Information Sources

The Department of Environment and Science's Website -

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

provides further information on the regional ecosystem framework, including access to links to the Regional Ecosystem Database, Broad Vegetation Group Definitions, Regional Ecosystem and Land zone descriptions.

Descriptions of the broad vegetation groups of Queensland can be downloaded from:

<https://publications.qld.gov.au/dataset/redd/resource/>

The methodology for mapping regional ecosystems can be downloaded from:

<https://publications.qld.gov.au/dataset/redd/resource/>

Technical descriptions for regional ecosystems can be obtained from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/technical-descriptions/>

Benchmarks can be obtained from:

<http://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks/>

For further information associated with the remnant regional ecosystem dataset used by this report, refer to the metadata associated with the Biodiversity status of pre-clearing and Remnant Regional Ecosystems of Queensland dataset (version listed in **Appendix 1**) which is available through the Queensland Government Information System portal,

<http://dds.information.qld.gov.au/dds/>

The Queensland Globe is a mapping and data application. As an interactive online tool, Queensland Globe allows you to view and explore Queensland maps, imagery (including up-to-date satellite images) and other spatial data, including regional ecosystem mapping. To further view and explore regional ecosystems over an area of interest, access the Biota Globe (a component of the Queensland Globe). The Queensland Globe can be accessed via the following link:

<http://www.dnrm.qld.gov.au/mapping-data/queensland-globe>

## References

Neldner, V.J., Niehus, R.E., Wilson, B.A., McDonald, W.J.F., Ford, A.J. and Accad, A. (2019). The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 4.0. Queensland Herbarium, Department of Environment and Science.

<https://publications.qld.gov.au/dataset/redd/resource/78209e74-c7f2-4589-90c1-c33188359086>

Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F., Addicott, E.P. and Appelman, C.N. (2020). Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 5.1. Updated March 2020. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.

<https://publications.qld.gov.au/dataset/redd/resource/6dee78ab-c12c-4692-9842-b7257c2511e4>

Sattler, P.S. and Williams, R.D. (eds) (1999). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

## Appendices

### Appendix 1 - Source Data

The dataset listed below is available for download from:

<http://www.qld.gov.au/environment/plants-animals/plants/ecosystems/download/>

- Regional Ecosystem Description Database

The datasets listed below are available for download from:

<http://dds.information.qld.gov.au/dds/>

- Biodiversity status of pre-clearing and 2019 remnant regional ecosystems of Queensland
- Pre-clearing Vegetation Communities and Regional Ecosystems of Queensland
- Queensland Wetland Data Version - Wetland lines
- Queensland Wetland Data Version - Wetland points
- Queensland Wetland Data Version - Wetland areas

## Appendix 2 - Acronyms and Abbreviations

AOI	- Area of Interest
GDA94	- Geocentric Datum of Australia 1994
GIS	- Geographic Information System
RE	- Regional Ecosystem
REDD	- Regional Ecosystem Description Database
VMA	- <i>Vegetation Management Act 1999</i>

# **Appendix B**

**Fauna and weed species identified during field surveys**

## Fauna species recorded in the Project area

Scientific name	Common name	NC Act Status	EPBC Act status	Total number of individuals	Observation Type (obs/trapped)
Birds					
<i>Anhinga novaehollandiae</i>	Australasian Darter	LC		2	obs
<i>Sphecotheres vieilloti</i>	Australasian Figbird	LC		4	obs
<i>Anthus novaeseelandiae</i>	Australasian Pipit	LC		1	obs
<i>Alectura lathami</i>	Australian Brush-turkey	LC		2	obs
<i>Cracticus tibicen</i>	Australian Magpie	LC		3	obs
<i>Corvus coronoides</i>	Australian Raven	LC		2	obs
<i>Threskiornis molucca</i>	Australian White Ibis	LC		3	obs
<i>Ceyx azureus</i>	Azure Kingfisher	LC		1	obs
<i>Milvus migrans</i>	Black Kite	LC		5	obs
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	LC		6	obs
<i>Artamus cinereus</i>	Black-faced Woodswallow	LC		2	obs
<i>Poephila cincta</i>	Black-throated Finch	E	E	2	obs
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	LC		5	obs
<i>Dacelo leachii</i>	Blue-winged Kookaburra	LC		9	obs
<i>Lichmera indistincta</i>	Brown Honeyeater	LC		1	obs
<i>Coturnix ypsilophora</i>	Brown Quail	LC		1	obs
<i>Cincloramphus cruralis</i>	Brown Songlark	LC		2	obs
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater	LC		1	obs
<i>Cacomantis variolosus</i>	Brush Cuckoo	LC		3	obs
<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo	LC		4	obs
<i>Lonchura castaneothorax</i>	Chestnut-breasted Mannikin	LC		1	obs
<i>Ocyphaps lophotes</i>	Crested Pigeon	LC		3	obs
<i>Neochmia phaeton</i>	Crimson Finch	LC		4	obs
<i>Eurystomus orientalis</i>	Dollarbird	LC		7	obs
<i>Taeniopygia bichenovii</i>	Double-barred Finch	LC		6	obs
<i>Eudynamys orientalis</i>	Eastern Koel	LC		1	obs
<i>Gerygone palpebrosa</i>	Fairy Gerygone	LC		2	obs
<i>Todiramphus macleayii</i>	Forest Kingfisher	LC		3	obs
<i>Lichenostomus fuscus</i>	Fuscous Honeyeater	LC		1	obs
<i>Cisticola exilis</i>	Golden-headed Cisticola	LC		3	obs
<i>Ptilonorhynchus nuchalis</i>	Great Bowerbird	LC		1	obs
<i>Cracticus torquatus</i>	Grey Butcherbird	LC		1	obs
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	LC		3	obs
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	LC		1	obs
<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	LC		2	obs
<i>Microeca fascinans</i>	Jacky Winter	LC		1	obs
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	LC		2	obs

Scientific name	Common name	NC Act Status	EPBC Act status	Total number of individuals	Observation Type (obs/trapped)
<i>Myiagra rubecula</i>	Leaden Flycatcher	LC		1	obs
<i>Chalcites minutillus</i>	Little Bronze-Cuckoo	LC		1	obs
<i>Philemon citreogularis</i>	Little Friarbird	LC		2	obs
<i>Grallina cyanoleuca</i>	Magpie-lark	LC		6	obs
<i>Vanellus miles</i>	Masked Lapwing	LC		3	obs
<i>Dicaeum hirundinaceum</i>	Mistletoebird	LC		2	obs
<i>Falco cenchroides</i>	Nankeen Kestrel	LC		1	obs
<i>Philemon corniculatus</i>	Noisy Friarbird	LC		2	obs
<i>Oriolus sagittatus</i>	Olive-backed Oriole	LC		4	obs
<i>Nectarinia jugularis</i>	Olive-backed Sunbird	LC		1	obs
<i>Platycercus adscitus</i>	Pale-headed Rosella	LC		5	obs
<i>Geopelia striata</i>	Peaceful Dove	LC		8	obs
<i>Centropus phasianinus</i>	Pheasant Coucal	LC		7	obs
<i>Cracticus nigrogularis</i>	Pied Butcherbird	LC		3	obs
<i>Strepera graculina</i>	Pied Currawong	LC		2	obs
<i>Merops ornatus</i>	Rainbow Bee-eater	LC		2	obs
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	LC		4	obs
<i>Malurus melanocephalus</i>	Red-backed Fairy-wren	LC		2	obs
<i>Calyptorhynchus banksii</i>	Red-tailed Black-Cockatoo	LC		2	obs
<i>Malurus elegans</i>	Red-winged Fairy-wren	LC		2	obs
<i>Aprosmictus erythropterus</i>	Red-winged Parrot	LC		4	obs
<i>Platalea regia</i>	Royal Spoonbill	LC		1	obs
<i>Cincloramphus mathewsi</i>	Rufous Songlark	LC		1	obs
<i>Pachycephala rufiventris</i>	Rufous Whistler	LC		1	obs
<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet	LC		2	obs
<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater	LC		2	obs
<i>Dicrurus bracteatus</i>	Spangled Drongo	LC		1	obs
<i>Geophaps scripta</i>	Squatter Pigeon	V	V	10	obs
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	LC		4	obs
<i>Lalage leucomela</i>	Varied Triller	LC		3	obs
<i>Smicrornis brevirostris</i>	Weebill	LC		4	obs
<i>Hirundo neoxena</i>	Welcome Swallow	LC		1	obs
<i>Haliastur sphenurus</i>	Whistling Kite	LC		4	obs
<i>Coracina papuensis</i>	White-bellied Cuckoo-shrike	LC		2	obs
<i>Egretta novaehollandiae</i>	White-faced Heron	LC		1	obs
<i>Ardea pacifica</i>	White-necked Heron	LC		2	obs
<i>Gerygone albogularis</i>	White-throated Gerygone	LC		2	obs
<i>Melithreptus albogularis</i>	White-throated Honeyeater	LC		2	obs
<i>Rhipidura leucophrys</i>	Willie Wagtail	LC		3	obs



Scientific name	Common name	NC Act Status	EPBC Act status	Total number of individuals	Observation Type (obs/trapped)
<i>Lichenostomus flavus</i>	Yellow Honeyeater	LC		6	obs
<i>Taeniopygia guttata</i>	Zebra Finch	LC		1	obs
Mammal					
<i>Macropus agilis</i>	Agile Wallaby	LC		3	obs
<i>Felis catus</i>	Cat			1	obs
<i>Trichosurus vulpecula</i>	Common Brushtail Possum	LC		4	obs
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	LC		1	obs
<i>Isoodon macrourus</i>	Northern Brown Bandicoot	LC		1	obs
<i>Sus scrofa</i>	Pig			2	obs
<i>Oryctolagus cuniculus</i>	Rabbit			1	obs
<i>Aepyprymnus rufescens</i>	Rufous Bettong	LC		2	obs
Reptile					
<i>Hemidactylus frenatus</i>	Asian House Gecko	LC		1	obs
<i>Dendrelaphis punctulatus</i>	Common Tree Snake	LC		1	obs
<i>Varanus varius</i>	Lace Monitor	LC		1	obs
Amphibian					
<i>Litoria caerulea</i>	Green Tree Frog	LC		1	obs

Notes:

NC Act: LC (Least Concern), SLC (Special Least Concern), NT (Near Threatened), V (Vulnerable), E (Endangered), CR (Critically Endangered)

EPBC Act: V (Vulnerable), E (Endangered), CE (Critically Endangered)

## Invasive weeds recorded in the Project area

Family	Scientific name	Common name	Cover/density
Apocynaceae	<i>Cryptostegia grandiflora</i>	Rubber vine	CW
Apocynaceae	<i>Nerium oleander</i>	Oleander	OL
Asteraceae	<i>Xanthium occidentale</i>		AL
Cactaceae	<i>Opuntia stricta</i>		OW
Caesalpiniaceae	<i>Parkinsonia aculeata</i>	Parkinsonia	CL
Convolvulaceae	<i>Argyrea nervosa</i>		OL
Euphorbiaceae	<i>Jatropha gossypifolia</i>	Bellyache bush	AL
Euphorbiaceae	<i>Ricinus communis</i>	Castor oil bush	CL
Fabaceae	<i>Abrus precatorius</i>	Crabs-eye vine	OL
Fabaceae	<i>Clitoria ternatea</i>		OL
Fabaceae	<i>Macroptilium lathyroides</i>		CL
Fabaceae	<i>Stylosanthes hamata</i>		OW
Fabaceae	<i>Stylosanthes scabra</i>		CW
Lamiaceae	<i>Basilicum polystachyon</i>		CW
Lamiaceae	<i>Mesosphaerum suaveolens</i>		AL
Malvaceae	<i>Urena lobata</i>	Urena weed	OL
Mimosaceae	<i>Vachellia farnesiana</i>		OL
Passifloraceae	<i>Passiflora foetida</i>		OW
Poaceae	<i>Bothriochloa pertusa</i>		OW
Poaceae	<i>Cenchrus ciliaris</i>		CL
Poaceae	<i>Chloris gayana</i>	Rhodes grass	CL
Poaceae	<i>Chloris inflata</i>	Purpletop chloris	OW
Poaceae	<i>Cynodon dactylon</i>		OW
Poaceae	<i>Dichanthium annulatum</i>	Sheda grass	OW
Poaceae	<i>Dichanthium aristatum</i>	Angleton grass	CW
Poaceae	<i>Hymenachne amplexicaulis</i>	Hymenachne	CL
Poaceae	<i>Megathyrsus maximus</i>		AL
Poaceae	<i>Melinis repens</i>	Red natal grass	OW
Poaceae	<i>Sporobolus jacquemontii</i>		OL
Poaceae	<i>Themeda quadrivalvis</i>	Grader grass	AL
Poaceae	<i>Urochloa mutica</i>		AL
Portulacaceae	<i>Portulaca pilosa</i>		OL
Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	AW
Sparrmanniaceae	<i>Grewia asiatica</i>		CL
Verbenaceae	<i>Lantana camara</i>	Lantana	OL
Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica snakeweed	OL

### Notes:

Cover and density classes: OL – Occasional and localised, OW – Occasional and widespread, CL – Common and localised, CW – Common and widespread, AL – Abundant and localised and AW – Abundant and widespread

# **Appendix C**

**Likelihood of occurrence**

Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
Birds					
Curlew sandpiper <i>Calidris ferruginea</i>	CE, Mig	CE	PMST	The sandpiper mainly occurs along the coastlines of Australia. They are in smaller numbers across inland water of Queensland. Known to inhabit sheltered intertidal mudflats, and ephemeral and permanent lakes and dams (Higgins and Davies 1996).	<b>May occur</b> This species has not been historically recorded from the desktop search extent. Limited suitable habitat was observed within the Project area.
Red goshawk <i>Erythrororchis radiatus</i>	V	E	PMST	The red goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia and nests in tall trees within 1 km of permanent water (DAWE 2021).	<b>May occur</b> Suitable habitat is present within the Project area, but no known records are present within the desktop search extent. The closest record is approximately 83 km north-west of the Project area (ALA 2021).
Grey falcon <i>Falco hypoleucos</i>	V	V	PMST	The grey falcon occurs in arid and semi-arid Australia, where rainfall is less than 500 mm annually. The species has been observed hunting in treeless areas, tussock grasslands and open woodland. The species appears to be absent from areas east of the Great Dividing Range in Queensland (TSSC 2020).	<b>May occur</b> Limited suitable habitat is present within the Project area. No known records are present within the desktop search extent. The closest record is approximately 81 km north-west of the Project area (ALA 2021).
White-throated needletail <i>Hirundapus caudacutus</i>	V, Mig	V	PMST, WO	Almost exclusively aerial, it does prefer wooded, inland areas and heathland. In coastal areas they have been seen flying over mudflats and beaches. Widespread throughout eastern and south-eastern Australia. It has been recorded along all coastal regions of QLD and NSW (DAWE 2021).	<b>Likely to occur</b> The species has been historically recorded in the desktop search extent, approximately 4 km east of the Project area (ALA 2021). The species has potential to forage aerially across the Project area.
Star finch <i>Neochmia ruficauda ruficauda</i>	E	E	PMST	The star finch occurs in central Queensland including the Burdekin natural resource management region. The species occurs in damp grasslands, sedgeland or grassy woodlands near permanent water (DAWE 2021).	<b>May occur</b> The species has not been historically recorded in the desktop search extent. The closest records are approximately 81 km north-west and east. Limited suitable habitat was present in the north of the Project area.
Eastern curlew <i>Numenius madagascariensis</i>	CE, Mig	E	PMST	The eastern curlew primarily occur coastally and are rarely recorded inland. During the non-breeding season in Australia, the species is commonly	<b>Unlikely to occur</b>

Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
				associated with sheltered coasts, mudflats and sandflats (DoE 2015a).	The species has not been historically recorded in the desktop search extent. The closest record is approximately 33 km west of the Project area. No suitable habitat was observed across the Project.
Black-throated finch (southern) <i>Poephila cincta cincta</i>	E	E	PMST, WO	The black-throated finch is distributed across central Queensland with known populations near Townsville-Charters Towers. The species inhabits grassy woodland dominated by eucalypts, paperbarks or acacias, where there is access to seeding grasses and water (Black-throated Finch Recovery Team 2007).	<b>Confirmed present</b>
Australian painted snipe <i>Rostratula australis</i>	E	E	PMST	The species generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps, claypans and waterlogged grasslands (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. Limited suitable habitat was observed in the Project area.
Buff-breasted button-quail <i>Turnix olivii</i>	E	E	PMST	The buff-breasted button-quail occurs in north-eastern Queensland, with records ranging from the Iron Range to Ingham. The species occurs in patches of short and sparse grassland, on a terrain of small stones, often on lower slopes of hills and ridges, and in open glades amongst <i>Melaleuca</i> , <i>Acacia</i> , <i>Alphitonia</i> or <i>Tristania</i> in rainforest or open <i>Eucalyptus</i> woodland (DAWE 2021).	<b>Unlikely to occur</b> The species has not been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.
Masked owl <i>Tyto novaehollandiae kimberli</i>	V	V	PMST	The masked owl occurs from Cape York Peninsula south to Einasleigh-Burdekin divide. The species has been recorded from riparian forest, rainforest, open forest, Melaleuca swamps and the edges of mangroves, as well as along the margins of sugar cane fields (DAWE 2021).	<b>Unlikely to occur</b> The species has not been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.
Squatter pigeon (southern) <i>Geophaps scripta scripta</i>	V	V	WO	The species occurs in open-forests to sparse, open-woodlands and scrub that are dominated by <i>Eucalyptus</i> , <i>Corymbia</i> and <i>Acacia</i> or <i>Callitris</i> species, remnant and regrowth within 3 km of water (DAWE 2021).	<b>Confirmed present</b>

Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
Fork-tailed swift <i>Apus pacificus</i>	Mig	SL	PMST, WO	The species is almost exclusively aerial. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including 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 sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines (DAWE 2021).	<b>Likely to occur</b> The species has been historically recorded within the desktop search extent. The species has potential to forage aerially across the Project area.
Oriental cuckoo <i>Cuculus optatus</i>	Mig	SL	PMST	The species inhabits coastal regions across northern and eastern Australia, as well as offshore islands (DAWE 2020). Species utilises a range of vegetated habitats, including monsoon rainforests, wet sclerophyll forests, open woodlands and along the edges of forests (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent, however the species has been recorded approximately 4 km east of the Project area on Atlas of Living Australia. Suitable habitat was observed in the Project area.
Black-faced monarch <i>Monarcha melanopsis</i>	Mig	SL	PMST, WO	Species inhabits rainforest ecosystems that include semi-deciduous vine thickets, complex notophyll vine-forests, tropical rainforests, subtropical rainforests, mesophyll thicket/shrubland, warm and cool temperate rainforest, and dry rainforest (DAWE 2021).	<b>May occur</b> The species has been historically recorded within the desktop search extent. Marginally suitable habitat was observed in the Project area.
Spectacled monarch <i>Monarcha trivirgatus</i>	Mig	SL	PMST, WO	The species occurs in coastal north-eastern and eastern Australia, including coastal islands, from Cape York, Queensland to Port Stephens, New South Wales (BirdLife 2021a). Dense vegetation, mainly in rainforest but also in moist forest or wet sclerophyll and occasionally in other dense vegetation such as mangroves, drier forest and woodlands (DoE 2015b).	<b>May occur</b> The species has been historically recorded within the desktop search extent. Marginally suitable habitat was observed in the Project area.
Yellow wagtail <i>Motacilla flava</i>	Mig	SL	PMST	The species is found in highly variable habitats, but typically found in open grassy flats near water. Habitats include, open areas of low vegetation such	<b>May occur</b>



Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
				as grasslands, pastures, sport fields and damp open areas (DAWE 2021).	The species has not been historically recorded within the desktop search extent. Suitable habitat was observed in the Project area.
Satin flycatcher <i>Myiagra cyanoleuca</i>	Mig	SL	PMST, WO	The species occurs in heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, typically near wetlands and watercourses (DAWE 2021).	<b>May occur</b> The species has been historically recorded within the desktop search extent. Limited habitat was observed in the Project area.
Rufous fantail <i>Rhipidura rufifrons</i>	Mig	SL	PMST, WO	Species inhabits wet sclerophyll forests, often in gullies dominated by eucalypts and usually within a dense shrubby understorey that often includes ferns (DAWE 2021).	<b>May to occur</b> The species has been historically recorded within the desktop search extent. Limited habitat was observed in the Project area.
Common sandpiper <i>Actitis hypoleucos</i>	Mig	SL	PMST	In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including 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 sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines (DAWE 2021).	<b>Unlikely to occur</b> The species has not been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.
Sharp-tailed sandpiper <i>Calidris acuminata</i>	Mig	SL	PMST	Most of the population migrates to Australia, mostly to the south-east and are widespread in both inland and coastal locations and in both freshwater and saline habitats. Many inland records are of birds on passage (Cramp 1985; Higgins & Davies 1996). In Queensland, they are recorded in most regions, being widespread along much of the coast and are very sparsely scattered inland (DAWE 2021).	<b>Unlikely to occur</b> The species has not been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.
Pectoral sandpiper <i>Calidris melanotos</i>	Mig	SL	PMST	Prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes,	<b>Unlikely to occur</b> The species has not been historically recorded within the desktop search

Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
				river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. The species prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation (DAWE 2021).	extent. No suitable habitat was observed in the Project area.
Latham's snipe <i>Gallinago hardwickii</i>	Mig	SL	PMST, WO	The species inhabits permanent and ephemeral freshwater wetlands with low, dense vegetation (DAWE 2021). Species sometimes occurs in habitats that have saline or brackish water, such as saltmarshes, mangrove creeks, around bays and beaches (DAWE 2021).	<b>Unlikely to occur</b> The species has been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.
Osprey <i>Pandion haliaetus</i>	Mig	SL	PMST, WO	The species occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (DAWE 2021). They are mostly found in coastal areas but occasionally travel inland along major rivers (DAWE 2021). They require extensive areas of open fresh, brackish or saline water for foraging (DAWE 2021).	<b>Likely to occur</b> The species has been historically recorded within the desktop search extent. Suitable habitat was observed in the Project area
Common greenshank <i>Tringa nebularia</i>	Mig	SL	PMST	The species is widespread in the Gulf country and from Cooktown to Cape York Peninsula, and is scattered elsewhere in Queensland. The species occurs in inland wetlands and sheltered coastal habitats typically with mudflats, saltmarsh, mangroves. The species is also associated with river estuaries, swamps, lakes, dams billabongs, rivers, creeks and inundated floodplains (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. Limited suitable habitat was observed in the Project area.
Glossy ibis	Mig	SL	WO	The glossy ibis frequents much of the Australian mainland, but is most numerous in the north (Birdlife 2021b). The species occurs in freshwater marshes at the edge of lakes and rivers, lagoons and swamps. They occasionally occur coastally in estuaries, saltmarshes and lagoons (DAWE 2021).	<b>May occur</b> The species has been historically recorded within the desktop search extent. Marginal suitable habitat was observed in the Project area
Gull-billed tern	Mig	SL	WO	The gull-billed tern occurs on all continents except Antarctica. The species inhabits shallow wetlands, including coastal or inland lakes, swamps and	<b>May occur</b> The species has been historically recorded within the desktop search

Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
				lagoons, as well as sheltered bays and estuaries (Birdlife 2021c).	extent. Marginal suitable habitat was observed in the Project area
Caspian tern	Mig	SL	WO	In Queensland, the Caspian tern is widespread in coastal regions in the Gulf of Carpentaria and along the eastern coast. Historical records of the species is scattered across central Queensland. The species occurs in sheltered coastal embayments and those with sandy or muddy margins. They occur on near-coastal or inland terrestrial wetlands including rivers, lakes, and creeks (DAWE 2021).	<b>May occur</b> The species has been historically recorded within the desktop search extent. Marginal suitable habitat was observed in the Project area
<b>Mammals</b>					
Northern quoll <i>Dasyurus hallucatus</i>	E	LC	PMST, WO	The northern quoll occurs north to Weipa, south to Maleny and west to Carnarvon Range National Park. The species occurs across a range of habitats including rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands, beaches, grasslands and desert. Their habitat generally includes rocky areas for denning purposes (DAWE 2021) .	<b>Unlikely to occur</b> The species has been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.
Semon's leaf-nosed bat <i>Hipposideros semoni</i>	V	E	PMST	The Semon's leaf-nosed bat occurs in its northern distribution from Cape York to south of Cooktown, records of the species are also located on Mt Windsor Tableland and nearby Gladstone. The species is found in tropical rainforest, monsoon forest, wet sclerophyll forest and open savannah woodland. The species roosts in caves, mines, tree hollows and deserted buildings. It may share roosts on occasions with the Large-eared Horseshoe bat, ( <i>Rhinolophus philippinensis</i> ) (DAWE 2021).	<b>Unlikely to occur</b> The species has not been historically recorded in the desktop search extent, DAWE note that an apparent record from Townsville is incorrect, as the specimen was collected from Cape Direction near Iron Range (DAWE 2021).
Ghost bat <i>Macroderma gigas</i>	V	E	PMST	The ghost bat occurs discontinuously with geographically disjunct colonies. The species Queensland occurrence includes the Gulf of Carpentaria, from Cape York to Rockhampton, and western Queensland. The species roosts in deep natural caves or disused mines. The species occurs in habitats ranging from arid Australian locations to tropical savanna woodlands and rainforests (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. Suitable foraging habitat was observed in the Project area.

Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
Large-eared horseshoe bat <i>Rhinolophus robertsi</i>	V		PMST	The large-eared horseshoe bat occurs in north-eastern Queensland, from the tip of Cape York Peninsula to as far south as Townsville (Kutt 2005; Pavey & Kutt 2008 cited in TSSC 2016). The species is found in lowland rainforest, forest-lined creeks within open eucalypt forest, <i>Melaleuca</i> forest with rainforest understorey, open savannah woodland and tall riparian woodland (Churchill 2009; Pavey & Kutt 2008 cited in DAWE 2021a). Daytime roosting habitat includes caves, underground mines located in rainforest, and open eucalypt forest and woodland. Roosts have also been observed in road culverts, and it is suspected that the species uses basal hollows of large trees, dense vegetation, rockpiles and areas beneath creekbanks (DAWE 2021a).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. Potentially suitable roosting habitat was observed in the Project area. The nearest historical record is 80 km north of Townsville in the Paluma mine.
Koala <i>Phascolarctos cinereus</i>	V	V	PMST, WO	In the region, the koala occurs through the Brigalow Belt North bioregion and Einasleigh Uplands bioregion. Throughout the species' range, koalas inhabit moist forests and woodlands mostly dominated by <i>Eucalyptus</i> species, and are also found in vegetation communities dominated by <i>Melaleuca</i> or <i>Casuarina</i> species (DAWE 2021).	<b>Likely to occur</b> The species has been historically recorded in the Project area. Essential habitat for the koala is mapped ~2 km west of the Project alignment. Suitable habitat was observed during the field survey.
Bare-rumped sheath-tail bat <i>Saccolaimus saccolaimus nudicluniatus</i>	V	E	PMST	In Queensland, the species is known to occur from Ayr to the Iron Ranges (TSSC 2016). Most historical records have been near-coastal locations. In Queensland, the species is known to be associated with coastal lowland rainforests, as well as open forests dominated by <i>Eucalyptus</i> or <i>Corymbia</i> species intermingled with coastal lowland rainforest. The species has been recorded using deep hollows for roosting and breeding (TSSC 2016).	<b>Likely to occur</b> The species has not been historically recorded in the Project area. Suitable habitat was observed during the field survey.
Water mouse <i>Xeromys myoides</i>	V	V	PMST	The water mouse occurs across an extensive range in coastal and near-coastal south-east and south-central Queensland (TSSC 2021). The species occurs in aquatic environments including mangroves and the associated saltmarsh, sedgelands, clay pans, heathlands and freshwater wetlands (TSSC 2021).	<b>Unlikely to occur</b> The species has not been historically recorded in the Project area. No suitable habitat was observed during the field survey.

Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
Reptiles					
Ornamental snake <i>Denisonia maculata</i>	V	V	PMST	The ornamental snake is only known from the Brigalow Belt North and South bioregions. In the region, the species is known to occur in the Charters Towers area. The species preferred habitat is close to that favoured by its prey – frogs. This includes woodlands and open forests associated with gilgai mounds and depressions in RE landzone 4. The species is likely to be found in association with <i>Acacia harpophylla</i> , <i>Acacia cambagei</i> , <i>Acacia argyrodendron</i> or <i>Eucalyptus coolabah</i> (DAWE 2021).	<b>Unlikely to occur</b> The species has not been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.
Yakka skink <i>Egernia rugosa</i>	V	V	PMST	In the region, the yakka skink occurs in the Brigalow Belt North and Einasleigh Upland Bioregions. This species typically inhabits open dry sclerophyll forest, woodland and scrub. The species is typically found under partly buried rocks, logs, tree stumps, root cavities and abandoned burrows (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. Marginally suitable habitat was observed in the Project area.
Mount Cooper striped skink <i>Lerista vittata</i>	V	V	PMST	The Mount Cooper striped skink occurs in the Mount Cooper area with a second population potentially occurring on the Chudleigh Plateau. The species inhabits ironbark ( <i>E. crebra</i> , <i>E. melanophloia</i> ) and bloodwood ( <i>C. clarksoniana</i> , <i>C. intermedia</i> ) dominated woodland with shrub and/or grassy ground layers on deep red earth (RE11.5.9), undulating plains and steep hills (RE9.12.1a), Semi-evergreen vine thicket TEC (RE11.5.15) and spinifex communities (DAWE 2021). The species is typically found under leaf litter, loose soil under logs and inside rotten logs (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. Marginally suitable habitat was observed in the Project area.
Saltwater crocodile <i>Crocodylus porosus</i>	Mig	V	PMST	In Queensland, the saltwater crocodile occurs from Gladstone through to Cape York, including in the Burdekin River catchment. In Queensland, the species is usually restricted to coastal waterways and floodplain wetlands. Populations may also be found hundreds of kilometres upstream (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.

Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
Plants					
Miniature moss-orchid <i>Bulbophyllum globuliforme</i>	V	NT	PMST	The miniature moss-orchid is a host-specific species, and only grows on the Hoop Pine ( <i>Araucaria cunninghamii</i> ), where it colonises the upper branches of mature trees (Jones 2006 cited DAWE 2021a). The Hoop Pine occurs in upland (usually 100-900 m above sea level) (Jones 2006 cited DAWE 2021a) subtropical rainforest communities that have a discontinuous distribution along the Australian east coast (NSW OEH 2012a, cited DAWE 2021a).	<b>Unlikely to occur</b> The species has not been historically recorded within the desktop search extent. No hoop pines were recorded within the Project area or historically recorded within the desktop search extent.
Bluegrass <i>Dichanthium setosum</i>	V	LC	PMST	<i>Dichanthium setosum</i> has been reported from inland NSW and Queensland. Recorded on heavy basaltic black soils and red-brown loams with clay subsoil. <i>Dichanthium setosum</i> is often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. Suitable habitat was observed in the Project area.
Black ironbox <i>Eucalyptus raveretiana</i>	V	LC	PMST, WO	<i>Eucalyptus raveretiana</i> is found in the region between Ayr in the north to Rockhampton in the south, and inland to Nebo. The species is generally restricted to the riparian zone of watercourses (i.e. below the high bank), growing in loams and clay soils between altitudes of 0 – 300 m. It is usually co-dominant or sub-dominant with species such as <i>M. leucadendra</i> , <i>M.a fluviatilis</i> , <i>E. tereticornis</i> and <i>C. tessellaris</i> (DAWE, 2021).	<b>Confirmed present adjacent to Project area</b>
<i>Marsdenia brevifolia</i>	V	V	PMST	<i>Marsdenia brevifolia</i> occurs in north and central Queensland where it is known from near Townsville, Springsure and north of Rockhampton. At Hidden Valley near Paluma, plants grow in woodland on granite soils dominated by <i>E. granitica</i> , <i>C. leichhardtii</i> and <i>E. acmenoides</i> (DAWE 2021).	<b>Unlikely to occur</b> The species has not been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.
<i>Omphalea celata</i>	V	V	PMST	<i>Omphalea celata</i> is a small tree growing to 12 m. This species occurs within the Burdekin and Fitzroy (Queensland) Natural Resource Management Regions. The species is known from three sites in central east Queensland, including near Eungella, Bowen and Nebo. The species is known to occur in	<b>Unlikely to occur</b> The species has not been historically recorded within the desktop search extent. No suitable habitat was observed in the Project area.



Species name	EPBC Act status	NC Act status	Source	Habitat requirements	Likelihood of occurrence
				semi-evergreen vine thicket TEC and Araucaria microphyll vine forest (DEWHA 2008).	
<i>Tephrosia leveillei</i>	V	LC	PMST	<i>Tephrosia leveillei</i> is known to occur in six locations in Queensland, including near Ravenswood. The species has been recorded in <i>Eucalyptus</i> and <i>Corymbia</i> woodland and tall open forest (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. Suitable habitat was observed in the Project area.
<i>Solanum sporadotrichum</i>		NT	WO	<i>Solanum sporadotrichum</i> is an erect rhizomatous, perennial shrub growing 1.5 to 4 m high. The species is endemic to Queensland and occurs west of Townsville to Mount Wickham. The species grows in association with Semi-evergreen vine thicket TEC, notophyll rainforest, littoral rainforest, or in eucalypt open forest or woodland. Soils are moderately to very fertile (DES 2021).	<b>May occur</b> The species has been historically recorded within the desktop search extent. Marginally habitat was observed in the Project area.
Fish					
Freshwater sawfish <i>Pristis pristis</i>	V, Mig	-	PMST	The species is known from several drainages in Queensland, including the Gilbert River, Mitchell River, Norman River and Leichhardt River. Juveniles and sub-adult Freshwater Sawfish predominantly occur in rivers and estuaries, while large mature animals tend to occur more often in coastal and offshore waters up to 25 m depth. They are usually found in turbid channels of large rivers over soft mud bottoms (DAWE 2021).	<b>May occur</b> The species has not been historically recorded within the desktop search extent. Suitable habitat was only observed adjacent to the Project area.

Notes:

NC Act: LC (Least Concern), SLC (Special Least Concern), NT (Near Threatened), V (Vulnerable), E (Endangered), CR (Critically Endangered)

EPBC Act: V (Vulnerable), E (Endangered), CE (Critically Endangered)

WO (Wildlife Online), PMST (DAWE Protected Matters Search Tool)

# **Appendix D**

**Risk framework**

**Table D1** Risk matrix used to assess impacts and residual impacts

Likelihood	Consequence				
	Negligible	Low	Moderate	High	Severe
Certain	Negligible	Low	High	Severe	Severe
Almost certain	Negligible	Low	Moderate	High	Severe
Likely	Negligible	Low	Moderate	High	High
Possible	Negligible	Negligible	Low	Moderate	High
Unlikely	Negligible	Negligible	Negligible	Low	Low

**Table D2** Criteria used to define likelihood

Likelihood	Criteria used to define likelihood
Certain	It is very probable that the risk event could occur in any year (>95%)
Almost certain	It is more probable than not that the risk event could occur in any year (>50%)
Likely	It is equally probable that the risk event could or could not occur in any year (50%)
Possible	It is less probable than not that the risk event could occur in any year (<50%)
Unlikely	It is improbable that the risk event could occur in any year. (<5%) The risk event is only theoretically possible or would require exceptional circumstances to occur.

**Table D3** Criteria used to define the severity of the impact

Magnitude	Criteria used to define severity of impact
Severe	Permanent impacts AND/OR extreme intensity AND/OR regional extent (i.e. impact at a population level)
High	Long duration AND/OR high intensity AND/OR large extent (i.e. major impact to individuals with minor impacts at a population level)
Moderate	Moderate duration AND/OR moderate intensity AND/OR localised extent (i.e. moderate level impacts to individuals with no impact at a population level)
Low	Short duration AND/OR low intensity AND/OR very localized extent (i.e. low level impacts to individuals that have no impact at a population level)
Negligible	Very short duration AND/OR negligible intensity AND/OR (i.e. negligible impact to individuals)



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